Terms of Trade and Growth of Resource Economies: A Tale of Two Countries

By

Augustin Kwasi FOSU*
UN University-WIDER

Anthony GYAPONG
Penn State University-Abington

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*Corresponding author (e-mail: Fosu@wider.unu.edu).

Abstract

The present paper demonstrates the dichotomy of the growth response to changes in the barter terms of trade (TOT), employing as case studies two African countries: Botswana and Nigeria. Using distributed-lag analysis, the paper finds that the effect of TOT on output is positive and negative for the two countries, respectively. These results are interpreted as supportive of the 'resource curse' hypothesis for Nigeria but not for Botswana. It is further argued that the superior institutional quality (IQ) in Botswana, relative to Nigeria, is likely responsible for the dichotomy in the results. Moreover, Nigeria seems to be making progress on IQ, especially in the last decade. Avoiding the resource curse may require that the current progress in democratization continue.

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1. Introduction

The potential danger of natural resources to the economy of developing countries has been receiving increasing attention in the literature. The previously reigning hypothesis, especially in the 1950s and 60s, was that natural resource-richness implied economic prosperity. This was the 'Big Push' view that such wealth would raise aggregate demand and hence income (see, e.g., Murphy et al, 1989; Sachs and Warner, 1999). As many natural resource-rich countries in the developing world began to experience economic difficulties relative to resource-poor nations, however, the 'resource curse' hypothesis began to gain traction.[1] According to this hypothesis, greater natural resource wealth would lead to less economic growth.

Although Raol Prebisch and Hans Singer had raised the issue that countries relying on the exports of primary commodities would experience relatively weak growth,[2] the argument relied primarily on the hypothesized long-run deterioration in the terms of trade (TOT) associated with primary products, especially agricultural products. The new resource-curse literature, however, is based on the harmful effects of rents derivable from natural resources. According to this literature, TOT appreciation that raised natural resource rent could reduce economic growth; conversely, declining TOT that lowered the rent might actually increase growth, contrary to the Prebisch-Singer hypothesis.

Recent literature suggests, though, that whether natural resource abundance increases or decreases economic growth depends on the institutional architecture. Mehlum et al. (2006) and Robinson et al. (2006), for example, observe that resource-rich countries need not experience lower growth as long as they are endowed with 'good institutions'. Nonetheless, it is still unclear as to what 'good institutions' are and if these institutions may themselves be eroded by natural resources.

Africa is often characterized as the continent with the largest abundance of natural resources. While most countries on the continent could be recognized as having significant natural resources, the IMF currently classifies one-third of sub-Saharan African (SSA) countries as 'resource-rich'. Among these are Botswana and Nigeria, which are rich in non-oil and oil resources, respectively. As is generally well known, the development paths of these countries have been quite different. While Botswana has succeeded in increasing its per capita GDP by an average of about 7 percent annually since 1960, Nigeria's per capita GDP growth has averaged approximately 1 percent (Fosu, 2010, table 1). Indeed,

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[1] See, for example, Auty (2001), Baland and Francois (2000), Gelb et al. (1988), Gylfason et al (1999), Lane and Tornell (1996), Sachs and Warner (1997, 1999, 2001), and Torvik (2002). Van der Ploeg (2007) provides a useful a review.

[2] See Prebisch (1950) and Singer (1950).

as Chart 1 shows, the growth rate of Botswana's GDP has been well above Nigeria's not just on average but every year, with few exceptions, until about 2002.

Chart 1 about here

Yet, both countries have enjoyed substantial revenues from their natural-resource wealth: primarily diamonds for Botswana and oil for Nigeria. In Botswana, diamonds have traditionally constituted 70-80% of export earnings, and about one-half of the government's revenues. In the case of Nigeria, oil has historically provided over 90% of foreign exchange earnings and about 80% of budgetary revenues (US Government, *The World Factbook*, 2010), with the country estimated to have accumulated oil revenues of about US$350 billion at 1995 prices since 1965 (Sala-i-Martin and Subramanian, 2003). Thus, both countries may confidently be viewed as 'resource economies', though Nigeria seems more dependent on oil than Botswana does on diamonds.

In the present paper, we examine how the barter TOT, or simply TOT, may have affected economic growth in either country.   We use TOT, rather than income TOT or measures of actual revenues, as the relevant explanatory variable. TOT can reasonably be considered as exogenous for a given country, while other income-related measures are not.[3] Actually, TOT is probably one of the precious few bona-fide exogenous variables at the country level, provided of course that a given country does not have monopoly power in the export or import of the commodity. In section 2, we present a theoretical discussion on the channel through which TOT is expected to affect growth, with implications for the two countries of interest, Botswana and Nigeria. Section 3 presents the empirical model, which is estimated and discussed, respectively, in sections 4 and 5. The last section offers some lessons and concluding observations.

2. Theoretical Discussion

By relieving the balance-of-payments constraint and expanding the production set, improvements in a country's TOT should in turn increase GDP, implying a positive effect of TOT on GDP. The rise in the relative price of exports expands the feasible set for purchasing greater quantities of production inputs, and for investing in productivity-enhancing measures such as adopting more technologically efficient production processes. Several studies present evidence in support of this hypothesis of a 'positive growth impact' of TOT, including Basu and McLeod (1992) for twelve developing countries, mostly from Latin America. Deaton (1999) and Deaton and Miller (1996) further bolster this hypothesis for African countries generally. Based on a sample of 14 African countries, Bleaney and Greenaway (2001) provide additional support for the hypothesis.[4]

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[3] There is also the unresolved issue of whether the relevant non-price variable is the income derivable from the resource exploitation, or the wealth represented by the known reserves.

[4] Fosu (2001) presents a summary of studies on the TOT impact for African economies.

An alternate hypothesis is that of the 'resource curse', which implies that improvements in TOT from natural resources would adversely affect economic growth. One of the most potent explanations is that such improvements would create opportunities for rent seeking (Baland and Francois, 2000; Krueger, 1974). Such rent-seeking activities themselves tend to be non-productive and inefficient, resulting in lower growth. Furthermore, resource rents from TOT improvements would exert a corrosive effect on institutions (Isham et al, 2003; Sala-I-Martin and Subramania, 2003). Another channel is the 'Dutch Disease', resulting from real exchange-rate appreciation that hurts relatively growth-enhancing (manufacturing) exports (van Wijnbergen, 1984).[5]

Cross-country analysis constitutes the usual basis for evaluating the resource curse hypothesis (RCH). In addition to the usual omitted-variable and endogeneity problems plaguing such methods, the relevant studies often do not shed light on country-specific or long-term effects. The latter problem is usually addressed by estimating the growth equation over a relatively long period, such as 1970-1998 by Sala-I-Martin and Subramanian (2003) and 1965-1990 by Mehlum et al (2006). The former study also persuasively draws important inferences about Nigeria, a country of present interest. Nevertheless, still at issue is the inability of such studies to control for unobserved country-fixed effects, despite the use of reasonably credible instruments. Germane to this issue also is the possibility that the response of growth to natural resources may have country-specific periods of adjustment.

The vector auto-regressive (VAR) models, employed by Deaton and Miller (1995), which include lagged values of commodity prices as well as autoregressive terms, represent a considerable improvement over the cross-country studies. Nonetheless, these VAR models do not lend themselves to generating long-term effects either, as degrees-of-freedom problems militate against longer lags, nor do they account for possible differences in periods of adjustment or in model specification across countries.[6]

Most recently, Collier and Goderis (2007) have advanced the empirical debate by employing a panel estimation of GDP growth and generating long-term effects of commodity prices involving the coefficient of the lagged dependent variable. While this approach represents an important improvement on the existing literature, it still does not resolve the issue of the country-specific relationship between prices and growth; after all, the same period length is used for the panel and the long-term parameter is assumed to be constant across countries.[7]

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[5] For an example of a study showing that countries with a greater composition of manufacturing in exports tend to experience higher growth, see Fosu (1990).

[6] Deaton and Miller (1995) use 1961-87 yearly data to estimate seemingly unrelated regression (SUR) models involving commodity prices as well as the four endogenous variables: GDP, investment, consumption, and government expenditure, involving a pooled set of African countries. Each variable was lagged three years.

[7] See for instance equation (1) of Collier and Goderis (2008), where the long-run parameter λ is specified as a constant coefficient of the lagged dependent variable.

We employ in the current paper the distributed-lag model to test RCH. Although such modeling may still suffer from deficiencies, including the possibility of inadequate degrees-of-freedom, it makes it feasible for us to estimate country-specific relationships by allowing both the lag length and model specification to differ across countries. We apply this model to the two countries, Botswana and Nigeria, which we hypothesize to exhibit different growth-TOT relationships with respect to the predictions of RCH. A critical assumption here is that a higher TOT results in larger revenues. We present below several of the channels via which the implied TOT effect may materialize.[8]

Institutions and Governance

One potential adverse effect of generating public revenues from natural resources is the tendency for the revenues to promote rent seeking and to undermine government accountability (Baland and Francois, 2000; Tornell and Lane, 1999). Indeed, the revenues provide the grease for the maintenance of dictatorships (Acemoglu et al, 2004). If so, then unless mediated by 'good institutions', we should expect measures of political contestation, executive constraint, political rights and civil liberties to be relatively low. Indeed, this might represent a channel by which institutional quality is eroded, though the present study is not intended to delineate between the two hypotheses of whether it is the initial bad institutions or corroded institutions that might cause the negative growth effect of natural resources. In Table 1, we present comparative values for the above institutional/governance measures for Botswana and Nigeria.

****Table 1 about here****

As the statistics in Table 1 clearly indicate, and consistent with several studies (e.g., Acemoglu et al, 2002; Robinson, 2009; Robinson and Parsons, 2006), Botswana displays 'good institutions' that give rise to the above relatively high governance measures. It is also noteworthy that the initial quality of the institutions does not appear to have been eroded over time. Thus, by this 'institutions' channel, it is anticipated that the effect of TOT on GDP would be positive in Botswana; greater rents from higher TOT would be allocated in favor of growth due to such institutions (e.g., Knack and Keefer, 1995; Acemoglu et al., 2001).

Historically, Nigeria stands in stark contrast with Botswana on all the governance measures presented in Table 1.[9] Compared with the SSA average, furthermore, Nigeria does rather poorly, that is, until most recently.[10] This evidence of poor governance suggests that the effect of TOT on GDP would be

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[8] The channels discussed here are not exhaustive. For example, Sala-i-Martin and Subramanian (2003) argue persuasively that the 'Dutch Disease' was not a problem in Nigeria. We have no evidence on Botswana and do not discuss this possible channel between the two countries.

[9] Nigeria's governance measures have improved considerably most recently in the early 21st century, though, with those of legislative index of competitiveness (LIEC) and executive index of electoral competitiveness (EIEC) standing at the maximum possible level of 7.0 during 2000-04 (Table 1).

[10] While Nigeria does relatively well, compared to SSA as a whole, on these governance measures initially, there appears to be considerable deterioration generally during the intervening years, that is, until most recently in the 21st century.

negative (or at least non-positive). For example, TOT improvements should generate oil resource windfalls, which in turn engender rent seeking, in the form of bribery and corruption (Ades and Di Tella, 1999), with negative growth consequences (Mauro, 1999). Greater revenues from higher TOT may also result in less political contestation (Acemoglu et al, 2004), which could diminish growth.[11]

Civil Conflicts

Similarly, by financing rebel groups or by raising the expected value of war, natural resources would raise the risk of civil conflicts (Collier and Hoeffler, 2004; Skaperdas, 2002), with adverse growth implications (Collier, 1999; Gyimah-Brempong and Corley, 2005). During civil war, the annual per capita growth rate is estimated to fall by 2.2 percent (Collier, 1999). Given, furthermore, that per capita growth has been rather paltry, averaging no more than 1 percent for either SSA generally or for Nigeria in particular, civil wars could indeed be quite destructive.

In contrast to Botswana, where there has been no evidence of major conflicts since independence in 1966, Nigeria has experienced a number of civil conflicts in the form of ethnic/religious clashes during its 50-year post independence. In particular, there have been two civil wars between 1960 and 1999 (Collier and Hoeffler, 2004; table 1): January 1966 to January 1970, and December 1980 to January 1984. While the former is the well-known Biafran civil war, the latter constitutes severe ethnic clashes that resulted in at least 1,000 deaths annually (ibid.).

Elite Political Instability

Natural resources may also result in elite political instability (EPI) in the form of military coups d'etat, as various elite groups compete for power in order to extract rent from natural resources (Kimenyi and Mbaku, 2003). Moreover, EPI has been deleterious to growth in SSA (e.g., Fosu, 1992, 2001a, 2002; Gyimah-Brempong and Traynor, 1999). Being high-EPI could reduce GDP growth by as much as 1.2 percentage points, about one-third of the average growth during the 1960-1986 sample period (Fosu, 1992).

Botswana and Nigeria differ substantially in terms of their post-independence EPI records. While Botswana had no record of EPI – no 'successful', failed coups or plots – during 1956-2001, Nigeria experienced 6 'successful' coups, 2 failed coups and 6 coup plots during the same period, ranking the country as 7th out of the 46 SSA countries in terms of high EPI (McGowan, 2003; appendix C).

Human Capital

Another argument supportive of a negative relationship between natural resource TOT and economic growth pertains to the view that the higher rent from increasing TOT would discourage investment in

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[11] Fosu (2008c), for instance, finds from a decadal panel of a large sample of SSA countries that at the 'intermediate-level' democracy, as measured by the index of electoral competitiveness, democratization tends to be growth-inhibiting, but growth-enhancing in 'advanced-level' democracies. The threshold is estimated at 4.4, which is much higher than the values historically exhibited by Nigeria (table 4), in contrast to that for Botswana, which scores well above the threshold.

innovation, particularly in education (Gylfason, 2001). The data for Nigeria, relative to Botswana, seem rather consistent with this view. We present in Table 2 comparative statistics on educational expenditures for Botswana, versus Nigeria. Also reported are data on health spending, as the above hypothesis may be extended to human capital more generally.

****Table 2 about here****

We find that public expenditures on education and health are quite high for Botswana and very low for Nigeria. On a per-capita basis, Nigeria's public spending represents only about 5 percent of Botswana's for either sector. Furthermore, as a measure of budget allocation priorities, the expenditure shares are also respectively higher, by more than twice, in Botswana than in Nigeria. Thus, assuming that human capital expenditures positively affect growth (Baldacci et al, 2004), we should expect a negative effect of TOT on GDP.

Openness

Another view about natural resource economies is that they are more likely to adopt trade restrictions (Auty, 2001). This view is underpinned by the belief that the larger resources would render governments less interested in other tradable products. Hence, governments would shift economic activity in the non-resource sector toward domestic production that is shielded from foreign competition. We should therefore expect such economies to be less open than their counterparts are. To the extent that openness exerts a positive impact on growth (Sachs and Warner, 1997), it is anticipated that TOT would decrease growth under RCH.

The data show a wide divergence in the index of openness between Botswana and Nigeria. Based on the Sachs and Warner (1997) rather comprehensive measure of openness,[12] Mehlum et al (2006, table 4) report the respective levels of 0.42 and 0.00 for these countries, where 0.00 and 1.00 indicate the least and highest levels of openness, respectively.

3. Empirical Model

The above channels then suggest that Nigeria is likely to conform to RCH, while Botswana is not. That is, we expect a positive impact of TOT on GDP for Botswana, and a negative, or at least a non-positive, effect for Nigeria. To test the RCH, we estimate for each country the following distributed-lag model:

(1) $y_t = \alpha + \sum_{j=0}^{J} \beta_j X_{(t-j)} + u_t$ $t = 1, 2, \ldots, T$

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[12] The Sachs and Warner openness measure is the proportion of years that a country is open during the 1965-90 sample period. A country is considered 'open' if it satisfies all the following five conditions: (1) average tariff rates below 40%; (2) average quota and licensing coverage of imports of less than 60%; (3) a black market exchange rate premium of less than 20%; (4) no extreme controls (taxes, quotas or state monopolies); and (5) not considered a socialist country. (Sachs and Warner, 1997)

where y is GDP growth, X the growth of TOT, u the error term, and t is the year index; α and β_j are coefficients to be estimated. X_t is non-stochastic, and u_t is distributed as $(0, \sigma^2)$, for all t. Assuming a polynomial lag structure, β_j can be written as:

$$(2) \quad \beta_j = \sum_{k=0}^{P} \delta_k(j)^k \qquad j = 0, 1, 2, \ldots, \lambda_j$$

Neither the lag length λ_j nor degree of the polynomial P is known ex-ante and must be selected, with the weights δ_k also to be determined. There are several methods for such selection.[13] We opt here for more heuristic but relatively strict criteria as follows: for each country, equations (1) and (2) were estimated for a large number of lag lengths (maximum of 15 years) and orders of polynomial (maximum of 4). The admissible set comprises those regressions with p values of at most 0.01 for the F statistic and no evidence of autocorrelation.[14] Where necessary, the Akaike information and Schwartz criteria were applied to selecting the optimal lag length among the admissible set.

If RCH does not hold, then we should expect the sum of the lags to be positive, that is, $\sum_j \beta_j > 0$; TOT increases should expand the production set and hence output. A non-strict condition for upholding RCH then is that the sum of the lags is non-positive.

4. Data and Estimation

GDP and TOT data were obtained from World Bank (2005) and World Bank (2004), respectively. The sample periods for the two countries differ somewhat between the two countries (see Table 3) due to data availability. Both periods end in 2002, however, mainly because the data sources differ thereafter, but also because there appears to be some structural change that year between the two countries with respect to growth (see Chart 1). The mean values, reported in Table 3, show that GTOT is much higher for Nigeria than for Botswana (9 times larger), while GDP growth averaged more than three times lower in Nigeria. Thus, casual empiricism suggests that the higher growth of TOT, GTOT, in Nigeria, relative to Botswana, was not transformed to larger GDP growth. The question of interest, though, is if on an absolute basis, the cumulative effect of GTOT was positive or negative for either country. The latter sign would favor RCH.

Table 3 about here

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[13] See for instance Trivedi and Pagan (1979) and Hendry et al. (1984). One of the popular selection methods is the Pagano and Hartley (1981) procedure involving choosing first the optimal lag length and then the optimal degree of the polynomial. For details of the implementation of this procedure, see for example Azzam and Yanagida (1987). However, this method is susceptible to the existence of autocorrelation (ibid.). I opt for a more heuristic approach by estimating a large number of regressions involving different lag lengths and orders of polynomial and selecting a set that simultaneously meets the F statistic and autocorrelation test criteria, as stated in the text.

[14] These criteria, especially that involving the F statistic, are rather stringent, thus omitting other potentially good candidates with respect to the goodness of fit (GOF). For example, a specification for Nigeria involving a second-degree polynomial with an F value of 0.027 was rejected even though the sum of the lags was much more statistically significant than that reported here. However, this small risk of type 1 error is meant to ensure that any selected model is highly reliable in terms of GOF.

The results of the distributed-lag analysis are reported in Tables 4 and 5 for Botswana and Nigeria, respectively. As apparent from Table 4, the cumulative effect of GTOT is positive for Botswana and is rather large. The long-term effect of an increase in GTOT, estimated with a third-degree polynomial and a 10-year lag, is 2.3, which is highly significant with a t ratio of 5.0. This estimate constitutes 23 percent of the mean GDP growth rate reported in Table 3.

Table 4 about here

Table 5 about here

In contrast, the cumulative effect of GTOT, which is estimated with a fourth-degree polynomial and a 15-year lag, is negative for Nigeria, though with a relatively low 0.10 statistical significance level (Table 5). This outcome is supportive of RCH and suggests that increases in GTOT would reduce GDP growth. The cumulative effect is 0.35 percent for a 1 percent rise in GTOT,[15] representing roughly 10 percent of the mean growth rate over the sample period.

5. Discussion of Results

The above results suggest that while TOT appreciation increased long-run growth in Botswana, the reverse was the case in Nigeria. We interpret these results as indicative of the existence of a 'resource curse' in Nigeria but not in Botswana. As customary, one must exercise caution in reaching such a conclusion. It is, of course, conceivable that factors unrelated to the 'curse', but omitted from the model, might bias our estimates of the TOT effect.[16] For example, there is existing evidence that the volatility of TOT has an adverse effect on growth (Blattman et al, 2007; Mendoza, 1997). Using a sample of 14 SSA countries, including Botswana but not Nigeria,[17] Bleaney and Greenaway (2001) also find that the volatility in TOT negatively affected growth between 1980 and 1995, though GTOT itself had a positive effect on growth. Hence, the negative cumulative impact of GTOT obtained above for Nigeria may simply be the result of the volatility of TOT, that is, if TOT instability is positively correlated with GTOT. Indeed, using data for 1981-2002,[18] the standard deviation for TOT is computed at 26.7 and 7.3 for Nigeria and Botswana, respectively.[19]

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[15] As indicated above, another set of results (a second-degree polynomial with a 15-year lag), which did not pass the selection criteria because of its relatively high p value of 0.027 for the overall goodness-of-fit F test, yielded a cumulative GTOT coefficient of 0.38 with a more statistically significant t value of -2.42.

[16] The issue is if other variables correlated with but not caused by TOT are omitted from the equation, in which case the estimated TOT impact would be biased.

[17] These 14 countries are: Botswana, Burkina Faso, Cameron, Cote d'Ivoire, Gambia, Ghana, Kenya, Malawi, Mauritius, Niger, Senegal, Tanzania, Togo and Zimbabwe.

[18] Note that the adjusted sample periods are 1986-2002 and 1981-2002 for Botswana and Nigeria, respectively.

[19] These estimates are based on data from World Bank (2009).

There are two reasons why the above omitted-variable scenario involving TOT instability need not invalidate the above conclusion in support of RCH for Nigeria. First, the issue of the negative effect of TOT volatility on growth for *SSA* countries is far from settled. Reviewing the evidence, Fosu (2001, p. 300) concludes: "That is, for African economies, instabilities in exports, in their price or in terms of trade, do not seem to explain the low growth experienced in many of these countries." Instead, Fosu (p. 304) concludes that, "terms of trade deterioration has a substantial negative impact on growth in Sub-Saharan Africa, both directly and indirectly via investment." Thus, for SSA generally, the reviewed evidence seemed to imply that it is the trend in TOT, and not so much its *variability around trend*, that apparently matters for growth.

Second, and perhaps more importantly, even if TOT volatility exerted an adverse impact on growth, it may be viewed as part-and-parcel of the resource curse syndrome. Specifically, high TOT volatility might result in sub-optimal inter-temporal allocation of revenues, characteristic of resource economies, which could be deleterious to growth.[20] In that case, however, reducing the volatility through de-linking public revenues from such volatility would be the appropriate strategy for addressing the resource curse. Finally, the finding here for Nigeria is consistent with that by Sala-i-Martin and Subramanian (2003), which is based on the share of natural resources in GDP or exports rather than TOT.

6. Some Lessons and Concluding Observations

As already alluded to above, a resource curse need not occur under the right set of institutions. Mehlum et al (2006), for instance, find that resource abundance actually increases growth when there are 'good institutions', even though the independent effect of resource abundance is negative. What then are 'good institutions'?

Institutional quality (IQ) is measured in the Mehlum et al. study by the (simple) average of the following indexes: rule of law, bureaucratic quality, corruption in government, risk of expropriation, and government repudiation of contracts. A larger value of this average index indicates a higher institutional quality. Furthermore, the threshold for 'good institutions' is computed as 0.93 over the (0.0 -1.0) interval (ibid. p. 13). Thus, with Botswana and Nigeria scoring 0.70 and 0.31 on IQ, respectively (ibid, table 4), neither is considered to have 'good institutions'.[21] Qualitatively speaking, though, Botswana should be less of a resource-curse risk than Nigeria.

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[20] For an elaboration of this 'policy syndrome' see, for instance: Collier and O'Connell (2008), Fosu (2008a), and Fosu and O'Connell (2006).

[21] Actually, only the developed countries qualify for this non-resource curse status. Thus, the Mehlum et al (2006) results do not seem to adequately help to delineate between resource curse and non-resource curse groups among developing countries like Botswana and Nigeria.

With the IQ score of 0.96, Norway is beyond the above estimated threshold and is thus considered, with a high degree of confidence, as one of the non-resource curse countries. Despite detractors,[22] the country is often cited as a case in favor of the alternative view that resource abundance is good for growth. That is, Norway has had 'good institutions' and 'clever policies' to prevent the resource curse (Cappelan and Mjoset, 2009). A high IQ is likely a necessary condition for guarding against the resource curse, but is it sufficient? Probably not, for in addition to its solid institutional base, Norway undertook steps to ensure that its revenues from petroleum exports were well managed, and that the petroleum sector was integrated with the rest of the economy. Norway accomplished this by ensuring forward and backward linkages with the petroleum sector, through in part the establishment of Statoil Company in 1972. "This state-owned company played a critical role as parts of the Norwegian manufacturing industry were transformed into an engineering supply industry with specialized knowledge in the production of deep-sea oil drilling equipment, platforms, pipelines and supply ships." (Cappelen and Mjoset, p.8) The authors further write (p. 17):

> "One of Statoil's main tasks was to organise learning and technology transfers. A separate government body or directorate was set up to implement part of government policy in the area. Some universities developed their education and research in areas relevant for the petroleum sector. Government policies were in place to ensure that linkages could develop between petroleum extraction and the supply industry. As the new manufacturing skills spread, Statoil would place orders with a variety of old and new Norwegian firms. Crisis-ridden shipyards were restructured into producers of oil-exploration equipment."

Hence, Norway took special policy steps to ensure that its oil sector was well integrated into the rest of the economy. In particular, it exploited natural linkages with the sector by adopting proactive and farsighted policies. "The government focused on technology transfers from foreign companies" and "Norwegian industry developed production technologies which later turned out to be quite competitive." (Cappelen and Mjoset, 2009, p. 17)

Another potential lesson is Norway's establishment of the Petroleum Fund in 1990, intended to delink the economy from the vagaries of oil prices, and to minimize oil's potential corrosive ability. In particular, the Norway Petroleum Fund, now called the Norway Pension Fund, was established in 1990 even though the country's oil production actually began in 1970. A key policy rule associated with the fund was that only the expected earnings from it (estimated to be 4 percent of the domestic value of the

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[22] For example, Gylfason (2001, p. 851) argues that, "Norway's oil exports have crowded out its non-oil exports *krone* by *krone*, leaving total exports stagnant relative to national income for a generation." This argument suggests the Dutch Disease in operation in Norway as well. The more recent evidence does not, however, really support this view. For example, though total exports as share of GDP remained stagnant from 1981 to the mid-1990s, by 2008 it had reached 55 percent, from 37 percent in 1981 (World Bank, 2010).

fund) would be transferred to the state budget every year, with any change in the transfer rules to be approved by parliament.

In 2003, Nigeria also established the Excess Crude Account (ECA), in order to save windfall revenues during periods of above-benchmark high oil prices. By 2007, the amount in the Account had reached US$17.3 billion from $5.1 billion in 2004 (Sovereign Wealth Fund Institute – Nigeria, website, 2/19/2008). "However, permissive governance structures have allowed extensive ad hoc withdrawals, reducing the ECA balance by almost 85%, or 16 billion dollars, in just 18 months." (*Africa News*, website, 30 July 2010) Unlike the case of the Norway Petroleum Fund, Nigeria's ECA does not have a well-defined legal framework for its operation, allowing powerful political interests to prevail on its disposition (ibid.). The recent withdrawals might be prudent in terms of meeting unanticipated exigencies associated with the 2008-09 economic crisis; however, the process also underscores Nigeria's weak governance.

The important lesson here is that it is not sufficient just to set up a fund, but that the necessary legal and policy framework should complement its establishment. Indeed, there is currently strong urging to convert the ECA to a Sovereign Wealth Fund (SWF), which would properly define the legal and policy rules for its operation, as in the case of the Norway Petroleum Fund, for example.

While Botswana's IQ is not considered good enough a la Mehlum et al. (2006), unlike the case of Norway, Botswana likely presents useful lessons as well. After all, its institutions were good enough to transform its TOT growth to considerable economic growth.[23] It would be too presumptuous, however, to assert that Nigeria should acquire a similar good-governance status as Botswana's. That would be easier said than done, for Botswana's governance status, just like Norway's, is steamed in its political history involving a relatively homogeneous, small population. This is in contrast to Nigeria, which is Africa's most populous country and is one of the highest ethnically diverse countries on the continent.[24] While recent literature suggests that ethnic diversity need not be deleterious to growth,[25] it is

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[23] Unfortunately, though, Botswana has not succeeded in achieving a structural change despite its remarkable growth.

[24] Nigeria's population is about 150 million, compared with Botswana's of only 2 million, while the ethnic fractionalization scores are 0.485 and 0.885, respectively, for the two countries (Montalvo and Reynal-Querol, 2005; Appendix B).

[25] Montalvo and Reynal-Querol (2005) argue that it is the ethnic polarization rather than ethnic fractionalization that matters for the risk of civil wars and, hence, for growth, ceteris paribus. They, furthermore, actually report a higher ethnic polarization score of 0.650 for Botswana, compared with Nigeria's of 0.404, despite the latter's higher level of ethnic

nonetheless true that ethnic and religious clashes, likely related to Nigeria's ethnic and religious configurations, have posed ongoing conflicts for the country. Poor governance may have, however, contributed to these conflicts, with Easterly (2001) and Collier (2000) for example arguing that good institutions can attenuate the risks of ethnic conflicts. If so, then it all boils down to the attainment of good institutions. But what are 'good institutions'? Unfortunately, and as alluded to above, there is yet no available quantitative threshold.

A radical solution to Nigeria's resource curse problem is provided by Sala-i-Martin and Subramanian (2003): Distribute all the oil revenues to the (adult) citizens of Nigeria. While this proposition has some merit, the political feasibility of its implementation may be dubious. Carrying out the proposal would be tantamount to requiring Nigerian politicians to vote themselves out of office. After all, like many other politicians in the developing world, their interest in office-holding is likely to be guided, at least in great part, by their expected gains, which may include public revenues, legally or illegally.

A less radical, and perhaps more implementable, proposal is suggested here: Ensure that there are sufficient checks and balances in the system to provide transparency and accountability. Of course, politicians would be unlikely to directly vote for this proposal either. A similar favourable outcome could, however, be achieved via an appropriate democratisation process that may take time to crystallize. For example, Fosu (2008c) observes that democratisation in an electorally competitive 'advanced-level' democracy in Africa tends to be growth-enhancing, perhaps as a result of the regime's ability to resolve the initial political disorder engendered by the initial democratisation process. Such advanced-level democracy would by and large entail significant executive restraint, consistent with the observation by Alence (2004), for instance, that it is the executive restraint in democratic institutions that improves 'developmental governance', which he defines as 'economic policy coherence (free-market policies), public-service effectiveness, and limited corruption'.

It is noteworthy that Nigeria's recent improvements on both the legislative and executive indexes of electoral competitiveness are also associated with an increase in the executive constraint, XCONST (Table 1). It is also significant that other forms of governance indices, while still below the world's

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fractionalization (ibid., Appendix B). Nonetheless, their results do not necessarily invalidate the Easterly and Levine (1997) finding that more ethnically fractionalized countries are more likely to adopt policies that hurt growth.

respective averages,[26] have improved (Table 6).[27] Hence, it seems as if the relatively recent multiparty democratization dispensation, which has witnessed a transfer of authority from one civilian government to another, may be bearing fruits in terms of governance improvements. The key challenge is the extent to which the momentum for the current democratization process can be maintained in Nigeria.

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[26] In contrast, for Botswana, the governance indexes are all above the respective world averages, typically residing between 0.5 and 1.0 standard deviation above the world mean of 0.0.

[27] All the governance measures fro Nigeria, except 'political stability/absence of violence', show increases since 1998 or 2003 (Table 6), with the increase (decrease) in 'voice and accountability' ('political stability/absence of violence') between 1998 and 2008 significant at the 0.10 level (Kaufman et al, 2009, table 5).

References

Acemoglu, D., Robinson, J.A. and T. Verdier (2004). "Kleptocracy and Divide-and-Rule: A Theory of Personal Rule," *Journal of European Economic Association*, Vol. 2, 162-92.

Acemoglu, D., Johnson, S. and Robinson, J. A. (2002). "An African success: Botswana," in D. Rodrik (ed.) *Analytic Development Narratives*, Princeton: Princeton University Press.

Acemoglu, D., Johnson, S. and J. A. Robinson (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review* 91, 1369-1401.

Ades, A. and Di Tella, R. (1999). "Rents, Competition, and Corruption," *American Economic Review*, vol. 89, pp. 982–93.

Auty R. M. (2001). *Resource Abundance and Economic Development*, Oxford: Oxford University Press.

Azzam, A. and J.F. Yanagida (1987). "A Cautionary Note on Polynomial Distributed Lag Formulations of Supply Response," *Western Journal of Agricultural Economics*, 12(1): 60-64.

Baland, J.-M., and Francois, P. (2000). "Rent-seeking and resource booms," *Journal of Development Economics*, vol. 61, pp. 527–42.

Baldacci, E., Clements, B., Gupta, S. and Q. Cui (2004). "Social Spending, Human Capital, and Growth in Developing Countries: Implications for Achieving the MDGs," *IMF Working Paper*, WP04/217.

Basu, P., and D. McLeod (1992). "Terms of Trade Fluctuations and Economic Growth in Developing Economies," *Journal of Development Economics*, 37, 89-110.

Blattman, C., Hwang, J, and J. G. Williamson (2007). "Winners and Losers in the Commodity Lottery: The Impact of Terms of Trade Growth and Volatility in the Periphery 1870-1939," *Journal of Development Economics*, 82, 156-179.

Bleaney, M. and D. Greenaway (2001). "The Impact of Terms of Trade and Real Exchange Rate on Investment and Growth in Sub-Saharan Africa," *Journal of Development Economics*, 65, 491-500.

Capellen, A. and L. Mjoset (2009), "Can Norway Be a Role Model for Natural Resource Abundant Countries," *WIDER Research Paper No. 2009/23*.

Collier, P. (2000). "Ethnicity, Politics and Economic Performance," *Economics and Politics*, 12(3): 229-272.

Collier, P. (1999). "On the Economic Consequences of Civil War," *Oxford Economic Papers*, Vol. 51, 168-183.

Collier, P., and B. Goderis (2007). "Commodity Prices, Growth, and the Natural Resource Curse: Reconciling a Conundrum," *CSAE Working Paper Series*, WPS/2007-15.

Collier, P. and A. Hoeffler (2004). "Greed and Grievance in Civil War," *Oxford Economic Papers*, 56, pp. 563-595.

Collier, P. and S. O'Connell (2008). "Opportunities and Choices," in Ndulu, B., S. O'Connell, R. Bates, P. Collier and C. Soludo, *The Political Economy of Economic Growth in Africa 1960-2000*, Cambridge: Cambridge University Press, 2008, 76-136.

Deaton, A. (1999), "Commodity Prices and Growth in Africa," *Journal of Economic Perspectives* 13, Summer, 23-40.

Deaton, A. and Miller, R.I. (1996), "International Commodity Prices, Macroeconomic Performance and Policies in Sub-Saharan Africa," *Journal of African Economies* 5, Supplement, 99-191.

Deaton, Angus S. and Ronald I. Miller (1995) "International Commodity Prices, Macroeconomic Performance, and Politics in Sub-Saharan Africa," *Princeton Studies in International Finance* 79.

Easterly, William (2001). "Can Institutions Resolve Ethnic Conflict?" *Economic Development and Cultural Change*, 49 (4): 687-706.

Easterly, William and Ross Levine (1997). "Africa's Growth Tragedy: Policies and Ethnic Divisions", *Quarterly Journal of Economics*. CXII (4): 1203-1250.

Fosu, A.K. (2010), "Africa's Economic Future: Learning from the Past," *CESifo Forum*, 11(1), 62-71.

Fosu, A.K. (2008a). "Anti-Growth Syndromes in Africa: A Synthesis of the Case Studies," in Ndulu, B. et al, eds., *The Political Economy of Economic Growth in Africa, 1960-2000*, Cambridge: Cambridge University Press, 2008, pp. 137-172.

Fosu, A.K. (2008b). "Implications of External Debt-Servicing Constraint for Public Health Expenditure in Sub-Saharan Africa," *Oxford Development Studies*, 36(4), 363-377.

Fosu, A.K. (2008c). "Democracy and Growth in Africa: Implications of Increasing Electoral Competitiveness," *Economics Letters*, 100, September 2008, 442-444.

Fosu, A.K. (2007). "Fiscal Allocation for Education in Sub-Saharan Africa: Implications of the External Debt Service Constraint," *World Development*, 35(4), pp. 702-713.

Fosu, A.K. (2002). "Political Instability and Economic Growth: Implications of Coup Events in Sub-Saharan Africa," *American Journal of Economics and Sociology*, 61(1): 329-348.

Fosu, A.K. (2001). "The Global Setting and African Economic Growth," *Journal of African Economies*, Vol. 10, No. 3, pp. 282-310.

Fosu, A.K. (2001a). "Political Instability and Economic Growth in Developing Economies: Some Specification Empirics," *Economics Letters*, Vol. 70, No. 2, pp. 289-294.

Fosu, A.K. (1992). "Political Instability and Economic Growth: Evidence from Sub-Saharan Africa," *Economic Development and Cultural Change,* 40(4), 829-841.

Fosu, A.K. (1990). "Export Composition and the Impact of Exports on Economic Growth of Developing Economies," *Economics Letters*, Vol. 34, No. 1, pp. 67-71.

Fosu, A. K. and S. A. O'Connell (2006). "Explaining African Economic Growth: The Role of Anti-growth Syndromes," *Annual Bank Conference on Development Economics*, F. Bourguignon and B. Pleskovic, eds., Washington, DC: World Bank, 2006, pp. 31-66.

Gelb, A. and Associates (1988). *Oil Windfalls: Blessing or Curse?* World Bank: Oxford University Press.

Gyimah-Brempong, K., and M. E. Corley (2005), "Civil Wars and Economic Growth in Sub-Saharan Africa," *Journal of African Economies*, 14(2), 270-311.

Gyimah-Brempong, K., and T. Traynor (1999). "Political Instability, Investment and Economic Growth in Sub-Saharan Africa," *Journal of African Economies* 8(1), 52-86.

Gylfason, T. (2001), "Natural Resources, Education, and Economic Development," *European Economic Review*, 45(4-6), pp. 847-859.

Gylfason, T., Herbertsson, T. T. and Zoega, G. (1999). "A Mixed Blessing: Natural Resources and Economic Growth," *Macroeconomic Dynamics*, vol. 3, pp. 204–25.

Hendry, D.F, Pagan, A.R., and J.D. Sargan (1984). "Dynamic Specification," in Z. Griliches and M.D. Intriligator (eds.), *Handbook of Econometrics*, Amsterdam: Elsevier Science Publishers.

Isham, J., L. Pritchett, M. Woolcock, and G. Busby (2003). "The Varieties of the Resource Experience: How Natural Resource Export Structures Affect the Political Economy of Economic Growth," mimeo, World Bank, Washington D.C.

Kaufmann, D., Kraay, A., and M. Mastruzzi (2009). "Governance Matters VIII: Aggregate and Individual Governance Indicators 1996–2008," *World Bank Policy Research Working Paper* 4978.

Kimenyi, M.S. and J.M. Mbaku (2003). "Rent-Seeking and Institutional Stability in Developing Countries," *Public Choice*, Vol. 77 (2), pp 385-405.

Knack, S. and Keefer, P. (1995). "Institutions and Economic Performance: Cross-country Tests using Alternative Institutional Measures," *Economics and Politics*, vol. 7, pp. 207–27.

Krueger, A.O. (1974), "The political Economy of the Rent-Seeking Society," *American Economic Review* 64, June, 291-323.

Lane, P. R. and Tornell, A. (1996). "Power, Growth and the Voracity Effect," *Journal of Economic Growth*, vol. 1, pp. 213–41.

Mauro, P. (1999). "Corruption and Growth," *Quarterly Journal of Economics*, 90, 681-712.

McGowan, P. (2003). "African Military Coups d'etat, 1956-2001: Frequency, Trends and Distribution," *Journal of Modern African Studies*, 41(3), pp. 339–370.

Montalvo, J.G., and M. Reynal-Querol (2005). "Ethnic Polarization, Potential Conflict, and Civil Wars," *American Economic Review*, 95(3), 796-816.

Murphy, K., Schleifer, A. and R. W. Vishny (1989). "Industrialization and the Big Push," *Journal of Political Economy*, pp. 1003-1026.

Pagano, M. and Hartley, M. (1981), "On Fitting Distributed Lag Models Subject to Polynomial Restrictions," *Journal of Econometrics*, 16, 171-98.

Prebisch, R. (1950). "The Economic Development of Latin America and its Principal Problems," United Nations, Department of Economic Affairs, Lake Success, NY. Reprinted in *Economic Bulletin for Latin America* 7 (1962): 1-22

Robinson, J.A. (2009). "Botswana as a Role Model for Country Success," *UNU-WIDER Research Paper* No. 2009/40.

Robinson, J. A., and Q. N. Parsons (2006). "State Formation and Governance in Botswana," *Journal of African Economies*, 15: 100-40.

Robinson, James A., Ragnar Torvik and Thierry Verdier (2206), "The Political Foundations of the Resource Curse," *Journal of Development Economics* 79, 447-468.

Sachs, Jeffrey D. and Andrew M. Warner (2001). "The Curse of Natural Resources," *European Economic Review* 45, 827-838.

Sachs, Jeffrey D. and Andrew M. Warner (1999). "The Big Push, Natural Resource Booms and Growth," *Journal of Development Economics* 59, 43-76.

Sachs, J. D. and Warner, A. M. (1997). "Sources of Slow Growth in African Economies," *Journal of African Economies*, vol. 6, pp. 335–76.

Sala-I-Martin, X., and A. Subramanian (2003). "Addressing the Natural Resource Curse: An Illustration from Nigeria," *IMF Working Paper*, WP/03.

Singer, H.W. (1950). "The distribution of gains between investing and borrowing countries," *American Economic Review* (40), 473-485

Skaperdas, S. (2002). "Warlord Competition," *Journal of Peace Research*, vol. 39, pp. 435–46.

Tornell, A., and P. Lane (1999). "Voracity and Growth," *American Economic Review*, 89, 22-46.

Torvik, R. (2002). "Natural Resources, Rent Seeking and Welfare," *Journal of Development Economics*, vol. 67, pp. 455–70.

Trivedi, P.K., and A.R. Pagan (1979). "Polynomial Distributed Lags: A United Treatment," *Economic Studies Quarterly*, April, pp. 37-49.

Van der Ploeg, Frederick (2007). "Challenges and Opportunities for Resource Rich Economies," *Journal of Economic Literature* (forthcoming).

Van Wijnbergen, S. (1984), "The 'Dutch Disease': A Disease After All," *Economic Journal*, 94(373): 41-55.

World Bank (1992). *African Development Indicators*, Washington, DC: The World Bank.

World Bank (1996). *African Development Indicators*, Washington, DC: The World Bank.

World Bank (1998/99). *African Development Indicators*, Washington, DC: The World Bank

World Bank (2004). *Africa Database CDROM*, Washington, DC: The World Bank.

World Bank (2004). *World Development Indicators*, Washington, DC: The World Bank.

World Bank (2009). *World Development Indicators Online*, Washington, DC: The World Bank.

World Bank (2010). *World Development Indicators Online*, Washington, DC: The World Bank.

Chart 1: Historical Comparison (GDP Growth) – Botswana vs. Nigeria

GDP Growth (annual %), 1961-2008
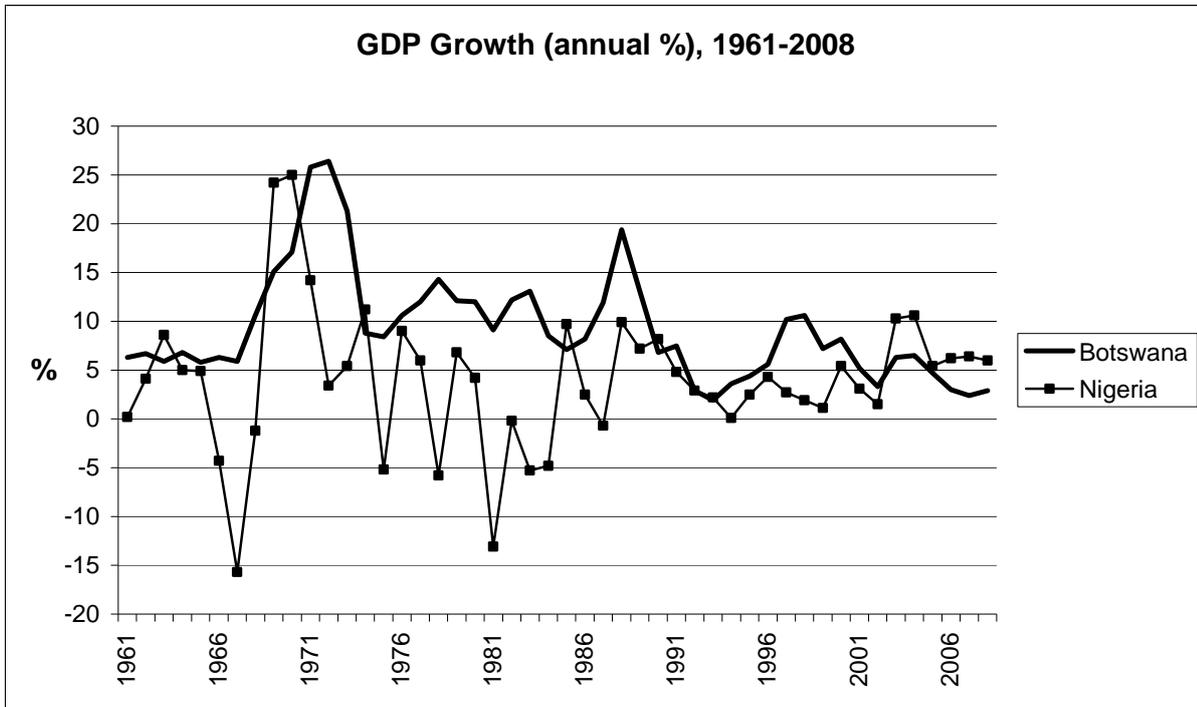
Source: Data from World Bank (2010)

Table 1: Governance Indicators, Botswana vs. Nigeria, 1975-2004

	Botswana			Nigeria			SSA		
	75-79	**95-99**	**00-04**	**75-79**	**95-99**	**00-04**	**75-79**	**95-99**	**00-04**
Political Rights	6.0	6.0	6.0	3.2	1.8	4.0	2.3	3.4	3.6
Civil Liberties	5.2	6.0	6.0	4.2	2.8	3.6	2.7	3.5	3.8
LIEC	6.0	7.0	7.0	1.0	1.0	7.0	2.8	5.5	5.9
EIEC	6.0	7.0	7.0	2.0	2.0	7.0	2.8	5.4	5.6
XCONST	5.0	6.6	7.0	2.8	2.2	5.0	2.6	3.3	3.7

Notes: LIEC = Legislative Index of Electoral Competitiveness

EIEC = Executive Index of Electoral Competitiveness

XCONST = Degree of Constraint on the Government Executive

Political Rights and Civil Liberties are calculated as unweighted averages by the author using data from *Freedom in the World*, Freedom House, various issues. Note that the numbers, which range from 1.0 to 7.0, are transposed here so that 1.0 indicates the lowest level of freedom and 7.0 the highest level. LIEC and EIEC, whose values range from 1.0 to 7.0 (highest level to lowest level of democracy), are unweighted averages using data from the *Database of Political Institutions (DPI)*, World Bank. XCONST ranges from 0.0 to 7.0 (0.0=perfect incoherence; 1.0=no one regulates the authority; 7.0=strict rules for governance) and are unweighted averages of data from the *Polity IV Project*.

Table 2: Public Spending on Education and Health, Botswana vs. Nigeria (1975-94)

	Botswana		Nigeria	
	Educ	**Hlth**	**Educ**	**Hlth**
Per Capita (1987 US$)	88.5	23.0	4.0	1.1
Expenditure Share (%)	18.7	5.2	7.6	1.9

Source: Computed by author using data from World Bank (1992, 1996, 1998/99). For details see Fosu (2008b) and Fosu (2007).

Table 3: Mean GDP Growth and GTOT (annual average, %) – Botswana vs. Nigeria

	Botswana	Nigeria
Mean GTOT	0.9	6.3
Mean GDP Growth	10.2	3.2

Notes: GTOT is the Net Barter Terms of Trade. Data are for 1966-2002, except GTOT for Botswana, which is for 1976-2002. GDP and TOT data are from World Bank WDI 2005 and World Bank Africa Database CDROM 2004, respectively.

Table 4: Distributed-Lag Analysis: GDP Growth vs. GTOT – Botswana

Sum of lag coefficients (t value) = 2.26 (5.00)

Number of lags = 10; Degree of polynomial = 3

Sample period = 1976-2002; Adjusted sample period = 1986-2002

R^2 = 0.867, Adj. R^2 = 0.834

F statistic [p value] = 28.4 [0.000]

DW = 2.09

Akaike Information Criterion = 4.16

Schwartz Criterion = 4.36

Table 5: Distributed-Lag Analysis: GDP Growth vs. GTOT – Nigeria

Sum of lag coefficients (t value) = -0.350 (-1.70)

Number of lags = 15; Degree of polynomial = 4

Sample period = 1966-2002; Adjusted sample period = 1981-2002

R^2 = 0.513, Adj. R^2 = 0.400

F statistic [p value] = 4.48 [0.012]

DW = 2.30

Akaike Information Criterion = 5.81

Schwartz Criterion = 6.06

Table 6: More Recent Institutional/Governance Development, Nigeria (1998 – 2008)

	1998	2003	2008	98-03	03-08	98-08
A. Voice and Accountability	-1.19	-0.70	-0.60	0.49	0.10	0.59
B. Political Stability and Absence of Violence	-0.98	-1.73	-2.01	-0.75	-0.28	-1.02
C. Government Effectiveness	-1.06	-0.94	-0.98	0.12	-0.04	0.08
D. Regulatory Quality	-0.93	-1.19	-0.62	-0.26	0.57	0.30
E. Rule of Law	-1.30	-1.51	-1.12	-0.21	0.39	0.18
F. Control of Corruption	-1.17	-1.34	-0.92	-0.17	0.42	0.25

Note: The value for each measure is standardized to lie between -2.5 and 2.5, with the world mean of 0.0.

Source: Kaufman et al (2009) and author's computations