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Explaining Africa's Export Performance – Taking a New Look

Oliver Morrissey and Andrew Mold

Abstract

Africa's export performance over recent decades is typically portrayed as being poor. This paper takes a new look at the record, using data on the volume rather than the value of African exports. When analysed in volume terms a quite different picture of African export performance emerges. According to UNCTAD data, between 1990-2002 the export volumes for non-oil exporters actually increased by over *130%*. This impressive supply-side performance has not been properly documented. Previous studies have fixed too much attention to the *value* of African exports, something which, as primary commodity exporters, is largely beyond their control. The study uses estimates of volume of exports, available from UNCTAD, to explain African trade performance. Using a dynamic panel data analysis for 48 African countries over the period 1987-2002, the key determinants of export performance are ascertained. The implications of the findings for policy makers are subsequently discussed.

1. Background

It is not difficult to find statements lamenting Africa's purportedly poor export performance. For example, the recent Commission for Africa study suggests that

> *"….The last three decades have seen stagnation in Africa. The composition of Africa's exports has essentially remained unchanged, and has contributed to a collapse in Africa's share of world trade…Africa will not be able to achieve the Millennium Development Goals, nor set itself on a sustainable path to growth and poverty reduction, without increased trade*." (Commission for Africa, 2005:256).

Is this kind of affirmation justified? This paper takes a new look at the record, using data on the volume rather than the value of African exports. One of the most important stylised facts of African exports is that exporters have been facing a sharp decline in the price of most of their commodities. World prices for many of the commodities that Africa exports declined between 1990 and 2000: cocoa, cotton, sugar and copper by over 25%, coffee by 9% and minerals overall declined by 14% (WTO, 2001: 212). As noted in Ng and Yeats (2002), product price instability may also be a major problem for exporters. One half of traditional products experience average price changes of 50% or more during the 1990s. Price changes are associated with the collapse of traditional product prices, and this reduces the value of export earnings.

However, when analysed in volume terms a different picture of African export performance emerges. To cite a few examples, between 1990-2002, Mozambique increased the volume of its exports more than nine fold, Lesotho, eight fold, Uganda and Sudan, five fold, etc.[1] On average, for non-oil exporters, export volumes increased by over *130%*. This impressive supply-side performance has not been properly documented. Previous studies have fixed too much attention to the *value* of African exports, something which, as primary commodity exporters, is largely beyond their control.

The aim of this paper is to analyse the performance of African exports in volume terms, using data available from UNCTAD. Specifically, we investigate the hypothesis that African

[1] Admittedly there may be certain doubts about the quality of some of this data. In cases like Uganda, for instance, there is evidence that the improvement in trade performance in recent years (at least up to 2003) has been driven by cross-border shipments of commodities plundered from DRC.

exporters respond to declining world prices by increasing the volume of exports to maintain a target revenue level. Two supplementary hypotheses follow from this. First, mineral exporters are better able to increase volumes (increase the rate of extraction) than are agricultural exporters. Second, price responsiveness may be asymmetric: volumes are increased far more in response to a price fall than they are to a price increase.

The structure of the paper is as follows. Section 2 presents some of the stylised facts on African exports. Section 3 provides some exploratory analysis of the data. Section 4 discusses the policy environment in which African trade performance has to be considered. Section 5 presents the main econometric results, and Section 6 concludes by drawing some policy implications.

2. Africa's Trade Performance in Perspective[2]

One of the most extensively cited stylised facts of African trade performance is that the continent's share in world merchandise trade, measured in value terms, has declined steadily since 1980, from around 6 percent to around 2% in 2002 (WTO, 2004). However, as Morrissey (2005: 1134) argues, this does not mean that trade is unimportant for Africa: compared to other developing country regions, sub-Saharan Africa (SSA) tends to have high export/GDP and import/GDP ratios. In simple terms, exports are very important to African countries even if African exports are not very important in the world market.

Economists are divided on the significance of Africa's declining share in world markets (Gibbons and Ponte, 2005: 38). Some present deeply pessimistic assessments – Sachs and Warner (1997), for example, portray Africa's trade performance as having been an unmitigated disaster. Others, however, present a more nuanced interpretation. Using a gravity model specification, Rodrik (1999) arrives at the conclusion that when other variables affecting trade are controlled for (such as location and per capita income), "*there is little evidence that trade policies have repressed trade volumes below cross-national benchmarks, unless they have done so indirectly through their depressing effect on incomes…..once the focus is shifted from trade to economic growth in general, we are forced to think more broadly about the whole range of growth determinants, and not just the impediments to exchanges at the border*." (ibid, page 113).

[2] This section borrows from Mold (2006).

The irony of the situation is that, faced by the pressures of Structural Adjustment and the need to increase the capture of foreign exchange during the 1980s and 90s, many African countries did manage to expand their export *volumes* very significantly. As can be appreciated from Table 1, estimates by UNCTAD of the volume of exports shows that in aggregate **African exports increased by more than 60 percent over the 12 year period from 1990-2002**.

Table 1: Volume Indexes of Exports, 1990-2002 (1990=100)

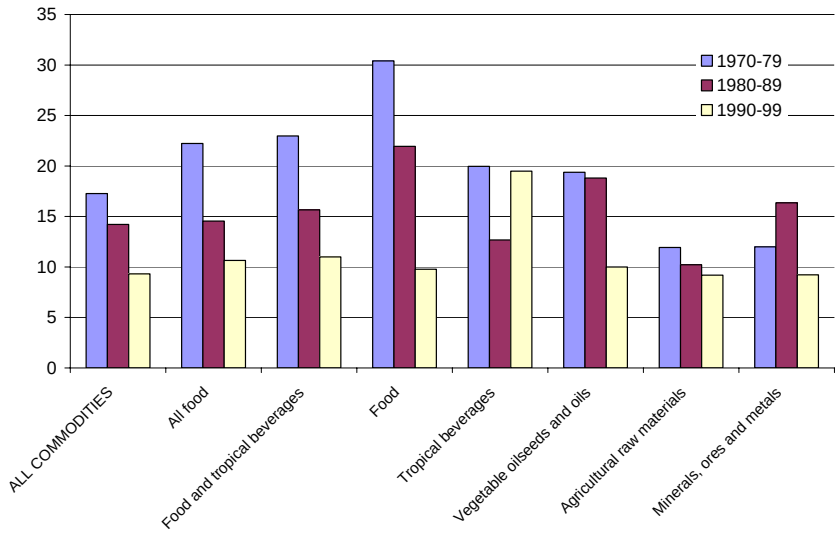
	1990	1994	1998	2002
World	100.0	126.5	177.6	208.2
Sub-Saharan Africa	***100.0***	***104.8***	***127.0***	***161.9***
Oceania	100.0	168.9	64.9	37.7
Land-locked countries	100.0	119.3	156.1	203.5
Least Developed Countries	100.0	132.4	186.5	216.2

Source: Calculated from UNCTAD Statistical Yearbook, 2004

It is true that this is below the world average, which more than doubled. However, the Africa-wide figure is distorted by oil production and weighed down by the poor performance of relatively large countries like Nigeria (whose exports have failed to grow in volume terms over the last twelve years). The simple, unweighted, average increase in trade volumes for the 46 African countries for which estimates exist is an impressive 123 percent increase over the 12-year period (Annex Table 1). These figures hint at the extent to which gains from a fairly respectable supply-side response have almost completely been wiped out by falling commodity prices.

As noted in the introduction, it is sometimes suggested that the key export problem for African countries is not the declining prices *per se* but rather volatility in price levels. It is certainly the case that some countries have been very negatively affected by price volatility – it can play havoc with government revenues and adversely impact on public expenditure in areas like health, infrastructure and education. It is also often suggested that with the trend towards the globalisation of markets and increasing liberalisation, volatility has increased (e.g. Rodrik, 1999). In terms of the key commodities for African producers, this argument is not born out by statistics (Figure 1) – on average price volatility declined significantly over the course of the 1970s, 1980s and 1990s for all commodities except for tropical beverages.

Figure 1: Commodity Price Volatility – 1970-1999
(annual average percentage variation)



Source: UNCTAD Yearbook 2004 on cd rom

This data does not imply, of course, that price volatility is not a problem, especially for small countries dependent on the export of one or two commodities. But it does suggest that the key problem is the underlying secular downward in commodity prices, not the fluctuations *per se*. Ever since the controversial and path-breaking studies of Singer (1950) and Prebisch (1950), there has been debate over the net barter terms of trade for commodity exporters vis-à-vis the exporters of manufactured goods has raged. Some authors have tried to dismiss the hypothesis, pointing out (correctly) that the trend depends on the period chosen, and on the relative importance of primary commodities in the total composition of developing country exports.[3] Nevertheless the basic hypothesis has been repeatedly tested and found valid, especially over the long-run (e.g. Spraos, 1983; Bloch and Sapsford, 2000, Ocampo and Parra, 2003).

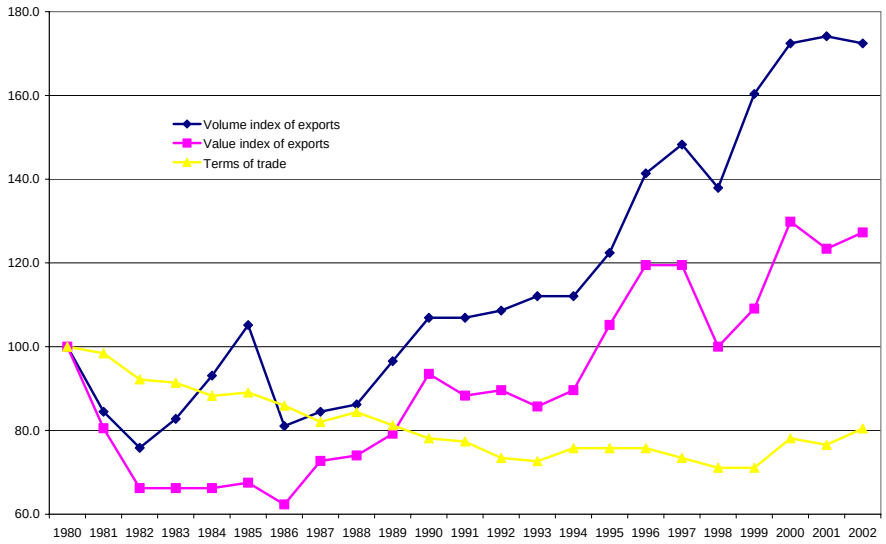
Theoretical analysis suggests that agricultural commodity prices fall relative to others because of relatively inelastic demand and because of the lack of differentiation among producers, which means that the markets are competitive. Moreover, the decline in agricultural commodity prices is likely to continue. On the supply side, technological improvements, increased competition, reduced protection of markets and devaluation of some national currencies (e.g. CFA franc) of many agricultural commodity-producing countries (following structural adjustment programmes) have all contributed to significant increases in production.

[3] For instance, in his otherwise exhaustive text book Feenstra (2004:338) dispatches the hypothesis with the simple one-line affirmation that "*there is little evidence to support that hypothesis in general*".

On the demand side, the development of synthetic substitutes further displace agricultural commodities as intermediate inputs (DFID, 2004:6), reducing at least the growth in demand.

The extent to which these trends have undermined Africa's trade performance are reflected in Figure 2. As noted earlier, despite a fall in export volumes during the crisis period in the 1980s, the volume of exports have subsequently expanded quite impressively, by around 80% over the period since 1990. But these gains have been largely offset by a significant decline in the terms of trade over around 20 percent over the whole period, leaving the value index of exports only 20% higher.

Figure 2: UNCTAD Volume and Value Index of Exports of SSA, and Terms of Trade, 1980-2002 (1980=100)



Source: UNCTAD Handbook of Statistics 2004, on cd rom.

For particular countries, these broad trends may have had a particularly perverse impact. Wuyts (2005), for example, documents that from 1987 to 2001 Tanzania's overall terms of trade (for goods and services) dropped by nearly 30%, while the terms of trade for goods dropped by nearly 40%. The agricultural terms of trade, however, declined by about 50%. Wuyts (2005:11) concludes that "*poverty incidence may rise, even if per capita GDP is growing (without adverse changes in income inequality) because declining external terms of trade may offset the gains from increased production.*"

3. A Simple Illustration of the Seriousness of the Commodity Price Problem for Africa

The seriousness of the commodity price-trap problem for African exports can easily be illustrated by estimating a simple model. A standard approach for modelling market equilibrium in any particular product is by way of the following structural equations:

Demand equation:	$q_d = \alpha_1 p + \alpha_2 y + \varepsilon_d,$	(1)
Supply equation:	$q_s = \beta_1 p + \varepsilon_s$	(2)
Equilibrium condition	$q_d = q_s = q$	(3)

where q_d is the quantity demanded, q_s is the quantity supplied, p is the price, y is income, α and β are the respective elasticities, and ε the error term. This implies that there is a joint determination of price and quantity i.e. that these variables are determined endogenously, and only income is supposed to be exogenous. Under such circumstances, if we wanted to estimate the response of the supply side to changes in price (equation 2), price is not an exogenous variable in the system, and Ordinary Least Squares (OLS) estimation of the supply equation would thus be biased. The correct form of estimation is thus usually through a two-stage least squares estimation. However, in the case of African exporters, who are usually considered as *price-takers* in most commodity markets, this is not necessarily the case. Estimation via OLS is thus likely to produce unbiased estimates. Table 2 shows the result of regressing a pooled data set for the export volumes of 33 Sub-Saharan exporters on the aggregate unit price indicators, taking logarithms to give us the corresponding elasticities. The regression uses a fixed effects model and the technique of White's Heterokedastic-consistent standard errors and co-variance.[4]

This simple regression analysis provides highly suggestive results. For any particular good or service provided, neoclassical economic theory posits a positive relationship between price and quantity supplied. The regression analysis here suggests however a significant *negative* relationship between price and quantity. Indeed, the estimated coefficient (-0.95) implies that **for every 1 percent decline in prices, African exporters increase the volume of their exports by approximately 1 percent**. Outside the standard neoclassical assumptions, this response can be rationalised as the reaction of countries to the decline in the unit price of their exports, by trying to maintain net income (revenue) through an increased volume of exports.

[4] White's heteroskedastic-consistent standard errors allows us to obtain unbiased (though not the most efficient) standard errors. For a discussion on this, see Greene (1997:Chapter 12).

For countries which are more or less locked into their existing pattern of exports, and under considerable external pressure to service foreign debts, such a response can be seen as entirely rational.

Table 2: Pooled Regression Estimates of Export Volumes on Unit Price Indexes for a sample of 33 SSA countries, 1980-2002

Dependent Variable: LOG(VOLUME)
Method: Pooled Least Squares
Included observations: 23
Number of cross-sections used: 33
Total panel (balanced) observations: 759
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(PRICE)	-0.950047	0.106205	-8.945383	0.0000

R-squared	0.762240	Mean dependent var	4.345323
Adjusted R-squared	0.751418	S.D. dependent var	1.026942
S.E. of regression	0.512013	Sum squared resid	190.0644
F-statistic	70.43302	Durbin-Watson stat	0.412193
Prob(F-statistic)	0.000000		

Source: Own elaboration, using data from UNCTAD Statistical Yearbook (2005).

None of this is to deny that other developing regions have also had to contend with declining terms of trade. This is of course to some extent the inevitable (and desirable) consequence of rising productivity (which moreover tends to be higher in the tradeable sector rather than in non-tradeables, which are less exposed to international competition) which feeds through in lower unit costs. Thus countries like China which have had an enormous success in expanding labour intensive manufacturing exports have had to face sharply declining export prices too. An UNCTAD study has shown that China's net barter terms of trade in manufactures deteriorated by more than 10 percent over the period 1993-2000 (Zheng and Yumin, 2002).

These countries have been particularly vulnerable to the problems associated with the 'fallacy of composition' – the idea that if a number of developing countries simultaneously try to increase exports in a similar range of product categories, then they may all end up losing through insufficient foreign demand and depressed international prices. However, some countries, like South Korea, have successfully managed to avoid this dilemma by increasingly shifting production towards higher value-added, technologically more sophisticated, dynamic manufactures. A study by Berge and Crowe (1997, cited in UNCTAD, 2003:90), for instance, reveals no significant trends in the net barter terms of trade of the Republic of Korea regarding its trade in manufactures with advanced industrial countries, but a significant increase vis-à-vis other developing countries and an even greater increase in the income terms

of trade, suggesting a relatively successful strategy of diversification into higher value-added products compared to its less developed trading partners. The tragedy of Africa is, of course, that most countries in the continent have not managed a similar transformation. We will discuss briefly why this has not been the case in the following section.

4. The Role of Trade Policy

Another important stylised fact, again at odds with orthodox economic analysis, is that African countries are surprisingly open to international trade. Measured by the standard index of "openness" of African economies (i.e. exports plus imports as a percentage of GDP), **African countries typically display an openness ratio in the order of 50-60 percent, comparable to the average of the European Union countries, and about *three times higher* than that displayed by the world's biggest importer, the United States.** This implies that, by the benchmark of the well-known Sachs-Warner index of openness, all African countries could now be considered as "open". And as a recent World Bank study notes "*tariffs have been falling throughout much of the region over the past decade for capital goods, intermediate goods and total imports….Furthermore, tariff rates do not appear any higher in Africa than in the more successful exporters in East and South Asia*" (Clarke, 2005:7). [5] For SSA countries on average, scheduled tariffs have fallen from 33% in the early 1980s to 15% by 2002 (Morrissey, 2005: 1139).

The majority of SSA countries have implemented significant liberalisation of trade since the 1980s, with reforms mostly related to reducing restrictions on imports (Ackah and Morrissey, 2005). In theory, trade liberalisation reduces relative price distortions, encouraging an expansion of exports which promotes economic growth. Although the empirical evidence linking trade liberalisation to growth is quite weak (Santos-Paulino, 2002a, 2002b), in SSA there does appear to have been an export response (relative to GDP): imports have risen

[5] Contrary to this view, some authors argue that the trade regimes of Africa are extremely restrictive. Using an index of trade restrictiveness, Khandelwal (2004) suggests that only about 9 countries in the Eastern and Southern African region have open trade regimes, and these do not include the relatively developed countries in the region like Kenya or South Africa. Arguably, such a view confuses measurement of the policy environment with the actual outcome – although it is true that significant barriers to trade remain in most African countries, and these are relatively high by world standards, the simple fact that trade represents such a high percentage of GDP suggests that in practice these economies are indeed extremely open. The structural trade deficits which these countries sustain also corroborate the relatively open nature of the trade regimes.

fairly slowly and on average export growth has tended to match this (Ackah and Morrissey, 2005). There is some evidence that growth has been higher in more open SSA economies (Onafowora and Owoye, 1998), even those dependent on primary commodity exports (Mbabazi, Milner and Morrissey, 2003). However, as observed above, in SSA, export values tend to be determined externally, by trends in world commodity prices, and export earnings are variable across countries and over time depending on the commodities they export (Morrissey, 2005). Countries dependent on primary (agricultural) exports have a limited ability to increase production in response to improved price incentives following trade liberalisation (Mckay, Morrissey and Vaillant, 1997; Noorbakhsh and Paloni, 1998). Furthermore, SSA countries have failed to expand exports of manufactures, largely due to inefficiency and a lack of investment in technology in African manufacturing firms (Söderbom and Teal, 2003). Consequently, export response to trade liberalisation has been at best slow, and trade has not provided a growth payoff to SSA.

Arguably, some of the reforms that have been instigated have compounded, rather than alleviated, some of the aforementioned difficulties associated with the declining terms of trade for African exports. In the area of agricultural policy, for instance, during the 1980s and 1990s, much pressure was placed upon African countries to abolish their marketing boards, on the grounds that they distorted price incentives in the agricultural sector, and had been used to "plunder agriculture". By 1992, 16 marketing boards covering cash crops in 23 countries had given up their monopoly positions or had been eliminated (UNCTAD, 1999:ix). As Oxfam (2004:12) notes, although sometimes corrupt or inefficient, these boards provided information and facilities such as credit and extension services to farmers, and mobilised the country's market power in selling the crop for export. Their elimination has regrettably left farmers vulnerable to the full force of price shocks in commodity markets.[6]

Together these stylised facts suggest that, contrary to the conventional wisdom, the **basic problem is not that Africa trades too *little,* or that the trade regime is excessively closed** – rather that it is trading the wrong kind of products: primary commodities with low valued added, low prices and a very low elasticity of demand on world markets. The question of

[6] An empirical study by Boratav (2001), surveying evidence on 20 sub-Saharan countries finds that deregulation has not been associated with improvements in real producer prices or in the terms of trade. In an authoritative account of trends in the cocoa market, ul Haque (2004) documents the decline in cocoa prices subsequent to liberalisation.

overcoming Africa's economic marginalisation is therefore essentially *qualitative*, rather than *quantitative*. Seen from this perspective, the low (and decreasing) share of Africa in world trade is merely the outcome of a poor relative economic performance, and is reflected equally in other indicators such as Africa's declining share of world GDP.[7] In consonance with the analysis of Rodrik (1999) cited earlier, this conclusion is supported by econometric evidence from Coe and Hoffmaister (1998) who estimate a gravity model to address the question of whether Africa's bilateral trade with the industrial countries is "unusual" compared with other developing country regions. Their main finding is that the unusually low level of African trade is fully explained by economic size, geographical distance, and population; if anything, the average African country tends to 'overtrade' compared with developing countries in other regions.

What emerges from this brief review is that African, and we refer specifically to SSA, countries have been following appropriate trade policies (i.e. export taxes and the most severe quantitative restrictions have been eliminated and tariffs have been reduced) but have not derived a significant benefit. Many reasons can and have been offered to explain this, especially natural barriers, high trade costs, structural characteristics and institutional weaknesses (e.g. Morrissey, 2005). Overdependence on a (narrow range of) primary commodity exports has been recognised as a major constraint to export-led growth in SSA, and it is this issue we now address in more detail.

5. Econometric Analysis

In an attempt to explain African trade performance, Rodrik (1999) carried out a regression analysis on pooled cross-section, time-series data for the 1964-94 period. The dependent variables were the shares of trade in GDP (either total trade or exports) and their rate of growth. These were regressed on a range of determinants, including trade policies, income levels and geographic variables. The sample consists of 37 Sub-Saharan African countries. Although the results show income per capita, population, market access and a tropical location as all influencing trade volumes, Rodrik especially emphasizes the role of trade policy, arguing that the "*main conclusion to be drawn from these regressions is that trade*

[7] For instance, with over 11 percent of the world's population, sub-Saharan Africa has barely one percent of world's GDP (UNCTAD Statistical Yearbook, 2005). This pattern is repeated in areas like FDI, were Africa's share of total does not reach more than around 1 percent of total inflows. See Mold (2004).

policies matter in sub-Saharan Africa, in determining both the volume of trade and the growth thereof. As suggested by economic theory, import restrictions act as export restrictions. The variation in the trade/GDP ratios among Sub-Saharan African countries can be explained well by a small number of determinants, namely income per capita, country size, geography, and trade policy. The variation in the growth of trade is not as well explained, but there is strong evidence that trade taxes play a significant role here as well." (ibid., pp.118-119).

In a more recent empirical study, Cline (2004) uses the following OLS regression for pooled data on 100 developing countries during the period 1981-2001 (t-statistics in parentheses):

$$GX^*_{i,t} = \underset{(-1.53)}{-6.93} + \underset{(2.48)}{1.93}GW_t + \underset{(1.61)}{0.41}GYLAG_{i,t} + \underset{(1.97)}{0.079}MFSHR_{i,t-1} + \underset{(2.36)}{7.76}REER_{i,t-1}$$

$$\underset{(-1.00)}{-0.00040}yyppp_{i,t-1} + \underset{(2.36)}{8,83}D_L + \underset{(2.39)}{7.23}D_C + \underset{(0.29)}{1.66}D_A - \underset{(2.36)}{10.75}D_S \; ; \tag{4}$$

$$Adj.R^2 = 0.0163; no.obs. = 1{,}412. \tag{2.1}$$

The variables are as follows: $GX^*_{i,t}$ = percentage growth rate of real exports for country i in year t; GW_t = percentage real growth rate in world GDP (at market exchange rates); $GYLAG_{i,t}$ = average real percentage growth rate of country i for the three years preceeding t; $MFSHR_{i,t-1}$ = percent of exports in manufactures for country i in year prior to t; $REER_{i,t-1}$ = index of real effective exchange rate for country i in year t (1981-2002 average = 1.00); and $yypp_{i,t-1}$ = purchasing power parity GDP per capita in the year prior to t (dollars). The dummy variables D_L, D_C, and D_A represent the Lomé, Caribbean Basin Initiatives and the Andean Trade Preference Act. "*In part because of the strong patterns of below-norm economic performance in SSA*", the final dummy, D_S, is a dummy for Sub-Saharan Africa.

Despite the very low explanatory power of this model, for all except the purchasing power income per capita variable, the estimators are significant. Cline (2004:96-98) draws a number

of conclusions from the model, including the relative efficacy of preferential market access schemes. But he also suggests that the model confirms the poor performance of SSA (despite preferential market access), and indicates that "an SSA country typically had a 10.7 percent lower real export annually than would otherwise be expected" (Cline, 2004:97).[8]

Is this the case? We have maintained earlier that focusing on the value of exports gives a misleading impression of African export performance and the supply-side response to the reforms carried out in the 1980s and 1990s. Consequently, for our own analysis we propose a similar model to that utilised by Rodrik and Cline, but substituting exports volume indexes for growth (GX) as the performance measure, and adding a larger range of explanatory variables:

$$(5) \quad VI_{i,t} = c + \alpha_1 P_{i,t} + \alpha_2 GDPCAP_{i,t} + \alpha_3 MAN_{i,t} + \alpha_4 GFCF_{i,t} + \alpha_5 FDI_{i,t} + \alpha_6 REER_{i,t} + \alpha_7 TAX_{i,t} + \alpha_8 DIVERS_{i,t} + \alpha_9 DPRICE_{i,t} + \alpha_{10} DLANDLOCKED_{i,t} + \varepsilon_{i,t}$$

where VI is the volume index of exports (from UNCTAD data), and $P_{i,t}$ is the unit price data for exports (also from UNCTAD). The other control variables were chosen to better reflect the supply side capacity of the African economies under analysis (bearing in mind limitations regarding data availability) than those used by Cline. GDPCAP is taken from World Bank data of GDP per capita in national currency (using an index where 2000=100), and is used as a proxy for average productivity rates of labour. MAN is the share of manufacturing industry in GDP (taken from World Bank Africa Database), GFCF is gross fixed capital formation (taken from UNCTAD data) as a percentage share of GDP, reflecting the investment 'effort' of each economy, FDI is FDI inflow as a % of GDP (UNCTAD), and DIVERS is the Hirschman index of diversification (calculated from UNCTAD data). The expectation here is that more diversified economies should expect a stronger export performance. REER is the real effective exchange rate, taken from WB.

To reflect the policy stance, the *ad valorem* equivalent of international trade taxes was calculated by dividing tax revenue on both imports and exports by the volume of total trade

[8] It is unclear from the reported results whether Cline has used the appropriate transformation of the coefficient on the dummy variable – he seems to be using log transformations, but nowhere states this. This would imply having to do some simple calculations, rather than interpreting the elasticity directly – see Kennedy (2003:412).

(TAX).[9] Finally, two dummy variables are included – a dummy for landlocked African countries (DLANLOCKED), and a variable to capture the separate response to increasing and decreasing prices (DPRICE). This is done by creating a price dummy = 1 if price increases, 0 otherwise.

The full panel includes data for 48 African countries (both sub-Saharan and North African) over the period 1987-2002 (covering the period of trade reforms). But regressions were also carried out using a sub-sample of sub-Saharan countries which are predominantly agricultural exporters.[10] Detailed results are showed in the Annex. Pooled regressions on the data were carried out using both the volume index estimates of UNCTAD as the dependent variable, and the value of total exports (Tables 3 and 4 respectively). In this latter regression, so as to avoid spurious collinearity, and thus biased results, the unit price index was removed from the regression.

Regressions were undertaken in both levels and differences, each time using the log-linear model. Both sets of results are suggestive, showing volume export performance to be highly negatively correlated with price (as explained earlier, the converse of the neoclassical case), and significantly related to average relative productivity. An interesting result in Table 3 is the estimated price elasticity of -0.93, very similar to that reported from the more simple regression reported above (also pooled OLS); this supports the hypotheses that countries adjust volume to try and meet an export revenue target. Note also that the estimated coefficient is still larger in case of the SSA agricultural exporters (-1.0). However, the result may be more difficult to interpret for a price increase (the price dummy is not significant) – further analysis, given the context of declining prices, would be required to establish if volumes actually fell in proportion (unit elasticity is within the confidence interval) to a price increase. Perhaps unsurprisingly, export volumes tend to be higher in richer countries (higher GDPCAP) and countries with higher FDI. The latter is consistent with the view that FDI in SSA has traditionally been attracted to export, usually extractive, activities, as the economies are mostly too small for market-seeking FDI. Consistent with the idea that overvalued

[9] This variable used combined data on both import and export taxes, on the grounds that import taxes also act as a restraint on exports. This effect is likely to be particularly powerful for relatively undiversified economies like those of sub-Saharan Africa.

[10] As well as the North African countries in the sample (Algeria, Egypt, Morocco, Tunisia), this meant excluding the following countries: Angola, Equatorial Guinea, Gabon, Congo, DRC, Nigeria and South Africa.

exchange rates detract from export performance, in the levels regressions REER exerts a significant negative impact on export volumes.

More difficult to explain is the apparent significant negative relationship between gross fixed capital formation and export performance (one would expect *a priori* higher levels of GFCF to lead to higher export volumes, not the inverse). Given the dependence of most of the countries in the sample on agricultural exports (which presumably do not depend to the same extent on infrastructure as manufacturing or industrial products), a non-significant result might be expected. But a highly significant negative relationship is somewhat surprising, and suggests perhaps problems of collinearity between this variable and others in the model.

Table 1: Determinants of Export Volumes in Africa, 1987-2002

	Africa		SSA Agricultural Exporters	
	Levels	Differences	Levels	Differences
Unit Price of Exports	-0.93*	-0.38	-1.00*	-0.42*
	(0.14)	(0.08)	(0.15)	(0.12)
Income per capita	1.62*	1.42*	1.61*	1.46*
	(0.26)	(0.32)	(0.25)	(0.32)
Share of manufacturing in GDP	-0.10	-0.11	-0.12*	-0.06
	-0.09	(0.06)	(0.14)	(0.10)
GFCF as % of GDP	-0.15**	-0.14*	-0.16	-0.16*
	(0.06)	(0.03)	(0.08)	(0.04)
FDI stock as % of GDP	0.10*	0.05	0.10**	0.06
	(0.02)	(0.05)	(0.03)	(0.05)
REER	-0.20***	-0.01	-0.07*	0.03
	(0.11)	(0.11)	(0.15)	(0.17)
Taxes on Trade	0.04	0.01	0.02	0.03
	(0.05)	(0.07)	(0.05)	(0.07)
Diversification Index	-0.04	-0.06	-0.04	-0.05
	(0.04)	(0.09)	(0.06)	(0.11)
Price Dummy	-0.08	-0.01	-0.02	-0.01
	(0.10)	(0.02)	(0.15)	(0.03)
Landlocked	0.08	-0.01	0.03	-0.02
	(0.06)	(0.02)	(0.07)	(0.02)
N	471	428	364	331
Adjusted R^2	0.67	0.11	0.67	0.10
S.E. of regression	0.33	0.25	0.35	0.27
F-statistic	96.76	6.23	75.22	4.64

*Notes: Regressions are carried out on pooled data covering the period 1987-2002. All regressions use the Swamy and Arora estimator of component variances and White cross-section standard errors & covariance (d.f. corrected). Standard errors are reported below the coefficients. The levels of significance are as follows: * 99% level, **95% level, ***90% level.*

The contrast between the two sets of estimates depending on whether export volumes or values are used as the dependent variable is particularly interesting. Although the variables

that are significant are broadly comparable, in the SSA sub-sample it is interesting to note that the diversification index now has a significant positive impact on export values. This is to be expected a priori – whereas greater diversification of the productive structure would imply, *ceteris paribus*, more higher-value added activities than in the case of a country which is dedicated solely to the export of agricultural commodities, it need not add any more to the *volume* of exports. Indeed, diversification into higher value products, leading to higher income from exports, might be compatible with a decrease in the volume of exports.

Table 4: Determinants of Export Values in Africa, 1987-2002

	Africa		SSA Agriculture	
	Levels	Differences	Levels	Differences
Income per capita	1.09*	1.15*	0.86*	1.20*
	(0.16)	(0.23)	(0.20)	(0.25)
Share of manufacturing in GDP	-0.17**	0.01	-0.15	0.07
	(0.08)	(0.06)	(0.12)	(0.09)
GFCF as % of GDP	-0.23*	-0.07**	-0.24*	-0.06
	(0.06)	(0.03)	(0.07)	(0.04)
FDI stock as % of GDP	0.27*	0.05***	0.30*	0.06**
	(0.04)	(0.03)	(0.03)	(0.03)
REER	-0.13*	0.02	-0.19*	0.03
	(0.04)	(0.06)	(0.05)	(0.09)
Taxes on Trade	0.00	-0.01	0.01	0.01
	(0.05)	(0.05)	(0.06)	(0.06)
Diversification Index	0.03	0.04	0.10***	0.05
	(0.05)	(0.04)	(0.05)	(0.04)
Price Dummy	0.01	-0.03***	-0.16	-0.03**
	(0.26)	(0.02)	(0.16)	(0.02)
Landlocked	0.07	0.00	0.09	0.00
	(0.23)	(0.02)	(0.16)	(0.02)
N	453	413	346	316
Adjusted R-squared	0.55	0.12	0.57	0.13
S.E. of regression	0.22	0.15	0.24	0.16
F-statistic	62.80	7.52	52.31	6.04

Notes: Robust standard errors reported in parenthesis. All regressions using the same methodology as in Table 3.

The first difference estimates in Tables 3 and 4 can be interpreted as 'rates of growth' estimates (as such the coefficients should not be interpreted as conventional elasticities), and are consistent with the levels results. The relationship between growth (increase) in prices and volumes is negative. Although (growth in) GDP remains positive and significant in determining growth in volumes, FDI is no longer significant. Surprisingly, investment growth appears to have a negative relationship with export volume growth, perhaps because

additional investment is in different sector (e.g. utilities or public infrastructure). It is also likely that investment takes a longer time to impact on exports than other variables.

Given potential endogeneity problems, and availing of the panel data, a more appropriate analysis would be a dynamic panel using a GMM estimator (Arrellano and Bond, 1991; Arellano and Bover, 1995). The same model was estimated using the GMM methods, but because of the fixed effects, the dummy variables had to be omitted from the specification (no great loss given their previous insignificance under the random effects estimation). Results are reported in Table 5.

Table 5: GMM Panel Estimation of the Determinants of Export Growth

	All African Countries	SSA Agricultural Exporters
LOG(VOLUMES(-1))	0.05	0.06
	(0.17)	(0.20)
LOG(VALUES)	-0.99*	-0.97**
	(0.36)	(0.43)
Income per capita	2.41**	2.63***
	(1.18)	(1.37)
Diversification index	0.01	0.22
	(0.78)	(0.69)
Share of Manufacturing in GDP	0.22	0.15
	(1.17)	(1.07)
REER	-1.52	-1.21
	(1.27)	(1.20)
Gross Fixed Capital Formation	0.06	0.14
	(0.48)	(0.53)
Trade Taxes	0.00	-0.07
	(0.57)	(0.65)
R-squared	0.58	0.63
Adjusted R-squared	0.54	0.60
S.E. of regression	0.42	0.40
J-statistic	1.31	1.31

The core results are again consistent: the price elasticity is -0.99 for the full sample, 0.97 for the SSA agricultural exporters, and GDP has a highly significant positive impact on volumes. The different result is that export volumes appear to be lower when manufacturing share in GDP is higher, possibly because manufacturing exports do not face declining price or are not price takers. Significantly, once the issue of endogenity has been dealt with, none of the other variables are significant.

Moreover, in none of the regressions is the trade policy proxy (taxes) significant. Obviously, this indicator has shortcomings as a measure of trade policies (Rodrik, 1999:114). It underestimates the effects of extremely high taxes that bring in very little revenue, ignores non-tariff barriers and the role of implicit export taxation through commodity boards, and overlooks the role of smuggling.[11] Nevertheless, even taking into account these shortcomings, it does suggest that trade policy has not a major determinant of export performance *per se* (which is not so surprising as the major trade policy reforms have related to import taxes, which at best would require time to increase incentives to the export sector). Far more significant has been the struggle by SSA countries to keep pace with collapsing export prices and high debt repayments.

6. Conclusions

The objective of this study has been to analyse the fundamental determinants of African trade performance. It has been argued that by focusing excessively on export values a rather misleading impression has been given of African performance. If by an unsatisfactory trade performance, we mean the apparent inability to move rapidly into new, high-value added, dynamic products, then African countries have clearly failed.[12] But if we mean the capacity of African countries to expand their existing range of exports, then the argument is not so clear. Many African countries have increased the volume of exports quite significantly over the last two decades of reform.

Our analysis puts centre stage once again the issue of commodity prices. If in value terms African exports have failed to provide the momentum for broader economic growth, then it is surely worth examining more closely the reasons for low prices. As argued elsewhere (Mold, 2006), it is not for want of possible solutions, rather the serious political impediments to take the issue seriously. Moreover, the issue has a new resonance as the 'fallacy of composition' arguments begin to raise their head once again. The appearance of China and India onto the world market represents a serious competitive hazard to developing countries trying to gain a foothold in world markets for labour-intensive manufactures (DFID, 2006). Finding a solution for the problem of low commodity prices is thus more urgent than ever.

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[11] An additional econometric problem in the second set of regressions, in so far as the dependent variable (the volume of exports) enters the trade-tax measure in the denominator, raising the possibility of a spurious negative correlation between the two variables.

[12] Note also that what diversification that has taken place in sub-Saharan Africa took place before the period of reforms in the 1990s – see World Bank (2005b: Table 3.6).

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8. Annex Tables

Table A.1. UNCTAD Export Volume Indexes of Export for African Countries 1990-2002

	1990	1994	1998	2002
Equatorial Guinea	100.0	185.7	1100.0	3442.9
Mozambique	100.0	152.4	266.7	*923.8*
Lesotho	100.0	207.4	311.1	800.0
Uganda	100.0	320.0	390.0	580.0
Sudan	100.0	225.0	187.5	550.0
Central African Republic	100.0	258.8	394.1	476.5
Mali	100.0	128.6	214.3	364.3
Seychelles	100.0	84.4	190.6	362.5
Burundi	100.0	170.6	185.3	297.1
Guinea Bissau	100.0	545.5	218.2	290.9
Zimbabwe	100.0	147.8	178.3	267.4
Guinea	100.0	112.5	160.7	250.0
United Republic of Tanzania	100.0	144.9	146.9	244.9
Senegal	100.0	128.9	195.6	233.3
Ethiopia	100.0	132.1	149.1	228.3
Burkina Faso	100.0	78.8	240.4	219.2
Congo	100.0	120.8	211.3	203.8
Togo	100.0	177.4	188.7	203.8
Tunisia	100.0	144.6	162.5	200.0
Morocco	100.0	143.9	166.7	187.7
Ghana	100.0	158.2	167.3	185.5
Cape Verde	100.0	69.2	161.5	180.8
Swaziland	100.0	121.1	146.5	180.3
Angola	100.0	133.3	171.7	180.0
Kenya	100.0	163.5	150.8	177.8
Mauritius	100.0	110.3	125.3	164.4
Botswana	100.0	104.8	112.7	160.3
South Africa	100.0	109.1	128.8	157.6
Benin	100.0	160.9	131.9	153.6
Namibia	100.0	135.9	140.6	146.9
Algeria	100.0	97.0	122.4	143.3
Zambia	100.0	84.9	145.2	138.7
Cote d'Ivoire	100.0	89.6	129.9	136.4
Mauritania	100.0	119.8	91.9	133.7
Cameroon	100.0	77.6	105.6	126.4
Comoros	100.0	107.0	30.4	124.0
Malawi	100.0	112.6	131.0	123.0
Dem Rep of the Congo	100.0	46.3	41.2	118.4
Madagascar	100.0	131.6	128.1	103.5
Gabon	100.0	138.9	137.0	101.9
Nigeria	100.0	96.4	128.6	95.2
Sao Tome and Principe	100.0	106.8	91.4	87.0
Egypt	100.0	61.4	52.8	86.6
Chad	100.0	99.0	120.2	85.9
Rwanda	100.0	21.9	39.7	54.2
Gambia	100.0	114.4	61.7	39.4
Sierra Leone	100.0	42.7	0.4	1.9

Source: Calculated from UNCTAD Handbook of Statistics, 2004

Annex Table 2: Determinants of Export Volumes, SSA Agricultural Producers

Dependent Variable: LOG(EXPVOL_?)
Method: Pooled EGLS (Cross-section random effects)
Sample: 1987 2002 (16 observations, 29 cross sections)
Total pool (unbalanced) observations: 364
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.487626	1.543712	1.611457	0.1080
LOG(EXPVAL_?)	-0.996271	0.148610	-6.703945	0.0000
LOG(GDPCAP_?)	1.613055	0.250844	6.430507	0.0000
LOG(MAN_?)	-0.124652	0.143683	-0.867549	0.3862
LOG(GFCF_?)	-0.159335	0.077526	-2.055251	0.0406
LOG(FDI_?)	0.103963	0.026337	3.947389	0.0001
LOG(REER_?)	-0.069664	0.153531	-0.453748	0.6503
LOG(TAX_?)	0.017040	0.049571	0.343753	0.7312
LOG(DIVERS_?)	-0.036620	0.058883	-0.621921	0.5344
PRICEDUM_?	-0.024106	0.146216	-0.164866	0.8691
LANDLOCKED_?	0.033094	0.068234	0.485010	0.6280

R-squared	0.680592	Mean dependent var	1.208012
Adjusted R-squared	0.671544	S.D. dependent var	0.604507
S.E. of regression	0.346449	Sum squared resid	42.36960
F-statistic	75.21695	Durbin-Watson stat	0.672489
Prob(F-statistic)	0.000000		

Annex Table 3 Determinants of Export Volumes, SSA Agricultural Producers

Dependent Variable: DLOG(EXPVOL_?)

Method: Pooled EGLS (Cross-section random effects)

Sample (adjusted): 1988 2002 (included 15 observations,29 cross sections)

Total pool (unbalanced) observations: 331

Swamy and Arora estimator of component variances

White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047080	0.019261	2.444271	0.0151
DLOG(EXPVAL_?)	-0.420451	0.117275	-3.585162	0.0004
DLOG(GDPCAP_?)	1.460161	0.319656	4.567920	0.0000
DLOG(MAN_?)	-0.058522	0.095895	-0.610270	0.5421
DLOG(GFCF_?)	-0.160004	0.039750	-4.025264	0.0001
DLOG(FDI_?)	0.057774	0.052837	1.093438	0.2750
DLOG(REER_?)	0.029313	0.174240	0.168233	0.8665
DLOG(TAX_?)	0.028895	0.068582	0.421322	0.6738
DLOG(DIVERS_?)	-0.048067	0.105459	-0.455788	0.6489
PRICEDUM_?	-0.005584	0.033874	-0.164853	0.8692
LANDLOCKED_?	-0.017855	0.022675	-0.787426	0.4316

R-squared	0.126566	Mean dependent var	0.058665
Adjusted R-squared	0.099272	S.D. dependent var	0.283914
S.E. of regression	0.269453	Sum squared resid	23.23366
F-statistic	4.637016	Durbin-Watson stat	2.312460
Prob(F-statistic)	0.000004		

Annex Table 4: Determinants of Export Volumes, All African Countries

Dependent Variable: LOG(VOLUMES)

Method: Panel Generalized Method of Moments

Transformation: Orthogonal Deviations

Sample (adjusted): 1990 2002 (36 cross sections, total observations 388)

White period instrument weighting matrix

White period standard errors & covariance (no d.f. correction)
Instrument list: LOG(VOLUMES(-1)) LOG(VOLUMES(-2)) LOG(VALUES) LOG(GDPCAPWB) LOG(DIVERSIFICATION) LOG(MANUFACTURING) LOG(FDI) LOG(TAX) LOG(REER) LOG(GFCF) @LEV(@SYSPER)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(VOLUMES(-1))	0.526280	0.058259	9.033515	0.0000
LOG(VALUES)	-0.510313	0.057597	-8.860083	0.0000
LOG(GDPCAPNAT)	1.001623	0.188862	5.303454	0.0000
LOG(DIVERSIFICATION)	0.023346	0.058881	0.396491	0.6920
LOG(MANUFACTURING)	-0.065265	0.074625	-0.874584	0.3824
LOG(FDI)	0.109781	0.028028	3.916915	0.0001
LOG(TAX)	-0.022876	0.062716	-0.364760	0.7155
LOG(REER)	0.052393	0.102286	0.512226	0.6088
LOG(GFCF)	-0.025674	0.059269	-0.433178	0.6651

Effects Specification

Cross-section fixed (orthogonal deviations)

Period fixed (dummy variables)

R-squared	0.659663	Mean dependent var	-0.155848
Adjusted R-squared	0.640135	S.D. dependent var	0.369038
S.E. of regression	0.221381	Sum squared resid	17.93755
J-statistic	0.030355	Instrument rank	23.00000

Dependent Variable: LOG(VOLUMES)

Method: Panel Generalized Method of Moments

Transformation: Orthogonal Deviations

Sample (adjusted): 1989 2002 (25 cross sections, 286 observations)

White period instrument weighting matrix

White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(LOG(VOLUMES),-1) LOG(REER) LOG(GDPCAPNAT) LOG(VALUES) LOG(TAXES) LOG(GFCF) LOG(MANUFACTURING) @LEV(@SYSPER)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(VOLUMES(-1))	0.064074	0.197884	0.323794	0.7464
LOG(GDPCAPNAT)	2.631035	1.373663	1.915343	0.0565
LOG(DIVERSIFICATION)	0.218258	0.693494	0.314723	0.7532
LOG(VALUES)	-0.967078	0.427154	-2.264006	0.0244
LOG(MANUFACTURING)	0.149639	1.066862	0.140261	0.8886
LOG(REER)	-1.207252	1.196223	-1.009220	0.3138
LOG(GFCF)	0.136848	0.530684	0.257872	0.7967
LOG(TAXES)	-0.074287	0.651260	-0.114066	0.9093

Effects Specification

Cross-section fixed (orthogonal deviations)

Period fixed (dummy variables)

R-squared	0.630428	Mean dependent var	-0.102165
Adjusted R-squared	0.601031	S.D. dependent var	0.627440
S.E. of regression	0.396317	Sum squared resid	41.46564
J-statistic	1.307915	Instrument rank	25.00000