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Abstract

The export performance of manufacturing industries in LDCs is particularly important in growth and development, especially where domestic markets are relatively small. However, market structure can play an important role in determining the extent to which foreign exchange earnings could be potentially generated from manufactured products. This paper uses the traditional market structure variables, utilizing panel data from 1984 to 1988 for twenty-two industries, to determine their influence on the export performance of the manufacturing industry in Malawi. The results indicate a positive relationship between export performance and industrial concentration and scale economies while capital intensity is negatively related to export performance. These results suggest that selective government intervention aimed at encouraging domestic monopoly power and exploitation of economies of scale for export-oriented industries may be necessary for the much needed foreign exchange earnings from the manufacturing sector.

1. Introduction

Since the pessimism in the terms of trade in primary products based on the Prebisch-Singer thesis, less developed countries (LDCs) have been rethinking about their development policy. Most LDCs are now shifting their emphasis in agriculture as the engine of economic growth in favour of industrialisation. While doing this, they have been in a dilemma whether to pursue an export oriented strategy or import substitution strategy. But whatever strategy, the speed of this transformation varies, with the fastest moving being the 'four tigers' of East Asia. The expansion of manufactured exports has particularly contributed much to the transformation and the performance of these newly industrialised countries (NICs) (Ariff, 1993). These countries have registered high levels of economic growth and development within the framework of the export-oriented strategy.[1] The success of these NICs is attributed to the competitive private sector production activities, with less government involvement in industrial activities. On the other hand, most LDCs and African countries in particular, have not kept pace with the NICs and their transformation to industrialisation has been slow and disappointing.

Economic growth in Malawi like in most African countries has been slow. Since independence in 1964, the economy has been agro-based and is still classified as one of the poorest nations in the world. In 1964 the manufacturing sector only accounted for 8 per cent of GDP, but in the

eighties and nineties the sector accounted for 13 per cent of GDP. But most of this emerge from agro-based manufacturing industries. The agricultural sector is the main foreign exchange generator accounting for more than 90 per cent of total foreign exchange earnings. With unfavourable market environments for primary products in international markets, in the early 1970s the government in principle emphasised the development of import-substitution industries and more recently export-oriented industries. However, as Kaluwa (1992) argues there were serious weaknesses and problems in the industrialisation policy including conflicts among policy objectives, lack of a clear policy orientation towards industry, lack of government commitment and serious internal and external imbalances. Such policy inconsistencies and conflicts led to the existence of a highly monopolistic market structure and inefficiencies in the manufacturing industries.

The objective of this paper is to investigate the importance of market structure variables in determining the export performance of manufacturing industries in Malawi in the context of the structure-conduct-performance (SCP) paradigm using pooled cross section and time series data. This is of particular importance as the economy moves towards the diversification of the export base. The empirical investigation of the relationship between the existing industrial structure and foreign exchange earnings performance of export manufacturing industries is necessary in guiding the sort of government intervention required to achieve an optimal market structure which would provide more foreign exchange earnings to the economy on a sustainable basis. The second part of the paper briefly discusses the industrial policies towards the manufacturing sector, and export performance in Malawi. The third part reviews the relationship between market structure and export performance, and existing SCP studies and specifies the model. The fourth part analyses the results of the cross-sectionally heteroscedastic and time-wise autoregressive model. The fifth and final part gives a summary and concluding remarks.

2. Industrial Policy and Export Performance in Malawi

2.1 Industrial Policy and its Impact on Market Structure

While politicians in Malawi under the Banda regime had advocated a laissez-faire economy, where the free market mechanism is the basis for the allocation of resources, in practice there had been serious interventionist policies which ended up distorting market prices. These policies resulted in the existing highly concentrated market structure in the manufacturing sector.[2] Since independence, the manufacturing sector has been highly protected by policies which were effectively anti-competitive in the economy. These protectionist policies were done in several ways. Firstly, Malawi has been maintaining a rigid incomes and wages policy. The statutory minimum wages for unskilled/semi-skilled labour have been increasing marginally and at random, penalising the very low income earners in periods of high inflation. The aim of this policy towards industry has been to encourage labour intensive industries vis-a-vis capital intensive industries and to attract foreign direct investments. However, as Ariff (1993) has noted, cheap labour alone is not sufficient to attract export-oriented direct foreign investments, as labour costs are only a small proportion of total production costs even in labour intensive activities. Moreover, with advances in technology, many countries do not consider cheap labour as a viable incentive to foreign investors. While the Malawian manufacturing sector has benefitted from this policy in the wage bill component of their total costs, this has resulted in labour inefficiencies and regrettably, the manufacturing industry remains internationally less competitive.

Secondly, a policy of price controls in the industrial sector was pursued since 1968 to curtail the seemingly monopolistic pricing behaviour in the sector which was detrimental to consumer welfare. Adjustments in the prices of controlled goods were on average cost plus a margin of up to 18 per cent after taking into consideration cost increases and the performance of the enterprise. However, these price controls had little incentives to efficiency (cost minimisation) and created equity problems by restricting profitability which is the main internal source of investment financing (Kaluwa, 1986). Consequently, the price control system provided little incentives to entry by potential investors, since government established a limit-price on existing firms. It was nonetheless, difficult to enforce this policy because the import-substitution industries heavily

depend on imported raw materials and equipment whose unit value increased sharply leading to frequent justified price adjustments while minimum wage increases had been rigid.

Thirdly, red tape in manufacturing licensing and provision of monopoly rights provided an environment which was not conducive to competitive manufacturing in the economy. Entry in manufacturing in Malawi until 1991 was guided by the Industrial Development Act which gave powers to the Minister responsible to deny a potential investor a license to manufacture on the basis of inadequate resources, public importance of the products, location and relative size of the economy among other things (Malawi Government, 1965). Exclusive monopoly rights were also granted to large enterprises with the potential for the exploitation of economies of scale. In any case, Kaluwa (1992) has pointed out that the actual licensing procedure, in which applications were made public with an invitation for objections, provided a warning to established firms and encouraged them to initiate entry deterring strategies. It is clear from this point that instead of boosting competition, the government encouraged concentration of industry in the manufacturing sector. This high level of concentration resulted in fringe competition exacerbated by restrictions on import competition through higher tariffs.

Fourthly, the manufacturing industry also benefitted from import protection through tariffs which were intended for revenue generation purposes. Although the Malawi government pursued an import-substitution strategy since independence through to the seventies, the government did not use tariffs as a direct policy to protect domestic industries. As World Bank (1989) asserts, the economy was more open in the seventies but trade became restrictive through higher average tariffs and foreign exchange allocation in the eighties and nineties due to balance of payments problems and the desire to generate revenue necessitated by government deficit spending. Average tariffs on manufactured goods have been higher than those of all imports especially in the eighties and nineties. Moreover, estimates of effective rate of protection reflected that on average industrial value added for import-substitution firms was about 140 percent higher than under free trade, but there were wide variations across industries ranging from 574.9 percent for cement and glass to 39.0 percent for food products (World Bank, 1989). The analysis also indicated that the policy regime favoured import-substitution with an average anti-export bias ratio of 1.8, although the policy shift was a result of the desire to raise government revenues and improve balance of payments position.

The policies outlined above reveal that government policy conflicted with the objectives of expanding the manufacturing base. For example, the wages policy was intended to attract investments in manufacturing, at the same time the government pursued policies which imposed institutional barriers to entry.[3] These conflicting policies were likely in Malawi because policy issues were rarely debated and given that there was lack of an effective link between the private sector and the government.[4] Apart from the effects of policy contradictions, the manufacturing sector has also faced serious problems in financing, foreign exchange (input procurement), transport and proper export incentives.

All these protectionist policies have contributed to the existing market structure in the manufacturing industry. Using manufacturing data of the period between 1984 and 1990, Chirwa (1994) concluded that the manufacturing sector does not reflect major changes in the level of concentration and a larger proportion of industries are monopolists. Table 1 shows the proportion of fifty-five industries by concentration level. The data indicate that there are many industries with monopolistic power. The proportion of industries which can be said to be competitive in the manufacturing sector has been low and fairly stable over the period under consideration. The proportion of industries with higher monopolistic power has marginally declined from 47 percent in 1984 to 35 percent in 1990. However, the proportion of oligopolistic industries have sharply increased from 49 % in 1984 to 60 percent in 1990. This should reflect the argument that the industrial base has been stable with very moderate entry.

[Table 1 about here]

In addition, between 1984 and 1990, changes in overall concentration levels indicate that on average monopoly power increased by 4.8 percent with the highest increase of 30.4 percent in 1988, and the only decline of 8.9 percent in 1988. The figures indicate great instability in market shares in all sectors.[5] On average most sub-sectors had substantial gains in market power. In clothing, leather and footwear (48.3%) and sawmill and wood products (14.1%) monopoly power gains were substantial while textile, netting and blankets (-1.3%) and packaging, printing and publishing (-2.6%) industries become more competitive.

Since 1980, the government adopted the World Bank/International Monetary Fund supported structural adjustment programs (SAPs). The austerity measures were aimed at removing market distortions and improving the operation of the market mechanism. Various sectors in the economy have undergone structural reforms. Notable reforms in the manufacturing sector include the abolition of price controls in most products by 1985, reduction in government involvement in manufacturing, the elimination of red tape in manufacturing license since 1992, removal of export and import licensing and introduction of a package of export incentives contained in the Investment Promotion Act of 1991. However, these policy changes seem not to have improved the performance of the manufacturing industries in foreign trade.

2.2 Export Performance of Malawi Manufacturing Industries

Since independence the manufacturing base and export of non-traditional products have expanded marginally.[6] The traditional trade theorists, given the protectionist policies outlined above, would argue that production has been inefficient and manufactured products have not been able to compete favourably in international markets. The industrial policy regime has not favoured export-oriented activities. The anti-export bias revealed by the World Bank (1989) study is reflected in the low volume and poor growth of manufactured goods exports. The policy of encouraging exports was not emphasised prior to the mid-1980s. Industrial exports as a percentage of total exports averaged 4 percent in the 1980s. The proportion of manufactured exports products in Malawi's total exports is negligible and dominated by agro-processing industries. In 1982 exports of sugar (17.8%), tea (64.3%), tobacco (0.9%), and textiles (11.1%) accounted for 94.1 percent of total manufactured exports. These four sectors accounted for 88.3 percent of total manufactured exports in 1990 with the share of tea (22.2%) and sugar (7.0%) exports declining and the share of tobacco (29.1%) and textiles (30.0%) exports increasing.

The growth of exports of manufactured goods between 1983 and 1990 had not been impressive. Growth in export as indicated by the index of industrial production for manufactured exports was on average 4.6 percent between 1983 and 1990, with declines of 10.6 percent in 1986, 2.3 percent in 1987 and 0.4 percent in 1989. Most of the manufacturing industries in Malawi tend to produce for the domestic market. This is largely due to policy emphasis on import substitution vis-a-vis export orientation. Very few industries can be said to be export-oriented as measured by export

shares. Only four industries had average export shares of at least 50 percent in 1980s. On this basis only the resource-based manufacturing industries of sugar (62.6%), coffee (50.0%), tea (56.5%) and sporting goods (66.3%) could be classified as export-oriented industries.

This poor export orientation has been exacerbated by the increased transport costs due to closure of the rail routes to the sea as a result of the Mozambican civil war. Malawi's landlocked position provides a natural protection to imports but also contributes to the low competitiveness of exports, since the manufacturing sector is heavily dependent on imported raw materials. World Bank (1989) estimated that in 1980 the CIF value of imports was 38 percent higher than the FOB value and in the late eighties it was about 67 percent higher due to the virtual closure of the Nacala and Beira railway lines.

3. Determinants of Export Performance and Model Specification

3.1 Comparative Advantage, Market Structure and International Trade

The integration of industrial organisation in the new trade theories has generated some controversies on the definitive theoretical implications of the predictions obtained from the traditional Heckscher-Ohlin-Samuelson (H-O-S) trade model. According to Krugman (1989) this integration focuses on the role of economies of scale as an explanation of intra-industry trade between countries and the trade policy implications of market power of domestic firms. In the traditional H-O-S model based on perfect competition assumptions, it is argued that trade reflects the interaction between the characteristics of countries and their technology. The proposition which emerges is that countries will export goods whose production is intensive in the factors in which it is abundantly endowed. Theoretical arguments based on free trade theories favour the negative relationship between the degree of seller concentration and trade performance since domestic competition in the manufacturing sector is expected to bring efficiency gains and hence competitiveness in the export market. Proponents of free trade policies have therefore argued that protectionist policies which may lead to domestic market concentration in turn lead to domestic inefficiencies. This has been characterized as the 'competition policy' hypothesis (Pickering and Sheldon, 1984). However, this theoretical framework which ignored the typical

market behaviour was unable to explain the high incidence of intra-industry trade among countries with identical factor endowments.

In the new trade theories, increasing returns which are a characteristic feature of imperfect competition provide a simple explanation of intra-industry trade. It is argued that specialisation which takes place to realise economies of scale rather than because of differences in factor rewards is an important determinant of intra-industry trade. This gave a place to other market structures other than perfect competition in the new trade theories which are surveyed in Helpman and Krugman (1985). The policy implications emerging from these theories include a new edge for protectionism.[7] Proponents of the new trade theories advocating the 'industrial strategy' hypothesis have argued that in highly concentrated market structures monopolistic profits in the domestic market enable firms to undertake export market and product development activities and compete favourably in international markets on non-price variables. This is possible due to economies of scale in production and marketing.

Das (1982) concluded that if market structures are endogenous the Heckscher-Ohlin-Samuelson model is preserved; but if market structures are exogenous because of entry limitations then they exert an influence on comparative advantage and the degree of concentration in the sector is positively correlated to its degree of comparative advantage. If market structure is an important aspect of trade performance, then we have to be critical to the neoclassical approach of trade liberalisation as advanced by the Bretton Woods institutions.

Empirically, the use of a variant of the traditional structure-conduct-performance (SCP) framework has been used to test the hypothesis of the effect of market structure on trade performance. The SCP hypothesis, based on orthodox economic theory, postulates that there exist a one way positive relationship between market structure as measured by the concentration ratio and industrial performance as measured by the level of profitability. Others have argued that the direction of causality is either way. Many researchers have empirically tested the hypothesis both in developed and less developed countries albeit the results have been mixed.[8] Most empirical studies in the SCP framework have focused on the US and the United Kingdom and have been summarised by various authors (see, Devine *et al.*, 1979; George and Joll, 1971; Scherer, 1980; Scherer and Ross, 1990). By contrast, fewer studies have been done in LDCs

manufacturing sector although the number is increasing.[9] Kaluwa (1986) and Kaluwa and Reid (1991) utilising Malawi manufacturing data found less support for the positive and significant relationship between profit margin and concentration, but input scarcity and demand variables were significant. Overall, the empirical results on the concentration-profitability hypothesis have been mixed leading to other explanations such as Baumol (1982) contestable market hypothesis and Demestz (1973) efficient market hypothesis.[10]

Most of the empirical studies have dealt with the general manufacturing industrial performance in terms of profitability. However, the export orientation of the manufacturing sector may be critical in LDCs' development aspirations. The export manufacturing sector plays a very important role in economic growth and development. There have been studies, however, that have focused on the relationship between export performance and market structure. Pickering and Sheldon (1984) using the static approach found evidence in favour of a positive relationship between export performance and concentration although there were other exceptional cases, in the study of the British industry. One notable study that extends the SCP hypothesis to model the relationship between market structure and export manufacturing performance was done by Jebuni *et al*. (1988) on data from twelve less developed countries, including Malawi. In this study export performance was measured by export shares and market concentration was measured by entropy coefficient. There were wide variations in the performance of the market structure variable in different countries, with some countries suggesting that highly concentrated industries performed well in export earnings while in other countries high seller concentration was detrimental to export performance.

With respect to Malawian manufacturing industries, the evidence in Jebuni *et al.* (1988) utilizing 1971/72 data was an insignificant negative relationship between export performance and market concentration, while scale economies and skill levels were significant determinants of export performance. They concluded that in half of the sample countries market structure exerted a positive impact on export performance and a negative impact on the other half. However, in eight of the twelve countries, the coefficient of market concentration was not statistically significant. One limitation of this study is that it was based on one time period and thus masking the performance over time.

3.2 Specification of the Model

We assume that the export manufacturing firms can penetrate in the export market and sell as much as possible, *ceteris paribus*, depending on the price competitiveness both in the export and domestic markets. However, this might be affected by the quality of products, and in the case of Malawi there is a high incidence of poor product standardization. The model specified in this study is based on the conventional market structure variables and other control variables and follows the Jebuni *et al*. (1988) specification. The market structure-export performance hypothesis is tested using the following:

$$EXPS_{it} = f(IMC_{it}, MGROW_{it}, SKIL_{it}, KLR_{it}, MES_{it}) \quad (1)$$

where for industry i in year t; EXPS is the measure of export performance, IMC is the index of market concentration, MGROW is the market sales growth, SKIL is the measure of labour skills, KLR is the capital-labour ratio (factor endowment variable) and MES is the minimum efficient scale measure.

Export performance (EXPS) is measured by export shares defined as a ratio of actual exports of the industry to total output or sales (domestic and export sales). Export performance can also be measured by the revealed comparative advantage which is the ratio of the country's share in the export of a given commodity to its share in total group trade in manufactured products. The former measure is adopted in this study for its relative simplicity.[11] Computation of the revealed comparative advantage is difficulty in the case of Malawi because of data aggregation in cases where firms are multi-product.

Index of market concentration (IMC) is estimated by both the three-firm concentration ratio (CR3) and the Herfindahl-Hirschman Index (HHI). The CR3 is the share of domestic production (domestic output) accounted for the first three largest firms in the industry. The HHI is the sum of the squared market shares of individual firms in the industry. Unlike the CR3, the HHI takes into account all firms in the industry (George and Joll, 1971; Davies, 1979; Devine *et al.*, 1979).

However, there is no direct theoretical guidance regarding the choice of the best concentration index.[12] In the case of Malawi, most industries have very few interdependent firms and there is need to consider all firms, and both measures are used in this study. The CR3 and HHI of market concentration have a value ranging from 0 to 1, with values closer to zero representing competitive cases and those equal to one indicating monopolistic industries. The first partial derivative can either be positive or negative depending on the 'industrial strategy' or 'competition strategy' hypotheses, respectively.

Market growth rate (MGROW) is the proportionate change in total sales of the industry over a period of one year. This variable captures the growth of effective demand for the industry in both the domestic and export markets. On *ceteris paribus* assumption, an expanding market enables firms to exercise oligopolistic behaviour and to diversify their product (export) base. The hypothesis is that the first partial derivative of export performance with respect to market growth is positive.

Skill intensity (SKIL) is a measure of labour skill levels. In most cases, this variable is measured based on wage differentials or occupational categories (Jebuni *et al.*, 1988). Due to data problems in the latter, wage differentials are used in this study estimated as average earnings of the industry. Kaluwa (1986) and Kaluwa and Reid (1991) also used average earnings as a proxy for skill levels. Different average earnings across industries reflect differences in the skills of labour. Skill intensity is on *a priori* expected to be negatively correlated with export performance in less developed countries since their manufactured exports tend to have low skill content. Thus higher average earnings should be associated with low competitiveness of manufactured exports. However, this variable may be affected by the incomes and wages policy within the period of study, which led to enforcement of minimum wages at relatively low level in Malawi.

Capital-labour ratio (KLR) is the ratio of book value of fixed assets of the industry to total industry labour employment. This variable measures the relative importance of factor endowments. The data for book value of fixed assets from National Statistical Office (1992) are highly aggregated with different 4-digit International Standard Industrial Classification (ISIC) industries combined, and disaggregated data is available only for largest establishments. Since

data on book value of fixed assets is not available for all firms in the industry, the capital-labour ratio for the largest firms is used as a proxy for the industry particularly in industries with small competing firms. In the Heckscher-Ohlin model it is argued that there are efficiency gains in production techniques that use the most abundant factor of production. However, this also depends on the cost of capital relative to the cost of labour. The Heckscher-Ohlin model predicts that developing countries with abundant labour have a comparative advantage in labour-intensive techniques vis-a-vis capital intensive techniques. On the basis of this proposition, the hypothesis is that the partial derivative of export performance with respect to the capital intensity variable is negative. However, it should be noted that in Malawi, with the small size of the economy, large plants were acquired which are not utilised to their full capacity, and one would expect high capital intensive techniques in most large establishments.

Minimum efficient scale (MES), in the face of difficulties in obtaining engineering data or statistical surveys relating to cost and output combination, is approximated by various methods. Caves and Porter (1980) suggests that the minimum efficient scale can be estimated as the size of the average plant of establishments among the largest ones accounting for 50% of shipments as a proportion of total industry shipment. Alternatively, the cost disadvantage ratio can also be used as a proxy of the minimum efficient scale. The cost disadvantage ratio is defined as the average value added per worker in establishments supplying the bottom 50% of industry value added divided by the average value added per worker in establishments supplying the top 50%. In this study the former proxy is used and is calculated as output per firm of the largest firms in the size distribution accounting for 50% or more of total industry output divided by total industry output.[13] The conventional expectation of this MES based on new trade theorists explanations is the positive correlation with export performance.

4. Data, Estimation and Empirical Results

4.1 Data Sources and Estimation

The data used in this paper was obtained from the National Statistical Office (NSO). Data available in the official publication of National Statistical Office (1992) is highly aggregated, with two or more 4-digit ISIC industries placed in the same group. However, this study uses

data at a less aggregated level, with each 4-digit ISIC industry as a distinct unit of analysis as reported in Kaluwa (1993) and Chirwa (1994). The model is estimated using pooled cross-section (N = 1, 2, ..., 22) representing number of export manufacturing industries and time-series (T = 1, 2, ..., 5) representing the period from 1984 to 1988. In total there are N x T = 22 x 5 = 110 observations for the variables specified in the model. The industries included in the analysis are provided in Table 2.

[Table 2 about here]

Table 3 presents the summary statistics of the variables used in the model. On average 14.55 percent of domestic production in the manufacturing sector is exported. The maximum export share is 99.5 percent indicating that only 0.5 percent of output in some sector is sold in the domestic market. The level of overall monopolization for the whole period is 90.34 percent and 67.95 percent as reflected by the CR3 and HHI, respectively. The manufacturing industries in the sample also recorded an average annual growth rate of 47.76 percent during the period of analysis, with the highest growth rate being 1023 percent and the lowest being a reduction by 86.56 percent. The capital-labour ratio is also high and there is wide variability across industries over the period.

[Table 3 about here]

The model was estimated using ordinary least squares (OLS) on pooled cross-section and time-series data for twenty-two industries over a five year period. The cross-sectionally heteroscedastic and time-wise autoregressive model was selected among other methods to deal with the problem of panel data.[14] The cross-section heteroscedastic and time-wise autoregressive model involves a double transformation of variables in the process of correcting for autocorrelation in the first stage and heteroscedasticity in the second stage (Kmenta, 1986; Pindyck and Rubinfeld, 1991). In the first stage the pooled sample was estimated using OLS and residuals were used to estimate the autocorrelation parameters for each industry (ρ_i) which were used formulate the generalized difference form of the original model. Thus each variable was adjusted by ρ_i such that

$$X_{it}^{*} = X_{it} - \rho_i X_{i(t-1)} \qquad (2)$$

for i = 1, 2, ..., N; t = 2, 3, ..., T. At this stage N observations were lost. In the second stage, the residuals from the OLS regression of the generalized difference model were used to correct heteroscedasticity by estimating the variance for each industry (σ_i^2). The estimated standard deviation, σ_i, were used to formulate a weighted least squares model. Each generalized difference form model variable was transformed such that

$$X_{it}^{**} = \frac{X_{it}^{*}}{\sigma_i} \qquad (3)$$

for i = 1, 2, ..., N; t = 2, 3, ..., T. In the final stage, the OLS was applied on the weighted variables in (3). This process was performed on MicroTSP and generated the serial correlation parameters and the standard deviations, for various specification that are presented in Appendix.

4.2 Results of the Model

The OLS estimates of the weighted least square model for different specifications are present in Table 4. The explanatory power of the model is satisfactory and ranges from 59.01 percent to 89.77 percent. The F statistic also shows that overall, the coefficients are significantly different from zero. Specific forms (1) and (3) uses the three-firm concentration ratio as a measure of market power with the latter excluding the market growth variable. Similarly, specific forms (2) and (4) uses the Herfindahl-Hirschman index of monopoly power, with the market growth variable excluded in specification (4). It should also been noted that the measures of minimum efficient scale (MES) was highly correlated with HHI than with CR3. The specifications with CR3 are therefore, more plausible.

The index of market concentration is positively related to export performance in all specifications regardless of the measure of monopoly power, but is only statistically significant at 1 percent level when monopoly power is measured by the HHI. Actually, in specification (2) and (4) only the index of market concentration is statistically significant. The positive relationship suggests support for the Das (1982) and Pickering and Sheldon (1984) industrial strategy arguments that firms use domestic monopolistic power to influence export performance. In specific forms (2) and (4) the computed export share elasticity with respect to market power evaluated at the means is about unitary, with a value of 1.099 percent in (2) and 0.971 percent in (4).

[Table 4 about here]

The other variable that has a consistent sign in all the specifications is the capital-labour ratio although its coefficient is relatively small. The capital-labour ratio is negatively related to export orientation and is statistically significant in specification (1) at 5 percent and in specific form (3) at 10 percent, where monopoly power is measured by the three-firm concentration ratio. This estimate of factor endowment, shows support for the Heckscher-Ohlin proposition. Export performance is relatively inelastic with respect to the capital-labour ratio. The computed elasticities suggest that a one percent increase in the capital intensity reduces export performance by 0.086 percent and 0.063 percent in specific forms (1) and (3), respectively.

The minimum efficient scale variable changes signs with different measures of monopoly power. It has the expected positive coefficient and significant at 1 percent level in specifications (1) and (3) where market power is measured by CR3. Otherwise, the use of HHI as a measure of monopoly power reverses the sign of the scale variable. This could be due to the high correlation between the HHI and MES. The performance of the scale measure is sensitive to the measure of market concentration. The significant results in specific forms (1) and (3) support the new trade theory that the exploitation of scale economies is a critical factor in determining export performance. This reinforces the case for concentrated domestic markets to boost the export success of firms. The computed elasticities of export shares with respect to scale economies evaluated at the means in specific forms (1) and (3) are respectively 0.884 percent and 0.79 percent, suggesting that export shares are inelastic with respect to factor endowments.

The market growth variable is not significant and takes different signs in different specifications. The coefficients of the skill intensity variable are very small and insignificant and only negatively related to export performance as expected in specifications (1) and (3). It seems lower average earnings contributed to the comparative advantage of Malawi manufactured exports only when market power is measured by CR3. Since labour is the abundant factor and given sticky wages in Malawi, export manufacturing industries which took advantage of the incomes and wages policy were able to compete favourably in export markets. However, the sensitivity of this variable to measures of market power and insignificance of the coefficient does not provide justification for maintaining the income and wages policies.

5. Concluding Remarks

This paper has estimated the relationship between market structure and export performance of manufacturing industries in Malawi using panel data. The cross-sectionally heteroscedastic and time-wise autoregressive model was selected to deal with the problem of pooling cross-section and time-series data. Overall, the results indicate a positive relationship between export performance and monopoly power contrary to the earlier finding in Jebuni *et al*. (1988) of a negative relationship.

The industry strategy hypothesis is supported by the positive and significant relationship of market power measured by HHI at 1 percent level while the positive relationship of monopoly power measured by CR3 is not statistically significant. Thus, the market structure-export performance relationship is statistically significant when the measure of monopoly power takes into account fringe competition exerted by small firms as captured by the HHI. The export share elasticity with respect to HHI is close to unity, suggesting that a one percent increase in monopoly power leads to about one percent increase in export orientation. The significance of the market concentration variable supports the role of domestic monopoly power as conceived in the new trade theories. However, the significance of the variable is not robust to both measures of market power. There is also some evidence that scale economies play a significant role in export orientation, although the response of export performance to the changes in the level of scale economies is inelastic. Scale economies are significant and with the expected sign in

the specification where concentration is measured by CR3 and is insignificant and takes a perverse sign in the alternative measure of concentration. The factor intensity variable is also statistically significant and takes the expected negative sign where CR3 is used to measure monopoly power, suggesting support for the Heckscher-Ohlin hypothesis of a negative relationship between LDC exports and capital intensity. However, export shares are very inelastic with respect to factor intensity.

The overall evidence suggest that market concentration was an important determinant of export performance in Malawian manufacturing industries during the period under study. These results suggest that selective government intervention aimed at encouraging domestic monopoly power and exploitation of scale economies for export-oriented industries may be necessary for the much needed foreign exchange earnings from the manufacturing sector. If these results are to go by, then LDCs have to be cautious in accepting the neoclassical structural adjustment reforms with respect to protectionism and towards policies that aim at dismantling domestic monopoly power in the manufacturing countries.

NOTES

1. Various authors have discussed the performance of these NICs, see for example, Lau and Klein (1990), Robinson and Tambuntertchai (1993), Cline (1982) and Hughes (1992).

2. Kaluwa (1986) provides a detailed analysis of market structure in Malawi.

3. A discussion of institutional barriers to entry in Malawi is in Kaluwa (1986).

4. Even though the Malawi Chambers of Commerce and Industry has been having discussions with the government since the late 1980s, these discussions with government have concentrated on problem solving other than prior consultations on policy issues.

5. Chirwa (1994) contains a detailed analysis of seller concentration trends.

6. These are products excluding Malawi's traditional exports of tobacco, tea, coffee and sugar.

7. Krugman (1989) summarises several models in the new trade theories and their policy implications.

8. See summaries in George and Joll (1971), Kirkpatrick *et al.* (1984).

9. Kirkpatrick *et al.* (1984) provide a good evaluation of SCP studies in LDCs. Other studies include Reekie (1984) and Leach (1992).

10. See Civelek and Al-Alami (1991).

11. For relative simplicity of these measures see Jebuni *et al.* (1988), and Balassa (1979) for a discussion of the revealed advantage measure. See Pickering and Sheldon (1984) for other alternative measures of export performance.

12. One exceptional theoretical argument is given by Dansby and Willig (1979) with the H-Index implied for Cournot competitors and the m-firm concentration ratio when the largest firms collude and the remaining firms are price takers.

13. This estimate has been used in empirical studies, see Auquier (1980), Jebuni *et al*. (1988).

14. Other available models are the variance model and the error component model.

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Table 1. Indices of Industrial Concentration in Selected Years (Percentage Number of Industries)

HHI	1984	1987	1990	1984-90
Competitive				
0 - 0.200	4	4	5	4
Oligopoly				
0.201 - 0.700	33	34	31	33
0.701 - 0.900	16	24	29	38
Monopoly				
1.000	47	38	35	25

Note: The HHI is the Herfindahl-Hirschman Index of market concentration which is calculated as the sum of the squared market share of each firm in the industry.

Source: Chirwa (1994)

Table 2. Manufacturing Industries in the Export Performance Analysis by ISIC

No.	ISIC	Description	No.	ISIC	Description
1.	3111	Preparing, Preserving Meat Products	12.	3311	Wood and articles of Wood
2.	3113	Canning, Preserving Fruits and Vegetables	13.	3412	Paper and Paperboard boxes
3.	3117	Bakery Products[1]	14.	3420	Printing and Publishing
4.	3118	Sugar	15.	3521	Paints, Vanishes and Inks
5.	3121	Coffee, Cocoa and Confectioneries	16.	3522	Pharmaceuticals
6.	3123	Tea	17.	3523	Soaps, Perfumes and Cosmetics
7.	3131	Distilling, Blending of Spirits	18.	3560	Plastic Products
8.	3140	Tobacco	19.	3811	Hand tools, Cutlery, Hardware
9.	3211	Spinning, Weaving, Finishing Textiles	20.	3819	Fabricated Metal Products
10.	3215	Cords, Ropes and Twine	21.	3829	Machinery and Equipment
11.	3220	Wearing Apparel exc footwear	22.	3839	Batteries

Note: 1. This category includes manufacturing of biscuits and potato crisps.

Table 3. Descriptive Statistics for Variable in the Model

Variables	Mean	Standard Deviation	Maximum	Minimum
EXPS	0.1455	0.2205	0.9950	0.0000
CR3	0.9034	0.1806	1.0000	0.0930
HHI	0.6795	0.3217	1.0000	0.0647
MGROW	0.4776	1.3514	10.230	-0.8656
SKIL	174.79	179.46	1391.50	12.2000
KLR	7580.0	6133.74	38819.82	129.060
MES	0.7276	0.3054	1.0000	0.0600

Table 4. Determinants of Export Performance: EXPS as Dependent Variable

Variable	(1)	(2)	(3)	(4)
Constant	-0.1537 (-1.1793)	0.1348 (0.9860)	0.1075 (0.7770)	0.1611 (1.2031)
CR3	0.0366 (0.9888)	-	0.0030 (0.0882)	-
HHI	-	0.2353 (4.6251)[a]	-	0.2079 (4.1327)[a]
MGROW	0.0036 (0.8805)	-2.34×10^{-4} (-0.2251)	-	-
SKIL	-7.46×10^{-5} (-1.6309)	2.43×10^{-6} (0.0643)	-3.85×10^{-5} (-0.8891)	3.02×10^{-6} (0.0815)
KLR	-1.66×10^{-6} (-2.1262)[b]	-1.50×10^{-7} (-0.1551)	-1.21×10^{-6} (-1.7733)[c]	-1.95×10^{-7} (-0.2182)
MES	0.1767 (4.8901)[a]	-0.0595 (-1.1914)	0.1580 (4.5011)[a]	-0.0478 (-0.9925)
R2	0.8977	0.7598	0.5901	0.6380
F	143.95	51.887	29.869	36.573
SSR	81.216	100.15	90.745	95.645

t-statistics in parentheses
a significant at 1 percent level
b significant at 5 percent level
c significant at 10 percent level

APPENDIX 1

Table A1. Estimates of Serial Correlation Coefficient and Standard Deviations used in the Cross-Sectionally Heteroscedastic and Time-Wise Autoregressive Model by Specific Form.

Industry Number	(1)		(2)		(3)		(4)	
	ρ	σ	ρ	σ	ρ	σ	ρ	σ
1	-0.6759	0.0245	0.6617	0.0068	-0.0820	0.0324	0.7089	0.0078
2	0.7433	0.0895	0.7703	0.0857	0.7215	0.0847	0.7724	0.0850
3	0.7945	0.0566	0.7082	0.0514	0.9040	0.0403	0.7270	0.0493
4	1.0031	0.0706	1.0254	0.0780	1.0215	0.0723	1.0255	0.0775
5	0.5753	0.3574	0.5717	0.3699	0.5847	0.3634	0.5715	0.3704
6	1.0302	0.2231	1.0325	0.2268	1.0287	0.2255	1.0330	0.2268
7	1.1437	0.0365	1.1012	0.0186	1.1123	0.0223	1.1003	0.0189
8	0.3937	0.1169	0.8920	0.1029	0.4170	0.1121	0.8879	0.1029
9	0.5070	0.0875	0.6170	0.0915	0.5025	0.0927	0.6112	0.0918
10	0.1946	0.0944	0.2917	0.1044	0.2001	0.0890	0.2984	0.0988
11	0.9964	0.0585	0.8402	0.0313	0.9107	0.0385	0.8654	0.0292
12	0.4836	0.1136	0.5548	0.1148	0.4232	0.1146	0.5407	0.1167
13	0.7253	0.0932	0.8700	0.0967	0.7892	0.0965	0.8711	0.0972
14	0.8333	0.0832	0.7278	0.0639	0.8766	0.0781	0.7424	0.0639
15	0.3048	0.0487	0.2325	0.0496	0.1011	0.0568	0.2028	0.0519
16	0.1711	0.0765	0.0586	0.0984	-0.1305	0.0981	0.0367	0.1027
17	0.5596	0.0504	0.7412	0.0291	0.3369	0.0466	0.6524	0.0279
18	0.3401	0.0371	-0.1018	0.0244	0.3852	0.0357	-0.0971	0.0240
19	0.3185	0.1437	0.2673	0.1471	0.3398	0.1451	0.2670	0.1467
20	0.7179	0.0419	1.1427	0.0276	0.8418	0.0390	1.1420	0.0281
21	0.8509	0.0266	0.9790	0.0221	0.7664	0.0375	0.9697	0.0230
22	0.9425	0.0399	1.0679	0.0073	1.0749	0.0103	1.0684	0.0074

Notes: (1) - (4) refers to the specification of the model as in Table 4.