Determinants of manufactured export performance in Namibia

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Abstract

The current study looks at the determinants of manufactured exports in Namibia during the period from 1970 through 2009. In line with the international trade and finance literature, the paper focuses on the investment GDP ratio; foreign income; real effective exchange rate; real gross domestic product; consumer price index; and export processing zones to be the key determinants for manufactured exports in Namibia. Due to the non-stationarity of many macro-economic variables, the Johansen Cointegration Procedure is adopted in this study. Most of the results came out as expected. Investment GDP ratio and foreign income have a positive effect on manufactured exports. The results indicate that real effective exchange rate and consumer price index, is negatively related to the manufactured exports in both equations. This implies that exchange appreciation and currency overvaluation exert adverse effects on production for export. Surprisingly, the results indicate that the export processing zones relate negatively to manufactured exports and the coefficient is insignificant in all the equations. The key recommendations from this paper are that there is a need to review the current export processing zone regime with the purpose of identifying new amendments to the framework legislation in order to make the zone more competitive. Thus, there is also a need to relook at various investment incentives that are aimed at promoting manufactured exports with the aim of removing some constraints that might hinder companies in realising full benefits from these regimes.

Introduction

Namibia is a country of sharp contrasts. From one point of view it is a prosperous middle-income country: its physical infrastructure is comparable to that of Western European country, its telecommunications system is one of the most efficient, and its public administration is highly developed. From the other point of view, Namibia is a poor country. The majority of the population live under primitive conditions without adequate housing, potable water, sewerage, health services, or education.

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The Namibian economy is characterised by erratic up and down swings, which primarily result from Namibia's vulnerability to external shocks and adverse climatic conditions. Factors such as the severe drought Namibia experienced during the early 1990s, the world market recession for mineral products including the quota for diamonds imposed by the Central Selling Organisation and other external factors have been serious drawbacks to the Namibian economy. However, despite these problems, the country has not been subjected to Structural Adjustment Programmes like many other countries in sub-Saharan Africa. At independence, Namibia's income distribution was highly skewed with limited access for the majority of Namibians to the mainstream of economic activities; high variation in social indicators with lack of access to health, education, housing and sanitary facilities for the majority of Namibians; a trade balance tilted in favour of South Africa; concentration of export markets and a non-diversified economy.

Namibia is a fairly open economy particularly from trading perspective, and this has been so before and after independence. However, this openness also meant higher foreign competition for most sectors of the economy. The economy has been and remains dominated by the export of primary commodities, particularly mineral exports. On average, these accounted for about 50 per cent of exports after independence. Merchandise exports have grown substantially from N\$3.4 billion in 1991 to N\$10.1 billion in 2000 posting an increase of about 197.0 per cent. Broadly, the growth trends in exports can be examined by looking at the two main components of merchandise exports: mineral and non-mineral exports. Mineral exports form the core of the total exports.

The discussion on the constraints facing Africa's manufacturing sector has indicated that high input costs constitute an important factor which negatively impacts upon the competitiveness of African manufacturing firms (Ajakaiye Oyejide, 2005). In addition, it is generally agreed that the openness of an economy tends to induce specialisation and generate a domestic vector similar to international prices. At independence in 1990, Namibia's exports were mainly a small number of unprocessed primary commodities such as minerals, meat and fish (small industrial/export base), with a few export destinations (South Africa, Western Europe). Exports, as a percentage of GDP, remained more or less unchanged during the post-independence decade even though the year 2000 reported an encouraging increase in exported commodities. Between 1996 and 2000, exports in relation to GDP increased moderately to 47.9 per cent from 46.6 per cent during 1991-1995. During the last 5 years exports of goods and services as percentage of GDP was on average about 48.2 per cent. It is surprising to note that this share is almost equal to the export sector's contribution of 49.5 per cent which was recorded in 1990 (BoN, 2010).

On the other hand, the growth rate of export over the last 10 years has been fluctuating up and down, with a highest rate of 23.0 per cent and lowest rate of -4.1 recorded in 2003 and 2004, respectively. Exports also remain skewed towards primary unprocessed commodities, mainly minerals, meat and meat products, and fish. The processing of these goods for export purposes remains largely unexplored. There may well be room for further processing and value addition to primary commodities for exports. Value addition in the export sector can contribute substantially to economic growth and job creation. The process of integrating Namibia in the global economy in the past decades has been accompanied by essential changes in her balance of payments. One such change is the marked increase in trade deficit.

However, since independence, the Namibian government has made extensive efforts towards diversifying export products and export markets, and where possible to increase

the level of domestic value addition in each exported product by launching Namibia Export Development Strategy in 1998. The 1998 Export Development Strategy for Namibia was to provide a comprehensive, more focused, long-term strategic approach for the development of exports in Namibia, taking into account opportunities and constraints in all sectors of the economy. Nevertheless, long before this strategy was drawn up, the government has put in place some policy instruments and institutional frameworks to support the trade environment and export development in particular. For instance: the foreign investment act of 1990; the white paper on industrial development of 1992 (later reviewed in 1997 and adopted as the Second Industrial Policy and Strategies in 2002); and the promulgation of the export processing Zones Act in 1995 and launch of the EPZ regime in 1997 which seeks to expand the manufacturing base, value addition and export-led industrialisation by attracting both foreign and local investment.

This formed the beginning of a national strategic approach to the development of a conducive policy framework, services and physical infrastructures for easy facilitation of the export development programme in Namibia. Despite these efforts the country is still experiencing low levels of both growth rates of exports as well as the contribution of exports to the gross domestic product. Therefore, an analysis of Namibia's Manufactured Export performance at this point is quite important. Hence, the objectives of this study are to: (i) give a broad overview on the performance of exports in Namibia; (ii) analyse the factors that are likely to have influenced trends in manufactured exports; and recommend policy guidelines that will promote manufactured exports.

The study covers several sections, structured in the following way. Section two discusses the structure of the manufacturing sector and trends of exports. Section three surveys the literature review, followed by section four which presents the estimation and analysis of results. Section five gives conclusions and policy recommendations of the study.

The structure of the manufacturing sector
The economy of Namibia is based on its natural resources, mineral, agricultural and marine. What little activity there is in the manufacturing industry has grown in ad hoc fashion, mainly in downstream resource-based activities, partly in response to natural protection as for example, in baking but it remains disjointed and random with earlier production in parts of food processing, clothing and metal working that have been destroyed by South African competition (Curry Stoneman, 1993). Furthermore, there is very little informal sector activity, consequent to the suppression and over-regulation of this sector under the colonial regimes.

A picture of the industrial sector shortly after independence was constructed from interviews conducted in 1991 in both the formal and informal sectors supplemented by secondary data from earlier official surveys, mainly carried out in 1989. Out of 259 formal companies in nine manufacturing sub-sectors, the largest numbers are in food and drink processing and wood products and furniture. However, several companies are engaged in engineering and repair activities and producing associated metal products.

Manufacturing production and employment is concentrated geographically in Windhoek and a few small towns, all of them far from the major population concentrations in the north of the country. Some industries such as slaughtering, bakery products and furniture are distributed widely, but only a few are in communal areas while the majority are in the Windhoek area alone. Resource based activities depend principally on livestock, fish and minerals. In livestock, beef is now chilled before exported to Europe as well as South

Africa, and speciality meats are produced for the local and increasingly the export market. A minority of karakul pelts are processed to garments for export whilst woven karakul wools with a high design standard are sold in the tourist market and carpets are exported. Similarly, shoes and bags are produced from game skins although there is not much processing of game meats. Perhaps, most importantly, the major tannery faces supply problems and has to import whilst raw hides are also being exported.

Small-scale industries, whether formal or informal, are underdeveloped in Namibia. Although a range of products and services are produced, the geographic spread is very uneven, small-scale enterprises are concentrated in retailing, with little manufacturing or repair activity. As indicated in the previous sections, main mineral exports are of uranium oxide and diamonds. A few years ago a substantial investment has been put in the cutting and polishing of diamonds. However, companies in this sub-sector continue to face the shortage of supply of diamonds. This is due to the fact that they have to source the rough diamonds from the international market, which is very competitive and expensive for local companies.

Trends in export growth in Namibia

The aim of this section is to provide an overview of the main export indicators. Namibia has a highly trade dependent economy. The openness index computed for the period 1990 – 2005 ranges from 90 to 111. Like other less developed economies, economic performance as well as export growth in Namibia are largely dictated by external factors such as weather, ocean condition and international commodity prices. Particularly world market prices for diamonds and uranium have major determining impact on the whole economy. The direction of exports has remained unchanged since independence. Close to three-quarters of exports go outside SACU markets with destinations in the United Kingdom, Japan, Spain, and Germany. The United Kingdom is Namibia's leading export market with over 38.7 per cent of exports going to that country during the period of 1993-1998. South Africa comes second with an average of 24.1.

Table 1: Trends in main export products since independence (%)

Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Exports ratio of GDP	49.1	53.4	52.0	56.2	51.8	49.5	50.6	47.5	46.0	46.2	45.6	45.0	49.6	51.4	46.3	47.9	45	51	52	44
Diamonds	27.0	32.4	31.3	30.4	26.1	28.0	30.7	31.3	24.9	30.0	36.5	33.5	31.9	20.5	29.4	27.2	27.6	19.7	19.2	14.6
Other mineral products	15.0	10.4	10.0	7.6	8.3	0.6	0.4	0.3	0.5	0.6	0.5	0.5	0.7	0.5	0.7	0.7	1.0	0.9	0.9	0.6
Live animals, animal products and crops	14.4	8.2	7.3	6.4	8.7	7.2	7.4	3.9	4.5	3.9	2.8	2.9	5.6	5.1	5.5	5.7	4.2	3.9	3.9	3.1
Manufactured	15.5	22.9	27.9	27.3	29.0	35.6	30.6	30.4	37.3	32.2	33.4	36.4	32.8	36.0	38.5	39.2	40.8	41.7	43.7	51.6

Source: National Accounts various issues.

The contribution of exports to GDP has grown on average 47.8 per cent during the 1990 through 2009 period. It has increased gradually from 49.1 per cent in 1990 to 56.2 per cent in 1993. The contribution of exports fell significantly to 44 per cent in 2009, after high levels of 51 per cent and 52 per cent were recorded in 2007 and 2008, respectively. The downward trend in exports was attributed by the decline in mineral exports which was adversely affected by the weakening of the international market for minerals and the closure of the Tsumeb Corporation Limited (TCL) mines. As indicated, the Namibian economy has been and remains dominated by the export of primary commodities, particularly mineral exports. Diamonds remain the main mineral exports. In 1990, the contribution of diamonds to total exports was 27.0 per cent and this rose to 36.5 per cent in 2000 before it declined to 14.6 per cent in 2009. During the same period other minerals declined in their total contribution from 15.0 per cent in 1990 to 0.5 per cent in 2000, before they rose slightly to 0.6 per cent in 2009. The substantial decrease in diamonds and other mineral exports during 2009 was due to a drop in global demand for these products. The slow demand in these commodities was caused by a financial crisis which was witnessed in North America, and then spilled over to Europe as well as East-Asia. Non-mineral exports particularly manufactured products have improved remarkably during the period under review. The contribution of the manufactured products to total exports rose from 15.5 per cent in 1990 to 33.4 per cent in 2000. This share has increased further to 41.7 per cent in 2007, before it reached a high level of 51.6 per cent in 2009.

Literature review

The theoretical foundation of the export supply model is based onthe imperfect-substitutes-model of trade; the key assumption is that neither exports nor imports are perfect substitutes for domestic goods (Goldstein Khan, 1985). It is widely held that, in the long run, export supply traditionally depends on productive capacity, relative prices and input prices, amongst others. The literature on international trade and finance regarding determinants of export supply is well established. What follows is the discussion on the key determinants on export performance that are important for this study. These determinants of export performance are production capacity, world income, real exchange rate, and consumer price index.

Lack of capacity to produce products in a given country limits the production of a given commodity in question. In addition, production of products at a level below potential output just signifies fewer products being manufactured at a given point in time. The key determinants of supply capacity like transport infrastructure, macroeconomic environment, regulatory framework, lack of access to credit, information on export opportunities, foreign direct investment, and institutions, do matter most for export expansion. To be more specific, an improvement in the overall manufactured export capacity should be reflected in higher exports of tradable products in individual sectors of the economy. The literature is vast that links the relationship of productive capacity, in the form of infrastructure, and export competitiveness. Mbekeani (2007) shows that infrastructural development in the form of transport services, port facilities, communications, energy, financial services and business services are key elements of a country's ability to produce and move goods. Weak infrastructure is a major impediment to trade, competitiveness and sustainable development in most African countries, particularly land-locked and small island countries. What can be implied from Mbekeani's study is that a limited investment in infrastructure is not good for export performance while adequate investment in infrastructure can boost production for export. It is well postulated in the trade literature that there is a positive correlation between world income and manufactured exports of less developed countries

(LDCs). In this context Hogendorn (1992) said that low demand for imports of LDCs can also hinder development of manufactured exports of LDCs.

Manufactured exports are perceived to be normal goods in the trade literature. This means that the income elasticity of demand for manufactured exports is higher thanunity. Income elasticity of demand is the responsiveness of manufactured goods of LDCs due to changes in incomes in developed economies. Piana (2001) also says that exports grow when income rises in other countries. Changes in real exchange rate have important implications for an economy's incentives for exporting industries. As shown in the work of Oyejide (2007) titled "African trade, investments and exchange rate regimes and incentives for exporting", when a country's domestic currency is overvalued, the structure of its incentives is biased against the production of export goods. Hence, ensuring that the exchange rate adjusts to more realistic levels is a means of enhancing the economy's incentives for exporting and could lead to increase in the production of export goods.

Developing countries are characterised as net importers of products because of their limited productive capacity. Raw materials and semi-finished products used in the production process constitute a bigger share of what is imported from the rest of the world. This means developing countries are susceptible to shocks that include prices and costs emanating from the foreign sector. Imported raw materials and other goods form part of the costs to manufacture goods in the developing world. In its 2008 report on economic development in Africa, the United Nations (UN), through its United Nations Conference on Trade and Development (UNCTAD), shows various ways how manufactured exports can be promoted in Africa. While it acknowledges the importance of macroeconomic policies in boosting exports of manufactures, it strongly says that firm level policies are important to increase manufactured exports from Africa. Three key factors identified are: increasing competitiveness; the need for large manufacturing firms; and facilitating access to credit to invest and foster firm growth.

In addition, the UN says access to credit hampers manufacturing for export in Africa. The problem is more acute on small and medium sized enterprises that cannot access credit through formal financial institutions. Financial institutions are comfortable if financial securities are brought from larger firms than smaller firms without collateral. In this connection, the UN recommends that specific institutions be created that look into the needs of SMEs in order to encourage manufactured exports in Africa. Lyakurwa (2007) discussed the transaction costs facing suppliers in Sub-Saharan Africa (SSA) at the level of export trade in the agricultural, horticultural and manufacturing sectors. According to him transaction costs are high in Africa and this status quo is ascribed to a number of factors that include constraints to production, distribution constraints, trade financing related constraints, trade facilitation related constraints, and marketing constraints. The issue of production constraints is important because this relates to productive capacity and costs of production, all of which affect exports of manufactures. In this context production constraints that are negatively affecting countries in SSA highlighted by the author include initial costs, labour costs, wages and productivity, standards and regulations, high taxes and license costs, structural and storage costs, investment climate, and the impact of China and India on Africa's trade competitiveness.

Edwards and Alves (2005) analysed the determinants of South African manufacturing performance using a panel of industry data from 1970-2002. They estimated export supply as a function of relative prices and competitiveness (REER); variable cost of production

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(unit labour cost and producer prices); infrastructure; and tariffs and export measures. They find that the constraints to growth lie on the side of export supply since South African manufacturers are on average price-takers in the international market. They argue that export growth is constrained by factors that affect the profitability of exports, REER, infrastructure costs, tariff rates and skilled labour.

Naude, Krugell and Gries (2005) studied the determinants of manufacturing exports from 354 magisterial districts across South Africa from 1997 through 2002 using the Static Tobit Maximum Likelihood Regression and Random Effects Tobit Regression. The authors included the following determinants of manufacturing exports from magisterial districts: skills-to-labour ratio, land-to-labour ratio, gross value added, population, foreign market access, distance to port, and capital stock. They estimated two models, a "Skills-to-Land Heckscher Ohlin Model" and "Geography Heckscher Ohlin Model". Their key findings are that geography (with distance, market effects and fixed costs) offers a better explanation for the manufactured export performance of the country's magisterial districts. Bhanu and Usha (2005) studied the role of foreign direct investment (FDI) in India's manufacturing exports and fiscal decentralisation during the period 1990/1 to 2003/04. They specified the export supply function whereby export supply is determined by export prices relative to domestic prices (Px/P), GDP as a measure of domestic demand and FDI. Their results are interesting. The GDP coefficient was found to be positive and the variable significant on export supply.

Damijan, Ferjancic, and Rojec (2006) in a study covering Central and Eastern European Countries (CEEC) found that supply capacity related factors like foreign direct investment (FDI), institutional set-up, and increased productivity improve export performance. The conclusions are supported in other empirical analysis (Limao Venables, 2001; Edwards Alves, 2005) indicating that levels of trade flows observed for African countries are relatively low, essentially because of poor transport infrastructures.

On the relationship between real exchange volatility and exports, Kroner and Lastrapes (1993), McKenzie (1998) and Aristotelous (2001) find no firm evidence for the relationship between exchange rate volatility and trade. Kumar and Dhawan (1991), Caporale and Doroodian (1994), Dell'Ariccia (1998) and Vergil (2002), provide, on the other hand, evidence in support of the view that the volatility of exchange rates reduces the volume of international trade. Grobar (1993), McKenzie and Brooks (1997) and Devlin et al. (2001) find some evidence for a positive effect of exchange rate volatility on trade flows. Moccero and Winograd (2006) say volatility matters for exports in Argentina and reducing RER volatility (intra-region or extra-region) has a positive impact on exports to Brazil but a negative impact on sales to the rest of the world.

Athukorala and Sen (1996) studied the determinants and patterns of processed food exports from developing countries during the period 1970 to 1994. They show that outward orientation or openness of the policy (OPEN), agricultural resource endowment (RE), level of per capita income (Y), and growth rate of per capita income (GY) are key determinants of processed food exports from developing countries. The coefficient of RE turned out to be statistically insignificant (with the perverse sign) in various alternative specifications, suggesting that resource endowments are not an important explicator of inter-country variations in processed food export growth. After factoring out multicollinearity between Y and GY, it was found that GY is a superior explicator of the two in terms of the F test. The coefficient of OPEN is statistically significant at one per cent with the expected sign.

According to their results, it is the nature of the policy regime and not the initial resource endowment which is crucial in explaining inter-country differentials in growth performance in processed food exports. The result for GY is consistent with the hypothesis that the expansion in the domestic economy provides a conducive setting for the emergence of agro-based food industries.

Empirical Model

The Model

The econometric analysis focuses on the estimation of an export supply function. Export supply function is typically postulated to be a function of relative prices (export prices relative to domestic prices), the domestic capacity to produce (at times proxied by domestic output or other proxies) and trading partners' incomes. With relative prices a proxy for the real effective exchange rate (REER), the study explores the impact of REER volatility on export performance. Based on the foregoing, our supply function to be estimated appears as follows:

$$X_s = \beta_0 + \beta_1 igdp + \beta_2 y^f + \beta_3 reer + \beta_4 cpi + \beta_5 epz + \mu \dots \dots \dots \dots \dots (1)$$

Where:

X_s = represents the real value of manufactured export supply for Namibia. The values of this variable are in the domestic currency.

β_0 & = β_i stand for constant term and coefficients respectively.

μ = refers to error term

$igdp$ = refers to investment to GDP ratio as proxy for capital formation to capture the supply constraints. The variable was also applied by Were, Ndung'u, Geda and Karingi (2002). The parameter for this variable β_1 is expected to have a positive sign because an improvement in the overall domestic productive capacity should be reflected in higher exportable products.

y^f = stands for foreign income or world income for the purchasing power of the main trading partners. Namibia's main trading partners are the United Kingdom, South Africa, Switzerland and Spain. For the purpose of this study, world income is the summation of the gross national product (GDP) of all these trading partners. One would expect exports to increase with the increase in foreign income in the exporting countries due to higher foreign demand. This means β_2 is expected to have a positive sign.

$reer$ = is a trade weighted exchange rate based on the real exchange rate. The REER is reported by the Bank of Namibia in its statutory bulletins and annual reports. The real exchange rate measures the competitiveness of a country's manufactured exports. The local currency is overvalued if REER is greater than 100 and undervalued if REER is smaller than 100. Overvaluation has a negative impact on exports and undervaluation has a positive impact on exports. Consequently the coefficient β_3 is expected to be negative in case of overvalued currency or positive in case of undervalued currency

cpi = is the consumer price index, a proxy for cost of production. CPI is a reliable measure of cost of production in a situation where direct and indirect costs of production are not available. In addition, it is more useful where a country, like Namibia, does not publish produce price index (PPI). Consequently the coefficient β_4 is expected to be negative because an increase in cost reduces production output and vice versa.

epz = refers to export processing zones. It was implemented to boost manufacturing in Namibia in 1998 - 2006. It takes the value of 1 in that period and zero otherwise. It is expected that the coefficient β_5 has a positive impact on manufactured exports in Namibia.

Estimation of regression analysis

This section presents the estimated results based on the empirical model shown in the previous section. A consistent Johansen procedure is followed. The process starts with stationarity test followed by testing for lag length structure. We then proceed to testing for the existence of cointegration and the long run relationship and the short-run relationship appear toward the end of the section.

Stationarity test

Stationarity test is a pre-requisite in the process of performing Johansen cointegration test. The hypothesis to be tested is that the time series does not exhibit stationarity. To do this, two tests, that is, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are employed. The rule-of-thumb is that there is existence of stationarity of variables if calculated values are greater than critical values of the variables. Both ADF and Phillips-Perron test results suggest that all variables are first-difference stationary, that is I(1). Consequently, they satisfy the necessary condition of constructing a cointegration system. The results for stationarity test appear in the Table 2.

Table 2: ADF and PP Unit Root Tests for Time Series

Series	Level		First Difference	
	ADF	PP	ADF	PP
LX	0.19	0.98	-7.24*	12.85*
LIGDP	-1.72	-1.74	-5.74*	-5.77*
LY^f	-1.00	-1.00	-4.96*	-4.95*
LREER	-1,74	-1.72	-6.20*	-6.20*
LCPI	-1.54	-1.54	-5.37*	-5.37*

Notes: (1) L represents logarithm. For instance, LCPI = log(CPI); * indicates significant at 1per cent level.

Lag structure

The lag length structure is used to identify the number of lags to include in the modeling process. The ideal number of lags is the ones associated with more asterisks. This is the lag number used in the regression process. The Schwarz information criterion is used to determine the appropriate lag length of the VAR. The optimal lag order equals 1, which is determined by the information criterion. The results using the Johansen procedure are reported in Table 3.

Table 3: Lag length structure

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-63.92689	NA	3.97e-05	4.054523	4.278988	4.131072
1	119.4863	302.0923*	3.63e-09*	-5.263900*	-3.917111*	-4.804607*
2	136.6631	23.23924	6.36e-09	-4.803714	-2.334601	-3.961676
3	159.3862	24.05975	9.65e-09	-4.669778	-1.078341	-3.444995

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Testing for cointegration

In a multivariate system the Johansen-Juselius method of testing for cointegration between a set of variables is preferred over the Engle-Granger two-step procedure. We, therefore, use the Johansen-Juselius method trace test to determine the number of cointegrating vectors in our model. With respect to cointegration relations, our results in Table 4 show that there is only one cointegration relation. So the null hypothesis of no cointegration relation is rejected. This means manufactured exports are cointegrated with foreign income, CPI, REER and investment-to-GDP ratio Both tests, that is, trace statistic and Max-Eigen statistic confirm the presence of one cointegration relation. The rule-of-thumb is that cointegration exists if the test statistic is greater than their critical value.

Table 4: Results from Cointegration test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.638533	74.12192	69.81889	0.0217
At most 1	0.481029	38.50645	47.85613	0.2804
At most 2	0.225536	15.54968	29.79707	0.7435
At most 3	0.156370	6.604244	15.49471	0.6241
At most 4	0.018479	0.652809	3.841466	0.4191

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.638533	35.61548	33.87687	0.0307
At most 1	0.481029	22.95677	27.58434	0.1753
At most 2	0.225536	8.945431	21.13162	0.8368
At most 3	0.156370	5.951435	14.26460	0.6195
At most 4	0.018479	0.652809	3.841466	0.4191

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Long run equilibrium relationship

As reported in the preceding section, both Trace and Maximum Eigenvalue tests indicate that there exists one cointegrating vector or long-run equilibrium relation among variables during the sample period. Then, we specify the regression equation indicating the long run relation as follows:

$$LX_s = \beta_0 + \beta_1 Ligdp + \beta_2 Ly^f + \beta_3 Lreer + \beta_4 Lcpi + \mu \dots \dots \dots \dots \dots \text{ (2)}$$

The variables are expressed in logarithm form, which shows the long run elasticity. The results of the estimated cointegrated vector are shown and discussed below.

LXs = 3.672LINVGDP + 2.515LCPI + 2.554LREER − 0.698LYf*
      (0.573)   (0.362)   (0.595)   (0.313)

*Numbers in the brackets are standard errors.

The results indicate that there exists a long run relationship among the variables in the model over the sample period. As expected the share of investment in gross domestic product is positively related to the manufactured exports in Namibia. Furthermore, the long run results indicate that the cost of production proxied by consumer price index and real effective exchange rate promote manufactured exports. These results contradict economic theory. Another surprising result from the long run equation shows that there is a negative relationship between foreign income and manufactured exports. These results are also not in line with the theory of international trade which indicates that an increase in foreign income leads to an increase in the foreign demand of the exporting country.

The short - run error correction model

After establishing that cointegration exists and there is a long run equilibrium relationship between dependent variable and explanatory variables, there is a need for testing if the long run relationship established in the model will hold given the short run disturbances. For this purpose, an error correction model derived from the cointegration vector is incorporated into a general error correction model. This leads to the specification of a general error correction model (ECM), as indicated in equation (3).

$$\Delta LX = \beta_0 + \beta_1 \Delta Ligdp + \beta_2 \Delta Ly^f + \beta_3 \Delta Lreer + \beta_4 ECM + \mu \dots \dots \dots \text{ (2)}$$

Once a cointegrating relationship is established, an ECM can be estimated subsequently to determine the short run dynamic behaviour of manufactured exports. The ECM is obtained from the long run relationship and expresses deviations in manufactured export from its long run mean. The coefficient in front of the ecm term measures the speed of adjustment in current export to its previous equilibrium value. Following Hendry's (1995) general-to-specific approach, we first include two lags of the explanatory variables and the error correction (EC) term, and then gradually eliminate the variables that do not have expected signs and are also not significant. This process attempts also to incorporate the feedback effects of the explanatory variables. It is important to indicate that since consumer price index was used as a measure of costs of production and the fact that it affects output prices which enter into the real effective exchange rate, we have run two additional separate regression equations, one with real effective exchange rate and another without consumer price index and vice versa. These equations are numbered as equations (4) and (5), respectively in Table 5.

Table 5: Regression results: Manufactured Exports as a Dependent Variable

Equation number			
Explanatory Variable	(3)* OLS	(4) OLS	(5) OLS
Constant	0.151 (4.290)	0.142 (4.628)	0.150 (4.039)
ΔlogREER	-0.275** (-2.050)	-0.271** (2.051)	_____ _____
ΔlogYf	0.229 (0.999)	0.249 (1.123)	0.328 (1.393)
EPZ	-0.013 (-0.309)	-0.010 (-0.245)	-0.033 (-0.757)
ΔlogIGDP$_{t-2}$	0.205*** (1.872)	0.200*** (1.857)	0.141 (1.275)
ΔlogCPI	-0.049 (-0.522)	_____ _____	-0.039 (-0.391)
ECM(-1)	-0.142) (-1.065)	-0.159 (-1.244)	-0.280** (2.298)
Adjusted R^2	.26	.28	0.18
F	3.00	3.61	2.45
DW	1.92	1.95	2.15
B-G LM Test[+] F-statistic	1.85[0.18][+++]	1.80[0.19]	0.81[0.46]
Jarque-Bera Normality Test	1.99[0.37]	1.66[0.44]	1.59[0.45]
ARCH F-statistic	0.22[0.81]	0.37[0.69]	5.34[0.11]
W-H Test[++] F-statistic	0.74[0.69]	1.04[0.44]	1.58[0.18]
Ramsey Reset F-statistic	2.01[0.16]	1.71[0.20]	1.61[0.22]

Source: *Regression results. T-ratios are in parentheses; ** 5 per cent significance level; *** 10 per cent significant level. [+] Breusch-Godfrey Serial Correlation LM Test; [++] White's heteroskedasticity test; [+++]The numbers in the square brackets are probability values.

Several diagnostic tests performed are listed in Table 5. The diagnostic tests include Durbin-Watson (DW) test, Langrange-Multiplier test (LM) for serial correlation, LM test for autoregressive conditional heteroskedasticity (ARCH), Jarque-Bera normality test and White's heteroskedasticity test and Ramsey's reset test for functional form. According to the results of the diagnostic tests, they are insignificant for the error correction model, and the short-run model appears to be well behaved with a white noise error term. What follows is a discussion of the impact of the independent variables on the dependent variable. As specified in the empirical model, depended variable is manufactured exports and independent variables are consumer price index (CPI), investment to GDP ratio, real effective exchange rate (REER), foreign income, and export processing zone (EPZ).

Our regression results of equations 3 and 5 support the economic theory. The results indicate that there is a negative relationship between manufactured exports and consumer price over the sample period. It is well known in microeconomic theory that capacity is one of the contributors to increase supply. At an aggregate level, increased production capacity highly explains the likelihood of a country's firms to boost production and exports of manufactured exports. Investment in human resources and physical infrastructure do expand production capacity of a developing economy. Other forms of infrastructural development, as shown in the literature review by Mbekeani (2007), can

do well in boosting production capacity. We find interesting results in this study on the role of production capacity and manufactured exports in Namibia. The sign is as expected and the independent variables are significant on the depended variable. This means that production capacity influenced manufactured exports in Namibia during the period under review. The t-statistics for the variable are statistically significant in equations 3 and 4, at 10 per cent significance level.

During the period under review the Government of the Republic of Namibia and other stakeholders have put in place sterling efforts to encourage investments in Namibia. Foreign Direct Investment (FDI) increased to more than N$2 billion per year in recent years. Government also believes that domestic investment in the local economy will also support economic growth and exports. Increased investments have also supported small and medium enterprises as well. They thrived through economic empowerment programs and incentives provided by the Government of Namibia. Consequently, all these developments are positive ingredients to production capacity and by extension manufacturing for exports. The coefficients for production capacity (investment/GDP ratio) are 0.21, 0.20 and 0.14 in equations 3, 4 and 5 respectively. In elasticity theory, this result refers to the inelastic situation. This would mean that a 100 per cent increase in production capacity would expand manufactured exports by 20 per cent. It implies that an increase in imports increases output by a smaller proportion.

The results show that REER had a significant impact on exports during the period under review. This means that REER was also responsible for changes in manufactured exports in Namibia. This observation stems from the t-statistics being at 2. The coefficients indicate that there was a negative impact on manufactured exports during the period under review. An increase in REER by 100 per cent led to a fall in manufactured exports by around 28 per cent and 27 per cent in equations 3 and 4, respectively.

REER in Namibia was greater than 100 in 2003 and 2004. In some years, like from 2005 onwards, it was just under 100. This means that the Namibian Dollar (N$) was getting strong compared to Namibia's major trading partners, that include the United Kingdom, Switzerland and Spain. Namibia exports more to these countries including South Africa. The abovementioned results would mean that in terms of competitiveness, Namibia's exports were not competitive on the international market. Besides, Namibian exports were expensive compared to the rest of the world.

Our results show that foreign income had a positive influence on Namibia's manufactured exports. This is in line with economic theory, which indicates that foreign income or world demand has a positive impact on imports from developing economies. Although there is a positive relationship between world income and manufactured exports in Namibia, the cause and effect relationship is not that strong. This is judged from the t-statistic for the independent variable on the depended variable, which is about unit. This statistic is less that the rule of thumb of close to 2, suggesting that world income does not adequately explain why manufactured exports from Namibia changed in a certain way. Elasticity can be used to understand the degree of responsiveness or sensitivity of manufactured exports to changes in foreign income. The elasticity value stands on average at 0.27. This means that an increase in world income by 100 per cent is probable to lead to the increase of manufactured exports by 27 per cent. Put another way, increase in world income by 1 per cent is accompanied by an increase in manufactured exports by 27 per cent.

The contribution of economic processing zones (EPZ) to production and exports of manufactured goods has been disappointing in Namibia in the period under review. This is deduced from our estimation results, which shows that there is a negative relationship

between EPZ and manufactured exports in Namibia, which contradicts economic theory. Economic theory predicts that government interventions and appropriate policies have a positive impact on exports, growth and development. The strength of causation for EPZ on manufactured exports is not strong. The t-statistic is on average around 0.4, which is far below than of the rule of thumb of close to 2. In terms of elasticity, the results show that 1 per cent change in EPZ related policies and incentives programs can change manufactured exports by on average 0.02 per cent. The above results are surprising. Government has put in place buildings and other infrastructures to enable companies to produce for exports. There are associated incentives for companies that obtain EPZ status. These incentives include tax holidays and rebates on training of employees. To the export oriented firms, these are savings that are ploughed back in company operations for further investments and production. Incentives in the EPZ scheme have attracted foreign firms that produce for export markets. Thus, these results should be interpreted with caution.

The error correction term shows the speed of adjustments to long-run equilibrium. It should be negative and less than unity in absolute terms because100 per cent instantaneous adjustments to equilibrium is not always expended. The error term is not significant in equations 3 and 4, while it turns out be statistically significant at 5 per cent in equation 5. It bears the correct sign in all the regression equations. This suggests a high speed of convergence to equilibrium and short run fluctuations in manufactured exports will not significantly affect the long run relationship between export supply and the important explanatory variables. It shows that there is on average a 19 per cent feedback from the previous year disequilibrium into the short run dynamic process and that the errors are corrected 19 per cent in a year.

Conclusion

The paper attempted to investigate the key determinants of manufactured export performance in the Namibian economy. It is well noted that the structure of exports has not significantly expanded since independence. The primary commodities continued to dominate the export sector in terms of foreign exchange. It is also noted that the Namibian Government has implemented a number of policies and programmes in order to boost exports and help to diversify the export sector. The study has found that the share of manufactured products in total exports have started picking up since the mid-1990s. It is pleasing to note that the shares of live animals and animal products and other minerals have declined significantly during the period under review. However, the results of the determinants of manufactured exports regression equations had mixed effects on exports. Some results are generally in accordance with the general economic theory. For instance, the effect of share of investment in GDP, foreign income, real exchange rate and consumer price index are consistent with the economic theory, while the effect of EPZ regime on manufactured exports are contrary to what we normally expect.

Generally speaking, the results of this study are quite informative and arguably point out several issues of policy concern. Potential for manufactured exports supply response exists in this sector, especially for the companies that are enjoying numerous benefits under the export processing zone (EPZ) regime. However, there is a need to review the current EPZ regime with the purpose of identifying new amendments to the framework legislation that will make the zone more competitive. It was found that the share of investment in GDP is beneficial to the exports of manufactured products. Thus there is also a need to relook at various investment incentives that are aimed at promoting manufactured exports with the aim of removing some constraints that might hinder companies in realising full benefits from these regimes. With the rising level of globalisation, openness through an export-

led growth strategy is inevitable, particularly in consideration of other development constraints such as limited external financing and declining revenue from the Southern African Customs Union (SACU). Nevertheless, to compete globally, costs including transaction costs should be minimal. That notwithstanding, trade liberalisation might also be associated with increased volatility, especially manufactured exports, therefore, justifying the need for strategic supportive policies to help this sector, when it might not be able to cope with the wave of globalisation.

References

Ajakaije, O. & Oyejide, A. T. (2005). Removing Impediments to African Exports. *African Journal of Economic Policy*, 12(1), 133-156.

Aristotelous, K. (2001). Exchange Rate Volatility, Exchange Rate Regime, and Trade Volume: Evidence from the UK - US Export Function (1889-1999). *Economic Letters,* 72(1), 87-94.

Athukorala, P. C. & Sen, K. (1996). Processed Food Exports from Developing Countries: Patterns and Determinants. *Trade and Development Report*, No. 96/6.

Bank of Namibia, Annual Report, Various Issues. Windhoek.

Bhanu, V. & Usha, M. (2005). Role of Foreign Direct Investment in India's Manufacturing Exports and Fiscal Decentralization, Nizam College, Osmania University.

Caporale, T. & Khosrow, D. (1994). Exchange Rate Variability and the Flow of International Trade. *Economic Letters,* 46(1), 49-54.

Central Bureau of Statistics, National Accounts, Various Issues, Windhoek.

Curry, S. and Stoneman, C. (1993). Problems of Industrial Development and Market Integration in Namibia. *Journal of Southern African Studies,* 19(1), 40-59.

Damijan, J. P., Ferjancic, M. & Rojec, M. (2006). *Growing Export Performance of Transition Economies: Where does it come from?* Paper Presented at the 9th Bi-Annual European Association for Comparative Economic Studies (EACES) Conference, University of Brighton, UK.

Dell'Ariccia, G. (1998). Exchange Rate Fluctuations and Trade Flows: Evidence from the European Union. *IMF Research Paper*, No.107.

Devlin, R., Estevadeordal, A., Paolo Giordano, P., Monteagudo, J. & Saez, R. (2001). Macroeconomic Stability, Trade and Integration. *IADB Briefing, Integration and Trade*, 13.

Edwards, L. & Alves, P. (2006). South Africa's Export Performance: Determinants of Export Supply. *South African Journal of Economics,* 74(3), 473-500.

Goldstein, M. & Khan, M.S. (1985). Income and Price effects of Foreign Trade. In R.W. Jones and P.B. Kenen (Eds.), *Handbook of International Economics*, Vol. II (pp. 1044-1150). Amsterdam: Elsevier Science Publishers B.V.

Grobar, L. M. (1993). The Effect of Real Exchange Rate Uncertainty on LDC Manufactured Exports. *Journal of Development Economics,* 41(2), 367-376.

Hogendorn, J.S. (1992). *Economic Development.* New York: Harper & Row.

Kroner, K.F. & Lastrapes, W.D. (1993). The Impact of Exchange Rate Volatility on International Trade: Reduced form Estimates Using the GARCH-in-Mean Model. *Journal of International Money and Finance,* 12(2), 298-318.

Kumar, R. & Ravinder, D. (1991). Exchange Rate Volatility and Pakistan's Exports to the Developed World. 1974 - 85, *World Development,* 19(9), 1225-1240.

Limao, N. & Venables, T. (2001). Infrastructure, Geographical Disadvantage, Transport Costs and Trade, *World Bank Economic Review,* 15(3), 451-479.

Lyakurwa, W. M. (2007). The Business of Exporting: Transaction Costs facing Suppliers in Sub-Saharan Africa. *African Economic Research Consortium (AERC) Framework Paper.* Nairobi, Kenya.

Mbekeani, K. K. (2007). The Role of Infrastructure in Determining Export Competitiveness: *African Economic Research Consortium (AERC) Framework Paper*, Nairobi, Kenya.

McKenzie, M. D. & Brooks, R. D. (1997). The Impact of Exchange Rate Volatility on German - US Trade Flows. *Journal of International Financial Markets, Institutions and Money,* 7(1), 73-87.

Moccero D. N. & Winograd, C. (2006). Real Exchange Rate Volatility and Exports: Argentine Perspectives. Paper presented at Fourth Annual Conference of the Euro-Latin Study Network on Integration and Trade (ELSNIT) Paris, 20-21 October 2006.

Oyejide, A.T. (2007). African Trade, Investments and Exchange Rate Regimes and Incentives for Exporting, *African Economic Research Consortium (AERC) Framework Paper*. Nairobi, Kenya.

United Nations. (2008). *Economic Development in Africa*. New York and Geneva: The United Nations.

UNCTAD. (2005). *Determinants of Export Performance, Trade and Development Index*. New York and Geneva: The United Nations.

Vergil, H. (2002). Exchange Rate Volatility in Turkey and Its Effect on Trade Flows. *Journal of Economic and Social Research*, 4(1), 83-99.