

MANUFACTURED IN AFRICA: WHY NOT? ^{*g}

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Abstract

At the start of the new millennium it is clear that most African countries have failed to develop a significant manufacturing sector or to significantly export manufactured goods. Reasons that have been noted in the literature are that most manufacturing firms in Africa are small and that even the large firms in Africa are not very large. This paper makes use of survey data to study the relationship between the size of a firm and its propensity and intensity to export. The data was gathered in 1999 from a sample of 61 manufacturing firms in the North West Province of South Africa. Using Probit and Tobit regressions it is found that larger manufacturing enterprises (having more than 100 employees) tend to be more likely to be successful in exporting than small manufacturing enterprises. Specifically, 63% of large manufacturing enterprises were found to be exporting, whilst only 41% of smaller manufacturing firms (those with less than 100 employees) were exporting. Moreover, for the larger firms the exports per employee was found to be US\$ 2100 in 1999 whilst for smaller manufacturing firms this was US\$ 1600. It is also shown in this paper that firm efficiency is important for success in exports: a 10% point increase in efficiency (calculated using a stochastic production frontier methodology) will increase the probability of exporting by 19% and the intensity of exports by 12%. Finally, a literature survey found that these findings are consistent with empirical findings from other African countries. For African countries this may explain why many instances of trade liberalisation and simultaneous promotion of the manufacturing SME sector have failed to significantly increase Africa's share of manufacturing exports.

Keywords : African manufacturing, South Africa, investment, exports

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[†] This paper is based on a longitudinal survey of manufacturing firms in South Africa's North West Province, 1999-2000 as well as the World Bank's Regional Programme on Enterprise Development (RPED). The authors are grateful to the South African Netherlands Programme on Alternative approaches to Development (SANPAD) for financial support. Opinions expressed in this paper are not necessarily that of SANPAD.

1. INTRODUCTION

Over the past decade many African countries have had to face up to the challenges of globalisation and internationalisation. This has been brought about by the increasing pace of trade liberalisation and regional integration that a number of countries has embarked on since the late 1980s. One of the objectives of trade liberalisation and regional integration of African countries was to improve the internationalisation of African manufacturing firms – especially through the growth of manufacturing exports. However, African manufacturing firms have not been very successful in penetrating world markets (see Pedersen & McCormick, 1999). One explanation may be due to manufacturing firm size, although the topic of firm size as a variable in the internationalisation of firms have not yet been adequately studied. According to Manuelli (1999:19) “among the various factor that may influence the internationalisation pattern of a country, scarce attention has been paid, so far, to the impact of enterprise size.” When one recognises that most manufacturing firms in Africa are Small and Medium sized Entreprises (SMEs) it is appropriate to raise the question of whether MSMEs (Manufacturing Small and Medium Entreprises) in Africa are appropriately equipped to be successful in penetrating export markets. This question has become especially relevant in the light of a growing international literature extolling the virtues of exporting for SME development¹ as well as a growing number of recent studies that have recognised that a large and growing percentage of small businesses in countries such as Taiwan, Latin America, the USA and Europe (e.g. Italy) are engaging in exporting (see Olson, Gough & Bokor, 1997:341).²

Micro-economic evidence based on surveys are suggesting that in Africa size matters as far as success in exporting of manufactured products are concerned. Thus, the view of MSMEs as an engine of growth and exports in Africa seems to be misplaced. Larger manufacturing firms seems to be better able to break into export markets in light of the challenges of globalisation facing African countries. This evidence from Africa seems to be contrasting with preliminary evidence from elsewhere. For instance in a survey of the literature Calof (1992;1993) concludes that firm size may not matter for export success, except if the firm is very small. He states, with reference to the literature that “taken collectively, these studies imply that very small firms are not likely to engage in export activity but beyond the very small classification, size may not be an important factor” (Calof, 1992:3).

The main evidence on firms size and exports in the case of Africa comes from the World Bank sponsored Regional Programme on Entreprise Development (RPED). The RPED surveyed four African economies’ manufacturing sector, namely Cameroon, Ghana, Kenya and Zimbabwe. The percentage of firms that were exporters in the first round of the surveys was 31 percent. However, this percentage varies greatly across countries. In the Zimbabwean sample just over half of the firms export, in Ghana less than 10% (Bigsten et al. 1999d). These differences can be explained in large part by the differences in firm size across the country samples. Most exporting is done by large firms (at least 100 employees), and in fact across all four countries 71 percent of the large firms export. Hence, although most African manufacturing firms do not export, which might be inferred from macroeconomic data on the low level of African manufactured exports, the microeconomic evidence reveals the result that most large firms do export.

¹ “From the early 1980’s onward, the theoretical and empirical literature, white placing a renewed interest on the role of SMEs in general, has also emphasised the significance of their role beyond local or national boundaries.” (Manuelli, 1999:20)

² A dissenting opinion is due to Amin & Roberts (1991) who claims that the potential for SMEs to play a significant role in internationalisation of an economy has been weakened because big firms have partially acquired a more flexible organisation and mode of production and that this has reduced the advantage of flexibility that may characterise some SMEs.

This paper provides evidence from the South African manufacturing sector. The latter is the largest manufacturing sector in Africa and has in recent years been subjected to increasing global pressures as the South African government implemented a significant trade liberalisation programme since 1994. The South African government considers growth in manufactured exports to be necessary for attaining high and sustainable economic growth rates and have been offering increasing incentives for exports as part of its "Growth, Employment and Redistribution Strategy" (GEAR). It is thus important to determine the extent to which MSMEs can boost South Africa's manufacturing exports and if not, to determine the reasons why larger firms may be more likely to be successful in exporting.

The paper is structured as follows. In section 2 the methodology is explained. In section 3 a description of the survey results, particularly as it relates to firm size and exports, are set out. Section 4 contains results from a regression model that attempts to identify the determinants of manufactured exports from South Africa. Section 5 concludes.

2. METHOD

This paper is based on some of the results obtained from the first wave (of three that is planned) of a firm-level survey conducted amongst manufacturing enterprises in South Africa's North West Province. The latter region which borders Botswana on the west and the industrial heartland of South Africa (Gauteng) on the east has been chosen because the manufacturing firms in that region provide an exceptional example of manufacturing enterprises in South Africa that is under various pressures to adjust to greater competition. The majority of manufacturing enterprises in this region is in industrial sectors that have in the past been significantly protected by tariffs, such as fabricated metals, food processing, automotive componets and non-metallic mineral products. Furthermore, many enterprises enjoyed additional protection under the apartheid regime as they were located in the Bophuthatswana Homeland. Thus, since 1994 manufacturing enterprises in this region were subject to significant challenges as apartheid was abolished and the new government committed itself to the Uruguay Round of the GATT.

The survey was implemented through a structured questionnaire conducted by an enumerator. The questionnaire was based on that of the World Bank's RPED in order to facilitate comparison. The enumerators – all who are enrolled students at the University of North West in South Africa - was trained during May 1999. After the training workshop a manual was compiled for the enumerators.

The multi-stage stratified cluster sampling method was used to select a representative sample of manufacturing enterprise to be interviewed as the enterprises were heterogeneous in respect of type of product and size of firm (in terms of number of workers). The firms were divided into non-overlapping groups or strata that were more homogeneous as far as the above mentioned variables were concerned than the population as a whole. Stratification increases the precision of estimates. It also ensures that every important part of the population is adequately represented in the sample, and hence guarantees a better average representation of the population in the sample. The size of the sub-samples drawn from a stratum was taken in proportion to the size of the stratum (i.e. Proportional Stratified Sampling) and Simple Random Sampling was done within strata to select the firms that were included in the sample and interviewed. This was done for proper statistical inference to be done on the data set.

The sampling frame that was used was through the Bureau for Market Reseach (BMR) at UNISA's Industrial Register for Northwest Province. This register, consisting of a census of 474 manufacturing firms in Northwest Province, was purchased from the BMR.

Written appointments were made with all firms beforehand and confirmed telephonically. A total of 61 firms were successfully interviewed. This was less than what was intended. The major problems were found to problems related to distance, the extent of the questionnaire (and the

time taken to complete it) and the unwillingness in general of the manufacturing firms to cooperate.

3. DESCRIPTION OF FIRMS

3.1 Location, sector, size and ownership

Of the 61 firms interviewed, 4 are situated in Mafikeng, 6 in Potchefstroom, 10 in Rustenburg, 22 in Babelegi, 8 in Brits, 8 in Garankuwa and 3 in Klerksdorp. Of these, 48 are in the eastern region of the province. In table 1 below the distribution of firms by location and sector is reported.

Table 1: Distribution of firms according to location and sector

	Food [*]	Wood and furniture ^{**}	Non-metal products ^{***}	Metal products ^{****}	Other ^{*****}
Mafikeng	0	1	0	2	1
Potchefstroom	1	0	1	2	2
Rustenburg	4	0	2	3	1
Babelegi	0	6	6	6	4
Brits	0	1	2	4	1
Garankuwa	1	2	0	2	3
Klerksdorp	0	0	0	3	0
Total	6	10	11	22	12

^{*} food, tobacco products

^{**} wood & wood products, furniture

^{***} chemical products, plastic products, pottery, China, & earthenware, other non-metallic mineral products, paper and paper products

^{****} metal products, motor vehicle & motor vehicle parts, electrical machinery, iron & steel basic industries, machinery

^{*****} footwear, leather, printing & publishing, other transport equipment, other manufacturing industries

From table 1 above can be seen that the metal product industry is the most represented in the region (with 22 firms). Apart from “other” industry, the non-metallic mineral products is next with 11 firms, followed by the wood and furniture industry with 10 firms.

Table 2 below indicates the distribution of the firms interviewed according to size. The smallest enterprise employs 2 permanent workers while the largest has 720 permanent employees. The sample included 12 (20%) small, 30 (50%) medium, 13 (22%) large and 5 (8%) very large enterprises. Thus, 70% of firms can be considered to be MSMEs.

Table 2: Size of firms

Size	No. of firms	Percent
Small (employees< =10)	12	20
Medium (10<employees<=100)	30	50
Large (100<employees<=250)	13	22
Very large (employees>250)	5	8
Total	60	100

Out of those firms who indicated their legal ownership, 12% are sole proprietorship, 18% are closed corporations, 68% are private companies and 3% are state owned enterprises.

3.2 Sales and employment

The mean sales and employment figures are summarised in table 3 below.

Table 3: Mean sales and employment by sector and year (in 1999 prices)

	Employment			Sales ('000 000)		
	1996-97	1997-98	1998-99	1996-97	1997-98	1998-99
Food	162.5	166.3	113.3	38.2	43.8	47.8
Wood and furniture	123.6	142.7	170.6	17.8	20.9	24.8
Non-metal products	81.8	55.4	63.4	31.2	33.0	32.5
Metal products	83.4	79.7	76.6	11.7	13.2	11.5
Other	108.2	105.0	100.0	20.2	22.2	15.4
Total	102.1	100.0	100.4	20.5	22.7	21.8

Note: the figures are given for firms which reported in each of the years. Sales is deflated with a seasonally adjusted manufacturing production price index (IMF International Statistics).

The average manufacturing firm in the region was found to employ 100 employees. There has been some decline in employment since 1996/97, albeit small. The wood and furniture have experienced an increase in employment over the three year period, but employment has been falling in the other sectors.

Sales, in constant 1999 manufacturing prices, have increased from 1996/97 to 1998/99, from 20.5 million Rand to 21.8 million Rand. This increase in sales occurred in the food, wood and furniture, and non-metal products sectors.

It was found that almost all firms are operating under capacity. For example, the mode of operation for about 83% of firms is 'one-shift'. In this mode of operation, on average, the firms could produce 80% more compared to now with the existing equipment. A lack of demand as well as working capital was indicated as the major explanations of low capacity utilization.

3.3 Export Profile

Table 4 below reports the proportion of South African manufacturing firms exporting and the percentage of sales exported if a firm does have any exports. On average about half the manufacturing firms do export (48%). Large firms are more likely to export and the majority of the large firms did exports in the last year (63%). There are also large sectoral variations in exporting behaviour. Firms in the food sector are least likely to export (only 20%), while in contrast 50% of metal working firms do export – the latter also tend to be larger firms. There are also many exporting firms in the 'other' sector, but for most firms the exact sector has not been identified.

Table 4: The proportion of firms exporting and percentage exported by sector and firm size

	Proportion of firms exporting	Percentage exported if firm exports	Exports per employee ('000 US \$)
Food	0.20	10	2.6
Wood and furniture	0.38	46	1.3
Non-metal products	0.42	10	0.6
Metal products	0.50	16	2.3
Other	0.78	19	1.9
Small firms (<100 employees)	0.41	19	1.6
Large firms (>=100 employees)	0.63	18	2.1
Total	0.48	19	1.8

Table 4 show that the percentage exported (column 2 is relatively low (with the exception of the wood and furniture industry). Wyr, Boocock, & Abdul-Hamid (1998:284) found that only 2% SMEs in Malaysia were engaged in export activities, whilst for a developed country Olson, Gough & Bokor (1997:341) found that about 37% of SMEs in the United States were exporting.

For Africa Bigsten et al. (1999c) have observed that most large manufacturing firms in Cameroon, Ghana, Kenya, and Zimbabwe do export, but that most do not specialise in exporting. Oostendorp (2001) finds that 47% of manufacturing firms in a sample from Zimbabwe exports. The same is true for our sample of South African firms –large exporting firms export only 18% of their output, which is below the percentage observed for large firms in each of the above RPED countries (Bigsten et al. 1999c, table 3).

The third column of table 4 above reports the amount of exports per employee in thousands of US \$. The average amount of exports is US \$ 1,800, which is close to the average observed for other RPED countries (Bigsten et al. 1999c, table 4).

4. DETERMINANTS OF MANUFACTURED EXPORTS

In order to understand better why South African manufacturing firms do export so little, Naudé, Oostendorp and Serumaga-Zake (2000) have fitted a probit model for decision to export following Bigsten et. al (1999c).³ This section relies heavily on the work by Naudé, Oostendorp and Serumaga-Zake (NOS) (2000). According to NOS, the decision to export for South African firms could be ascribed to the following factors:

The capital – labour ratio. The amount of capital used in relation to labour affects the productivity and quality of the product and (as a result), the ability to compete both at home (with imports) and abroad. A high capital – labour ratio is likely to result into a better price competitiveness because of a lower unit labour cost (i.e. unit labour cost = wage/(capital-labour ratio X exchange rate)) (see Biggs and Raturi, 1997).

Size of firm (proxied by number of employees). Large firms both have larger outputs and are therefor more likely to export than small ones. The same holds if there are fixed costs to exporting (such as search costs),

Sector. There are traded and non-traded products so sector may affect the decision to export and how much to export.

Location. The location of the firm may affect the decision to export and the percentage of output exported as a proxy for infrastructure and business support services.

Efficiency. The firm efficiency affects the decision to export because more efficient firms will find it easier to compete in the export markets.

Other possible factors of the dependent variables are age of the firm, state ownership and foreign ownership but the state ownership variable and firm age was not included in the equation for paucity of data. The results are contained in Table 5 below (Taken from NOS, 2000, Table 7).

³ Bigsten et al. (1999c) estimated a logit model but this does not make any difference for the results.

Table 5: Determinants of the decision to export (if firm exports dummy = 1 otherwise dummy = 0)

Variable	Probit [1]	Probit [2]	Tobit
Ln(employment)	0.38 [1.02]	0.71 [1.37]	0.31 [1.26]
Ln(capital/employee)	0.19 [0.71]	0.33 [0.94]	0.11 [0.64]
Foreign ownership	0.51 [0.54]	-0.83 [0.64]	-0.17 [0.25]
Babelegi	-0.11 [0.14]	-0.06 [0.07]	-0.02 [0.03]
Rustenburg	0.45 [0.42]	0.77 [0.72]	0.61 [0.83]
Food	-1.52 [0.93]	-1.40 [0.80]	-1.12 [1.02]
Wood & furniture	-0.19 [0.19]	0.04 [0.03]	-0.27 [0.42]
Non-metal	-0.80 [0.84]	-1.01 [0.97]	-0.70 [1.10]
Metal	-0.13 [0.14]	0.67 [0.50]	0.00 [0.01]
Firm Efficiency		4.82 [2.11]	2.30 [2.44]
Constant	-3.27 [1.02]	-9.60 [1.58]	-3.64 [1.67]
N	28	28	28
Pseudo R ²	0.12	0.32	0.20

Note: The figures in brackets are the t-values. The dummy for Potchefstroom was dropped because of perfect collinearity.

The first column in Table 5 reports the results including all factors except firm level efficiency. None of the regressors is significant, although there is some evidence that larger firms are more likely to export than smaller firms. In the second column the same regression is reported but with a measure of firm efficiency that was estimated separately using a stochastic production frontier methodology (see Aigner et al, 1997). This measure is clearly significant and the coefficient is large: a 10 % point increase in efficiency increases the probability of exporting by 19% points.

In the third column a Tobit is estimated for the percentage of output exported. Large firms tend to export a larger percentage of their production. Firm level efficiency remains significant, and the coefficient implies that a 10% point increase in efficiency increases the export intensity by 12% point.⁴

The results with respect to firm efficiency confirm the finding in Bigsten et al. (1999d): exporters are more efficient than non-exporters. Bigsten et al. also provide evidence for the opposite causal link: exporting increases the efficiency level of firms. Because of lack of data we are not able to investigate whether this also holds for our sample of firms.

Still, the results clearly suggest that also for the South African manufacturing sector the export-efficiency link is an important one, and that exporting at any scale is only a real possibility for firms if they have achieved a sufficient level of efficiency. It would appear that one of the reasons why larger firms export more is because they tend to be more efficient, but it also seems that by increasing exports may raise the efficiency of a firm. It is important that further research clarify this issue as this would suggest that programmes aimed at increasing the exports of SMEs would improve the efficiency of these firms. As recognised by Masurel (2000:80) *“Export and internationalisation are important to the survival of many SMEs because of their tremendous potential for enhancing sales growth, increasing efficiency and improving quality”*.

⁴ The marginal effect in a Tobit model is given by its coefficient times the probability of exporting (Greene 2000, pp. 908-10).

5. CONCLUSION

Why is there not more manufacturing in Africa? In the theoretical literature there are a number of explanations such as the Wood/Mayer argument (that Africa's real comparative advantage is in natural resources), the uncertainty thesis (such as the World Bank's explanations that centres around macroeconomic instability), the transportation/new economic geography thesis (high transport characterise trade in Africa because of its land-locked countries), and the institutional explanations that identify transaction costs, lack of social capital, & contract enforcement as reasons for Africa's failure to industrialise and export.

This paper focused on one aspect of the institutional environment as a reason for Africa's poor manufacturing export record, namely firm size. It is determined empirically that larger manufacturing firms tend to export *more* than smaller manufacturing firms. Even if, as Oostendorp (2001:1) suggest smaller firms may be better able to break into export markets than larger firms if one controls for scale effects, larger firms still export proportionally more. Thus, as far as exports of manufactured goods are concerned, it would seem that SMEs in Africa and South Africa are at a disadvantage. The large majority of manufacturing firms in Africa tend to be SMEs. In the South African sample that was used in this paper, 70% of manufacturing firms were in fact SMEs. This could possibly explain why African countries, including Cameroon, Ghana, Kenya and Zimbabwe for which similar data is available, have not succeeded in significantly increasing their manufactured exports following the liberalisation of trade and the greater integration of their economies into the global economy.

In the case of South Africa it was found in this paper that on average about half the manufacturing firms in the sample do export (48%). Large firms are more likely to export - about 63% of large firms export compared to 41% of smaller firms - but this finding does not control for scale effects.

Firms in the food sector are least likely to export (only 20%), while in contrast 50% of metal working firms do export. A regression model established that larger firms are more likely to export than smaller firms. Firm efficiency was found to be significant: a 10 % point increase in efficiency increases the probability of exporting by 19% points, and the export intensity by 12% point. This last result confirms what already has been found elsewhere in the literature on African manufacturing firms: exporters are more efficient than non-exporters, and that larger firms tend to be more efficient than smaller firms.

The conflict of the present paper's results with the interpretation of Calof (1992:1993) that size does not matter can perhaps be explained or resolved with reference to the literature on industrial districts⁵. Thus, it seems that where small firms do succeed in exporting to the degree of larger firms, it is when they make use of networking and externalities in industrial districts. For instance, Schmitz (1999:465) writes that, "*case studies have emerged from various parts of the world showing that clusters of small enterprises have broken into international markets*". In a similar vein Altenburg & Meyer-Stamer (1999:1693) state that "*clustering seems to enable firms, especially small and medium-sized enterprises (SMEs) to grow and upgrade more easily. SMEs may even become players in world markets if a high degree of interfirm specialization and their proximity to other firms performing complementary functions offset the disadvantages of being small*".⁶ According to Oostendorp (2001:1) "*if size is not helping African firms to become successful exporters, other factors need to compensate for this, such as higher levels of firms efficiency, lower transport costs, or higher product quality*". Clustering and network-effects may be important to provide this compensation.

⁵ Calof (1992:4) tries to explain conflicting studies on whether firm size matters for exports by ascribing it to "methodological factors such as differing definitions of small business".

⁶ Definition: "A cluster is a sizeable agglomeration of firms in a spatially delimited area which has a distinctive specialization profile and in which interfirm specialization and trade is substantial". (Altenburg & Meyer-Stamer, 1999:1694).

A related explanation to be considered in the case of Africa and South Africa for the failure of SMEs to export successfully (i.e. why size matters) is due to the “missing middle” in the industrial structure of most of these economies. This means that there are some large firms at the top and many small enterprises at the bottom that are unable to graduate into the medium-sized category. According to Schmitz (1999:478) they cannot grow because of “*informational and other market failures associated with the provision of financial technical and market support to SMEs*”. It is also note worthy that industrial clusters contain firms of all sizes, particular medium sized firms (Schmitz, 1999:478). Thus, the above suggest that size matters for export success, but that it can be overcome if appropriate clustering, where networking and linkages are important can be established. Such clustering enables SMEs to obtain efficiency gains through collective efficiency as a result of local external economies and joint action. As was found in this paper, efficiency is positively and strongly associated with export success in the South African sample.

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