

The Tanzanian Manufacturing Enterprise Survey 2002

Prepared by

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Acronyms Used

BoT	Bank of Tanzania
NBS	Tanzanian National Bureau of Statistics
ppp	purchasing power parity
RPED	Regional Program on Enterprise Development
SME	Small and medium scale enterprises
TMES	Tanzanian Manufacturing Enterprise Survey

Exchange Rates and Price Series Used

	[1] Tsh/US\$ nominal exchange rate	Change over period	[2] National CPI	Change over period	[3] Capital Stock Deflator	Change over period
1990	195.06	1.00	34.5	1.00	100.0	1.00
1991	219.16	1.12	44.4	1.29	120.5	1.21
1992	297.71	1.53	54.1	1.57	154.7	1.55
1993	405.27	2.08	67.8	1.97	202.1	2.02
1994	509.63	2.61	90.2	2.61	261.4	2.61
1995	574.76	2.95	115.8	3.36	315.2	3.15
1996	579.27	2.97	140.1	4.06	351.5	3.52
1997	612.12	3.14	169.0	4.90	401.8	4.02
1998	664.67	3.41	188.0	5.45	442.8	4.43
1999	739.25	3.79	201.1	5.83	480.9	4.81
2000	802.34	4.11	213.0	6.17	514.3	5.14

note: capital stock deflator is a weighted average of the nominal ER (0.5) and the CPI (0.5)

MAP OF TANZANIA



Foreword

This study presents some of the main results from Wave 5 of the Tanzania Enterprise Survey conducted between January-February 2002, which covered a total of 192 manufacturing enterprises in 6 main industrial locations in Tanzania. These results build upon the comparable data collected in the first 4 waves of the survey which were undertaken between 1992 – 1999. Efforts were made to revisit as many of the same firms last interviewed in 1999 as possible. For further details of these earlier surveys, see the list of available publications in the bibliography. The Wave 4 survey (conducted between November 1999 and January 2000) and the Wave 5 survey were undertaken by combined teams from the Centre for Study of African Economies (CSAE) in Oxford and the Economic and Social Research Foundation (ESRF) in Dar es Salaam. The two surveys were undertaken with generous financial support from the UK Government's Department for International Development (DFID) and the United Nations Industrial Development Organisation (UNIDO) respectively. The original three surveys in the early 1990's, upon which this later work builds, were undertaken as part of the World Bank's Regional Program on Enterprise Development.

It should be noted that some of the results presented here are based on relatively small sample sizes. In each case the number of observations used and average (mean) values calculated are presented in the respective tables. Several sections of the questionnaire were only relevant to firms in particular categories e.g. exporting firms or firms with some degree of foreign ownership. Some tables refer exclusively to results from the Wave 5 survey, whereas many others draw upon data for the whole period for which we have comparable firm-level data, from 1992 – 2001.

1. Background

1.1 Economic Performance 1992-2002

The Tanzanian economy has not performed as well as many had expected in the 1990's despite government efforts at economic reform. Growth has been muted and poverty levels remain at persistently high levels. Measured in domestic prices, real income per head is only about 30% higher than at independence in 1961. According to the World Bank (2001), "structural transformation in Tanzania has been extremely limited and the achievements relative to expectations have been only marginal." They also note that the lack of diversification of the Tanzanian economy, with its continued dependence upon agricultural production (representing 75% of merchandise exports and 80% of formal employment), reduces the economy's flexibility to respond to shocks. One sector which in theory could contribute to economic diversification, employment and exports is the manufacturing sector. However, the contribution of manufacturing value added has stagnated in the 1990's at around 7.5% of GDP. Danielson (2002) points to additional problems in the agricultural sector, where per capita food output has fallen by roughly 25% since 1986. He also argues that expanding sectors with the potential to earn foreign exchange are either too small (mining) or growing too slowly (tourism and manufacturing) to be able to replace the current reliance on exports of cash crops in the near future. The question remains as to what are the root causes of such sluggish economic performance?

Tanzania's economic reform programme effectively began in 1986, following the end of the Nyerere post-independence era. Initial reforms included a substantial devaluation, foreign exchange market liberalisation and reductions in import protection measures. There then followed a ten year period in which the reform programme, while moving gradually forward, also suffered several highly damaging reversals. Some of the more significant structural reforms have only effectively been implemented since 1995, during the first term of the Mkapa government, including financial sector reform and privatisation of important parastatals. The policy reform programme remains far from complete, with a substantial matrix of additional reform measures signalled for the 2000-2002 period, as set out in the Government's recent interim Poverty Reduction Strategy Paper (PRSP). Continuing over-regulation in the

labour market and weak implementation of agreed fiscal policy reforms remain two areas of continuing concern to aid donors.

Tanzania can thus be characterised as a late and incomplete reformer, compared for example to countries such as Uganda and Ghana. Several important policy reforms which impact directly upon the manufacturing sector are still to be fully implemented, including reform of tax and tariff structures and labour market liberalisation. There is also concern, expressed both by domestic commentators and by aid donors about the degree of commitment to the reform programme shown by successive Tanzanian governments. These concerns have gradually reduced since 1995, but it can be argued that earlier reform experiences may have affected expectations among private sector agents about the credibility of the current government's reform programme and hence their eventual investment and growth responses, which as we shall see have been muted. Two of the main factors identified as underlying Tanzania's slow development path since the 1970's are low levels of investment and low returns to both public and private sector investment in the economy. As the World Bank (2001) notes "The response of private investment to the reform measures has remained weaker than expected and has not compensated for the decline in public investment. Low returns to investment in the 1980's are attributed to poor investment choices and under-utilisation of capacity." In this report, we provide additional evidence on the response of firms in the manufacturing sector in the 1990's and ask whether the problems which underlay earlier periods persist or whether there is any evidence of enhanced productivity and investment rates?

1.2 Industrial Sector Performance

Official statistics on the industrial sector in Tanzania suffer from a number of weaknesses, both in terms of coverage and methodological consistency. These problems have been extensively analysed by Prins and Szirmai (1998). A summary of available statistics from a number of sources on aggregate levels of manufacturing output, exports and employment over the period 1986 – 2000 is given in Table 1.1. The revised index of industrial production indicates that aggregated industrial output has been growing on average by 5% per annum since 1995, which is consistent with the growth of general economic activity.

Table 1.1
Tanzania Manufacturing Sector Production, Exports and Employment 1990-2000
Official Statistics for Mainland Tanzania (exc. Zanzibar)

Period	[1] Real Manfac. Sector Output (Tsh millions, 1992 prices)	[2] Growth Rate of Output (%)	[3] Manfac. Share of GDP (%)	[4] Manfac. Sector Exports (US\$ millions)	[5] Share of Total Exports (%)	[6] Formal Sector Employ.
1986	91,082		9.1			120,168
1987	94,781	4.1	8.8			120,096
1988	97,730	3.1	8.7			121,642
1989	102,814	5.2	9.0			125,879
1990	107,008	4.1	8.8			134,413
1991	109,002	1.9	8.7			
1992	104,589	-4.0	8.2	27.6	12.7%	
1993	105,244	0.6	7.5	25.7	11.2%	
1994	105,042	-0.2	7.4	50.1	18.5%	
1995	106,750	1.6	7.2	41.6	12.1%	
1996	111,894	4.8	7.4	32.1	9.1%	
1997	117,489	5.0	6.9	87.3	22.8%	
1998	126,887	8.0	7.4	17.7	7.3%	60,000
1999	131,491	3.6	7.3	14.6	7.5%	
2000	137,809	4.8	7.5	16.6	5.5%	
<i>% change over five year period</i>						
1986-90	17.5					
1990-95	-0.2					
1995-2000	29.1			-64.9		

Source: Bureau of Statistics (quoted in BoT Economic Bulletin, March 1999); IMF Report No. 00/122, Statistical Annex IMF Staff Country Report No. 00/122 (September 2000); employment figures in 10+ manufacturing from Prins & Szirmai (1998); 1998 employment estimate is from UNIDO Industrial Survey 2000

This growth has occurred despite a widespread closure programme of failed parastatal enterprises and the privatisation of remaining productive firms, some of which are included in our sample. The sample of firms which are included in the government's index of industrial production cover all sub-sectors of manufacturing activity, but are biased towards the larger formal sector firms which are covered in the Quarterly Survey of Industrial Production (QSIP). The evidence would thus seem to be that large firms have increased their output in real terms quite substantially in recent years. There are no recent comparable data available for trends in employment in the sector, although this is widely believed to have contracted sharply since 1990. A UNIDO sector study (2000) gave the total employment level in formal sector manufacturing as 60,000 workers in 1998, which is less than half of the levels registered by the Bureau

of Statistics in their annual industrial surveys which were discontinued in 1990. Registered manufactured exports, which do not include such processed agricultural products such as coffee, tea and cashew nuts, have varied quite sharply over the period for which data is available. Despite a sharp peak in 1997, which may be due to data inconsistency, the trend has been one of decline from US\$ 50 million (or 18.5% of total merchandise exports) in 1995 to only US\$ 16.6 million (or 5.5% of total exports) in 2000. We may thus conclude that Tanzanian manufacturing production remains strongly oriented towards production for the domestic market, despite recent reforms. We should also note that official statistics are likely to under-report true export levels, due to evidence that some regional exports e.g. of handicrafts and fish products, particularly to Kenya, are not recorded for customs purposes.

2. Survey Sample of Firms

2.1 Sample Structure

This section gives an overview of the sample of firms that were included in the most recent fifth wave of the Tanzanian survey undertaken in early 2002. We also indicate the degree of overlap between this sample and that of earlier surveys. The original sample was based on a stratified sample of manufacturing firms throughout Tanzania, where the main stratifying characteristics were the sector, location and size of the firms. The aim of the repeat surveys is to collect panel data, which involves visiting the same firms to follow their progress over time. Where firms have dropped out of the sample, either due to their having closed down, not being located or being unwilling to cooperate, they are replaced with similar firms taken from a list of all registered manufacturing establishments in the sectors and locations of interest (the sample frame) provided by the Bureau of Statistics. Table 2.1 gives an overview of the sample of firms interviewed in Wave 5 by the size and sector of the firms. Table 2.2 gives the breakdown by firm sector and location.

As can be seen, only 66 firms out of a total of 192 interviewed have been in the surveys since they commenced in 1992. This is primarily due to the levels of firm turnover i.e. firm exits observed during this period, although for informal sector firms (which are mostly in the micro firm category) this is also due to difficulties in tracing these firms when they move to new locations, often in response to interventions by local government agencies. The majority of the firms are based in Dar es Salaam (52.1%), which is by far the most important location for manufacturing activity in Tanzania, followed by the northern region of Moshi and Arusha (18.2%). A total of 60 firms fall into the large and medium scale categories, representing 31% of the total sample. This greatly over-represents their relative frequency within the population of all manufacturing enterprises, which is dominated by smaller enterprises.

Table 2.1
Wave 5 Sample by Firm Size and Sector

		Food & Beverages	Wood & Furniture	Textiles & Garment	Metal & Machinery	All Sectors
Micro (including informal) [< 6 employees]	No. Firms	11	15	16	13	55
	% all sectors	20.0%	27.3%	29.1%	23.6%	100.0%
	% all sizes	23.9%	24.6%	44.4%	26.5%	28.6%
	RPED firms	0	4	4	5	13
Small (including informal) [6 - 20 employees]	No. Firms	12	30	7	28	77
	% all sectors	15.6%	39.0%	9.1%	36.4%	100.0%
	% all sizes	26.1%	49.2%	19.4%	57.1%	40.1%
	RPED firms	5	17	3	15	40
Medium [21 - 75 employees]	No. Firms	9	11	6	6	32
	% all sectors	28.1%	34.4%	18.8%	18.8%	100.0%
	% all sizes	19.6%	18.0%	16.7%	12.2%	16.7%
	RPED firms	0	4	2	2	8
Large [> 75 employees]	No. Firms	14	5	7	2	28
	% all sectors	50.0%	17.9%	25.0%	7.1%	100.0%
	% all sizes	30.4%	8.2%	19.4%	4.1%	14.6%
	RPED firms	1	3	0	1	5
All size groups	No. Firms	46	61	36	49	192
	% all sectors	24.0%	31.8%	18.8%	25.5%	
	% all sizes	100.0%	100.0%	100.0%	100.0%	
	RPED firms	6	28	9	23	66

note: RPED firms are those which were included in the RPED 1992-95 surveys i.e. a total of 66 out of 192 firms

Table 2.2
Wave 5 Sample by Firm Location and Sector

		Food & Beverages	Wood & Furniture	Textiles & Garment	Metal & Machinery	All Sectors
Dar es Salaam	No. Firms	17	38	21	24	100
	% all sectors	17.0%	38.0%	21.0%	24.0%	100.0%
	% all locations	37.0%	62.3%	58.3%	49.0%	52.1%
	RPED firms	3	16	5	10	34
Morogoro	No. Firms	5	4	4	9	22
	% all sectors	22.7%	18.2%	18.2%	40.9%	100.0%
	% all locations	10.9%	6.6%	11.1%	18.4%	11.5%
	RPED firms	0	3	1	6	10
Tanga	No. Firms	6	4	3	4	17
	% all sectors	35.3%	23.5%	17.6%	23.5%	100.0%
	% all locations	13.0%	6.6%	8.3%	8.2%	8.9%
	RPED firms	2	2	0	1	5
Arusha/ Moshi	No. Firms	8	9	8	10	35
	% all sectors	22.9%	25.7%	22.9%	28.6%	100.0%
	% all locations	17.4%	14.8%	22.2%	20.4%	18.2%
	RPED firms	0	2	1	4	7
Mwanza	No. Firms	5	7	2	4	18
	% all sectors	27.8%	38.9%	11.1%	22.2%	100.0%
	% all locations	10.9%	11.5%	5.6%	8.2%	9.4%
	RPED firms	1	5	2	2	10
All Locations	No. Firms	41	62	38	51	192
	% all sectors	21.4%	32.3%	19.8%	26.6%	
	% all locations	89.1%	101.6%	105.6%	104.1%	
	RPED firms	6	28	9	23	66

note: RPED firms are those which were included in the RPED 1992-95 surveys i.e. a total of 66 out of 192 firms

2.2 Representativeness of Sample

As already noted, due to our stratification procedures, we have over-sampled large firms compared to their expected relative frequency in a truly random sample of manufacturing firms in Tanzania. A stratified sample survey is appropriate where it is believed that firms within the strata categories are relatively homogenous, whereas there is a great deal of heterogeneity between firms in different strata. Inspection of the dispersion of firm characteristics below (such as labour productivity, capital-

labour ratios) lead us to conclude that this is true of probably true of Tanzanian manufacturing firms, as elsewhere. Our interest in larger firms is reinforced by evidence from previous surveys that they undertake the majority of investment and have a far higher propensity to export than the average firm.

The sample covers the main manufacturing locations in Tanzania, with the possible exception of the mainly wood-producing areas of Iringa and Njombe in the south-west, which have links to Zambia. The sectors chosen are those which continue to represent the highest contribution to manufacturing value added and employment – in 1995 they contributed 83.8% of MVA and over 90% of employment in the formal manufacturing sector.

2.3 Selected Firm Characteristics

We now switch attention to the total sample of firms for which we have evidence over the period 1992-2000. Table 2.3 gives an overview of some further basic characteristics of the 410 firms covered by all five waves of the survey. These characteristics are those which are used to analyse firm growth, productivity and investment levels in later sections of the report and are broken down by firm size categories.

The dispersion of firm ownership and legal status characteristics by firm size can be immediately seen. Only 11% of firms have any foreign ownership, but 38% of large firms do. In firms which involve some degree of foreign ownership, the foreign partners typically have a majority shareholding. Penetration of foreign ownership is relatively low in a comparative perspective. By comparison, 9% of all firms and 27% of large firms continue to have some form of state involvement in their ownership and operations, despite the parastatal divestiture programme. The percentages of state ownership are however relatively low, indicating that these are mainly residual shareholdings which the state retained when firms were privatised. Ownership and senior management of firms in Tanzania is predominantly a male activity, with only 3% of the firms having a female owner/ Managing Director and no women in these positions in the large firm category. In terms of firm experience, it can be seen that firms in the sample in all size categories are relatively old, with the mean for the

whole sample of 19 years. The existence of new entrants to manufacturing in the sample is hidden by the continued existence of a considerable proportion of firms in most sectors which were established either prior to independence or during the industrial expansion period of the 1970's.

Table 2.3
Selected Firm Characteristics By Firm Size

Table shows proportion of firms in each category (unless otherwise specified)

	Micro N=108	Small N=154	Medium N=80	Large N=66	All N=410
Legal Status of Firm					
Solo or Partnership	0.81	0.45	0.15	0.03	0.42
Cooperative	0.05	0.20	0.09	0.05	0.11
LLE or Corporation	0.06	0.31	0.68	0.76	0.39
State Enterprise	0.00	0.03	0.11	0.20	0.06
Firm Ownership Characteristics					
Tanzanian private owners only	1.00	0.90	0.73	0.38	0.80
Any foreign ownership	0.00	0.07	0.14	0.38	0.11
% foreign ownership, if any	--	48.9%	78.9%	62.6%	63.5%
Any state ownership	0.00	0.03	0.15	0.27	0.09
% state ownership. If any	--	100.0%	75.4%	29.7%	66.6%
Female owner/ MD of firm	0.06	0.04	0.01	0.00	0.03
Average age of owner/ MD (in years)	39	44	43	44	42
Ethnicity of Firm Owner/ MD					
African	0.92	0.75	0.35	0.18	0.62
Asian/ Indian	0.06	0.18	0.46	0.36	0.23
Other (inc. European/ Chinese)	0.02	0.07	0.19	0.42	0.14
Other characteristics					
Average Firm Age (in years)	13	20	22	21	19

note: total sample size is 410 firms interviewed over 5 waves of survey; some characteristics are only available for firms interviewed in Waves 4 and 5 of survey due to changes in the questionnaire structure from earlier waves; there are two firms for which we do not have total employment, so we are unable to allocate to a size category.

3. Overview of Recent Performance of Manufacturing Enterprises

3.1 Firm Growth

The following is a summary of work undertaken on the growth of sampled firms over the period 1992-2000, for which we now have data available. We compare trends in several measures of firm performance, namely real output, real value added, employment and the capital stock (measured as the replacement value of the firm's plant and machinery). We find different growth patterns for these variables over the period and examine some of the reasons why these differences may have occurred. We also disaggregate firms across a number of dimensions, including firm size and sector to see whether there are systematic differences in the ways in which firms in these categories have evolved over the period.

Given that we are interested in real changes, our measures of output, value added and the capital need to be deflated by an appropriate index for the change in prices over the period. All variables are measured over time using constant 1992 prices. Firm outputs for the first four waves of the survey were deflated by a producer price index at the industry level (using separate price indices at the 4-digit ISIC sectoral level) taken from official data sources. For the fifth wave firm-level price indices were calculated. The capital stock is deflated by an index which is a weighted average of the CPI (0.5) and the nominal shilling/ US dollar exchange rate (0.5). These price indices are shown in the table at the beginning of this report.

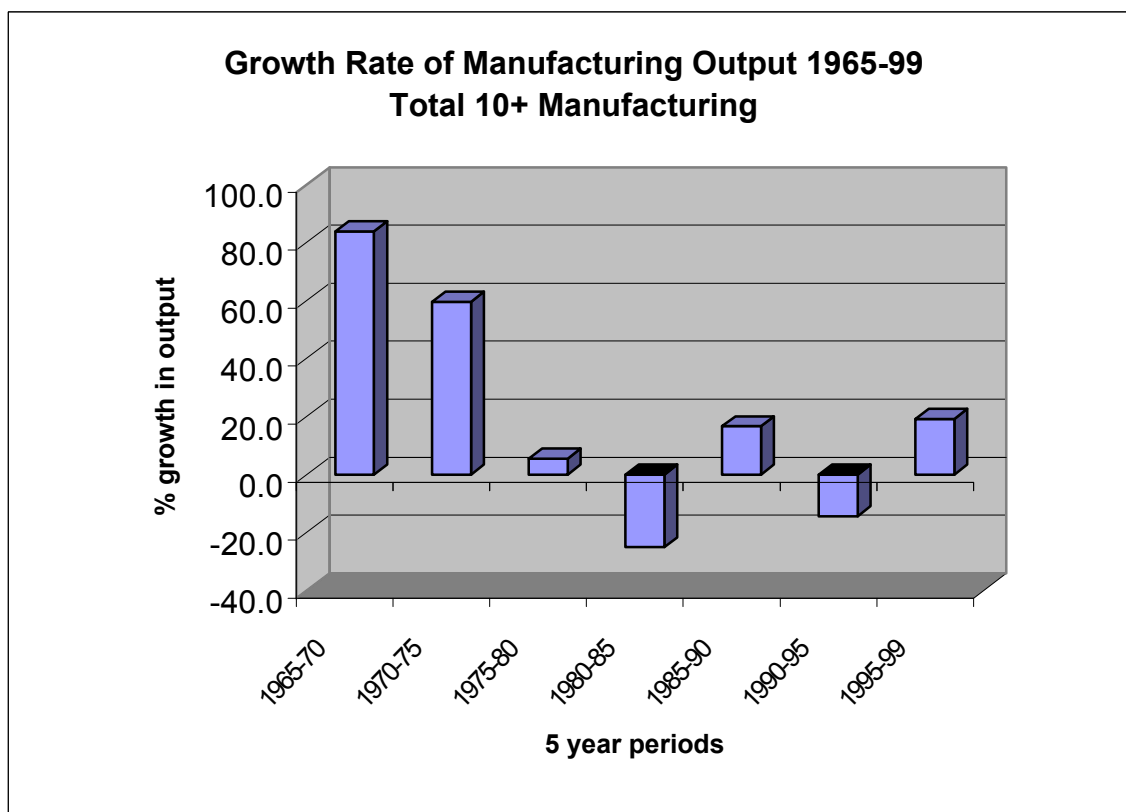
There are in practice a number of different methods by which we can calculate growth. Due to changes in the sample of firms in each time period, we cannot just compare changes in the average (mean) or median levels of these variables over time and infer a growth rate from these changes. One method is to construct a chained index of growth using matched observations in consecutive time periods – this looks at each firm in time period t and period $t+1$ and uses the change in the mean values to measure growth in that period. This procedure is repeated for all consecutive periods and a chain of growth established. This procedure is used for the 'matched' series in

the tables below. One of the drawbacks of this method is that in some firm categories, we have relatively few matched observations for some periods and hence we should be careful to infer growth for all firms in that category from just a few examples (which might be non-representative). Another problem is that average changes could be driven by dramatically large changes in one or two large firms – these could be genuine or the result of measurement error.

We thus compare the results of this matching procedure with an alternative which examines 1, 2 and 3 year differences in the variables over the entire period (the ‘differencing’ procedure). One advantage of this method is that we believe that changes over these longer periods are a more reliable measure of underlying growth – since the output and value added variables are particularly prone to both measurement error and to exogenous (i.e. external) shocks in specific periods which are outside of the control of the firm and which deviate from the firm’s longer term growth path. We regress these differences against a time trend and a squared time trend in order to examine the pattern of changes at different points in the decade and to allow for the probable non-linearity of the growth process over this period.

We firstly set the growth patterns observed in the 1990’s into historical context by presenting evidence on growth in industrial production since the 1960’s. See Figure 1 which is based upon the index of industrial production calculated by Prins & Szirmai (1998). Rapid expansion of industrial production in the 1960’s and 1970’s was followed by a dramatic collapse in the early 1980’s which was a period of economic crisis in Tanzania and led directly to the commencement of the economic reform programme in 1986. An immediate positive industrial sector response to the liberalisation of both trade and foreign exchange markets between 1985-1990 was followed by a period of further contraction in the early 1990’s. This seems to have been reversed in the most recent period.

Figure 3.1



Evidence from our sample for the 1990's mirrors trends in the official statistics, although the timing of the recovery appears to have been slightly later and its size is less pronounced than that in the official data. See Figure 3.2 for trends in real output and Figure 3.3 for trends in real value added. For all firms in the sample, the pattern we observe for our alternative measures of firm outputs is a U-shaped curve over the period of the 1990's, with sustained declines in real output and value added up to 1997 and then recovery from 1997 to 2000.

However, real output levels have still not recovered to the levels observed in 1992, hence on average firms have contracted over the whole period. We believe that the trends in real output are more reliable (and are definitely more consistent) than those in value added, due to the problems in accurately obtaining consistent information about firm's costs over time. However, the fact that the two measures show similar trends and that both methods of calculating growth yield similar results gives us some confidence in the robustness of our results.

Figure 3.2

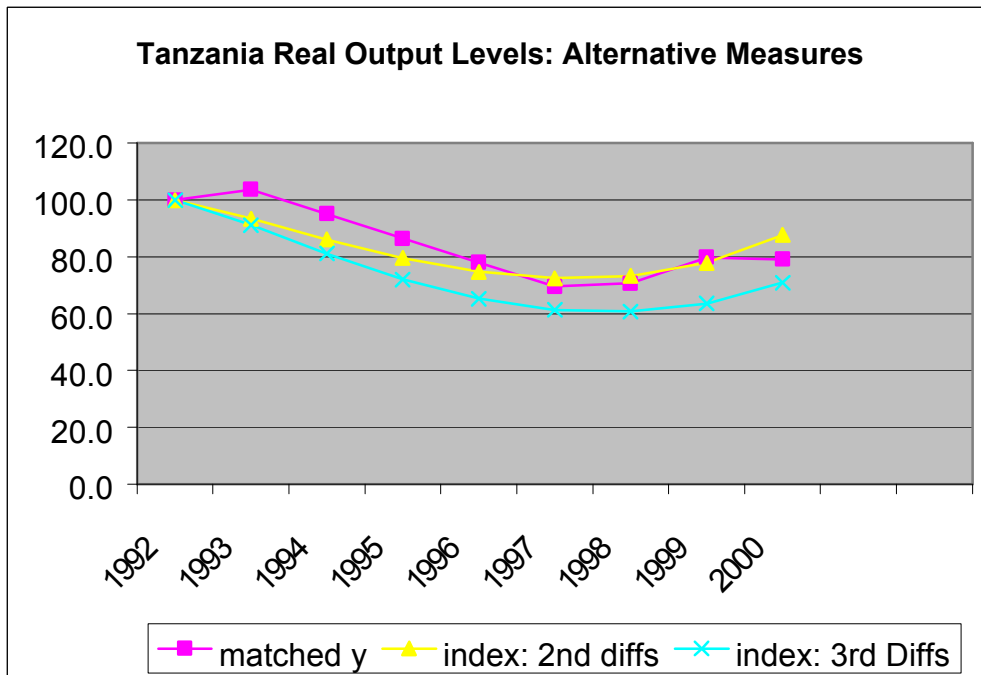


Figure 3.3

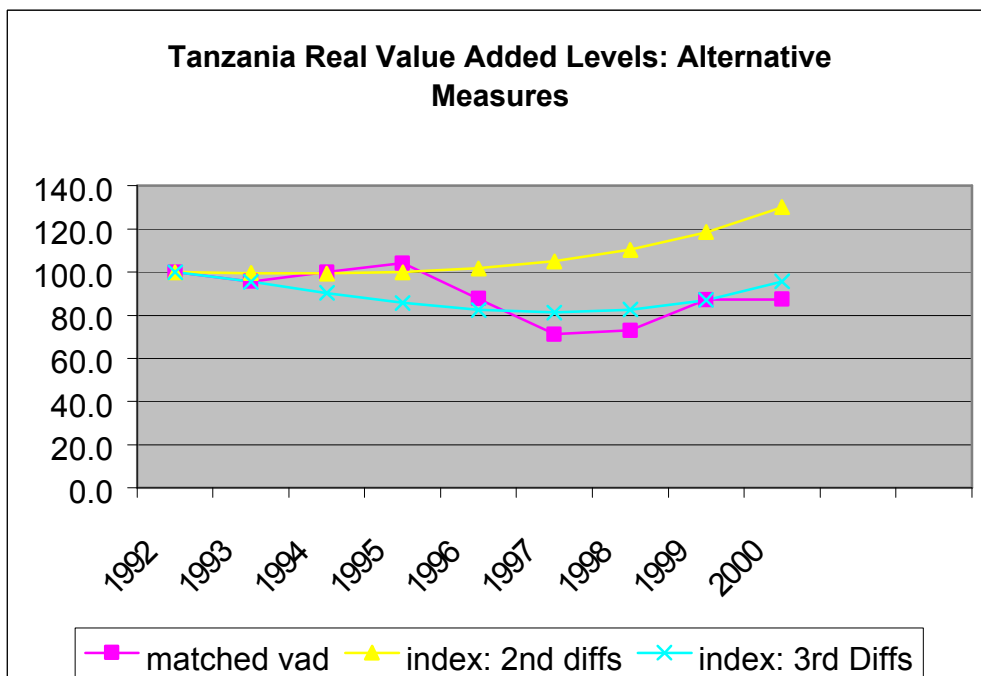


Figure 3.4

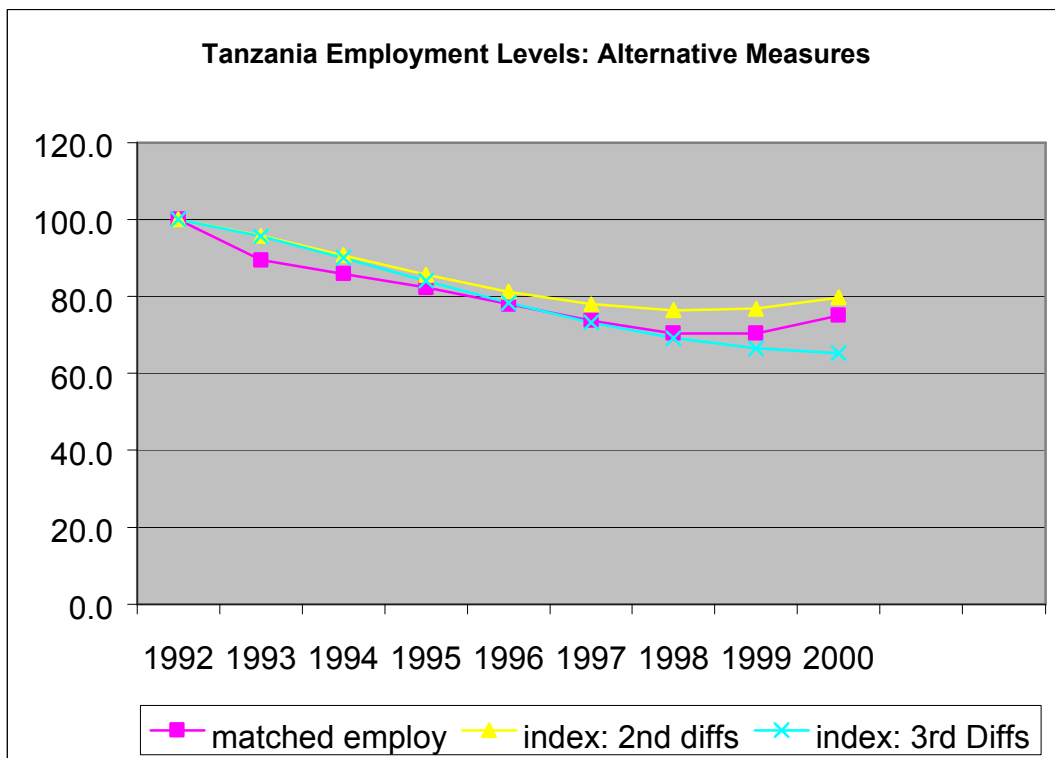
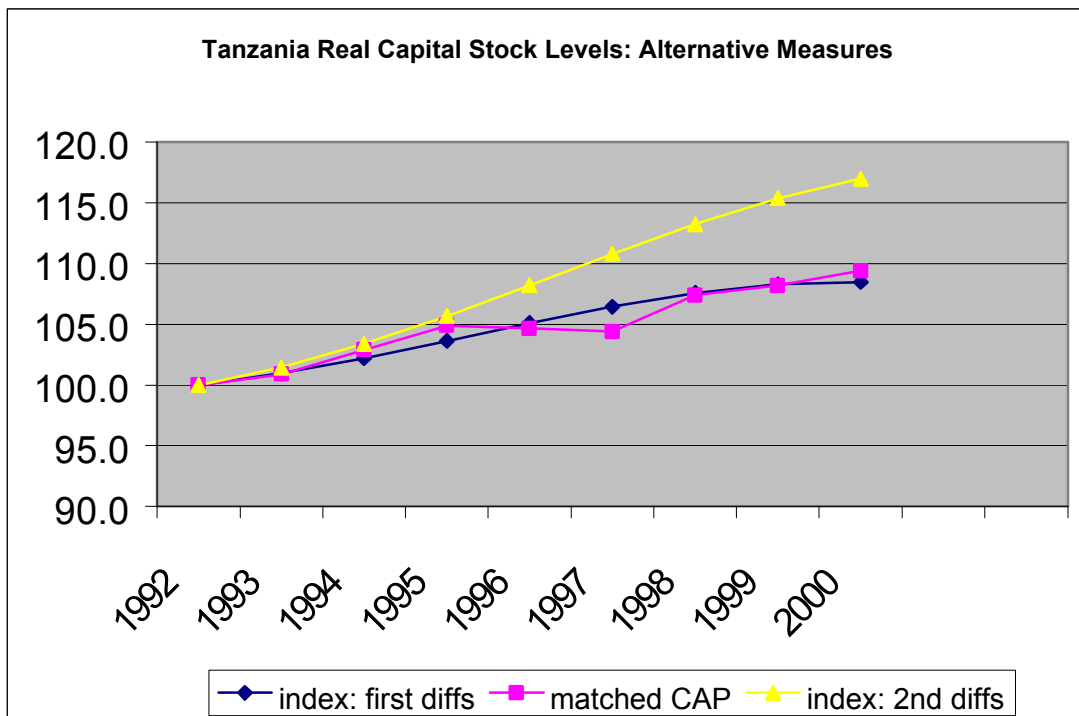


Figure 3.5



For the main factor inputs, employment levels (see Figure 3.4) follow a continuous downward trend over the period, indicating a substantial downsizing in average firm size. There is evidence of a small recovery in the most recent survey period i.e. 1999 – 2000. The downsizing of large firms in Tanzania could be attributed to the restructuring of previously state-owned enterprises, however the fall in average employment levels is common to firms in all size categories as seen in the tables below. Hence, we believe that this reflects a more general response to an increasingly competitive trading environment, particularly due to the trade liberalisation measures implemented in all sectors since 1992.

The fact that the value of firm's fixed capital in plant and machinery (see Figure 3.5) increases over the period is due to the new investment levels exceeding the rate of depreciation which we have estimated at 2% per annum in calculating our real capital stock series. Thus the growth in the capital stock reflects the assumed low levels of depreciation not high investment rates. As we show below investment rates have been low. Further, it should be borne in mind that the growth here refers only to surviving firms, and does not take into account that a considerable number of firms exited during the period.

Tables 3.6a and 3.6b give a breakdown of these overall growth patterns by firm sector and average firm size categories, with growth rates calculated using the matching procedure. It should be noted that the lack of observations for some categories in some years mean that these results are indicative only. We are particularly interested in the relationship between average firm size and growth performance. Based upon our sample firms, we can see that large firms (>75 employees) and medium firms (21-75 employees) contracted most sharply in the early 1990's and have failed to recover significantly since 1997. On average, large firms in the sample more than halved their employment levels from 1992-97. By contrast, smaller firms experienced a much smaller contraction in real output and employment levels in the 1992-97 period and have been growing strongly between 1997-2000. If correct, this represents an interesting contrast with the patterns of industrial growth observed in earlier periods in Tanzania which were very much associated with the expansion of large capital-intensive plants, mostly with state ownership.

Table 3.6a
Growth Rates by Firm Sector
Real Output, Real Value Added, Employment and Real Capital Stock

All Firms	1992-1997	1997-2000	1992-2000
Real Output	-30.5%	13.8%	-20.9%
Real Value Added	-28.8%	22.6%	-12.7%
Employment	-26.3%	1.9%	-24.9%
Real Capital Stock	4.4%	4.8%	9.4%
<hr/>			
Food & Beverages	1992-1997	1997-2000	1992-2000
Real Output	-40.6%	-4.2%	-43.1%
Real Value Added	-24.3%	-21.2%	-40.3%
Employment	-15.5%	-1.2%	-16.5%
Real Capital Stock	3.4%	8.6%	12.3%
<hr/>			
Textiles & Garments	1992-1997	1997-2000	1992-2000
Real Output	-41.4%	27.9%	-25.0%
Real Value Added	-48.2%	33.6%	-30.8%
Employment	-47.6%	6.5%	-44.2%
Real Capital Stock	-1.9%	4.2%	2.2%
<hr/>			
Wood & Furniture	1992-1997	1997-2000	1992-2000
Real Output	-29.0%	29.8%	-7.8%
Real Value Added	-33.4%	38.2%	-8.0%
Employment	-20.9%	-7.0%	-26.4%
Real Capital Stock	5.9%	1.5%	7.5%
<hr/>			
Metal & Machinery	1992-1997	1997-2000	1992-2000
Real Output	-24.7%	2.0%	-23.2%
Real Value Added	-0.5%	20.8%	20.1%
Employment	-24.7%	7.6%	-19.0%
Real Capital Stock	6.3%	5.4%	12.1%

note: growth rates based upon changes in logarithmic means for matched firms in adjacent years

Table 3.6b
Growth Rates by Firm Size
Real Output, Real Value Added, Employment and Real Capital Stock

All Firms	1992-1997	1997-2000	1992-2000
Real Output	-30.5%	13.8%	-20.9%
Real Value Added	-28.8%	22.6%	-12.7%
Employment	-26.3%	1.9%	-24.9%
Real Capital Stock	4.4%	4.8%	9.4%
Micro Firms	1992-1997	1997-2000	1992-2000
Real Output	-15.9%	24.4%	4.7%
Real Value Added	-5.8%	21.2%	14.1%
Employment	-7.6%	20.6%	11.4%
Real Capital Stock	-2.5%	2.2%	-0.3%
Small Firms	1992-1997	1997-2000	1992-2000
Real Output	2.0%	24.9%	27.4%
Real Value Added	14.0%	37.5%	56.7%
Employment	-5.1%	3.7%	-1.6%
Real Capital Stock	13.7%	0.5%	14.2%
Medium Firms	1992-1997	1997-2000	1992-2000
Real Output	-43.4%	-3.4%	-45.3%
Real Value Added	-24.5%	14.7%	-13.4%
Employment	-42.2%	-12.1%	-49.2%
Real Capital Stock	-3.0%	5.0%	1.9%
Large Firms	1992-1997	1997-2000	1992-2000
Real Output	-32.5%	-9.4%	-38.8%
Real Value Added	-55.1%	-14.4%	-61.6%
Employment	-59.1%	-15.3%	-65.4%
Real Capital Stock	-4.0%	17.9%	13.2%

note: growth rates based upon changes in logarithmic means for matched firms in adjacent years; the allocation of firms to size categories is based on average employment in the relevant years (this takes account of the fact that some firms move between size categories over the period); micro firms = 1-5 employees, small firms = 6-20 employees; medium firms = 21-75 employees and large firms = >75 employees

The sectors showing recovery in the late 1990's were textile and garments, wood products and furniture and metal-working firms. With the exception of textiles (which is probably continuing its long-term decline in Tanzania) these are all sectors which are dominated by small firms producing for the domestic market. Their success can perhaps be attributed to their greater flexibility to respond to changing market conditions and consumer demand patterns than larger enterprises with large amounts of sunk capital. We now wish to look at whether these differential growth patterns have had any impact upon underlying firm productivity levels.

3.2 Productivity Levels and Productivity Growth

Table 3.7 gives a breakdown of labour productivity levels over the period by firm sector and firm size, measured in thousands of Tanzanian shillings at constant 1992 prices. In most sectors, there is a monotonic increase in real output per worker across the size distribution, as we would expect. However there are some interesting exceptions to this general trend. In the garments sector, the few largest firms seem to be the least productive (although this is based on only four observations of firms in this category). This is not promising if Tanzania ever wishes to break into international export markets in clothing and apparel, which are dominated by large labour-intensive firms such as those in Mauritius. Food and beverages are the sectors with highest levels of labour productivity and wood products and furniture the lowest.

Table 3.8 gives a similar breakdown of capital per employee (or the capital/ labour ratio) by firm size and sector. Larger firms tend to have much higher levels of capital per employee, although in some sectors, the medium-sized firms are the most capital-intensive. There is a strong correlation between higher levels of labour productivity and higher levels of capital per employee, which is indicative of constant returns to scale production technologies.

Table 3.7
Real Output per Employee
Units = thousands of Tanzanian Shillings [1992 constant prices]

	Micro	Small	Medium	Large	All Firm Sizes
Food	1,723.7	3,493.9	6,371.1	8,947.9	6,145.8
Beverages	1,129.8	1,910.5	4,893.5	16,689.0	7,302.6
Textiles	--	363.1	2,109.6	2,651.9	2,322.3
Garments	822.2	688.3	941.6	490.6	783.9
Wood Products	514.2	678.9	523.1	826.8	641.9
Furniture	714.4	787.5	446.5	726.2	707.9
Metal & Machines	881.1	1,577.7	2,035.3	3,152.6	1,610.0
Other (inc. shoes)	685.8	426.7	4,104.3	8,121.5	2,474.2
All Firm Sectors	828.1	1,317.0	2,620.6	5,568.6	2,161.4
<i>No. observations</i>	287	456	265	190	1198

Table 3.8
Real Capital per Employee
Units = thousands of Tanzanian Shillings [1992 constant prices]

	Micro	Small	Medium	Large	All Firm Sizes
Food	642.9	2,869.3	5,632.0	7,160.3	5,128.8
Beverages	119.5	12,539.9	18,843.2	28,934.8	15,069.5
Textiles	--	2,590.3	2,502.9	2,500.8	2,509.2
Garments	202.4	850.8	1,873.6	922.6	746.0
Wood Products	166.0	913.3	1,139.7	885.4	864.2
Furniture	345.4	838.3	1,015.8	484.4	740.2
Metal & Machines	1,689.1	1,781.0	2,155.2	8,304.0	2,443.2
Other (inc. shoes)	179.9	2,065.3	3,581.9	4,716.3	1,959.0
All Firm Sectors	719.8	1,636.9	3,089.5	6,715.1	2,592.2
<i>No. observations</i>	287	456	265	190	1198

Is there any evidence that productivity levels in Tanzanian manufacturing have grown over the 1990's? To answer this question, we must control for changes in other inputs to the production process and examine trends in underlying productivity – often known as total factor productivity or TFP. The empirical method used to undertake this is to estimate a production function using regression analysis, which allows us to simultaneously estimate the effects of a number of different firm characteristics on production levels and how these have changed over time.

In Table 3.9 we present the results of two versions of the production functions – one using real output and the other real value added as the measure of firm performance. We can examine the time trends from these functions and see that there is some evidence of higher levels of total factor productivity (TFP) towards the end of this period compared to 1992 (which is the omitted year dummy). Another way of putting this is to say that it seems that, on average, sample firms became more efficient in generating more output from their factor inputs in the 1999 – 2000 period. Growth of TFP is widely seen as a precondition for higher real wage levels and more general economic growth.

The other significant effects from the estimated production functions are that older firms are less productive than newer firms, exporting firms are more productive (in the value added based specification) and that firms in the regions are less productive than firms based in Dar es Salaam. We find no significant relationship between levels of human capital, measured by worker education, age and tenure, and productivity. This may reflect the relatively simple production processes employed by most firms.

Table 3.9
Tanzania: Production Functions 1992 - 2001

	Dependent Variable					
	[1]			[2]		
	Log (Real Output)			Log (Real Value Added)		
	Coefficient	t-value		Coefficient	t-value	
Log (Raw Materials)	0.59	48.71	***			
Log (Indirect Costs)	0.28	20.13	***			
Log (Employment)	0.12	8.72	***	0.72	17.06	***
Log (Capital Stock)	0.01	1.92	*	0.31	14.25	***
Log (Worker Education)	0.004	0.88		0.03	1.40	
Log (Worker Age)	-0.001	-0.95		-0.01	-1.59	
Log (Worker Tenure)	0.01	1.78	*	0.01	1.01	
Firm Age/100	-0.20	-2.63	***	-0.24	-2.63	***
Any Foreign Ownership	-0.02	-0.62		0.30	3.00	***
Any Exports	0.02	0.77		0.28	2.64	***
Food	0.04	1.29		0.59	5.39	***
Beverages	0.18	3.06	***	0.51	2.50	**
Textiles	-0.07	-1.51		-0.27	-1.66	*
Garments	-0.03	-1.06		-0.09	-0.77	
Wood	0.08	2.00	**	-0.28	-2.16	**
Furniture	0.000	0.00		-0.26	-2.86	***
Other	0.06	0.86		0.64	2.61	***
Morogoro	-0.06	-2.04	**	-0.20	-1.80	*
Tanga	-0.003	-0.11		-0.07	-0.59	
Arusha	-0.09	-2.93	***	-0.39	-3.86	***
Mwanza	-0.06	-2.03	**	-0.27	-2.41	**
year 1993	-0.02	-0.76		-0.09	-0.79	
year 1995	0.09	2.53	***	0.17	1.35	
year 1996	0.01	0.15		0.23	1.39	
year 1997	0.03	0.94		0.16	1.22	
year 1998	0.05	1.42		0.27	2.39	**
year 1999	0.18	5.00	***	0.65	5.28	***
year 2000	0.16	4.72	***	0.62	5.27	***
Adjusted R2	0.983			0.790		
N	994			986		

t value = t statistics which use White (1980) corrected standard errors

* indicates significance at the 10% level; ** at the 5% level; *** at the 1% level

Omitted categories are sector = metal and location = Dar es Salaam

3.3 Capacity Utilisation

One of the main concerns in Tanzanian manufacturing in the 1980's were low levels of capacity utilisation. This is believed to be principally due to an over-investment in large-scale capital-intensive production processes as a result of artificially low capital costs, with many industries benefiting from preferential loans from state-owned investment banks (see Ndulu 1986). One of the responses we might expect to see to the reforms of the late 1980's would be a rationalisation of production processes and an increase in levels of capacity utilisation. Alternatively, it could be argued that the uncertain business environment in the 1990's and higher levels of domestic competition may have left some firms continuing to operate at below their productive potential.

Table 3.10
Degree of Capacity Utilisation Over Time
Percentages (realised output/ potential output)

	1992-95	1996-98	1999-2000	All Periods
Food	45.4	57.4	52.5	51.2
Beverages	50.1	61.3	57.9	57.7
Textiles	41.5	54.0	64.0	48.9
Garments	50.5	56.8	49.1	52.4
Wood Products	47.7	67.6	67.1	57.5
Furniture	56.0	56.0	46.6	53.7
Metal & Machines	49.9	48.8	45.7	48.8
Other (inc. shoes)	56.9	56.0	46.7	56.0
All Sectors	50.5	55.2	51.0	52.1
<i>No. observations</i>	<i>506</i>	<i>337</i>	<i>228</i>	<i>1198</i>

The evidence in Table 3.10 seems to support the latter hypothesis, rather than the former. On average, firms continue to operate at around 50% of their productive capacity and there is no clear aggregate upward trend over time. Some sectors do seem to have improved including food, beverages and particularly the textile sector. These are the sectors which are dominated by larger firms, which seem to have

responded most to market reforms in downsizing their operations (particularly through workforce rationalisation) and seeking to improve their cost competitiveness.

Table 3.11
Degree of Capacity Utilisation by Firm Age and Sector
Percentages (realised output/ potential output)

	New	Young	Mature	Old	All Firm Ages
Food	56.0	47.5	51.8	47.8	51.2
Beverages	54.4	77.6	65.6	46.8	57.7
Textiles	69.3	36.3	39.9	40.0	48.9
Garments	56.1	49.6	52.3	51.2	52.4
Wood Products	74.7	48.6	52.1	56.8	57.5
Furniture	54.8	59.7	49.4	54.5	53.7
Metal & Machines	51.0	50.1	46.3	47.1	48.8
Other (inc. shoes)	61.0	55.6	60.2	50.4	56.0
All Firm Sectors	56.2	53.4	50.0	49.7	52.1
No. observations	288	148	320	288	1071

note: new = 1-5 years; young = 6-10 years; mature = 11-20 years; old =>20 years

Another way of examining changes in capacity utilisation levels is to look at differentials between firms of different vintages. Even if older incumbent firms have not responded to the reform programme by rationalising their operations, it may be the case that new entrants to these sectors (who have the greatest scope to choose appropriate levels of their main factor inputs) have succeeded in doing so. The data in Table 3.11 gives some support to this argument – firms in the new and young categories report higher levels of capacity utilisation than older firms in most industrial sectors. This is particularly the case in the textiles and wood products sectors.

4. Investment Behaviour & Constraints

4.1 Explaining low investment

A common feature which distinguishes successful firms is investment and particularly sustained investment across a number of time periods. Several recent studies on investment behaviour have found that investment rates in African manufacturing sectors are very low, with median rates close to zero, and that few firms invest on a regular basis [Bigsten, et al 1999]. Why is this the case?

One argument which may explain such a reluctance to invest is linked with the investment under uncertainty theories originally due to Dixit and Pindyck (1994). These models analyse firm investment behaviour when uncertainty about future market conditions and hence the actual returns to investment is an important factor in manager's decision-making. In these conditions, it can be shown that firm's often exercise their "option to wait" before undertaking any investment – waiting for more information about the demand patterns for their products, the strategies of their competitors or perhaps, more importantly, information about changes in government policy affecting their operations. In these circumstances the required rate of return for specific investment projects to be undertaken is increased. A related argument is that investments in developing countries are often irreversible i.e. the full value of the investment in land, buildings, plant or machines cannot be easily recovered due to thin markets in second-hand capital equipment.

Soderbom and Teal (2000) have argued that non-linear adjustment costs are the main explanation of the lumpy/ spiky investment patterns commonly observed in African datasets i.e. firms do not invest at all for several periods and then make large (lumpy) investments which are not related to the indivisibility of the investment being undertaken. Firms have a choice of how to phase their investments and they choose to invest in lumps and zeros, rather than adjusting continuously to changing market conditions.

An alternative view of the dismal investment performance in African manufacturing during the 1990's argues that the main factor constraining higher investment rates is lack of access to financing at reasonable rates and under acceptable repayment conditions. It has been commonly observed from the RPED datasets that African firms prefer to finance investments using their own resources, rather than using external investment financing. However, the extent to which this is due to imperfections in local capital markets, rather than entrepreneurial preferences is not altogether clear. Some firm owners appear to exhibit high levels of "risk aversion" to incurring debts which may not be able to be repaid. This can also be linked to the underlying levels of uncertainty caused by the inherent riskiness of trying to establish and successfully run a firm in an imperfect operating environment. In some cases, firm failure can be attributed to weaknesses within the firm itself. However, there may be exogenous factors e.g. high inflation rates, exchange rate depreciations, natural disasters which lead firms to fail. In these cases, the returns which firms require in order to induce them to undertake investments will be relatively high. Likewise, the guarantees and levels of collateral that financial institutions require before they will give loans will be similarly biased upwards.

Finally, we may also need to consider the relative returns to investments in manufacturing compared to other sectors of economic activity. This is an issue for which we have relatively little data, but report here some evidence on Tanzanian entrepreneurs views on areas of relative investment potential. In general, entrepreneurs may prefer investments in activities which have lower initial capital commitments or shorter pay-back periods e.g. commercial activities or service industries. It may also be the case that financial institutions prefer to lend to borrowers in these categories, with repayment of loan capital and interest in periods of less than one year.

4.2 Investment Incidence and Investment Rates

The general picture of irregular investment performance is confirmed by examining data from the Tanzanian surveys over the period 1992 - 2000. Table 4.1 shows the proportion of firms investing, the gross investment/ capital rate for the whole sample and the investment/ capital rate given that the firm invests in a specific period. These

statistics are broken down by firm size and sector of operation and by year of the survey.

We can note an increase in the proportion of firms investing across size categories except for medium-sized firms. We do not have a clear explanation for the low investment incidence of firms in the medium-sized category (31 – 100 employees), although it is possible that these include several previously large enterprises that have downsized their operations during the 1990's and have hence been effectively 'disinvesting' over this period. Investment rates are quite similar across sectors and size categories, assuming that the firm does invest in a specific period, and the mean investment rates are relatively high, over 30% in several sectors. This picture is consistent with the models of lumpy investment - firms invest infrequently but invest quite high proportions of their existing capital stock when they do invest. For the whole sample the mean investment rate is less than 10% and, on average, firms only invest once every 4 years. These aggregate statistics mask the fact that some firms invest in all periods, whereas other firms do not invest at all. The skewness of the distribution of positive investment periods can be seen from the divergence between the mean and median investment rates. We observe a rise in the proportion of firms investing in later rounds of the survey, although no increase in investment rates. However, it should be remembered that these changes over time are not directly comparable due to changes in the sample composition between periods. As unsuccessful firms exit from our sample, we might expect to observe more frequent investments from surviving firms.

Table 4.1**Tanzania Investment Rates by Firm Size and Sector 1992 - 2001**

	<i>Number of Observations</i>	Proportion of Firms Investing	Investment/ Capital (Whole Sample)	Investment/ Capital (if firm invests)
<i>Firm Sectors:</i>				
Food	198	29.2%	0.11	0.37
Beverages	57	38.5%	0.15	0.38
Textiles	84	28.5%	0.08	0.28
Garments	160	23.1%	0.08	0.33
Wood Products	116	18.1%	0.05	0.30
Furniture	295	28.4%	0.08	0.29
Metal & Machines	393	23.4%	0.08	0.33
Other (inc. shoes)	86	17.4%	0.04	0.22
<i>Firm size categories:</i>				
Micro	284	24.2%	0.09	0.37
Small	446	31.1%	0.08	0.27
Medium	269	19.3%	0.07	0.39
Large	197	39.0%	0.11	0.29
<i>By year (round of survey):</i>				
1992 (round 1)	207	16.9%	0.06	0.34
1993 (round 2)	179	18.9%	0.03	0.18
1995 (round 3)	126	26.2%	0.06	0.25
1996 (round 4)	179	11.2%	0.04	0.33
1997 (round 5)	179	24.6%	0.08	0.34
1998 (round 6)	179	36.3%	0.16	0.43
1999 (round 7)	170	27.1%	0.09	0.34
2000 (round 8)	170	44.7%	0.13	0.29
All Firms	1389	25.4%	0.08	0.32

4.3 Investment Functions

In order to explore the factors determining investment incidence and levels of investment undertaken, we present in Table 4.2 the results of several investment functions. The first two equations model the decision to invest using a probit specification. We observe the strong positive correlation between investment incidence and firm size, measured by the log of total employment. We investigate the impact of firm-level efficiency on the decision to invest by including the residuals from the production functions presented in Section 3 above. Model [1] uses the residuals from the output-based production function and model [2] uses the residuals from the value added function¹. Is it the case that more efficient firms invest more frequently? The coefficient from the output-based function is inconclusive, but the coefficient from the value added function is positive and highly significant, indicating that more efficient firms invest more frequently. This result is interesting, if true, but requires further analysis, particularly to determine the direction of causality. The other factor which appears to have a strong impact on how frequently firms invest is firm age – with older firms investing significantly less frequently than younger firms. On the one hand, this is what we might expect to observe in any industrial sector, since older firms will have had more time to adjust their levels plant and equipment to optimum or desired levels, whereas new entrants may need to make incremental investments to reach their minimum efficient scale. However, an alternative explanation would be that newer firms are more responsive to changes in market conditions, given that their levels of sunk capital are likely to be lower.

Table 4.2 also presents two versions of an OLS investment function which regresses the investment rate (investment/ capital rate), assuming that an investment takes place, on a number of potential explanatory variables. These are equations [3] and [4] which again use alternative measures of firm technical efficiency. Apart from a small negative effect from firm size, it can be seen that investment rates do not seem to be correlated with either firm efficiency levels, sector of operation, firm age or

¹ This approach assumes that positive residuals from the production function are an indication of higher than average levels of time-variant total factor productivity (or technical efficiency), given firm inputs and characteristics, whereas negative residuals indicate lower than average TFP.

Table 4.2
Tanzania: Investment Equations 1992 - 2001

	Probit		OLS	
	Decision to Invest (marginal effects#)		Dependent Variable = investment/ capital if firm invests	
	[1]	[2]	[3]	[4]
Log (Employment)	0.11 (10.24)***	0.11 (9.07)***	-0.02 (-1.99)**	-0.03 (-2.15)**
Technical Efficiency (Output)	-0.03 (0.05)		-0.01 (-0.14)	
Technical Efficiency (Value Added)		0.13 (8.14)***		0.02 (1.01)
Firm Age/100	-1.17 (10.28)***	-1.20 (10.59)***	-0.09 (-0.78)	-0.09 (-0.77)
Any Foreign Ownership	-0.16 (1.47)	-0.14 (1.13)	-0.07 (-1.57)	-0.06 (-1.32)
Food	0.21 (2.34)**	0.25 (3.04)***	0.07 (1.41)	0.07 (1.29)
Beverages	0.64 (7.69)***	0.66 (8.01)***	0.05 (0.66)	0.04 (0.61)
Textiles	0.09 (0.17)	0.10 (0.21)	0.05 (0.70)	0.05 (0.64)
Garments	0.001 (0.00)	0.000 (0.00)	-0.084 (-1.52)	-0.087 (-1.58)
Wood	-0.17 (0.90)	-0.17 (0.84)	0.07 (1.01)	0.07 (0.98)
Furniture	0.12 (0.89)	0.09 (0.55)	-0.01 (-0.20)	-0.02 (-0.38)
Other	0.11 (0.12)	0.00 (0.00)	0.04 (0.44)	0.00 (-0.02)
Morogoro	0.13 (0.91)	0.13 (0.81)	-0.06 (-1.34)	-0.06 (-1.33)
Tanga	0.10 (0.46)	0.11 (0.51)	-0.09 (-1.80)*	-0.09 (-1.71)*
Arusha	-0.13 (0.87)	-0.19 (1.86)*	-0.06 (-1.24)	-0.06 (-1.23)
Mwanza	-0.12 (0.57)	-0.14 (0.84)	0.04 (0.69)	0.03 (0.44)
R-Square			0.102	0.102
Adjusted R-Square			0.024	0.023
N (invdum = 1]	297	293		
N	1020	1011	276	272

figures in brackets are t statistics; * indicates significance at the 10% level; ** at the 5% level; *** at the 1% level

Both regressions include time dummies (not reported); Omitted categories are sector = metal and location = Dar es Salaam

marginal effects of a 1% change in continuous variables on the probability of observing any investment;

for dummy variables the marginal effect is of a discrete change from value = 0 to value = 1.

Measures of technical efficiency: these are taken from respective production functions, omitting non-significant variables.

ownership characteristics. The initial conclusion is that observed investment rates are more idiosyncratic than investment incidence and respond to unobserved firm-specific conditions which are not captured by the explanatory variables used here. We have still to explore evidence on firms' financial conditions, including levels of indebtedness and access to external sources of financing.

Table 4.3
Tanzania: Investment Trends Over Time

	Probit	OLS
	Whether Firm Invests	Investment/ capital if firm invests
year 1993	0.04 (0.26)	-0.15 (-2.31)**
year 1995	0.31 (1.86)*	0.00 (0.05)
year 1996	-0.25 (-1.04)	0.00 (0.04)
year 1997	0.52 (3.11)***	-0.02 (-0.32)
year 1998	0.56 (3.68)***	-0.07 (-1.33)
year 1999	0.34 (2.01)**	-0.07 (-1.08)
year 2000	0.75 (4.80)***	0.02 (0.38)

notes: figures in brackets are t statistics; see previous table for details

We complete this analysis by asking whether there is any evidence of a change in either investment incidence or investment rates in Tanzanian manufacturing over this period? Table 4.3 displays the time dummies taken from the investment equations [1] and [3] shown in Table 4.2. Controlling for other factors, we can see that investment rates have essentially remained stable over this period. However, there is evidence that levels of investment incidence are higher in the 1997 – 2000 period compared to the early 1990's. This result must be interpreted with caution and may be due either to changes in sample composition in the last two surveys or alternatively to changes in survey methodology which means that we are now picking up small investments which were previously overlooked. However, the finding that Tanzanian

manufacturing firms were investing more frequently in the late 1990's would be consistent with the recovery in growth in real output in recent years.

4.4 Are firm's investment plans realised and realistic?

In this section, we examine some new evidence from the Wave 4 and Wave 5 surveys in Tanzania on entrepreneurs' investment plans over the period 1999 - 2001. We are able to examine to what extent firms' desired investment plans have been realised and also ask to what extent these plans were realistic? Wave 4 of the Tanzania survey conducted in late 1999 asked a series of questions about individual firm's investment intentions over a three year period. We now have actual investment data for the period 1999-2001 to be able to compare desired investment with realised investment. The questions posed to firm managers and owners in 1999 were as follows:

- (1) Would you invest in your current business in the future?
- (2) Assuming that you had access to the necessary financial resources and with a market for your products, how much would you invest over (a) the next 12 months, (b) the next 3 years?
- (3) Would you also invest in other sectors of real (i.e. non-financial) sectors of economic activity?
- (4) Which sectors would you choose to invest in (ranking of 1st, 2nd and 3rd choices)

The results of questions (1) and (2) are summarised in Table 4.4 along with information about firms actual investment rates over this period. The majority of entrepreneurs in all sectors except textiles responded that they would make further investments in their current businesses in the future, with the average for the whole sample being 56.3% of firms - indicating that more than 40% had no investment plan at all. The values of the planned investments are shown converted into US dollars. We interpret the 'planned' investment amounts as an indication of 'optimal' investment levels, relaxing all financial constraints upon the firm and assuming favourable market conditions for their products. As we might expect, most firms invested far less than these optimal investment levels. Optimal investment rates were more than 40 times higher than actual investment rates over the period. We find that large firms are

Table 4.4
Tanzania: Planned Against Realised Investment 1999 - 2001

	<i>Number of Obs.</i>	Proportion of Firms Who Would Invest in their Current Businesses in the Future	Average Planned Investment (next 12 months) in US dollars	Average Planned Investment (next 3 years) in US Dollars [a]	Planned Investment Rate [b]	Actual Investment Rate [c]
<i>Firm Sectors:</i>						
Food	58	56.9%	81,848	179,042	1.06	0.21
Beverages	17	64.7%	209,417	6,958,629	3.70	0.21
Textiles	16	43.7%	385,952	2,119,265	0.53	0.16
Garments	49	59.1%	9,303	35,065	5.48	0.13
Wood Products	30	66.6%	21,733	109,694	9.32	0.09
Furniture	79	54.4%	18,345	95,120	4.37	0.15
Metal & Machines	103	52.4%	47,236	164,141	3.70	0.12
Other (inc. shoes)	16	62.5%	56,180	222,793	4.10	0.03
<i>Firm size categories:</i>						
Micro	103	64.1%	3,416	16,743	6.54	0.11
Small	145	57.2%	22,020	68,215	4.19	0.15
Medium	70	52.9%	105,949	288,012	2.05	0.12
Large	49	40.8%	335,633	7,331,755	0.31	0.20
All Firms	368	56.3%	56,912	519,466	4.14	0.14

notes: combined observations for 1999 (Wave 4 of survey) and 2001 (Wave 5 of survey) except where indicated

[a] 3 year investment plan relates to 1999 only

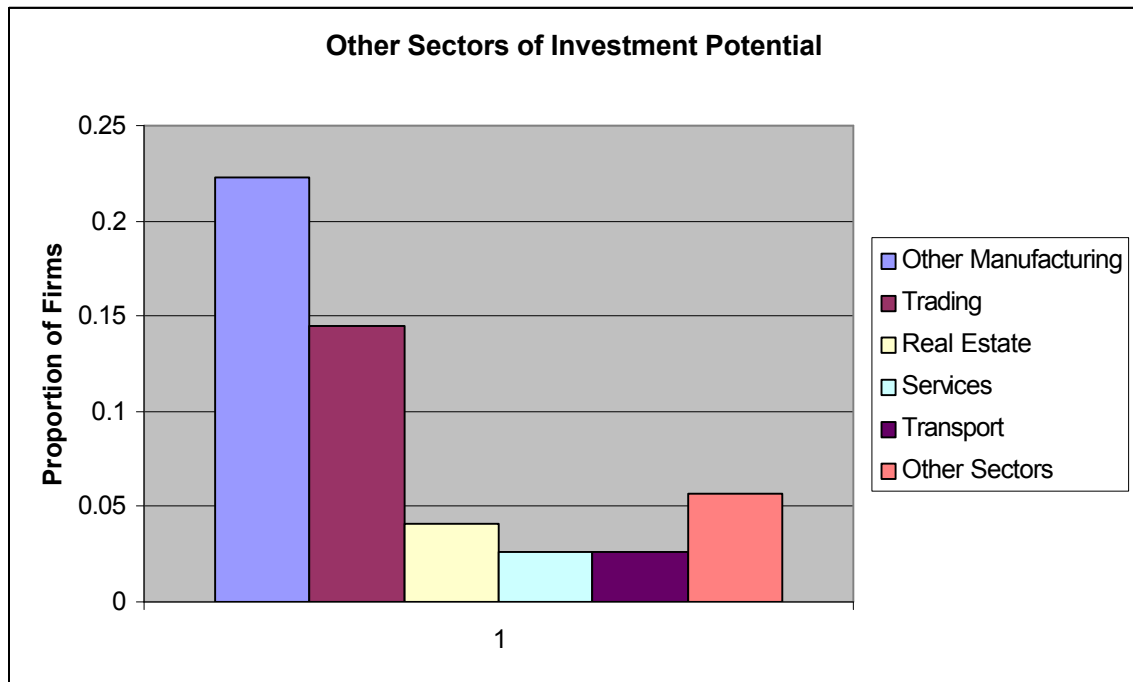
[b] planned investment rate = planned investment in year t+1/ capital stock in year t

[c] actual investment rate = observed investment in year t+1/ capital stock in year t

the only size category where planned (0.31) and realised (0.20) investment rates are comparable. This may reflect a combination of more realistic investment plans and the fact that they are less financially constrained in undertaking these plans. We should however note that only 41% of managers of large firms responded that they would invest further given expectations of market conditions.

In response to the questions about other sectors of investment potential, 58% of firms interviewed in 1999 expressed an interest in investing in other sectors, given available resources. Figure 4.5 gives the proportion of firms which mentioned other areas of investment interest either as their first or second option. We can see that these are dominated by other manufacturing activities (22% of firms) and trading (15% of firms), which are obviously areas in which these entrepreneurs have the most experience. Hence, despite perceived adverse operating conditions for firms in the industrial sector, it does seem as though the majority of entrepreneurs continue to see manufacturing (either of current products or in other subsectors) as a viable and attractive area for future investment.

Figure 4.5



In further work on investment plans, we propose to pursue this issue further by attempting to distinguish between endogenous and exogenous factors which may have prevented realisation of desired investment and attempt to understand which set of factors were the most significant. Endogenous factors include firm profitability (given that most investment is financed by own resources), relative level of firm efficiency (measured by TFP in current and previous periods), firm “success” (measured by growth in real output or sales), level of firm indebtedness, previous investment history and managerial capacity. Exogenous factors might include general sectoral performance, levels of competition and access to credit/ changes in the availability and cost of capital to the firm. A review of recent investment literature indicates that these issues have not been explored using firm-level datasets from developing countries and hence would make an original contribution to research in this area.

5. Market Orientation & Competition

5.1 Penetration of Export Markets

Many analyses have emphasised exporting as a key factor in reversing Africa's poor economic performance. Diversification of the current export base is seen as one of the key objectives of government economic policy. As in most other sub-Saharan African countries, however, manufacturers in Tanzania remain focused on the domestic market for their products and have not made any significant move into international export markets since the commencement of the liberalisation programme in 1986. Data on aggregate export performance (see Section 1) show that, if anything, export volumes and values have contracted in recent years. Certainly, the contribution of manufacturing exports to total exports has not increased, particularly if we exclude semi-processed agricultural products such as tea, coffee, tobacco and cotton bales. The World Bank (2001) conclude that Tanzania's export sector remains highly vulnerable to the vagaries of the weather and to fluctuations in world market prices for primary products.

Table 5.1 shows the proportion of firms that carried out any exporting to either regional markets in Africa or international markets over the period 1996 – 2000 for which comparable data is available. The breakdown by firm sector is also shown in Figure 5.2a. We can see that 10% of firms exported to the African region and 6% exported internationally. Larger firms are more likely to export in both market segments and firms below 30 employees (i.e. the small and micro categories) are almost exclusively oriented to the domestic market. Regional exports are mainly concentrated in the food, beverage and textile sectors, which are also those dominated by larger firms as we have already seen. International exports are concentrated in the same sectors plus wood products, which is mainly sawn timber. In the food sector, the main sub-sector which succeeds in exporting outside of the region is fish and seafood products. Garments and furniture exports are virtually non-existent in Tanzania, despite the fact that these sectors are the basis of labour intensive export-oriented manufacturing sectors in other African countries such as Mauritius, Botswana and throughout south-east Asia.

Table 5.1
Tanzania Manufacturing Firms: Export Performance 1996 - 2000

	<i>Number of Observations</i>	Proportion of Firms Exporting to Other African Countries	Percentage of Output Exported to Other African Countries (if firm exports to Africa)	Proportion of Firms Exporting outside of Africa	Percentage of Output Exported to Non-African countries (if firm exports outside of Africa)
<i>Firm Sectors:</i>					
Food	122	0.25	16.2%	0.11	67.0%
Beverages	36	0.17	3.0%	0.14	4.0%
Textiles	36	0.28	17.9%	0.19	40.6%
Garments	99	0.09	9.7%	0.08	16.1%
Wood Products	65	0.09	13.0%	0.12	40.0%
Furniture	161	0.00	0.0%	0.02	20.0%
Metal & Machines	202	0.06	14.5%	0.01	20.0%
Other (inc. shoes)	32	0.00	0.0%	0.00	0.0%
<i>Firm size categories:</i>					
Micro	195	0.01	10.0%	0.01	21.0%
Small	271	0.05	16.3%	0.03	36.4%
Medium	157	0.17	14.9%	0.13	31.3%
Large	113	0.29	12.8%	0.14	47.2%
All Firms	753	0.10	14.0%	0.06	37.5%

note: figures given in table are based upon pooled observations over 5 years (1996 - 2000) and include multiple observations on some firms; this allows for the fact that some firms do not export in all time periods and proportions of firms exporting should be interpreted accordingly

Figure 5.2a

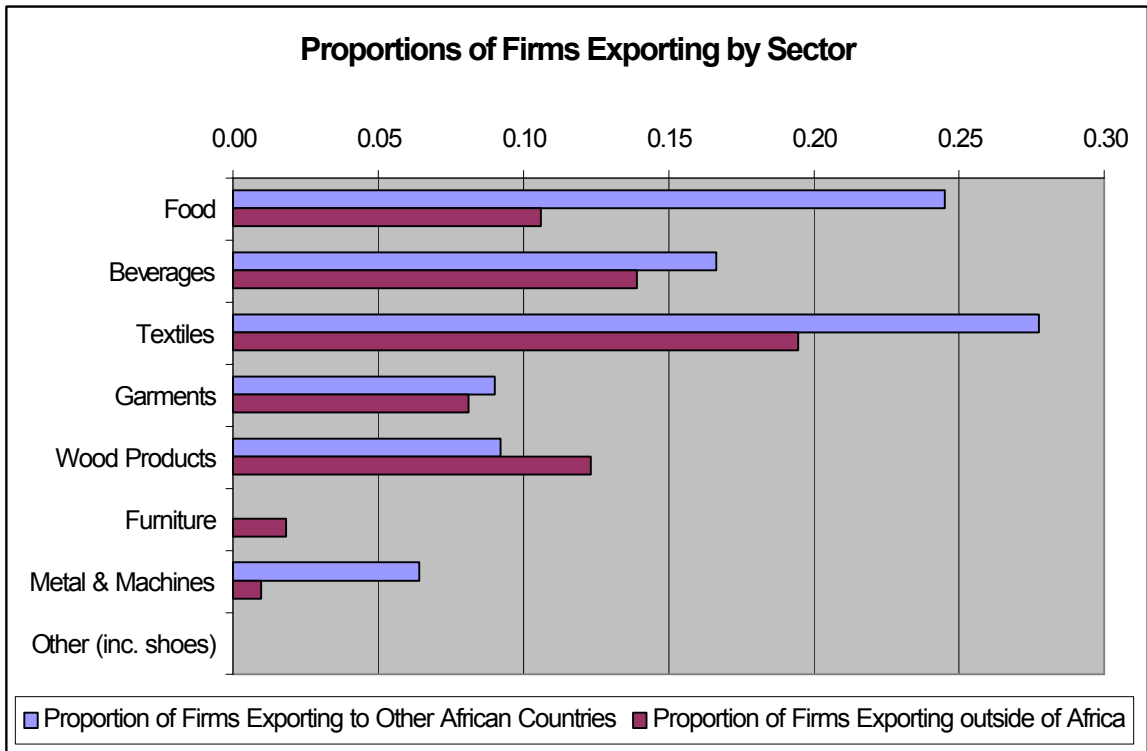
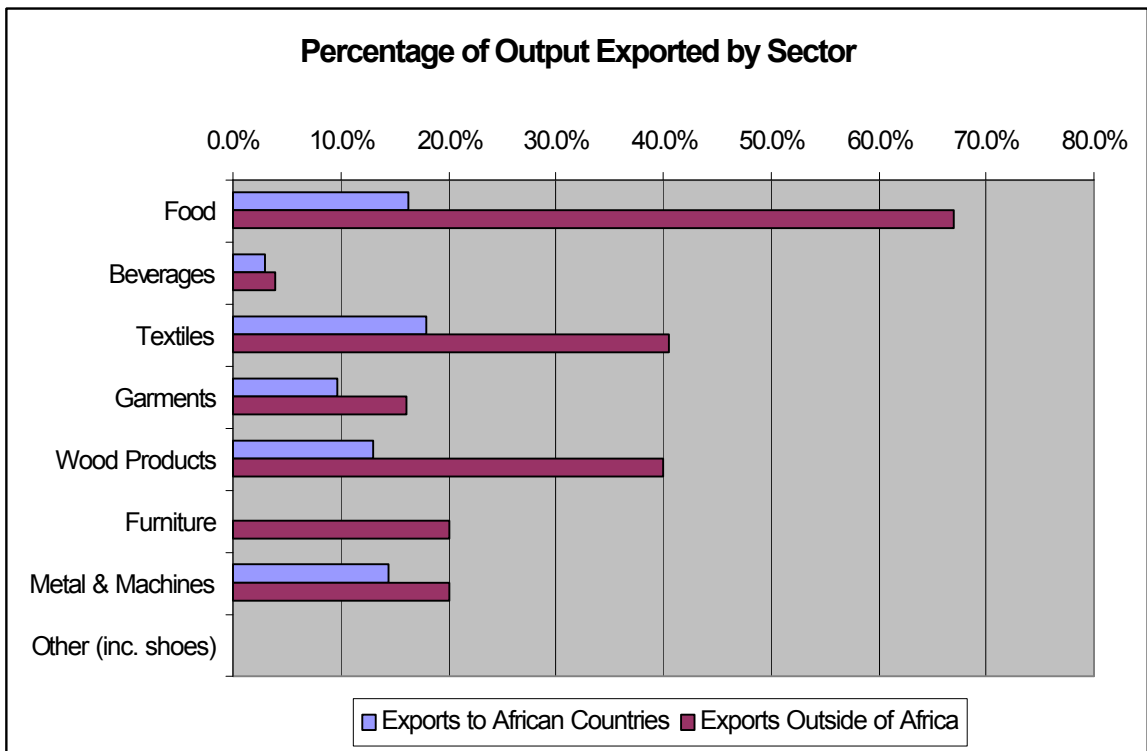


Figure 5.2b



We can also investigate how export-intensive firms in different sectors and size categories are (see Table 5.1 and Figure 5.2b). Very few firms outside of the food sector, where exporting is dominated by fish and seafood products, specialise in exporting or succeed in selling the majority of their output outside of Tanzania. Large firms tend to export a higher proportion of their total output to international markets, but not to regional markets, than firms in other size categories. The picture that emerges is one of some degree of regional market penetration (principally to other countries in East Africa, including Kenya and Uganda, but also Rwanda, Burundi and the Democratic Republic of Congo) with firms in several sectors occasionally obtaining regional export orders. By contrast, the relatively few firms that have entered international markets tend to be more specialised and begin to export higher proportions of their output.

To obtain a better understanding of the determinants of exports, a probit regression is used to model the decision to export as a function of technical efficiency (see Section 4 on investment), firm age, dummy variables for industry, location size and foreign ownership. The probit results are shown in Table 5.3. The dominant factors which positively and significantly affect the propensity to export are firm size (measured by number of employees), firm efficiency and whether the firms has any foreign ownership. Some foreign investors in Tanzania's manufacturing sector obviously view the country as a potential location for export-oriented manufacturing, as well as to supply the domestic market. We cannot determine from these results whether regional markets or international markets are of more interest to foreign-owned firms. However, experience in other developing countries, including Mauritius, suggests that encouraging firm learning via transfers of international market knowledge and exporting skills embodied by foreign owners and managers may be a necessary condition for enhanced export performance.

Table 5.3
Tanzania: Export Equations 1992 - 2001

	Probit	
	Decision to Export (marginal effects#)	
	[1]	[2]
Log (Employment)	0.47 (89.95) ^{***}	0.47 (87.90) ^{***}
Technical Efficiency (Output)	0.35 (2.69) ^{***}	
Technical Efficiency (Value Added)		0.18 (9.25) ^{***}
Firm Age/100	0.60 (1.67) [*]	0.54 (1.34)
Any Foreign Ownership	0.31 (4.44) ^{***}	0.32 (4.81) ^{***}
Food	0.34 (4.05) ^{***}	0.34 (4.10) ^{***}
Beverages	-0.27 (0.81)	-0.28 (0.87)
Textiles	-0.15 (0.36)	-0.16 (0.41)
Garments	0.609 (8.78) ^{***}	0.632 (9.32) ^{***}
Wood	0.13 (0.36)	0.12 (0.28)
Furniture	-1.13 (10.75) ^{***}	-1.09 (9.78) ^{***}
Other	-0.78 (2.86) ^{***}	-0.81 (2.69) ^{***}
Morogoro	0.12 (0.27)	0.14 (0.39)
Tanga	0.72 (13.38) ^{***}	0.78 (14.99) ^{***}
Arusha	0.22 (1.84) [*]	0.27 (2.58) [*]
Mwanza	-0.11 (0.32)	-0.07 (0.11)
R-Square		
N (expdum = 1]	144	143
N	1020	1011

figures in brackets are Chi Square statistics; * indicates significance at the 10% level; ** at the 5% level; *** at the 1% level
Both regressions include time dummies (not reported); Omitted categories are sector = metal and location = Dar es Salaam
marginal effects of a 1% change in continuous variables on the probability that the firm exports;
for dummy variables the marginal effect is of a discrete change from value = 0 to value = 1.
Measures of technical efficiency: these are taken from respective production functions, omitting non-significant variables.

5.2 Dependence on Imported Raw Materials

As well as the low incidence of exporting, another factor which potentially limits the performance of Tanzanian manufacturers are their dependence upon imports of raw materials and other intermediate inputs into their production processes. This may affect domestic producers in a number of ways. Changes in the relative prices of imported goods, due to exchange rate movements, may affect firm costs and hence profitability levels over time. Difficulties in securing timely delivery of required inputs, due to regulatory or other impediments to efficient importing, might disrupt production processes.

Table 5.4
Model of Real Exchange Rate Changes by Market Orientation of Firm

Market Orientation	Source of Raw Materials (assume 70% total costs)	Revenues Denominated in	Raw material costs denominated in	Affect on firm profits of 10% real devaluation of Tsh/USD
100% Exporter	100% domestic market	US Dollars	Tanzanian shillings	Increase by 7%
100% Domestic Market	100% Imported	Tanzanian shillings	US Dollars	Decrease by 7%

As well as expanded growth potential due to the size of international markets, one of the main advantages which exporters have over those firms producing exclusively for the domestic market is their relative insulation from macroeconomic shocks which impact negatively on the Tanzanian economy. A simple schematised model of the effects of a change in the real exchange rate on these two groups of firms, assuming specialisation in market orientation, will demonstrate this. The real exchange rate is in effect a measure of the number of units of domestic currency which is required to purchase a given quantity of goods on international markets or vice versa for a unit of foreign currency. It is measured as the nominal exchange rate * domestic CPI/ international CPI. Devaluations in the real exchange rate (RER) increase the relative incentives to produce for export, as opposed to domestic markets.

Is exposure to macro shocks an important factor for Tanzanian manufacturers? Table 5.5 shows the relative import dependence of firms by firm sector, size and age. This shows that several sectors, particularly beverages, textiles, garments and metal-working are dependent upon imports of raw materials and are hence vulnerable to changes in the real exchange rate. As the Tanzanian shilling devalues at a rate higher than domestic inflation rates, their costs (in dollars) rise but they may be unable to increase their sales prices to the domestic market sufficiently to compensate. The wood products and furniture sectors are the least import dependent, since their main input is timber from Tanzanian forestry's, and hence should be better able to resist profitability shocks arising from RER devaluations. We can also observe that levels of import dependence increase sharply with firm size, as might be expected, but that there appears to be no change with firm age.

5.3 Profile of Market Competition

We have some limited information about the levels of competition faced by firms in their domestic markets. One of the problems faced in calculating industry concentration ratios (typically the proportion of industry output accounted for by the largest five producers) is deciding upon the geographical boundaries of the markets within which firms are considered to be competing. As we have seen, several of the sectors covered by the survey are traded goods sectors which are open to considerable import competition and where firms also seek to compete in international markets.

Table 5.5 above gives a breakdown of the proportion of firms by size and sector which reported that they had more than five competitors in the market for their major products. We can immediately see that market structure is characterised in most sectors by relatively small producers with low market shares (20% or less). The only sectors which contradict this picture are textiles and beverages which are dominated by a much smaller number of relatively large producers. This is not surprising given the higher levels of technical capacity and capital inputs needed to produce successfully in these sectors.

Table 5.5
Tanzania: Import Dependence & Degree of Competition

	<i>Number of Observations</i>	Proportion of Raw Materials Imported (1992 - 2000)	<i>Number of Observations</i>	Proportion of Firms Reporting >5 Competitors in their Main Product Market (2000 only)
<i>Firm Sectors:</i>				
Food	119	15.8%	40	85.0%
Beverages	34	25.3%	14	42.8%
Textiles	62	37.1%	14	57.1%
Garments	126	27.9%	44	90.9%
Wood Products	76	3.9%	26	61.5%
Furniture	207	7.9%	66	96.9%
Metal & Machines	273	26.3%	76	78.9%
Other (inc. shoes)	56	34.8%	12	83.3%
<i>Firm size categories:</i>				
Micro	217	16.7%	83	91.6%
Small	356	12.0%	115	82.6%
Medium	200	26.6%	49	71.4%
Large	130	35.1%	35	68.6%
<i>Firm Age Categories:</i>				
New (1-5 years)	264	22.2%		
Young (6-10 years)	129	20.3%		
Mature (11-20 years)	295	18.0%		
Old (>20 years)	242	21.0%		
All Firms	953	20.6%	292	81.5%

6. Summary & Conclusions

This report has examined a number of aspects of the performance of Tanzanian manufacturing firms during the 1990's. Amongst the many potential issues of interest, we have chosen to focus upon (a) firm growth over the period, (b) levels of labour productivity and total factor productivity, (c) relative degrees of capital intensity and levels of capacity utilisation, (d) firm investment performance and (e) the market orientation of firms towards either domestic or international export markets. The following is a brief summary of the main findings in each of these areas.

- Manufacturing firms contracted sharply in the early 1990's in response to market liberalisation, although there appears to have been a recovery in real output levels, if not in aggregate employment levels, in the last 4-5 years.
- This positive response seems to be being driven by small and medium scale firms, in sharp contrast to earlier growth periods which were dominated by large parastatal enterprises.
- However, for firms in our sample, real output at the end of the 1990's remains at lower levels than at the beginning of the decade and aggregate employment levels have contracted by approximately 20%.
- The growth picture emerging from our survey data is broadly consistent with official statistics on industrial sector performance, which shows a similar U-shaped pattern through the 1990's; however, the contraction observed in the early 1990's is both more pronounced and more persistent for firms in our survey sample and the subsequent recovery is less dramatic than in official statistics.
- Labour productivity levels are shown to vary considerably by firm size and sector with food and beverages having the highest levels of productivity of the sectors covered. On average, workers in Tanzania produced outputs worth US\$ 6,187 per annum, compared to US\$ 7,896 in Ghana and US\$ 14,605 in Kenya (measured in internationally comparable ppp US dollars). There is some evidence of a rise in underlying productivity in recent years (1998 – 2000) compared to earlier periods as measured by time dummies in the production function.

- A large part of the differentials in labour productivity between firms in different sectors can be explained by the variation in levels of capital/ employee. The most capital-intensive sectors are food, beverages, textiles and machinery.
- We find some evidence of an increase in capacity utilisation rates amongst new firms (those that have entered in the last 5 years) compared to older firms, although this is limited to certain sectors, including textiles, wood products and garments. However, average capacity utilisation for 1999–2000 remained at 51%, the same level as in 1992-95.
- Investment rates remained low throughout the period, with many firms not investing at all. On average, firms invested once every 4 years during the 1990's and the mean investment/ capital rate was only 8% (although this rises to 32% if we restrict this to positive investment periods only). This is consistent with the models of lumpy investment, where non-linear adjustment costs means that firms invest infrequently in spikes, rather than continually adjusting their levels of plant and machinery to current market conditions.
- Very few firms in Tanzania lease, rather than purchase, their capital equipment which means that investment decisions once made are largely irreversible. There are also very few examples of firms being able to dispose of their equipment in second-hand markets.
- The investment functions showed that the decision to invest is positively correlated with firm size and levels of technical efficiency and negatively correlated with firms age. Foreign owned firms do not appear to invest any more frequently than Tanzanian owned firms. We found some evidence of an increase in the propensity of firms to invest since 1997, but no increase in the investment rate.
- Only 56% of owners or managers interviewed said that that they planned to make further investments in their current businesses. This fell to only 41% of managers of large enterprises. Planned investment rates greatly exceeded actual investment rates in the 1999-2001 period, with only large firms achieving investment rates close to those anticipated. It appears that many owners and managers do not have realistic investment plans for their enterprises, if any plans at all.

- When asked about other sectors of investment interest apart from their current businesses, 22% of entrepreneurs chose other manufacturing ventures and 15% trading – areas in which they have the most experience and competence.
- Tanzanian manufacturing is currently oriented almost exclusively towards domestic and regional markets, with only 6% of firms having undertaken exports outside of Africa during the 1996-2000 period. International exporting is concentrated in three subsectors – food products and beverages, textiles and wood products. Very few firms specialise in exporting.
- A probit analysis of the decision to export finds a strong positive correlation between underlying firm efficiency and exporting; there may be a two-way relationship between these variables – more efficient firms are better able to compete in international markets and entering the export market forces firms to become more efficient in their operations.
- Exporting is concentrated amongst firms which are medium or large scale (30 employees or more) and also among firms with some degree of foreign ownership. Encouraging new entry by these types of firms into sectors of export potential should be one of the main objectives of government policy towards the manufacturing sector.
- Outside of the wood products and furniture sectors, Tanzanian manufacturers remain dependent on imports for a significant proportion of their raw material inputs. On average, firms import 20% of their raw material requirements, with large firms importing 35%. This factor plus the reliance upon the domestic market, where revenues are almost exclusively in Tanzanian shillings, makes the majority of Tanzanian manufacturers vulnerable to macro-economic shocks which affect the real exchange rate.
- Most manufacturing firms in Tanzania are relatively small and face a large number of domestic competitors producing products of similar quality and price. Over 80% of firms report facing more than five competitors in markets for their main products. Market structures are different in the beverage and textile sectors, which are dominated by a few relatively large firms.

In this report, we have examined some of the explanatory factors underlying this performance, including firm size, efficiency levels and degree of foreign ownership.

However, there is considerable work still to be done to examine all of the possible factors which have influenced manufacturing firms and their production, investment and exporting decisions during the 1990's. We will explore further constraints to firms from the Tanzanian labour market, including low education and skills levels, changes in real wages over the period and the effects of labour market regulations. We also wish to examine the extent to which infrastructural deficiencies and associated costs impact on different types of firms. Recent policy analyses have emphasised the costs of regulatory burdens on manufacturing firms, particularly those involved in the import of raw materials and equipment and the export of their finished products.

What is the key to the future success of the Tanzanian manufacturing sector in the 21st century? Undoubtedly, the most important factor is reducing domestic costs of production and associated transaction costs which are abnormally high in Tanzania. For example, many firms complain about the high costs and unreliability of their energy supplies and also about transportation costs. Another factor concerns the continuing lack of export orientation in Tanzanian manufacturing. In the longer term, exporting must be the future of growth in the sector, due to a relatively small domestic market (attributable to low per capita income and expenditure levels, rather than an absolute lack of consumers). Moves to further integrate East African markets are welcome in this respect, although these markets are relatively homogenous and transport costs will limit the ability to supply distant consumers with products that they can more easily obtain from local producers. Hence, Tanzanian manufacturers need to be more ambitious in finding markets for their products. Many Tanzanian manufacturing firms lack currently both the experience and the correct incentives to enter the export market. Existing cost disadvantages are also an important constraint but can be overcome. Encouraging further foreign investment by medium and large-scale enterprises into potential export sectors, including fisheries, wood products and textiles should be central to government policy for the manufacturing sector.

Collier (2000) argues that manufacturing is a transaction-intensive process. Exporting manufactured goods successfully implies even higher transaction rates. Collier argues that manufacturing in Africa is at a comparative disadvantage due to a poor policy environment that increases transaction costs. Transaction costs in Tanzania are increased by a number of factors including poor infrastructure, inefficient public

utilities and a less than optimal regulatory and legal environment. Many of these problems are not exclusive to Tanzanian manufacturers, but face firms throughout the region, some of whom have overcome these constraints to begin to export successfully. Perhaps Tanzania's legacy of state intervention in the productive sectors, relatively low levels of foreign investment and incomplete policy reform programme will continue to prevent a rapid reorientation of the manufacturing sector to higher value-added export activities? There is some evidence that firms are beginning to challenge this legacy.

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