OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

Are manufacturing exports the key to economic success in Africa?*

Måns Söderbom[+,++] and Francis Teal[+]

Centre for the Study of African Economies
Department of Economics
University of Oxford

November 2002

Abstract

The poor performance of many African economies has been associated with low growth of exports in general and of manufacturing exports in particular. The two most successful countries in Africa have been Botswana and Mauritius. In Botswana rapid export growth followed the discovery of diamonds, in Mauritius manufacturing exports played a major role. In this paper we draw on both macro and micro evidence from nine African countries to investigate whether manufacturing exports are the key to success in Africa. We do this by posing three questions. First, how close is the link between export and income growth? Second, is there evidence from these African countries that manufactured exports have led to greater economic success? Third, what has limited the success of firms in the manufacturing sector? We argue that export and income growth are very closely linked. However there is, for this sample of countries, no evidence that if their exports are manufactures, growth rates are higher. We show that the factors that limit the success of African manufacturing firms in exporting are their levels of efficiency and small size. We argue that the key to success in an area where Africa has a potential cost advantage – labour intensive garments – is to enable large firms to use a more labour intensive technology than is the case at present.

---

*An early version of this paper was prepared for the *Third United Nations Conference on the Least Developed Countries*, Brussels, 14-20 May 2001. The paper draws on collaborative work undertaken by economists from Africa, Europe and North America who have worked on firm level data for the manufacturing sector in Africa. The CSAE is funded by the Economic and Social Research Council of the UK. We are grateful for comments from a referee and numerous colleagues.

[+] Affiliation: Centre for the Study of African Economies (CSAE), University of Oxford.
[++] Måns Söderbom is the UNIDO Fellow at the CSAE.

1 Introduction

The last two decades have witnessed major changes in economic policy in many African countries. A common factor in these changes has been a transition from economies where government controls were extensive to more open, market-oriented, regimes. In parallel with economic changes have been political and social transitions, from single- to multi-party states and an increasing concern with issues of governance and transparency in the policy making process. These changes in the mid 1990s were associated with optimism that economic performance in Africa would improve dramatically. There was talk of African economic lions able to emulate the performance of the Asian tigers. The economies whose performance appears to have improved in the 1990s include Ghana, Uganda and Tanzania. Is it possible these improvements in performance can be sustained to the point where the talk of African lions to match the Asian tigers moves from rhetoric to fact? If so will manufacturing exports be part of the success story? What factors have limited exports of manufactures to date? In addressing these issues the paper seeks to answer the question posed in the title: are manufacturing exports the key to economic success in Africa?

In the following sections we will examine a range of African countries which cover the spectrum of outcomes in Africa from rapid success to sustained failure – Mauritius, South Africa, Botswana, Ghana, Kenya, Nigeria, Tanzania, Uganda and Zambia. We have chosen these nine countries on two grounds. The first is to show the range of outcomes that have occurred in Africa. The second is that for several we have micro data on their manufacturing sector which can be used to assess the factors which have so limited their success in this area. Two, Botswana and Mauritius, have been very successful exporters over the long term and two, South Africa and Zambia, have not. We show just how large are the differences between these economies and we compare them with the countries for which growth has either recovered or accelerated in the 1990s - Ghana, Uganda and Tanzania. We then focus on manufacturing, both at the macro and the firm-level. At the macro level we ask if changes in their manufacturing exports have been linked to their economic growth. Using micro data we

seek to establish which factors have limited firm level success in terms of firm productivity. We conclude by summarising our answers to the questions posed above.

2 Exporting and Economic Success in Africa

There is a growing volume of empirical evidence that trade causes increases to a country's income, Edwards (1998), Frankel and Romer (1999), Söderbom and Teal (2001), Irwin and Terviö (2002), Greenaway et al (2002). The common factor in the collapse of many African economies in the period since independence has been the collapse of their exports. The most prominent feature of the Asian tigers was the growth of their exports, in particular their manufacturing exports. The issue as to how success in Africa can be achieved thus divides into two related questions. The first is how closely export and income growth are linked; the second is whether or not it matters if the exports are manufactures. We begin by documenting the link between incomes and export performance.[1]

Figure 1 shows an index of the volume of exports, based on 1974=100, for the nine African countries on which we focus. The top part of the figure shows the two long run successes, Mauritius and Botswana, one example of long run stagnation, South Africa, and an example of long run failure, Zambia. In both Botswana and Mauritius over the period from 1970 to 1999 trend growth of export volumes was 5 per cent. In Botswana very rapid growth in the 1970s was followed by much slower growth in the 1980s and no growth at all in the 1990s. In Mauritius trend growth of exports in the 1970s was negligible, about 1 per cent, in the 1980s this accelerated to 10 per cent falling to 5 per cent in the 1990s. Milner and Wright (1998) show that trade liberalisation in Mauritius led to a massive rise in employment in the new export industries.

The bottom part of Figure 1 shows exports volumes for Kenya, Uganda, Ghana, Tanzania and Nigeria. For three of the countries – Ghana, Tanzania and Uganda – there is a general pattern of contraction from the 1970s to the mid 1980s followed by a recovery. For Nigeria and Kenya there is continuing stagnation or decline in the 1990s. If attention is

[1] An appendix provides the sources for the macro data presented in this section.

focused on the last decade the trend annual growth rates for export volumes for those recovering - Ghana (7 per cent), Uganda (14 per cent), Tanzania (5 per cent) - equals or exceeds those achieved by the longer run success stories of Botswana and Mauritius. These important improvements in trade performance all follow periods of major trade reform involving a reduction in protection and a liberalisation of the exchange rate regime.

Figure 2 shows the values of per capita incomes of these countries measured in purchasing power parity (PPP) dollars. For many of the countries the pattern of achievement in income appears to match closely that for exports (we show below that this impression is confirmed in a simple regression). In 1970 the countries divided into three groups. On a per capita basis South Africa was by far the richest with an income close to US$10,000 (1995 prices). Four counties had incomes ranging from US1,500-US$3,000, Mauritius, Botswana, Zambia and Ghana. The other four countries – Uganda, Kenya, Nigeria and Tanzania – all had incomes of US$ 1,000 or less, in the case of Tanzania very substantially less.

It is often argued that African countries have suffered from long run declines in the terms of trade facing their economies. If this is so then the growth rate in export volumes will not be matched by an equal growth in the purchasing power of those exports. To see how far this is the case for any of the countries under review Figure 3 shows the value of exports, in 1995 US$, on a per capita basis for the same countries. The implied measure of the terms of trade from these two data series is given in Figure 4.

In the mid 1970s four of the countries - Botswana, Mauritius, South Africa, and Zambia - exported about US$ 500 (at 1995 prices) per capita. By the end of the 1990s Mauritius exported more than four times as much, US$ 2,200, and Botswana twice, US$ 1,000. In contrast the real value of exports from South Africa was virtually unchanged, while those for Zambia had fallen to less than one-fifth of their 1970s level. Of these four countries only Zambia experienced a long run decline in its terms of trade (see Figure 4). This decline combined with falling export volumes ensured that Zambia's per capita exports in 1999 were reduced to just US$ 67 (at 1995 prices). So from being on a par in the early 1970s the gap between Mauritius and Zambia by the late 1990s was a factor of more than 30.

We show in the bottom part of Figure 3 the values of exports for the other countries in this survey. For all these countries in the 1990s exports were less than US$ 200 (1995) per capita, ie at the level of Mauritius and Botswana of thirty years earlier. The values figures also emphasise how limited has been the success of the countries which have recovered in the 1990s. Ghana's exports remain below the level of 1970 while both Tanzania and Uganda export only about US$ 50 per capita. Kenya, Tanzania and Uganda have all experienced long run declines in their terms of trade over this period (see Figure 4). Indeed the decline for Uganda was greater than that for Zambia. However as policy in Uganda has enabled the volume of exports to grow the effect on the value of exports for Uganda has been much less than that observed for Zambia.

It appears that Botswana and Mauritius are atypical of other African countries so it is of interest to ask if the data show a link from export performance to growth of GDP for all the countries we are considering. In the micro data, to be presented below, we ask if exporting firms are more efficient than those oriented to the domestic market. Here we ask if there is evidence from the macro data that exporting is associated with faster growth. Figure 5 shows the result of plotting the growth rate of GDP (defined as a fifth difference) on the lagged growth of exports (both on a per capita basis). Clearly we cannot impute causality from this regression, we can however say that growth of income and growth of exports are closely linked for the countries on which we have chosen to focus.

So far we have focused on total exports. What is the role of manufacturing in these exports? In 1980 these were at a similar level in both Mauritius and South Africa, about US$ (1995) 200. After a period of stagnation exports from South Africa started to grow in the 1990s. South African manufacturing exports have grown slightly faster than overall exports during the last decade. However this achievement is markedly less than that of Mauritius where per capita exports of manufactures rose from some US$ 200 to over US$ 1000 (all at 1995 prices). Figure 6 shows the figures for per capita exports of manufactures from Mauritius and South Africa in 1999 in a wider context. In the case of all the other countries these are negligible.

We conclude this section by investigating the role of exports for growth by means of regression analysis. Consider the simple specification

[1] $$\ln y_{it} = \beta \cdot \ln Exports_{it} + \gamma \cdot PCMAN_{it} + \alpha_i + \eta_i \cdot t + \tau_t + \varepsilon_{it},$$

where y_{it} is per capita income in country *i* at time *t*, *Exports* is the volume of exports, *PCMAN* is the share of manufactured in total exports, β and γ are coefficients to be estimated, α_i is a country specific effect affecting the level but not the growth of income, η_i is country specific effect affecting both the level and the growth of income, τ_t is a time effect assumed common across the countries and ε_{it} is a residual. Manufactured exports are included in *Exports*, so the interpretation of γ is as a manufacturing specific effect on income. That is, if it is manufacturing exports rather than exports in general that impact on income we would expect the estimate of γ to be positive. If income is 'neutral' to the source of exports, we anticipate $\beta > 0$ and $\gamma = 0$.

We eliminate the country specific levels effects by differencing [1], yielding

$$\Delta_s \ln y_{it} = \beta \cdot \Delta_s \ln Exports_{it} + \gamma \cdot \Delta_s PCMAN_{it} + \eta_i \cdot s + \Delta_s \tau_t + \Delta_s \varepsilon_{it},$$

where Δ_s is the operator for differences of order *s*: $\Delta_s z_t \equiv z_t - z_{t-s}$. The main reason we consider different orders of differences is that taking time differences may aggravate any bias arising from explanatory variables being measured with error. Indeed, if the measurement errors are serially uncorrelated while the true but unobserved values of the explanatory variables are slow changing, estimators based on 'long' differences will be less severely biased than 'short' differenced results (Griliches and Hausman, 1986).

Table 1 shows regression results based on taking first differences, columns [1]-[2], and fifth differences, columns [3]-[5].[2] Columns [1] and [2] suggest that the link between the growth of exports and that of per capita income is at best weak. The estimated coefficient is equal to 0.06, and not significantly different from zero.[3] Further, column [2] suggests that

[2] Using the unit root test for panel data proposed by Ihm et al. (2002) we can reject at the one per cent level of significance that the first differences of *y*, *Exports* and *PCMAN* have unit roots.
[3] The covariance matrix is calculated treating each country as a 'cluster', which means the reported t-statistics are robust to serial correlation of residuals within countries and to heteroskedasticity.

conditional on the volume of exports, growth in the share of manufactured in total exports is negatively associated with income growth. Both these results change, however, when we use five year differences. The results in columns [3] and [4] indicate that if exports grow by one per cent, this is associated with a growth of income of about 0.25 per cent. This effect is significant at the five per cent level. The coefficient on *PCMAN* is now far from significant at conventional levels. In column [5] we lag the exports variable and *PCMAN* by one year. The estimated exports coefficient is now 0.16, and close to significant at the five per cent level (the *p*-value is 0.054). Again, the coefficient on *PCMAN* is insignificant.

There is thus some evidence, particularly from the specifications based on fifth differences, that there is a positive association between growth of income and growth of exports. We believe the specifications in fifth differences may be less susceptible to measurement error bias than those based on first differences. There is no evidence that manufactured exports have a stronger effect on income than other exports. Finally it is noted that the country effects are jointly significant in all specifications, indicating that there is country-specific heterogeneity in the underlying growth rates of these countries. Mauritius, which is the omitted country dummy, has the highest growth effect, followed by Botswana, while Zambia has the lowest underlying growth rate.

These results for the nine African countries on which we have focused are entirely consistent with the wider studies cited above of the positive impact of trade on growth. These studies allow for the endogeneity of trade by a variety of methods and several find that allowing for such endogeneity increases the effects of trade on growth. There is no reason on the basis of these studies to think our estimates overstate the effects of trade on growth.

3 Reasons for the Failure of Exports

What explains poor export performance generally and the poor performance of manufacturing exports in particular? One major factor has been macroeconomic policy, Collier and Gunning (1999a,b). Overvalued exchange rates and constraints on imports can make exporting very unprofitable. A large real overvaluation is a common factor in the dramatic decline in exports

volumes during the 1970s and early 1980s in Ghana, Uganda and Tanzania shown in Figure 4. It was the reversal of these policies that was the key policy that enabled export volume growth to occur. The evidence seems clear that policies which avoid an overvaluation of the real exchange rate are a pre-condition for the growth of exports.

It has been widely argued that another area of policy failure has been in the business environment. This is the issue which Collier (2000) has identified as the high transaction costs facing enterprises in Africa. Some of these costs are induced by inappropriate government policies, some are inherent in doing business in economies where the quality of the infrastructure services is often very poor.

African economies have faced constraints on their ability to export from a combination of poor macro polices and a high cost business environment. Collier (2000) argues that these factors will particularly disadvantage manufactured exports as they are intensive users of these services. Thus poor overall export performance will be matched by poor performance for manufacturing firms. We have noted from the macro data that manufactures remain a very limited presence in African exports. We now consider the evidence for how important is macroeconomic policy, relative to other factors, in explaining success and failure for manufacturing exports in particular.

A comparative study of firms across four African countries, but over a very short time period, found limited evidence that firms responded to real exchange rate changes (see Bigsten et al.1999). Other evidence, based on macro data, suggests that changes in the real exchange rate can have a major impact on manufacturing exports from Africa, Sekkat and Varoudakis (2000). Macro policy which changes the real exchange rate will benefit those firms which export, it will reduce the profitability of firms which are intensive users of imported inputs. So the effects of real exchange rate changes on exporting depends very much on the orientation of the sector. The limited response which has been observed in the micro data may reflect the short time period for which we have data. It may reflect the fact that firms remain oriented to the domestic market and import much of their raw materials which will mean that real devaluation may adversely affect their profitability. Most manufacturing

firms in most African countries remain focused on the domestic market and in this context they are likely to find trade liberalisation and real exchange rate devaluation problematic for their profitability. We turn now to ask of the micro evidence why manufacturing success has been so limited.

4 Exporting and Productivity in African Manufacturing

Why do most manufacturing firms in Africa remain focused on the domestic market? What limits their entry into foreign markets? How can improvements in their access be brought about? These are all questions central to policy making for the manufacturing sector in Africa. In this section we collate micro data for manufacturing firms from five countries – South Africa, Nigeria, Tanzania, Kenya and Ghana and ask, at this micro level, if there is evidence of exporting being linked to firm success.[4]

Summary statistics of key variables are shown in Table 2.[5] The average firm size ranges from 78 employees in Tanzania to 246 in Nigeria, and it is clear from the standard deviations that the size range is quite large. The smallest firm in the sample has one employee, while the largest employs more than 5,000 individuals. Labour productivity, measured by output per employee is highest in the South African sample and lowest in Ghana. These differences in labour productivity are mirrored in capital intensity in that Ghana has the lowest level of capital per employee and South Africa the highest. The export intensity varies substantially across the countries. More than half of the South African firms are exporters, while only eight per cent of the Nigerian firms export. It can be seen in the lower part of the table that exporters are larger, and have a higher level of capital-intensity than non-exporters. Next we turn to multivariate analysis to investigate if we can find a positive association

[4] The comparison uses a sample of firms collated from various surveys of African manufacturing firms, see Rankin, Söderbom and Teal (2002) for a background to the Ghanaian data set, Söderbom (2001) for information on the Kenyan data set, Söderbom and Teal (2002b) for the Nigerian data and Harding, Söderbom and Teal (2002) for the Tanzanian data. The South African data comes from a joint World Bank / Greater Johannesburg Metropolitan Council survey conducted in 1999. This survey includes only firms with over 50 employees and was limited to the Greater Johannesburg Metropolitan Area. All data sets except the South African one contain multiple observations on the same firms over time, i.e. panel data.

[5] In order to compare the data across countries constant price figures for each country are calculated and then converted to USD using the official exchange rates in 1992.

between productivity and exporting once we condition on a set of factor inputs and control variables that may be correlated with productivity and exporting.

The literature discusses two main reasons why exporting and productivity may be correlated: first, relatively productive firms may self-select into the export market; second, firms may become more productive as a result of exporting through a process of learning. Bigsten et al. (2002) analyse these issues using panel data from four African countries and find evidence that causality runs both from productivity to exporting, as predicted by the self-selection hypothesis, and from exporting to productivity, as predicted by the learning-by-exporting hypothesis.[6] Here we do not attempt to analyse directions of causality. Acknowledging that causality may run in both directions we adopt a reduced-form approach and estimate a production function and an export equation simultaneously allowing the residuals of the two equations to be correlated. We extend the work in Bigsten et al (2002) by distinguishing the decision to export within and outside of Africa. This procedure is similar to a SURE approach, although not identical as the export variables are binary. We consider a Cobb-Douglas production function of the form

[2] $$y_{it} = x_{it}\beta + controls_{it} + \eta_{it},$$

where x_{it} is a vector of factor inputs measured in natural logarithms, β is a vector of parameters to be estimated, $controls_{it}$ is a vector of total factor productivity shifters, η_{it} is a homoskedastic, serially uncorrelated and normally distributed residual that captures productivity shocks and $i = 1,2,...,N$ and $t = 1,2,...,T$ are firm and time indices, respectively.[7] Export participation is taken to depend on firm size, capital intensity, summarised by the vector z_{it}, and the same vector of control variables as in [2].[8] Because our exports variables are binary we employ a latent variable formulation and write the export equations as

[6] See also Söderbom and Teal (2000).
[7] The vector of control variables consists of firm age and dummy variables for country, industry, time and for whether there is any foreign ownership in the firm.
[8] Firm size is included in the model to control for the possibility that entering the export market may be associated with fixed costs that are more easily absorbed by large firms. Capital intensity is included in the model to control for the fact that, within these economies, exporting typically requires a relatively capital-intensive production process compared to that used by firms focussing solely on supplying the domestic market.

[3] $expa_{it}^{*} = z_{it}\theta_a + controls_{it} + \upsilon_{it}$,

and

[4] $expna_{it}^{*} = z_{it}\theta_{na} + controls_{it} + \omega_{it}$.

We define $expa_{it} = 1$ if $expa_{it}^{*} \geq 0$, otherwise $expa_{it} = 0$, indicating whether or not there is any exports within Africa; similarly $expna_{it} = 1$ if $expna_{it}^{*} \geq 0$, otherwise $expna_{it} = 0$, indicating whether or not there is any exports outside Africa. Further, θ_a and θ_{na} are vectors of parameters to be estimated, referring to the within-Africa and outside-Africa exports equations, respectively, and υ_{it} and ω_{it} are a homoskedastic, serially uncorrelated and normally distributed residuals whose variances we normalise to one. Finally we allow η_{it}, υ_{it} and ω_{it} to be correlated, reflecting a possibly combined outcome of self-selection of relatively efficient firms into the export market and learning-by-exporting.

In the empirical analysis we normalise the dependent variable and the factor inputs by employment, hence turning the production function into a labour productivity equation. The export equations are estimated by means of probit models. The productivity equation and the probits are estimated simultaneously using maximum likelihood. In doing so we assume all explanatory variables to be exogenous. While this may appear a strong assumption, perhaps particularly for the production function, the available evidence indicates that this is not so. Söderbom and Teal (2002a) estimate production functions based on Ghanaian manufacturing panel data in which all inputs are treated as endogenous, and the instrumental variable results differ little from those based on OLS. Bigsten et al. (2002) obtain a similar result for using data across four countries. Econometric results are presented in Table 3, where the productivity models gross output per employee in column [1a], the export probits are in columns [1b] and [1c] and an equation describing the differences in capital intensity is

presented in column [2].[9] The omitted country dummy in these regressions is Ghana and the omitted industry is wood.

In the output production function, column [1a], there is evidence for mild increasing returns to scale but we cannot reject constant returns to scale at the 1 per cent level. South African firms have the highest average total factor productivity, everything else equal, followed by Ghana. There is no significant difference in underlying productivity for Kenya, Nigeria and Tanzania. The productivity span across countries is such that the average productivity of South African firms is about 36 per cent higher than that of the Nigerian or Kenyan firms. We cannot reject the hypothesis that all sectors have the same level of underlying productivity, everything else equal, and neither is there any evidence that older firms, or firms with any foreign ownership, have significantly higher productivity.

The most important factor which determines whether or not a firm exports, whether regionally or internationally, is its size (Table 3 columns [1a] and [1b]).[10] This finding is consistent with the low volumes of manufactured exports in Africa as most firms are not large. There is no evidence that firm age, which is our proxy for firms' learning, or having some foreign ownership, increases the probability of being in the export market. In contrast capital intensity is positively associated with being in the export market, even if we control for size.

Economic theory suggests that African countries should export labour rather than capital intensive manufactures.[11] We investigate whether there is evidence for such an effect by showing which types of firm are labour intensive and then asking if these types of firms are more likely to export. Table 3 column [2] shows the results of regressing the log of capital intensity on firm size, sector and country dummies. We find that the sectors which have the

[9] Value-added production functions appear to be more common in the literature, however research by Basu and Fernald (1995) shows that adopting a value-added production function can yield misleading results if there is imperfect competition or increasing returns to scale.

[10] Confining attention to firms with more than 100 employees, between 58 and 80 per cent of the firms in Ghana, Kenya and South Africa carry out some exporting. For Tanzania and Nigeria, the corresponding numbers are 39 and 13 per cent, respectively. Pooling the sub-sample of large firms across countries, we find that 57 per cent of the firms do some exporting.

[11] There has been dispute as to whether Africa's factor endowment does permit it to compete in international markets for labour-intensive goods, see Wood and Mayer (1998) and Teal (1999).

lowest capital intensity (ie are the most labour intensive) are the textile sector within South Africa and the garment sector in the other SSA economies.[12] However it is clear that capital intensity increases with firm size. Further controlling for size, older firms and those with some foreign ownership are more capital intensive.

The sector which is labour intensive in SSA is garments (Table 3 column [2]). Relative to all except the omitted sector, which is wood, firms in the garment sector are significantly more likely to export to international markets (Table 3, column [1c]). The wood sector may be exploiting Africa's natural resources, the garment sector its potential cost advantage in labour-intensive products. It will be noted that this pattern cannot be observed for the propensity to export regionally. Here there is no significant differences across sectors in the propensity of firms to export.

Finally the estimated ρ_{ac}, which measure the correlation between the unobserved component of productivity and the unobserved component driving *international* exports, is positive and highly significant. This indicates that, even conditional on factor inputs and control variables, international exports and productivity are correlated. This is consistent with there being a link between unobserved efficiency and exporting. It is noted that while there is a positive correlation between efficiency and exporting within Africa it is not significant.

5 Specialisation and Exporting

So far we have focused on whether the firm exports. We now turn to a consideration as to the extent of specialisation in the export market. Table 4 shows the percentages of output exported both to Africa and outside of Africa for the five countries. The rather striking finding from the data is that these firms tend not specialise in exporting, either to African or non-African markets. The country which specialises most is Ghana. Those Ghanaian firms which do export to international markets export nearly 60 per cent of their output. In fact these exports are mainly from the wood sector.

[12] The South African data set does not distinguish between textiles and garments, hence we define three dummy variables: Garments, SSA; Textile, SSA; Textiles and Garments, South Africa.

The finding that manufacturing firms which export do not specialise in exporting has been found in other studies, see Clerides, Lach and Tybout (1998, Table 1 p.915). One explanation for this lack of specialisation is that exporters face declines in price when they increase exports. This would mean that exporters were limited by the market for their product. If this is the case then either new markets need to be created or actions taken, either by firms or by government, to expand the size of their market. Given the size of exports from Africa to the international market it seems very unlikely that this can be the explanation for most of the products African firms export.

An alternative explanation is that there are rising costs to increasing the supply of exports. Our measure of specialisation may be misleading for international exports. A feature of some of the export products – wood exports from Ghana are an example – is that there is a substantial quality difference between the product sold locally or within the region and those sold to non-African international markets. Our data is insufficiently detailed to assess how far this is the case but if the quality of the product to be sold internationally is much higher than the local product there may actually be quite high specialisation hidden in the data for international exports. Such exports may be limited by the much higher costs of producing goods of sufficient quality for the international market.

If this is so then the logic of being able to enter the export market is to produce goods intensive in the abundant factor which for manufacturing in Africa is clearly labour. We noted above that the distinction between exporting within Africa and outside of Africa was of importance in understanding which sectors are oriented to exporting. Garment firms in SSA were more likely than all other sectors except wood to enter the international market for exports. In order to present a more complete description of the factors correlated with export specialisation we run OLS equations for the percentage of output exported to both regional and international markets.[13]

[13] We note that these regressions cannot be given any causal interpretation. We have not allowed for endogeneity or the selectivity problems that arise in any causal interpretation of the regression.

We find a remarkable similarity in the sectoral effects of percentage exported to that which we have already observed in the export decision. For the regional market there are no significant sectoral effects. Indeed there are no significant effects from any of the variables in the regression and at the one per cent significance level we cannot reject the hypothesis that the coefficients are jointly zero. However the percentage exported by the garment sector to the international market is higher than any other sector with the exception of wood (the omitted sector), exactly the same pattern as was observed in the propensity to export. Thee is no evidence either for regional or international exports that the efficiency of the firms (the TFP measure) positively impacts on the percentage exported. The same is true both of size and capital intensity. It seems clear that the factors influencing the degree of specialisation differ from those affecting the export decision.

The data suggest that the most internationally oriented sector is the natural resource sector wood. Across the other sectors it is firms in the garment sector which are both more likely to export internationally and more likely to export a higher percentage of their output to international markets. This finding suggests that, for exports from the labour-intensive sector, it is the international not the regional export market that is important.

The data also reveal the nature of the dilemma facing the manufacturing sector in these African countries. Cost advantage depends in the international market on using low cost labour. However exporting is much more likely in large firms which are relatively capital intensive, so the size and the sectoral effects work against each other if the objective is to achieve labour intensive manufacturing exports.

6 Conclusions

In this paper we have sought to address a general question – are manufacturing exports the key to economic success in Africa – by looking in detail at a sample of nine African countries which cover the range of outcomes observed in Africa from rapid success to long term failure. The latter outcome has been far more common in Africa that the former. The two most

successful economies in Africa have been Mauritius and Botswana. We have set these two economies in the context of seven others and asked if long run income growth over the period from the 1970s to the 1990s is closely linked to their export performance. We found a close link. We also found no evidence that it is manufacturing exports rather than exports in general that impact on income.

With the exception of Mauritius no country in Africa has been able to develop a pattern of rapid growth of manufactured exports. In the latter part of the paper we presented micro evidence for manufacturing export performance drawing on a pooled sample of firms across Nigeria, South Africa, Tanzania, Ghana and Kenya. Contrary to what is often believed most large firms (meaning those with more than 100 employees) do some exporting. The fact remains that most firms in Africa are small and these do not export. We have argued that the efficiency with which firms operate is an important element in their ability to enter the export market. The most recent evidence from Africa suggests there is learning from exporting as well.

In this paper we have extended evidence from earlier papers by modelling the export decision within and outside of Africa. We found substantial differences. It seems clear that it is international, not regional, markets that are the key to enabling African countries to develop labour intensive exports There was for the international market evidence that the garment sector was relatively successful both in entering the export market and in the percentage of their output exported. However garment firms tend to be small and we have found that size is an important factor in enabling firms to export. Thus success is limited by the fact that the potential cost advantages of exporting goods whose technology is labour intensive is offset by the increases in capital intensity with firm size. There are obvious reasons why large firms are going to be able to export at lower cost than small ones. The key to success is to enable larger firms to be relatively more labour intensive than is the case at present.

References

Basu, S. and J. G. Fernald, 1995, "Are apparent productive spillovers a figment of specification error?" *Journal of Monetary Economics* 36, 165-188.

Bigsten, A., P. Collier, S. Dercon, M. Fafchamps, B.Gauthier, J.W. Gunning, J. Habarurema, A. Isaksson, A. Oduro, R. Oostendorp, C. Pattillo, M. Söderbom, F.Teal and A. Zeufack, 1999, "Exports of African manufactures: Macro Policy and firm behaviour", *Journal of International Trade and Development* 8, 53-71.

Bigsten, A., P. Collier, S. Dercon, M. Fafchamps, B. Gauthier, J. W. Gunning, A. Isaksson, A. Oduro, R. Oostendorp, C. Pattillo, M. Söderbom , F. Teal and A. Zeufack, 2002, "Do African manufacturing firms learn from exporting?" CSAE Working Paper WPS/2002-09.

Clerides S., S. Lach and J. Tybout, 1998, "Is learning by exporting important? Micro-dynamic evidence from Colombia, Mexico and Morocco," *Quarterly Journal of Economics* 113, 903-948.

Collier, P., 2000, "Africa's comparative advantage", chapter 2 in H. Jalilian, M.Tribe and J. Weiss (eds.), *Industrial Development and Policy in Africa*, Edward Elgar, Cheltenham, UK.

Collier, P. and J. W. Gunning, 1999a, "Explaining African economic performance", *Journal of Economic Literature* 37, 64-111.

_____, 1999b, "Why has Africa grown slowly", *Journal of Economic Perspective* 13, 3-22.

Edwards, S., 1998, "Openness, productivity and growth: what do we really know?" *The Economic Journal* 108, pp. 383-398.

Frankel, J. A. and D. Romer, 1999, "Does trade cause growth?" *American Economic Review*, Vol. 89, No. 3, June : 379-399.

Greenaway, D., W. Morgan and P. Wright, 2002, "Trade liberalisation and growth in developing countries," *Journal of Development Economics* 67, pp. 229-244.

Griliches, Z. and J.A. Hausman, 1986, "Errors in variables in panel data," *Journal of Econometrics,* 31, 93-118.

Harding, A., M. Söderbom and F. Teal, 2002, "The Tanzanian Manufacturing Enterprise Survey 2002": http://www.economics.ox.ac.uk/CSAEadmin/reports/.

Im, K. S., M. H. Pesaran and Y. Shin, 2002, "Testing for Unit Roots in Heterogeneous Panels," mimeo, University of Cambridge.

Irwin, D. A. and M. Terviö, 2002, "Does trade raise income? Evidence from the twentieth century," *Journal of International Economics* 58, 1-18.

Milner, C. and P. Wright, 1998, "Modelling labour market adjustment to trade liberalisation in an industrialising economy," *The Economic Journal* 108, 509-528.

Rankin, N., M. Söderbom and F. Teal, 2002, "The Ghanaian Manufacturing Enterprise Survey 2000" http://www.economics.ox.ac.uk/CSAEadmin/reports.

Sekkat, K. and A. Varoudakis, 2000, "Exchange rate management and manufactured exports in sub-Saharan Africa," *Journal of Development Economics* 61, 237-253.

Söderbom, M., 2001, "Constraints and Opportunities in Kenyan Manufacturing: Report on the Kenyan Manufacturing Enterprise Survey 2000," available from http://www.economics.ox.ac.uk/CSAEadmin/reports/main.html.

Söderbom, M., and F. Teal, 2000, "Skills, investment and exports from manufacturing firms in Africa," *Journal of Development Studies*, 37, 13-43.

_____, 2001, "Trade and human capital as determinants of growth," CSAE Working Paper WPS/2001.10.

_____, 2002, "Size and Efficiency in African Manufacturing Firms: Evidence from Firm-Level Panel Data", CSAE Working Paper, WPS 2002-07.

_____, 2002, "The Performance of Nigerian Manufacturing Firms: Report on the Nigerian Manufacturing Enterprise Survey 2001," available from http://www.economics.ox.ac.uk/CSAEadmin/reports/main.html.

Teal, F., 1999, "Why can Mauritius export manufactures and Ghana not?" *The World Economy* 22, 981-993.

Wood, A. and J. Mayer, 1998, "Africa's export structure in a comparative perspective," Study No. 4, African Development in a Comparative perspective, UNCTAD, Geneva.

TABLE 1

EXPORTING AND INCOME GROWTH IN NINE AFRICAN COUNTRIES

	Dependent variable: Δ_1 ln Per Capita Income$_t$		Dependent variable: Δ_5 ln Per Capita Income$_t$		
	[1]	[2]	[3]	[4]	[5]
Δ_1 ln Exports$_t$	0.06 (1.10)	0.06 (1.15)			
Δ_1 PCMAN$_t$ / 100		-0.39 (2.43)*			
Δ_5 ln Exports$_t$			0.22 (2.96)*	0.23 (3.00)*	
Δ_5 PCMAN$_t$				-0.06 (0.36)	
Δ_5 ln Exports$_{t-1}$					0.16 (2.26)$^+$
Δ_5 PCMAN$_{t-1}$					0.06 (0.36)
Botswana	-0.01 (3.29)*	-0.02 (3.37)**	-0.05 (87.93)**	-0.05 (2.45)*	-0.05 (2.39)*
Ghana	-0.02 (6.14)**	-0.03 (6.04)**	-0.12 (4.76)**	-0.12 (3.46)**	-0.13 (3.81)**
Kenya	-0.03 (6.31)**	-0.04 (6.27)**	-0.11 (5.29)**	-0.12 (3.59)**	-0.13 (4.26)**
Nigeria	-0.04 (9.85)**	-0.05 (8.47)**	-0.17 (7.53)**	-0.18 (4.81)**	-0.18 (5.37)**
South Africa	-0.04 (10.85)**	-0.04 (10.88)**	-0.16 (8.69)**	-0.17 (6.94)**	-0.18 (7.57)**
Tanzania	-0.03 (5.99)**	-0.04 (6.02)**	-0.11 (3.69)**	-0.12 (2.68)*	-0.13 (3.12)*
Uganda	-0.02 (10.37)**	-0.03 (7.19)**	-0.14 (7.43)**	-0.14 (4.36)**	-0.14 (4.13)**
Zambia	-0.06 (11.34)**	-0.07 (10.46)**	-0.25 (7.49)**	-0.26 (5.67)**	-0.28 (6.47)**
Observations	216	216	216	216	216
R-squared	0.17	0.18	0.47	0.47	0.42

Note: Dummy variables for year are included in all regressions. The numbers in ( ) are t-statistics. The estimated covariance matrix is robust to heteroskedasticity and intra-country autocorrelation. Significance at the 1 per cent, 5 per cent and 10 per cent level is indicated by *, ** and $^+$ respectively.

TABLE 2

MANUFACTURING FIRMS IN FIVE AFRICAN COUNTRIES: SUMMARY STATISTICS

	Ghana	Kenya	Nigeria	South Africa	Tanzania
A. All Firms					
Employment	82.86	110.07	246.31	206.09	77.64
	179.74	*247.39*	*753.79*	*289.43*	*226.87*
ln Ouput / Employment	8.15	8.90	8.46	10.55	8.23
	1.24	*1.28*	*1.48*	*0.67*	*1.36*
ln Capital / Employment	7.09	8.62	8.24	9.69	7.61
	2.01	*1.72*	*2.12*	*1.21*	*1.87*
Any Exports	0.19	0.35	0.08	0.70	0.17
Firm Age	18.37	20.98	20.19	76.56	16.50
	11.96	*13.66*	*10.44*	*17.62*	*13.23*
Any Foreign Ownership	0.21	0.18	0.24	0.22	0.21
Food	0.24	0.22	0.09	0.08	0.23
Metal	0.23	0.26	0.31	0.75	0.29
Textile	0.03	0.08	0.22	0.05	0.07
Garment	0.19	0.19	0.28	0.00	0.12
B. Exporters Only					
ln Capital / Employment	8.55	9.68	8.92	9.72	8.96
	1.49	*1.10*	*1.69*	*1.28*	*1.67*
Employment	209.39	231.09	1191.95	236.93	230.90
	252.66	*360.67*	*1902.44*	*300.97*	*456.20*
Observations	919	722	255	179	547
(Firms)	(202)	(321)	(109)	(179)	(198)

Note: All financial variables are measured in constant 1992 USD. Numbers in regular fonts are mean values and numbers in *italics* are standard deviations. Standard deviations are not reported for dummy variables.

TABLE 3

FIRM-LEVEL ANALYSIS OF PRODUCTIVITY AND EXPORTING IN FIVE AFRICAN COUNTRIES

	[1a] Prod. Function	[1b] Export Probit Within Africa	[1c] Export Probit Outside Africa	[2] ln Capital / Employment
ln Capital / Employment	0.04	0.16	0.10	
	(4.31)**	(4.02)**	(2.32)*	
ln Raw Material / Employment	0.67			
	(43.31)**			
ln Indirect Costs / Employment	0.18			
	(14.43)**			
ln Employment	0.02	0.33	0.34	0.49
	(2.35)*	(5.52)**	(6.13)**	(12.02)**
Firm Age / 100	0.12	-0.10	-0.10	0.01
	(1.80)$^{+}$	(0.27)	(0.23)	(3.37)**
Any Foreign Ownership	0.04	0.22	0.14	0.49
	(1.46)	(1.21)	(0.96)	(3.52)**
Food	-0.01	-0.26	-0.85	0.59
	(0.13)	(1.21)	(4.27)**	(2.94)**
Metal	0.00	0.24	-1.47	0.18
	(0.04)	(1.25)	(7.38)**	(0.90)
Textile, SSA	-0.09	0.36	-0.93	0.19
	(1.48)	(1.35)	(3.39)**	(0.83)
Garment, SSA	0.04	0.16	-0.49	-0.69
	(0.81)	(0.67)	(2.00)*	(2.94)**
Textile, South Africa	-0.07	0.37	-1.51	-1.37
	(0.94)	(0.40)	(2.59)**	(3.04)**
Furniture	0.04	-0.23	-1.13	-0.55
	(0.73)	(0.86)	(4.87)**	(2.63)**
Kenya	-0.10	0.71	-0.31	1.39
	(3.16)**	(3.57)**	(1.75)$^{+}$	(9.76)**
Tanzania	-0.08	0.27	-0.27	0.59
	(2.57)*	(1.40)	(1.35)	(3.51)**
Nigeria	-0.10	-0.82	-0.71	1.01
	(2.45)*	(3.27)**	(2.39)*	(4.68)**
South Africa	0.22	0.93	0.92	0.90
	(3.71)**	(3.79)**	(3.07)**	(3.30)**
Residual Correlations[$]:	$\rho_{ac} = 0.08$	$\rho_{ab} = 0.05$	$\rho_{bc} = 0.46$	
	(2.38)*	(1.43)	(7.04)**	
Log likelihood value		-2679.2		
R^2				0.47
Observations		2662		2662

Table notes on the next page.

Note: The three equations [1a]-[1c] were estimated simultaneously using maximum likelihood, whereas equation [2] was estimated using OLS. Dummy variables for time are included in all regressions. The numbers in ( ) are t-statistics based on standard errors robust to heteroskedasticity and intra-firm autocorrelation. Significance at the 1 per cent, 5 per cent and 10 per cent level is indicated by **, * and [+] respectively.

[$] ρ_{ac} is the estimated correlation between the residuals in equation [1a], i.e. the production function and [1c], the probit for exports outside Africa. Similarly ρ_{ab} is the estimated correlation between the residuals in equation [1a] and [1b], the probit for exports within Africa and ρ_{bc} is the estimated correlation between the residuals in equation [1b] and [1c].

TABLE 4

EXPORTING MANUFACTURING FIRMS IN FIVE AFRICAN COUNTRIES: SUMMARY STATISTICS

	Ghana	Kenya	Nigeria	South Africa	Tanzania
Conditioning on some exports within Africa:					
Percentage Exported	17.5	20.7	23.0	12.3	15.3
Within Africa	*22.2*	*20.3*	*21.9*	*15.8*	*13.4*
Firm Characteristics					
Ln Employment	4.9	4.6	4.6	5.1	4.2
	1.3	*1.2*	*2.1*	*0.9*	*1.4*
ln Capital / Employment	8.5	9.7	8.6	9.8	8.9
	1.6	*1.1*	*1.7*	*1.3*	*1.5*
Firm Age	20.2	23.2	22.7	75.4	20.6
	10.7	*11.9*	*8.2*	*17.3*	*16.5*
Any Foreign Ownership	0.49	0.35	0.36	0.26	0.38
	0.50	*0.48*	*0.49*	*0.44*	*0.49*
Number of observations	80	170	14	100	63
Conditioning on some exports outside Africa:					
Percentage Exported	60.1	37.1	38.1	13.9	36.8
Outside Africa	*34.8*	*37.9*	*41.3*	*19.3*	*37.5*
Firm Characteristics					
Ln Employment	4.6	5.2	4.2	5.1	4.1
	1.2	*1.4*	*2.6*	*0.9*	*1.5*
ln Capital / Employment	8.5	9.9	8.1	9.8	8.6
	1.5	*1.2*	*0.6*	*1.2*	*1.5*
Firm Age	19.7	24.8	25.2	73.0	23.0
	11.0	*16.3*	*6.2*	*17.6*	*17.4*
Any Foreign Ownership	0.42	0.34	0.27	0.32	0.31
	0.49	*0.48*	*0.47*	*0.47*	*0.47*
Number of observations	125	58	11	71	42

Note: All financial variables are measured in constant 1992 USD. Numbers in regular fonts are mean values and numbers in *italics* are standard deviations.

TABLE 5

FIRM-LEVEL ANALYSIS OF PERCENTAGE EXPORTED IN FIVE AFRICAN COUNTRIES

	Ln (Percentage Exported Within Africa)	Ln (Percentage Exported Outside of Africa)
ln Capital / Employment	-0.02	0.04
	(0.28)	(0.49)
ln Employment	-0.04	-0.06
	(0.58)	(0.53)
Firm Age / 100	-0.28	-1.6
	(0.52)	(2.25)*
Any Foreign Ownership	0.01	0.19
	(0.05)	(0.76)
Food	0.07	-0.76
	(0.23)	(1.86)$^{+}$
Metal	0.02	-1.44
	(0.06)	(2.76)**
Textile, SSA	0.36	-1.76
	(1.15)	(2.89)**
Garment, SSA	0.35	-0.49
	(1.03)	(1.34)
Textile, South Africa	0.25	-1.03
	(0.60)	(1.61)
Furniture	-0.13	-0.92
	(0.39)	(1.98)*
Kenya	0.21	-0.03
	(0.83)	(0.06)
Tanzania	0.09	-0.27
	(0.32)	(0.60)
Nigeria	-0.04	-0.11
	(0.07)	(0.16)
South Africa	-0.21	0.31
	(0.49)	(0.49)
TFP (a)	-0.03	-0.26
	(0.14)	(1.65)
Number of Observations	427	307
R^2	0.09	0.36

The numbers in ( ) are t-statistics based on standard errors robust to heteroskedasticity and intra-firm autocorrelation. Significance at the 1 per cent, 5 per cent and 10 per cent level is indicated by **, * and $^{+}$ respectively.

(a) TFP is total factor productivity measured as the residuals from the output production function reported in Table 3.

Macro Data Appendix

Export Volumes Index. This is a per capita volume index number based on 1974=100. The index is based on the figures from constant price exports number from the GDP data given in the World Bank Development Indicators for various years deflated by the population figures from the same source.

GDP per Capita, PPP (in $ 1995): the most recent data is from the World Bank Development Indicators for 2001, this has been linked to the series available from the PENN World Tables 5.6 back to 1970 using 1995 prices. The World Bank definition is as follows: GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

Exports Values per Capita in US$ (1995 prices): this series is obtained from the US$ denominated values of the exports from the World Bank Development Indicators, divided by the population number from the same source to create the per capita figure. This nominal number is then deflated by the price index for the US GDP based on 1995=100. These figures are thus "real" US $ figures and implicitly use official not PPP exchange rates.

Real Export Prices: these figures are obtained by dividing the export values figures by the export volume index, both on a per capita basis.

Manufactured Exports per capita at US$ (1995 prices): The World Bank Development Indicators gives the percentage of merchandise exports which are manufactures. These percentages have been used to provide figures for the levels of manufactured exports. These data which are in US$ are divided by population and then deflated by the US GDP price deflator.

Figure 1: Export Volumes Index (1974=100)

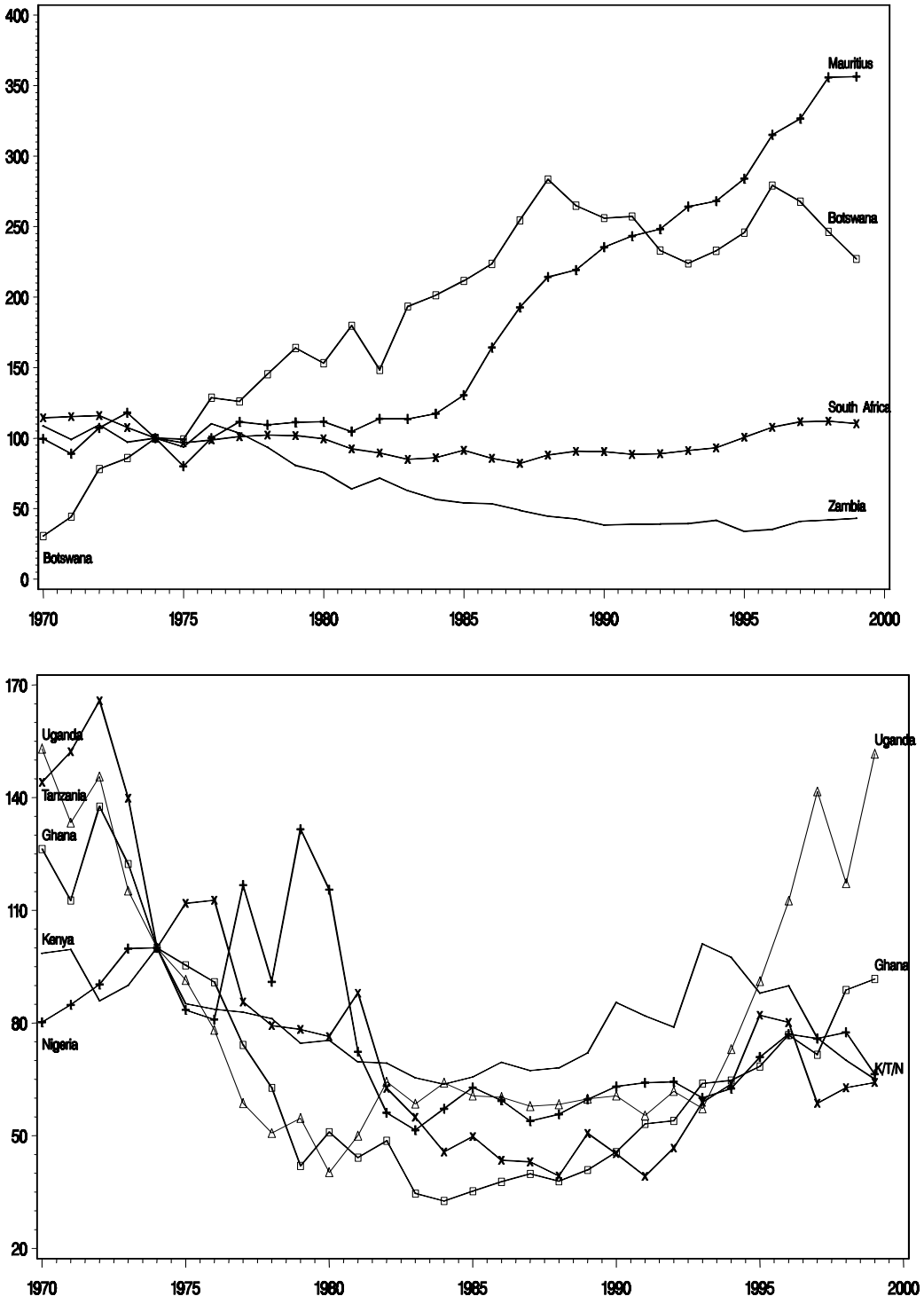
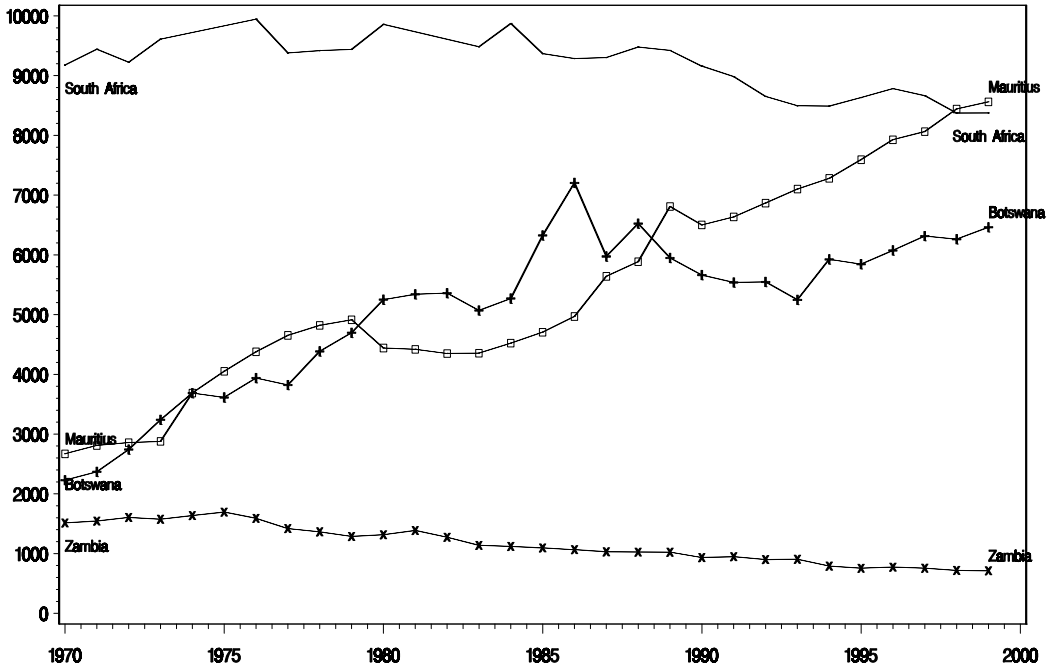


Figure 2: GDP per Capita, PPP (in $ 1995)



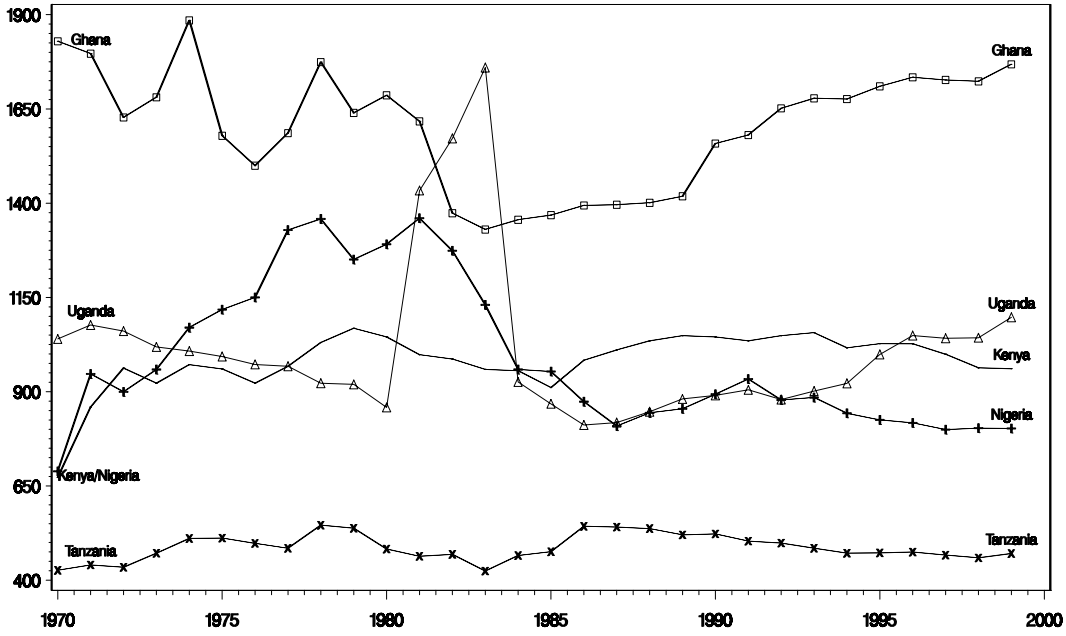


Figure 3: Exports Values per Capita in US$ (1995 prices)

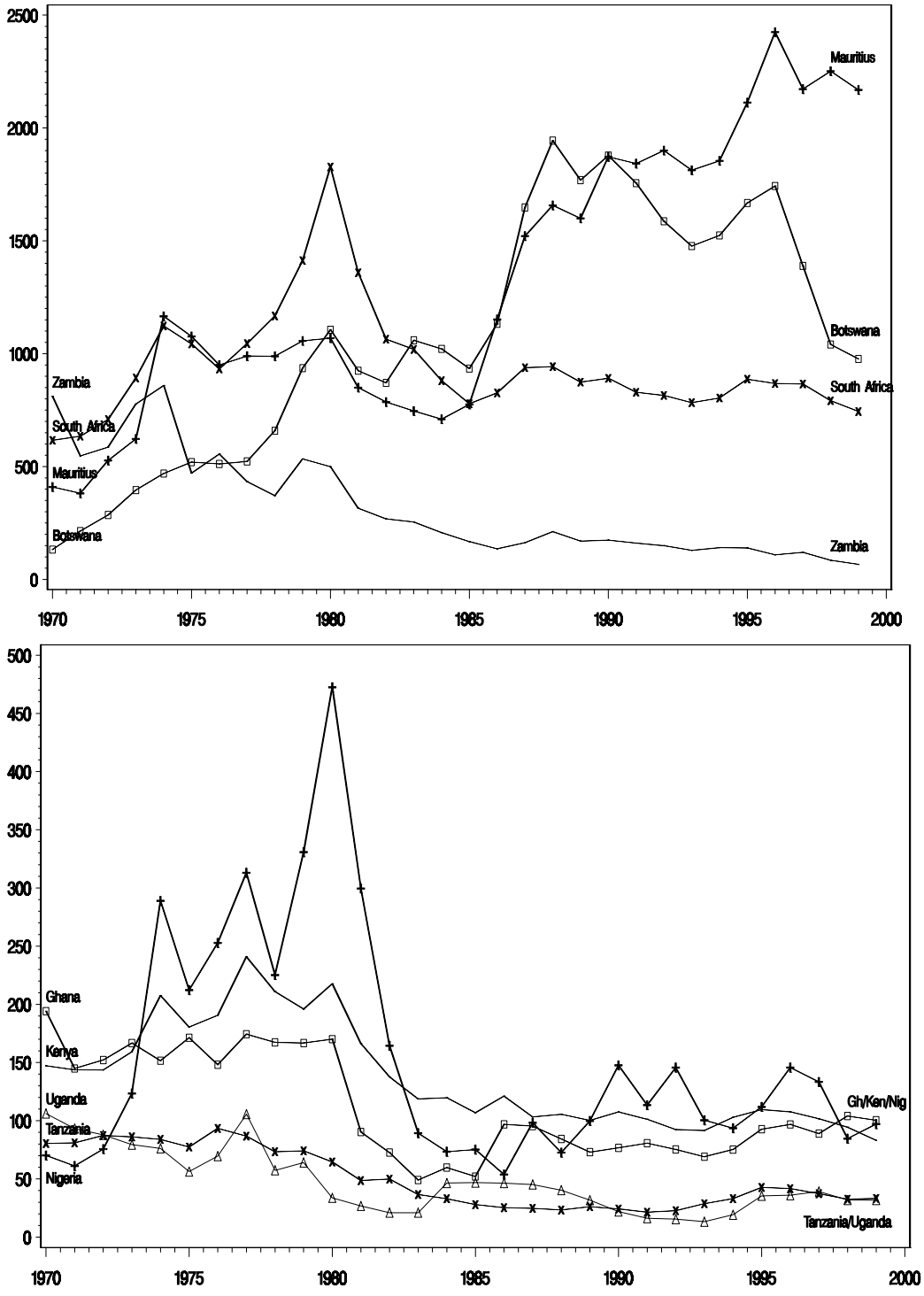
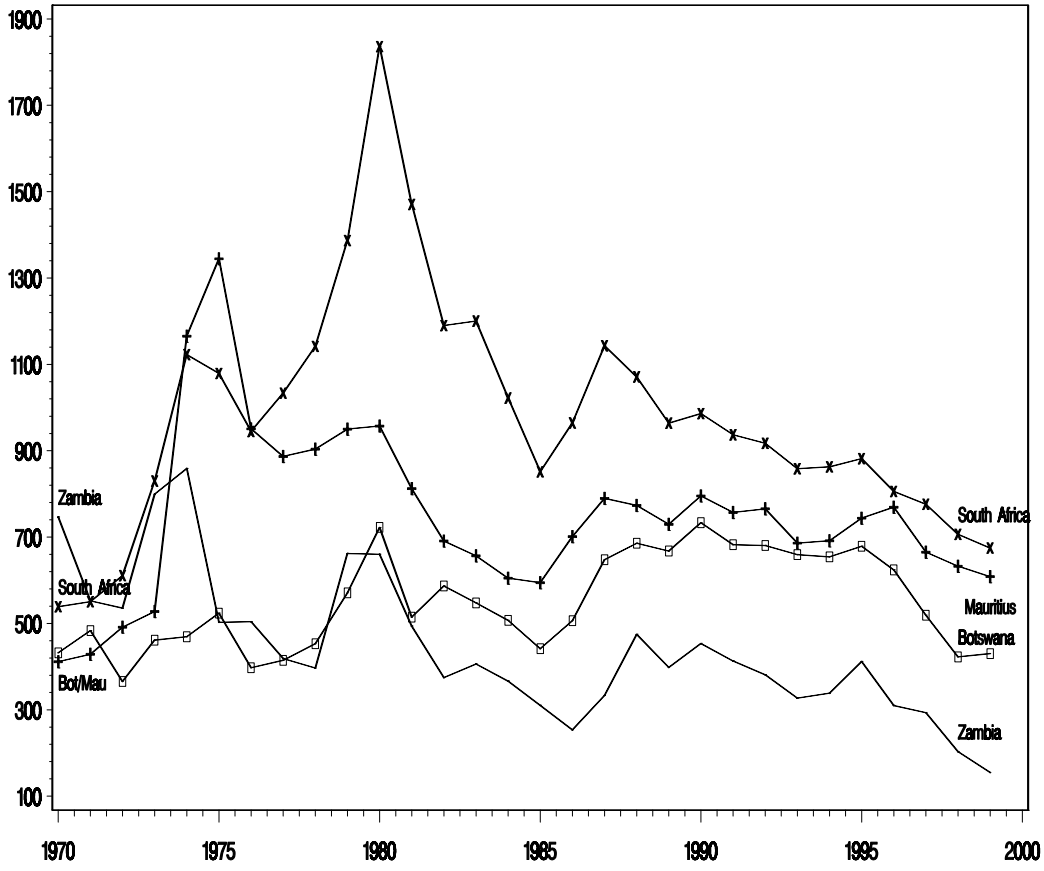


Figure 4: Real Export Prices



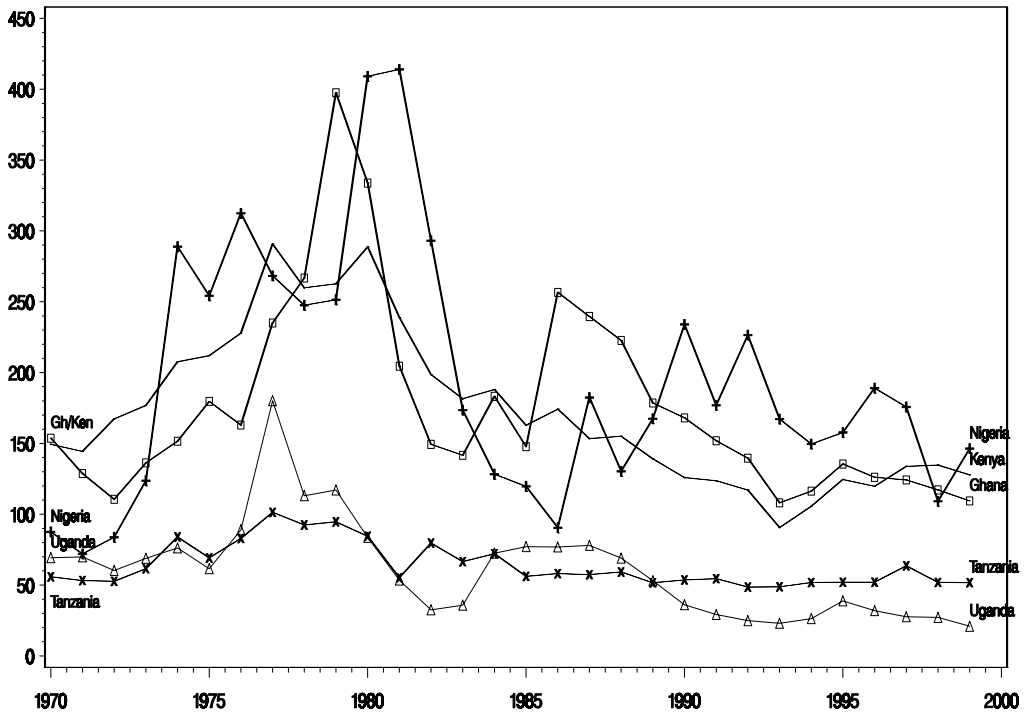
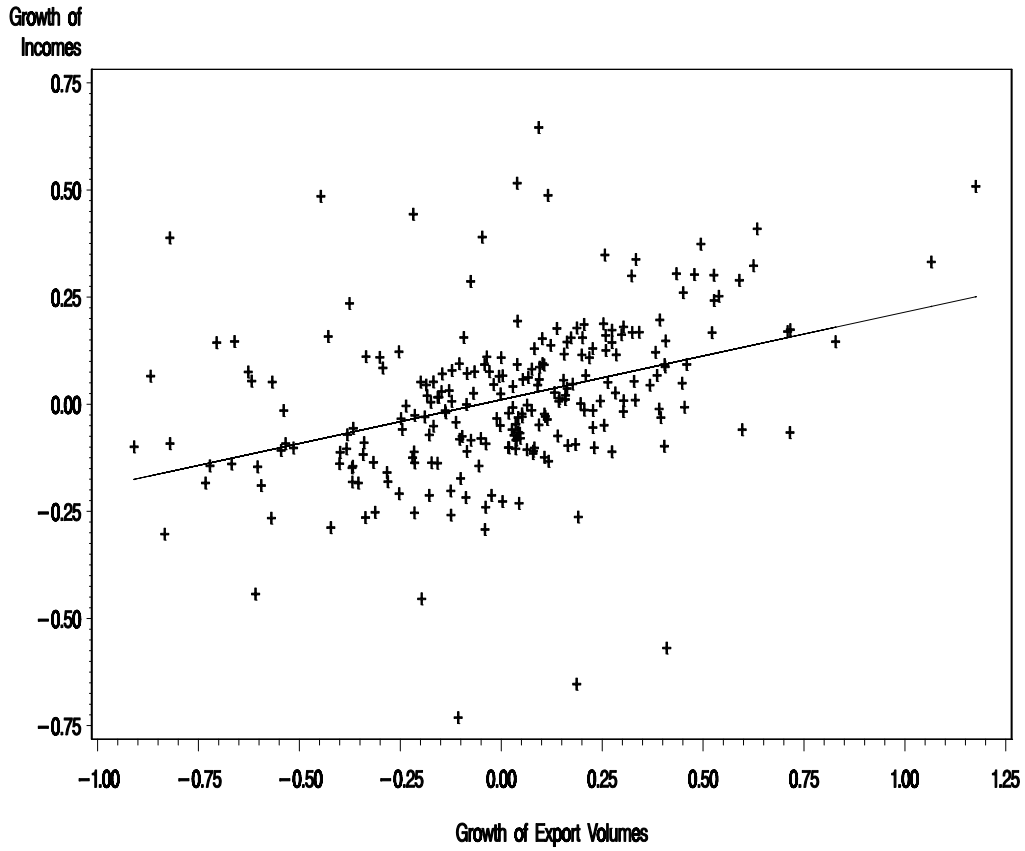


Figure 5: Growth of Incomes and Export Volumes *



*Incomes are GDP (PPP) per capita at 1995 prices. Export volumes are constant price volume figures. The growth rate of both incomes and exports are fifth period differences. The growth rate of exports is lagged one period.

The line shown is the predicted value of the regression

$$\text{Ln}\,(Y)_{it} - \text{Ln}(Y)_{i,t-5} = \alpha + \beta\,[\text{Ln}\,(X)_{i,t-1} - \text{Ln}\,(X)_{i,t-6}],$$

where Y is income and X is exports as already defined.

Figure 6: Manufactured Exports per capita at US $ (1995 prices)