

# Exports of African manufactures: macro policy and firm behaviour

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## Abstract

Macro policy has changed the real exchange rates for African countries dramatically in the 1990s. In this paper the possible impact of macroeconomic policy on firms in the manufacturing sector is considered based on a panel survey of such firms in Cameroon, Kenya, Ghana and Zimbabwe. The data show that most large African manufacturing firms do export, but most do not specialize in exporting. An export equation is estimated both for the propensity of the firms to export and the percentage of output exported. It is shown that a stable export function can be estimated for all four countries over the three rounds of the survey. While there is no evidence that real devaluations have effected a general rise in manufactured exports there is evidence from the surveys of a rise in the percentage of output exported from the Cameroon. Reasons for the lack of a general response to macro policy are suggested. In the Cameroon, large firms did increase their propensity to export. Understanding the links between macro policy and firm performance may require an understanding of how such policies impact on different types of firms.

## Keywords

Export performance, export incentives, African manufacturing

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## **1. INTRODUCTION**

In this paper a large, multi-country, African firm-level data set is used to analyse the characteristics and performance of African manufacturing firms in export markets. Africa has yet to break into the world market in manufactures on any scale. The extensive trade liberalization and macroeconomic policy changes of the last decade have had, as one of their objectives, facilitating the growth of manufacturing exports. While the macro data on manufacturing exports has been extensively investigated (Wood, 1994; Wood and Berge, 1997 and Owens and Wood, 1997), relatively little is known about export performance at the firm level in sub-Saharan Africa.<sup>1</sup> In firm level studies of other developing countries it has been found that sunk costs are important in determining the firm's response to export incentives (Roberts and Tybout, 1995). Such a finding implies that even if macroeconomic liberalization were to make exporting profitable the response may be modest unless profitability crosses the threshold at which firms are willing to invest in exporting.

The objective in this paper is to consider the possible links between macroeconomic policy and firm performance. The data are drawn from a comparable panel of firms in the Cameroon, Ghana, Kenya and Zimbabwe for the period 1991–95. In each country a sample was drawn from the major sectors within manufacturing. This enables a comparison to be made across sectors, across countries and over (albeit a short) time period. Over this period the pace of trade and exchange rate liberalization differed markedly between the countries. The cross country and panel dimensions of the study enable us to assess whether these macro policy changes had a measurable impact on the performance of manufacturing exports.

In the next section we compare the evolution of trade and exchange rate policies during the period. In Section 3 we discuss the pattern of manufacturing exports that emerges from the survey. The decision to export, and the amount of output exported, are modelled in Section 4. The role of macro policy in this process is considered in Section 5. A final section concludes.

## **2. TRADE AND EXCHANGE RATE POLICIES IN THE FOUR COUNTRIES**

In order to compare the impact of trade and exchange rate policies on the competitive position of firms in the four countries we need a summary measure of the relative prices generated by these policies. A particularly suitable such measure is the Dollar-Index derived from the Penn World Tables data (Dollar, 1992). This index measures the degree to which the domestic prices of non-tradable goods are above or below normal international levels controlling for the country's income level. If the index is above 100 the export sector is at a disadvantage through over-valuation and, conversely, if the index

is below 100, it is at an advantage through under-valuation.<sup>2</sup> The Dollar Index for 1992 for each of the five countries provides us with a cross-section comparison. However, to compare changes over the period of the surveys we need more recent data and for this we utilize IMF data on real effective exchange rates. Thus, if the real effective exchange rate depreciates by 20 per cent between 1992 and 1995, the Dollar Index for 1992 is multiplied by 0.8 to yield a relative price estimate for 1995. This is a reasonable procedure because the main advance of the Dollar Index over an index of the real effective exchange rate is its capacity to make inter-country comparisons. The resulting index is shown in Table 1, survey years used in the subsequent analysis being shown in italics.

The trade and exchange rate policy environment facing firms in the opening round of the survey differed greatly across countries, with by far the most hostile environment for exports being the Cameroon and the most favourable Kenya. The scale of the difference between the environment in Cameroon and Kenya was massive. The 50 per cent devaluation of the CFA franc in 1994 only halved the initial gap: in effect, there would have needed to be a further 50 per cent devaluation before Cameroon approximated the initial Kenyan environment. There is also substantial variation in the change in the index between the first and most recent survey rounds: in three countries exports

Table 1 Trade and exchange rate policies compared

	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>
Cameroon	<b>240.9</b>	<b>229.8</b>	214.3	143.0	162.9
Ghana	<b>108.8</b>	<b>97.0</b>	84.2	69.3	79.7
Kenya	<b>72.5</b>	<b>70.0</b>	61.0	76.6	75.8
Zimbabwe	<b>121.1</b>	<b>112.5</b>	105.8	102.9	95.6

In the figures above for 1991 and 1992 the Dollar Index is shown (in bold), as supplied from unpublished computations on Penn World Tables data by David Dollar. For subsequent years the 1992 Dollar Index has been chain-indexed to the real effective exchange rate. For Cameroon this is published in *International Financial Statistics, Yearbook, 1996*. For the other three countries it has been supplied by IMF and World Bank country economists. The first round and latest round years of the surveys in each country are shown in italics. The figures below show the percentage change in the Dollar index between the first and third round of the surveys.

	<i>Cameroon</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Zimbabwe</i>
Dollar Index Round 1	214.3	108.8	70.0	112.5
Dollar Index Round 3	162.9	84.2	76.6	102.9
Percentage change (%)	-24	-23	9	-9

became more competitive, and in one they became less competitive. In Section 5 below we test to see if the variation shown in the index influences the exports of the manufacturing sector.

### **3. THE PATTERN OF EXPORTS FROM AFRICA'S MANUFACTURING SECTOR**

In this section we examine firm export performance across the countries in the sample and across sectors within the countries. Tables 2 and 3 present the data from the survey for the characteristics of the exporting firms in the first round of the survey. Our objective is to explain exporting and to assess the extent of changes in exporting pattern over the three years of the survey. We will analyse firm performance in terms of 'export orientation'. We define export orientation as the percentage of output (by value) which is exported. For many firms the export orientation is zero. In particular, because of the possibility of threshold effects, it is useful to distinguish both between non-exporters and exporters, on the one hand, and between exporting firms with different degrees of export orientation, on the other. Table 2 shows both these dimensions of export orientation.

Focusing first upon the proportion of firms which export, across all four countries the percentage of firms which were exporters in the first round of the surveys was 31 per cent. However, this percentage varies greatly across countries. In the Zimbabwean sample, just over half of the firms export, in Ghana less than 10 per cent. How can this be explained? Table 3 provides part of the answer by disaggregating the data according to firm size. Large firms are those defined as having more than 100 employees. It is clear from the cross-tabulation (and will be confirmed in the econometric analysis of the next section) that most exporting is done by large firms. If attention is confined to large firms across all four countries, then 71 per cent export. Hence, although most African manufacturing firms do not export, which might indeed be inferred from macroeconomic data on the low level of African manufactured exports, the microeconomic evidence reveals the more surprising result that most large firms do export.

Now consider the proportion of output which is exported for those firms which are exporting at least some of their output. Table 2 reveals another important part of the pattern which the macro evidence misses. Most firms do not specialize in exporting. For firms which do export, on average, they export only 26 per cent of their output and this percentage varies relatively little across the countries. Discussions of the problems facing potential exporters in Africa frequently assume that the problem is enabling them to break into export markets. The micro data from the survey suggest that this is not the problem at all. Most large firms in Africa's manufacturing sector do export. The problem is to explain why they export, on average, less than 30 per cent of their output.

Table 2 The proportion of firms exporting and the percentage exported by sector and country in the first round of the survey

Sector		Country				
		Cameroon	Ghana	Kenya	Zimbabwe	All
Food	<i>N</i>	21	29	17	25	92
Percentage exporting		24	0	35	48	25
Percentage exported if firm exports		21	na	54	8	23
Furniture	<i>N</i>	9	21	21	13	64
Percentage exporting		11	14	24	38	22
Percentage exported if firm exports		10	24	27	24	24
Garments	<i>N</i>	4	25	15	29	73
Percentage exporting		0	0	7	59	25
Percentage exported if firm exports		na	na	30	34	33
Metal	<i>N</i>	32	27	26	21	106
Percentage exporting		41	11	35	67	37
Percentage exported if firm exports		28	10	17	15	19
Textile	<i>N</i>	6	na	9	23	40
Percentage exporting		50	na	33	57	48
Percentage exported if firm exports		11	na	18	18	17
Wood	<i>N</i>	7	4	12	3	42
Percentage exporting		71	75	17	33	61
Percentage exported if firm exports		83	67	15	30	
All	<i>N</i>	79	108	100	114	401
Percentage exporting		34	8	26	54	31
Percentage exported if firm exports		34	34	28	20	26

*N* is the number of observations.

**Table 3** The proportion of firms exporting and the percentage exported by size and country in the first round of the survey

<i>Sector</i>		<i>Country</i>				<i>All</i>
		<i>Cameroon</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Zimbabwe</i>	
Large	<i>N</i>	17	12	25	62	116
Percentage exporting		76	58	56	78	71
Percentage exported if firm exports		40	40	28	23	28
Percentage exported		30	24	16	18	20
Medium	<i>N</i>	21	19	27	25	92
Percentage exporting		38	0	41	52	35
Percentage exported if firm exports		22	na	29	11	20
Percentage exported		8	0	12	6	7
Small	<i>N</i>	33	61	26	21	141
Percentage exporting		15	2	0	5	4
Percentage exported if firm exports		26	5	na	0.5	19
Percentage exported		4	8	0	0.02	1
Micro	<i>N</i>	8	16	21	6	52
Percentage exporting		13	6	5	0	6
Percentage exported if firm exports		95	16	12	0	41
Percentage exported		12	1	1	0	2
All	<i>N</i>	79	108	100	114	401
Percentage exporting		34	8	26	54	31
Percentage exported if firm exports		34	34	28	20	26
Percentage exported		12	3	7	11	8

*N* is the number of observations.

*Table 4* The characteristics of exporting firms in Africa's manufacturing sector. The first round of the survey: firm averages of percentage exported and exports, exports/employee and capital/employee (exports and capital are in '000 US\$)

<i>Sector</i>	<i>N</i>	<i>Country</i>				<i>All</i>
		<i>Cameroon</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Zimbabwe</i>	
Food	<i>N</i>	21	29	17	25	92
Percentage exported		5	0	19	4	6
Exports		803	0	1,317	401	536
Exports/employee		2.3	0	9.7	1.1	2.6
Capital/employee		28.3	10.0	21.7	16.0	18.0
Furniture	<i>N</i>	9	21	21	13	64
Percentage exported		1	3	6	9	5
Exports		5	27	125	182	87
Exports/employee		0.2	0.2	0.6	0.7	0.4
Capital/employee		29.1	1.4	4.9	4.7	7.2
Garments	<i>N</i>	4	25	15	29	73
Percentage exported		0	0	2	20	7
Exports		0	0	37	1,223	494
Exports/employee		0	0	0.5	1.5	0.7
Capital/employee		4.1	1.1	2.7	4.9	3.1
Metal	<i>N</i>	32	27	26	21	106
Percentage exported		11	1	6	10	7
Exports		928	19	212	404	417
Exports/employee		7.1	0.07	0.6	1.1	2.5
Capital/employee		29.2	5.6	16.8	28.1	20.0
Textile	<i>N</i>	6	na	9	23	40
Percentage exported		5		6	10	8
Exports		932		35	719	561
Exports/employee		1.5		0.3	1.3	1.0
Capital/employee		47.7		15.1	9.1	15.9
Wood	<i>N</i>	7	4	12	3	26
Percentage exported		71	75	3	10	25
Exports		7,777	319	91	349	2,225
Exports/employee		31.3	3.6	0.4	1.3	9.3
Capital/employee		42.0	14.1	7.3	7.3	17.7
All	<i>N</i>	79	108	100	114	401
Percentage exported		12	3	7	11	8
Exports		1,350	22	325	648	537
Exports/employee		6.4	0.2	2.1	1.2	2.2
Capital/employee		30.2	5.2	11.8	12.5	13.8

*N* is the number of observations.

The results of the two decisions we will consider in the modelling – the decision to export, and the percentage exported – determine the export orientation of the firm. Table 4 presents the average export orientation by sector and by country for the first round of the survey. Export orientation is low, on average only 8 per cent of output, and the range is from a high of 12 per cent in Cameroon to a low of 3 per cent in Ghana. Again, as a comparison with Table 3 shows, most of this cross-country variation is explained by the different sizes of firms in the sample. If attention is confined to large firms the percentage exported is relatively high in Cameroon and Ghana, at 30 and 24 per cent respectively, and relatively low in Kenya and Zimbabwe, at 16 and 18 per cent respectively.

Table 4 also shows, for comparative purposes, the amount for exports per employee. These differ by a factor of over 30 times; from a high of US\$ 6400 per employee in Cameroon to US\$ 200 per employee in Ghana. Table 4 also shows the levels of capital per employee across the countries. In one sense the data from Table 4 again confirm what is well known: manufacturing exporting from Africa is of minor importance for the firms. In another sense, however, the micro data show the problem to be complex. The problem is not only that firms export little, it is that productivity within the firms in some of the countries is a fraction of that in other African countries. Inter-firm levels of firm efficiency are potentially of great importance in explaining poor African export performance. We return to the potential importance of firm heterogeneity below; in the next section, we formally consider the factors that determine the percentage of output exported.

#### **4. EXPLAINING AFRICAN MANUFACTURING EXPORTS**

This section focuses on explaining export orientation, defined as the percentage of output which is exported, and examines whether such orientation has changed over the sample period. The method chosen is to examine whether there are shifts over the three rounds either in the decision to export or in the amount exported, given the decision to export. We wish to see if there are links from macro policy to firm behaviour.

The objective of macroeconomic policy operating on the real exchange rate is to increase the profitability of exporting by increasing the prices of traded relative to non-traded goods. The manufacturing sector will contain firms belonging to both the traded and non-traded sectors. The firm level response to a real devaluation will depend in part on the composition of the sector and in part on the reasons for the low levels of specialization noted in the previous section. If firm level specialization was extensive then a real exchange rate depreciation could be reflected in an expansion of exports only by the entry of new firms. As most African firms do not specialize, part of the response could come from an increase in their output going to exports. For such firms, which are not specialized, the change in profits that results from the real devaluation



depends on how closely substitutable are the goods exported and those for the domestic market. If they are close substitutes then the real devaluation will increase the profitability of supplying both the export and the domestic market. The real devaluation will improve the incentives to increase output but may not change the extent of export orientation. In contrast, if the exported and domestic goods are not close substitutes then the response may be a rise in the share of output exported. Even in these circumstances firms may be unwilling to specialize because of the risks such specialization incurs. If the real exchange rate change occurs in the context of increased risk then the firm may wish to remain diversified even if export markets became more profitable. Further, increased exports may only be possible with investment in new equipment to upgrade the quality of the firm's products. In this latter case the already exporting firm is in a similar position to a firm outside the export sector in that it faces fixed costs to increase exports.

If fixed costs of expansion into export markets are important, many firms may be locked out of exporting unless relative price changes are large and credible. Roberts and Tybout (1997) in their study of three export booms state that the export responses in Colombia, Mexico and Morocco were predominantly of firms which had not been exporting breaking into the export market. Firms which were already exporting only modestly increased their export orientation. However, in circumstances where incentives change less decidedly, the composition of the export response may be very different. Whichever of these explanations for the low levels of exports observed in African manufacturing firms is correct, they all caution that there may be no strong link from macro policy to firm export performance.

We assess the extent of changes in export orientation by examining whether there are shifts in exporting behaviour of firms over the sample period. Such changes could occur in two ways. The first is the simplest to observe; there could be a shift in the export equations which would appear as significant time dummies in the regressions. One possible explanation for such shifts is the changes in the macro environment described in Section 2 above. The second possible route by which macro policy could affect firm performance is that, over the three rounds of the survey, the coefficients on the export equations could change. This would imply that, for any given characteristic, either the propensity to export had changed or, given that the firm was exporting, the amount it exported had increased. One interpretation of macro policy is that it is intended that both these aspects of export orientation should be reflected in firm performance.

The variables that enter the decision to export are intended to reflect the factors determining the profitability of being an exporter. These include its size, measured by the number of employees, the capital-labour ratio, the firm's age, its location, sector and ownership. Size may be important for a number of reasons. Exporting may involve the firm in higher marketing costs than domestic sales. The larger the firm the lower the average cost of

exporting. Size may lower capital costs and increase access to banking services which may be more important for export than domestic sales. Such arguments suggest that larger firms may be better able to export. Clearly there may be an effect by which exporting firms are able to grow faster so that exporting increases firm size. We make some allowance for such firm fixed effects by the panel logit reported below. The capital–labour ratio acts to proxy both for productivity and underlying factor endowments that may affect the ability of firms to export. In so far as firms with higher capital labour ratios are more efficient, this will increase the ability to export. If exporting is concentrated in sectors processing natural resources and such sectors are capital intensive then again there will be a positive relationship between the capital labour ratio and exporting. In contrast, if exporting is concentrated in labour-intensive activities then export propensity should fall with the capital–labour ratio. Capital intensity varies by sector, so that sectoral variables may affect exporting by reflecting the incentives provided by differing factor intensities. Firm age may affect capital costs and the extent of a firm’s learning experience. The structure of ownership may be important for access to foreign markets. Foreign ownership may provide information which facilitates access to foreign markets. Location in the capital city may act as a proxy for infrastructure and business services.

We now investigate changes in the pattern of export performance over the three years of the survey for each of the countries. We first consider the decision to export. Table 5 reports the results of a logit which describes the difference between exporters and non-exporters using as explanatory variables those already discussed. Clearly, since some variables such as firm size will be endogenous to the past history of exporting, this cannot be interpreted as causal. In all four countries exporting is associated with larger firms. In three of the countries it is also associated with greater capital intensity, although only in Ghana is this effect significant. In two of the four, location in the capital city is significant and positive. Either location in the capital city directly induces exporting, or those firms which plan to export are more inclined to locate in the capital city. State ownership has no consistent effect, but foreign ownership is always positive and is significant in two of the four countries. For the Cameroon and Ghana the wood sector is more likely to have exporting firms than other sectors. For both Kenya and Zimbabwe none of the sectoral variables are significant.

In terms of possible macro-induced shifts in micro behaviour, the finding in Table 5, for all countries, is that none of the time dummies are significant. A test is reported in Table 5 as to whether the coefficients are the same across the three rounds of the survey for each country. The hypothesis that the coefficients are unchanged is decisively accepted for all the countries. There is no evidence that there have been shifts in the underlying propensity to export and no evidence that the export function has changed.

The second dimension of the decision to export is the percentage of output

Table 5 The decision to export (logit with EXPORT=1 if firm exports, otherwise 0)

	Cameroon	Ghana	Kenya	Zimbabwe
Constant	-8.7 [4.5]**	-7.0 [3.9]**	-8.5 [5.6]**	-4.93 [4.6]**
ln(employment)	0.8 [5.4]**	0.6 [2.5]*	1.1 [7.3]**	1.0 [7.8]**
ln(capital/employee)	0.24 [1.9]	0.26 [1.96]*	0.19 [1.6]	-0.01 [0.1]
Firm age	0.02 [1.7]	-0.03 [1.7]	-0.01 [1.0]	0.02 [2.1]*
Capital city	0.82 [2.1]*	0.03 [0.9]	0.86 [2.2]*	-0.29 [1.1]
Any state ownership	0.63 [1.0]	0.36 [0.7]	-1.49 [1.13]	-0.82 [1.5]
Any foreign ownership	0.21 [0.6]	0.94 [1.7]	1.6 [4.5]**	0.75 [2.2]*
Garments	1.1 [1.5]	-0.26 [0.4]	-0.46 [0.7]	0.21 [0.5]
Food	-0.05 [0.1]		-0.41 [0.8]	-0.52 [1.1]
Textile	0.66 [0.9]	0.11 [0.13]	0.25 [0.4]	0.65 [1.4]
Wood	1.58 [2.2]*	2.74 [3.3]**	-0.84 [1.4]	-0.4 [0.5]
Metal	0.14 [0.2]	-1.91 [2.8]**	0.73 [1.5]	0.92 [1.8]
Round 2	-0.01 [1.0]	-0.17 [0.3]	0.25 [0.7]	-0.13 [0.46]
Round 3	0.19 [0.5]	0.05 [0.1]	0.19 [0.6]	-0.09 [0.3]
N	375	326	441	450
$\chi^2$ (df)	15.4 (18)	8.8 (18)	14.4 (18)	5.1 (18)
p value	0.63	0.97	0.70	0.99
Wald test on the hypothesis of common coefficients across all three rounds				

The figures in [] parentheses are z values, the ratio of coefficient values to standard errors. \*\* indicates significance at the 1 per cent level, \* at the 5 per cent level.

*Table 6* The percentage of output exported (if firm exports any output, i.e. EXPORT=1)

	<i>Cameroon</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Zimbabwe</i>
Mean dependent variable	34	36	29	21
Constant	-15.8 [0.4]	27.6 [0.6]	83.8 [2.5]	-13.5 [1.1]
ln(employment)	3.4 [1.6]	6.1 [0.7]	-0.6 [0.2]	3.8 [3.2]*
ln(capital/employee)	2.2 [0.8]	-1.12 [0.3]	-3.5 [1.4]	1.19 [1.0]
Firm age	-0.22 [1.1]	-0.7 [1.2]	-0.19 [0.6]	-0.02 [0.2]
Capital city	3.7 [0.5]	13.4 [0.8]	17.2 [1.7]	4.6 [1.6]
Any state ownership	8.2 [1.1]	18.6 [0.5]	19.9 [1.1]	16.6 [3.1]**
Any foreign ownership	-2.4 [0.5]	-23.2 [1.4]	-4.7 [0.7]	-0.74 [0.2]
Garments	-5.4 [0.3]	-21.4 [1.2]	18.9 [1.2]	9.6 [1.8]
Food	-19.7 [1.6]		45.1 [3.9]**	-11.1 [1.9]
Textile	-21.8 [1.6]	22.5 [0.7]	-1.6 [0.1]	0.03 [0.01]
Wood	49.4 [3.8]**	42.7 [2.4]*	6.1 [0.4]	32.9 [3.5]**
Metal	-4.9 [0.4]	-39.9 [1.4]	5.9 [0.6]	4.7 [0.8]
Round 2	-0.22 [1.1]	-0.97 [0.1]		1.8 [0.6]
Round 3	6.9 [1.3]	8.7 [0.6]	-0.6 [0.1]	-0.9 [0.3]
<i>N</i>	121	40	72	235
Adjusted <i>R</i> <sup>2</sup>	0.53	0.23	0.23	0.24
White $\chi^2$ (df)	67 (75)	39 (42)	56 (58)	85 (78)
<i>F</i> (df)	0.81 (18,89)	1.5 (12,13)	0.6 (9,51)	0.37 (18,203)
<i>p</i> value of <i>F</i>	0.69	0.23	0.81	0.99
<i>F</i> test on the hypothesis of common coefficients across all three rounds.				

The figures in {} parentheses are *t* statistics. \*\* indicates significance at the 1 per cent level. \* at the 5 per cent level.

Table 7 The percentage of output exported (if firm exports any output, i.e. EXPORT=1) corrected for selectivity bias

	<i>Cameroon</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Zimbabwe</i>
Mean dependent variable	34	36	29	21
Constant	40.4 [2.6]	55.9	40.2	27.0 [5.1]**
Firm age	-0.26 [1.3]	-0.52 [1.2]	-0.27 [1.0]	-0.07 [0.8]
Capital city	2.7 [0.4]	13.3 [0.8]	-15.9 [1.9]	5.2 [1.96]*
Any state ownership	9.6 [1.4]	10.2 [0.3]	15.1 [0.9]	-12.3 [2.4]*
Any foreign ownership	2.7 [0.4]	-26.0 [2.1]*	-4.2 [0.5]	-2.4 [0.8]
Garments	-8.9 [0.6]	-20.3 [1.2]	14.4 [1.0]	9.2 [1.8]
Food	-18.2 [1.6]		42.2 [3.6]**	-7.6 [1.4]
Textile	-20.7 [1.6]	13.0 [0.6]	-7.4 [0.6]	-0.09 [0.2]
Wood	48.3 [3.8]**	27.3 [1.9]	9.7 [0.6]	35.1 [4.0]**
Metal	-4.4 [0.4]	-24.6 [0.9]	1.2 [0.1]	-6.5 [1.2]
Round 2	-0.9 [0.2]	-1.5 [0.1]		2.3 [0.8]
Round 3	6.5 [1.3]	8.4 [0.6]	-2.3 [0.4]	-0.9 [0.3]
Lambda	-13.7 [4.2]	-15.8 [1.2]	0.6 [0.1]	-12.9 [7.3]
N	121	40	72	236

The figures in [] parentheses are *t* statistics. \*\* indicates significance at the 1 per cent level, \* at the 5 per cent level.

exported once the firm does export. Using the same variables as for the decision to export, Table 6 reports the results of modelling this second decision<sup>3</sup>. The equations reported in Table 6 are potentially subject to selectivity bias and an allowance for this is made in Table 7 where a Heckman corrected equation for the amount exported is presented. In Table 6, as with the

logit, none of the time dummies is significant and the hypothesis of common coefficients across the rounds is accepted for all countries. For the Cameroon there is some evidence of a shift in the export decision in that the dummy on the third round is positive and the *t*-statistic is greater than unity. If the sample is confined to large firms then this time dummy is significant at the 5 per cent level and the point estimate suggests that the percentage exported increased by 16 per cent between the first and third round of the surveys. For the other three countries, confining the sample to large firms fails to produce any evidence of a shift in the export function.

While for the logit on the decision to export there were marked differences across the coefficients on the sectoral dummies for the four countries, in Tables 6 and 7 there is more uniformity. With the exception of Kenya, the estimates show that the wood sector is the one where firms are most likely to export a relatively high proportion of their output. The effect is highly significant in both the Cameroon and Zimbabwe. For all four countries there is no evidence that foreign ownership increases the percentage of output exported.

## 5. MACRO POLICY AND FIRM PERFORMANCE

In this section we consider how far it is possible to assess the impact of macro policy on firm performance. Table 1 above showed that all the countries had experienced changes in the Dollar index. Table 8 reports the results of a panel logit on the decision to export for each of the countries and for the pooled sample in which the Dollar index is included as an explanatory variable. There

*Table 8* Fixed effects estimates of the logit: panel logit (EXPORT=1 if firm exports, otherwise 0)

	<i>Cameroon</i>	<i>Ghana</i>	<i>Kenya</i>	<i>Zimbabwe</i>	<i>All</i>
ln (employment)	0.43 [0.3]	1.77 [1.1]	1.68 [1.4]	1.40 [0.9]	1.12 [1.9]
ln (capital/ employee)	0.45 [1.1]	-0.09 [0.3]	0.61 [1.2]	0.13 [0.2]	0.24 [1.2]
Dollar index	-0.001 [0.07]	-0.03 [0.9]	0.02 [0.4]	0.002 [0.04]	-0.002 [0.3]
Log likelihood	-22	-11	-12	-21	-67
<i>N</i>	64	33	37	60	194

The fixed effects logit was run in STATA which implements the Chamberlain (1980) estimator.

The figures in [] parentheses are *z* values, the ratio of coefficient values to standard errors

is a negative effect from the dollar index onto the propensity to export for all the countries except Zimbabwe. The effect is not significant and the point estimate of the effect is small. In Table 9 a differenced estimator is reported for the percentage of output exported, this time only for the pooled sample as the sample size for each country is too small. The coefficient for the Dollar index is negative if the intercept term is dropped but again it is not significant and the point estimate is small. There appears to be no measurable effect of the Dollar index on firm performance. It is clearly possible that this result simply reflects the shortness of the time period for which we have data. However, it is also possible that changes within the manufacturing sector are important, which the macro variable cannot capture.

Table 10 reports a decomposition of the export proportions of output by size of firm. Large firms, as before, are those with more than 100 employees. As large firms both have larger outputs and are more likely to export, Table 10 shows marked differences between the average percentage exported and the percentage exported in total (the former is the mean of the ratios of exports to output, the latter is the ratio of total exports to total output). The figures for

Table 9 Fixed effects estimates of the amount exported. The change in the percentage of output exported (a)

	[1]	[2]	[3]
Constant	2.18 [0.5]		
$\Delta \ln(\text{employment})$	1.9 [0.1]	5.8 [0.3]	7.8 [0.5]
$\Delta \ln(\text{capital/employee})$	1.1 [0.1]	2.9 [0.2]	6.6 [0.5]
$\Delta$ Dollar index	0.03 [0.2]	-0.04 [0.1]	-0.02 [0.2]
Cameroon		0.07 [0.003]	
Ghana		-2.1 [0.11]	
Kenya		6.7 [0.8]	
<i>N</i>	42	42	42

The figures in [] parentheses are *t* statistics. \*\* indicates significance at the 1 per cent level, \* at the 5 per cent level.

(a) The sample is restricted to firms which exported at least 10 per cent of their output in both the first and third rounds of the survey.

Table 10 The proportion exported and firm heterogeneity

		<i>Cameroon</i>			<i>Ghana</i>		
		<i>Large</i>	<i>Small</i>	<i>All</i>	<i>Large</i>	<i>Small</i>	<i>All</i>
<i>N</i>		17	62	79	12	96	108
Proportion of firms							
Exporting	Round 1	0.76	0.23	0.34	0.58	0.02	0.08
	Round 3	0.71	0.26	0.35	0.42	0.07	0.11
Percentage of output exported							
If firm exports	Round 1	40	29	34	40.4	10.5	33.8
	Round 3	56	26	39	45.0	20.7	30.8
Average percentage of total output							
Exported	Round 1	30	7	12	24	0.2	3
	Round 3	40	7	14	19	1.5	3
Percentage of output							
Exported	Round 1	38	7	31	10	0.1	7
	Round 3	45	11	41	11	2	9
		<i>Kenya</i>			<i>Zimbabwe</i>		
		<i>Large</i>	<i>Small</i>	<i>All</i>	<i>Large</i>	<i>Small</i>	<i>All</i>
<i>N</i>		25	75	100	62	52	114
Proportion of firms							
Exporting	Round 1	0.56	0.16	0.26	0.77	0.27	0.54
	Round 3	0.52	0.19	0.27	0.79	0.27	0.55
Percentage of output exported							
If firm exports	Round 1	28	27	28	23	11	20
	Round 3	23	22	22	23	12	20
Average percentage of total output							
Exported	Round 1	16	4	7	18	3	11
	Round 3	16	5	8	18	3	11
Percentage of output							
Exported	Round 1	20	23	21	12	4	12
	Round 3	24	11	21	13	4	13

Cameroon show the potential importance of this distinction. In the first round of the survey the percentage of firms exporting was 34 and the average percentage exported among those firms was also 34 per cent. These figures imply that the average amount exported was 12 per cent across all firms. However, the percentage of total output that was exported was 31 per cent. The



decomposition by firm size in Table 10 shows the source of the discrepancy. Larger firms have higher levels of both exports and output and higher percentages exported. So large firms are much more important in the total than small firms. For the Cameroon the percentage of output exported over the period increased from 31 to 41 per cent, a 10 percentage points rise, even though the mean percentage exported only increased from 12 to 14 percent. It will be noted from Table 10 that it is only for the Cameroon that there is any increase in the proportion exported from the first to the third round of the survey.

Table 10 shows that shifts in the export function for large firms can have large effects on the proportion exported. It was found when analysing the percentage of output exported that, for the Cameroon, there was evidence of a shift in the function for large firms. There may well be a link from macro policy to firm performance but this link will not be picked up by a macro variable that cannot distinguish the importance of firm specific effects.

## **6. SUMMARY AND CONCLUSIONS**

Analysis of macro policy has sought a measure of openness that is comparable both across countries and over time. The Dollar index meets this requirement and has been shown to be a significant part of the explanation for the macro performance of economies. In this paper the links between such macro policy variables and firm level performance for manufacturing firms in Africa has been investigated. The issue is of importance as an objective of trade policy reforms in Africa has been to enable manufacturing exports to grow and the sufficiency, or otherwise, of macro policy to meet that objective is a contentious question.

In this paper, data have been analysed for four African countries, the Cameroon, Ghana, Kenya and Zimbabwe. All of these countries have, over the period for which we have data, experienced large changes in their real exchange rates. The export decision was modelled as a logit on the decision to enter the export market and, conditional on being in the market, the percentage of output exported. The only evidence of a shift in the functions was for large firms in the Cameroon. Equations were run including the Dollar index and allowing for firm fixed effects which showed no significant effect on exports of changes in the index. Such a finding is consistent with the lack of any general shift in the export functions over the period surveyed. However, the analysis does not necessarily imply that macro policy is ineffective for improving performance in the manufacturing sector. The period for which we have data is short. Sunk costs may limit the speed of response to price incentives. While the changes in the real exchange rate were large, in some of the countries there may well have been doubts as to whether the changes would be sustained. The method by which the real exchange rate is changed may be of equal, or greater, importance than the size of the change effected.

There was a common finding across all the countries that firms did not specialize in exporting. Most large firms in the African manufacturing sector export, but they export relatively small amounts. Reasons for this lack of specialization were suggested. Risk may underlie a reluctance to specialize. Quality may differ between the domestic and foreign market. Whatever its source, it seems clear that the problem faced by such firms is not entering the export market but growing in it.

A detailed analysis of the export response by firm size showed the importance of firm level heterogeneity. Large firms dominate in the export market. Rises in the propensity of such firms to export can have a large effect on the total percentage of output exported. In the case of the Cameroon, while the average across firms in the amount exported rose from 12 to 14 percent between the first and third rounds of the survey, the percentage of total output exported rose from 31 to 41 per cent. This finding suggests that the effects on firms of different size is going to be of great importance in understanding the linkages between macro policy and firm performance.

## NOTES

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- 1 A recent major study of industrial production in semi-industrialized countries (Roberts and Tybout, 1996) uses micro data to analyse firm performance. No sub-Saharan African country is included in the study.
- 2 While the Dollar Index is the best available, in its published form it ends in 1987 and we are grateful to Dollar for providing us with unpublished updates to 1992, the limit of the underlying Penn World Tables data.
- 3 For Kenya it is not possible to use the second round of data for the percentage exported. The question was misinterpreted and the answers are not comparable with the other rounds of the data.

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