EXPORT AND ECONOMIC GROWTH IN AFRICA

by

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CHAPTER I

INTRODUCTION

The purpose of this research is to examine the influence of export on the economic growth of African nations. The necessity of foreign trade in Africa during modern times derives in considerable part from the multiplicity of countries which are too small to practice autarky. Trade accounts for a larger proportion of national income in smaller countries than in larger and richer nations. In 1974, of the 52 African nations, only 8 countries had over 15 million persons, while 30 countries had between 1 and 15 million people, and 16 countries had less than 1 million inhabitants.[1]

African nations account for an insignificant proportion of the total world export. In 1974 the total value of African exports was 39.5 billion dollars, or only 5 percent of the total world export value. If oil exporting countries are excluded the percentage falls to a mere 2.7 percent.[2] However, exports are very important to individual nations because they make up a significant percentage of the Gross Domestic

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[1]World Bank, World Bank Atlas (1976).

[2]International Monetary Fund, International Financial Statistics (1976).

Product (GDP)[3] in many countries. Exports ranged between 10 and 58 percent of the GDP in individual African countries.[4]

In general, African countries concentrate on the production and export of just one or two primary commodities.[5] For example, in 19 African countries single commodities accounted for over 50 percent of their total export in 1975 (Table 1). In countries where single commodities account for the major proportion of the total export, these commodities are also the major source of foreign exchange and government revenue.[6] This situation agrees with the observation made by Andreas Grotewold over two decades ago. He writes:

> The export lists of the world's largest traders, especially the industrialized countries bordering the North Atlantic and Japan, show a large number of commodities derived from a great variety of raw materials. This contrasts sharply with the export lists of most small trade report units. The exports of the latter are often very specialized. Only one material and its immediate derivatives may contribute a very large share to the value of their total exports.[7]

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[3]The Gross Domestic Product is the value of all goods and services produced annually within the geographic boundary of a country. It is the amount of product per unit time. GDP differs from gross national product in that it does not include net income from abroad. The difference between the GDP and GNP is very small in many African countries.

[4]UN, Yearbook of International Trade Statistics (1976).

[5]Primary commodities are any product which is farmed, mined or hunted, or based on such products, but which do not contain any substantial manufacturing input. For example, rubber is primary material but not tires or shoes; copper ore or ingots of copper is, but not copper wire; live animals, meat, hides are, but not leather shoes or jackets. In this study primary commodity and primary product are used interchangeably.

[6]For a detailed discussion of one product character of African exports see Philipos Kemere "The One Product Character of African Economies," The Kansas Geographer, No. 13 (Spring, 1978), pp. 31-41.

[7]Andreas Grotewold, "Some Geographic Aspect of International Trade," Economic Geography, Vol. 33 (July, 1957), p. 259.

TABLE 1

African Countries Dependent on One, Two, or Three Major Export Commodities (1975)

Country	Commodity	Per Cent of Total Export (Value)
Algeria	Petroleum	91.1
Burundi	Coffee	80.5
Chad	Cotton	65.0
Gabon	Petroleum	68.9
Gambia	Groundnut	93.9
Ghana	Cocoa	53.7
Liberia	Iron Ore	74.4
Libya	Petroleum	99.0
Mauritania	Iron Ore	72.5
Mauritius	Sugar	89.2
Niger	Live Animals	64.5
Nigeria	Petroleum	94.8
Rwanda	Coffee	64.6
Senegal	Groundnut	75.0
Sierra Leone	Diamonds	60.7
Togo	Phosphates	76.4
Uganda	Coffee	72.7
Zaire	Copper	66.3
Zambia	Copper	92.6
Cameroon	Cocoa, Coffee, Wood	62.5
Central A. Rep.	Coffee, Cotton, Diamonds	83.2
Congo	Wood, Petroleum	80.4
Ethiopia	Coffee, Pulses, Oilseeds	63.1
Ivory Coast	Coffee, Cocoa, Wood	61.0
Madagascar	Coffee, Vanilla, Cloves	41.3
Malawi	Tobacco, Tea	59.5
Mali	Live Animals, Groundnut	68.0
Morocco	Phosphates, Citrus Fruit	59.3
Somalia	Live Animals, Bananas	77.4
Sudan	Cotton, Groundnut	68.5
Tanzania	Sisal, Cotton, Coffee	46.6
Tunisia	Petroleum, Phosphates, Olive Oil	72.6

Source: International Monetary Fund, International Financial Statistics, Vol. 30 (Washington, D.C.: International Monetary Fund, April, 1977).

Besides concentration of trade in a few commodities, there is also a regional concentration of export markets for many products of African countries (Tables 2 and 3). The countries in the list export on the average 66.5 percent of their products to industrialized countries and import 67.7 percent from the same region.

There is a low trade volume among African countries. Lack of complementarity between them may account for this low interaction.[8] The export section has been the focus of discussion among researchers as well as many policy makers, because of the sizable share of export in the GDP of many less developed countries and because of market concentration.[9]

There are a wide variety of views and opinions about the role of foreign trade on the growth of less developed countries. Many LDCs are composed of both traditional and modern sectors. The modern sector is affected by the exchange economy. It is asserted that, because of this dualistic nature of the economies in LDCs, trade poses varieties of problems. In this connection Myint observes:

> The typical problems of the present day underdeveloped countries arise, not because these countries are in the traditional state of isolation, but because they have been opened up to outside forces, in the form of foreign trade, investment and colonial rule. The expansion of export production and the spread of the money economy have disrupted in varying degrees the economic self-sufficiency of the traditional subsistence economy. Of course the traditional society still persists in varying degrees in most

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[8]Philipos Kemere, op. cit., pp. 35-38.

[9]Marian Radetzki, International Commodity Market Arrangements (London: Hurst and Co., 1970), pp. 1-35; see also Kathryn Morton and Peter Tulloch, Trade and Developing Countries (London: The Overseas Development Institute, 1977), Ch. 1.

TABLE 2

Direction of Selected African Countries' Export Trade in 1975

Exporting Country	% of Total Export To					Industrial Countries*
	Africa	Asia	Americas	Europe	Other	
Algeria	1.1	1.4	33.6	63.9	-----	83.9
Angola	7.3	11.6	48.6	31.9	.62	71.0
Benin	19.1	17.2	2.9	60.7	.09	61.1
Burundi	1.4	.7	44.8	53.1	-----	91.0
Cameroon	13.2	3.9	3.4	79.5	.01	71.0
Central A. Rep.	4.4	14.0	12.2	69.3	.13	73.3
Chad	31.8	8.7	12.1	47.4	-----	57.2
Congo	1.0	5.6	32.6	60.8	-----	64.5
Egypt	6.0	12.5	2.4	79.0	.01	27.3
Ethiopia	22.7	29.7	17.4	30.1	.14	49.7
Gabon	4.3	1.8	37.9	55.9	.09	64.0
Ghana	1.5	9.5	20.5	64.8	3.70	64.6
Guinea	3.9	4.7	34.3	57.1	-----	60.2
Ivory Coast	16.9	3.0	10.9	67.5	1.73	70.0
Kenya	36.5	10.6	7.3	33.2	12.30	37.5
Liberia	1.1	5.8	17.6	75.5	.02	86.2
Libya	1.2	4.7	32.9	61.2	-----	77.6
Madagascar	17.8	11.7	17.0	53.5	.02	69.8
Malawi	17.8	2.2	7.5	55.5	16.90	58.8
Mali	22.2	29.8	3.8	44.3	-----	44.0
Mauritania	6.1	11.5	----	82.3	-----	79.6
Morocco	4.9	5.2	3.6	85.5	.70	58.0
Mozambique	19.1	14.4	12.3	51.1	3.00	51.2
Niger	5.4	1.3	.03	93.3	-----	91.9
Nigeria	2.1	3.6	43.4	50.9	.08	82.2
Rwanda	3.7	.6	49.5	46.2	-----	94.9
Senegal	18.7	3.5	1.3	76.4	.01	75.0
Sierra Leone	2.8	7.4	13.7	71.5	4.64	92.5
Somalia	5.7	72.8	.08	21.4	-----	18.3
S. Africa	11.1	17.7	15.9	53.5	1.80	76.7
Sudan	5.5	3.8	2.6	53.9	.10	47.3
Tanzania	17.6	31.8	7.2	39.7	3.60	43.6
Togo	4.5	7.4	.9	87.3	-----	90.8
Tunisia	10.8	2.6	10.6	74.9	1.10	58.5
Uganda	11.8	13.2	24.7	46.5	3.70	69.3
Upper Volta	47.4	3.9	3.4	45.3	-----	50.9
Zaire	4.0	6.6	12.3	76.9	.09	87.0
Zambia	2.8	22.1	7.4	67.7	-----	76.1

Source: International Monetary Fund, Direction of Trade Annual 1969-75 (Washington, D.C.: IMF, 1976).

*Industrial countries include: USA, Canada, Japan, Austria, Belgium, Denmark, France, W. Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom.

TABLE 3

Direction of Selected African Countries' Import Trade in 1975

Importing Country	Africa	Asia	Americas	Europe	Other	Industrial Countries*
Algeria	2.2	5.6	20.0	72.3	.01	80.3
Angola	15.1	14.9	15.0	54.8	.10	53.3
Benin	8.2	22.0	9.9	59.8	.10	71.6
Burundi	20.8	13.7	3.6	61.8	.10	64.9
Cameroon	8.4	6.9	8.2	75.7	.75	83.7
Central A. Rep.	13.8	11.4	2.2	72.6	.01	63.7
Chad	37.3	2.6	10.2	49.8	.02	54.4
Congo	4.9	7.3	5.2	82.5	.03	85.4
Egypt	2.0	10.7	18.9	62.8	5.60	69.3
Ethiopia	2.0	33.7	17.6	45.7	.90	70.4
Gabon	5.9	3.2	11.2	79.7	.03	92.1
Ghana	14.6	13.3	17.5	54.0	.60	61.2
Guinea	12.5	3.3	18.0	66.1	----	75.8
Ivory Coast	11.5	12.9	9.2	66.0	.54	72.7
Kenya	4.1	27.0	10.1	44.7	3.60	59.6
Liberia	.6	6.8	8.4	84.2	.01	78.5
Libya	2.4	14.9	6.9	75.2	.65	71.8
Madagascar	1.8	14.8	3.3	79.6	.40	87.8
Malawi	39.7	14.9	4.9	38.7	1.70	49.0
Mali	31.4	11.2	6.5	50.9	----	49.3
Mauritania	7.3	3.5	9.8	79.4	----	88.5
Morocco	2.2	11.7	17.9	67.7	.50	64.4
Mozambique	23.6	18.3	5.6	51.5	1.11	46.0
Niger	18.0	16.8	7.4	57.3	.50	78.7
Nigeria	.9	15.0	13.6	70.1	.50	86.4
Rwanda	24.4	16.0	5.0	53.9	.70	60.1
Senegal	13.8	11.9	9.7	64.5	.10	70.5
Sierra Leone	13.1	12.1	13.3	58.4	3.00	63.2
Somalia	9.3	33.9	5.2	51.4	.08	54.4
S. Africa	4.5	14.2	19.9	58.8	2.50	87.0
Sudan	3.4	33.1	12.1	51.0	.30	65.1
Tanzania	7.7	37.8	15.1	37.5	1.80	55.1
Togo	5.0	8.1	12.7	74.1	.02	83.9
Tunisia	2.0	8.5	10.6	78.0	.80	76.1
Uganda	34.2	17.3	2.6	45.0	.71	48.2
Upper Volta	23.8	6.6	9.3	60.2	.09	68.0
Zaire	9.7	7.1	20.8	62.4	.01	82.7
Zambia	13.1	20.5	13.0	50.9	2.40	66.3

Source: International Monetary Fund, Direction of Trade Annual 1969-75 (Washington, D.C.: IMF, 1976).

*Industrial countries include: USA, Canada, Japan, Austria, Belgium, Denmark, France, W. Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom.

> underdeveloped countries in the form of a subsistence sector, particularly in Africa. But it is still true to say that the typical present day problems of these countries arise, not from traditional isolation but from modern changes..... Their problems arise from their difficulties in making satisfactory adjustments to these changes.[10]

In addition to this disruptive effect, deep involvement in foreign trade by LDCs is considered to have other drawbacks. LDCs specialize in exports of primary commodities which face deteriorating prices relative to manufactured products.[11] As a result of secular decline in demand for primary products the terms of trade are worsening for the countries producing primary goods.[12] To add to this problem, the prices for primary products vary much more sharply from year to year than do the prices of most manufacturers. Since most LDCs depend on income derived from the exports of a very small number of commodities, they are exposed to short-term instability as the world price of these commodities fluctuate.[13] Furthermore, exports create an economic enclave in LDCs and result in an unbalanced growth instead of generating a widespread development.[14] Finally, since LDCs lack adequate capital,

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[10]H. Myint, The Economics of the Developing Countries (London: Hutchinson & Co., 1967), pp. 23-24.

[11]Marian Radetzki, International Commodity Arrangements (London: Hurst & Co., 1970).

[12]Ragnar Nurkse, Pattern of Trade and Development (New York: Oxford University Press, 1961); Raul Prebisch, "Commercial Policy in Underdeveloped Countries," American Economic Review, Vol. 48 (May, 1959, pp. 261-264.

[13]UN, International Compensation of Fluctuation in Commodity Trade (New York: UN Department of Economic and Social Affairs, 1961), pp. 3-16.

[14]H. Singer, "The Distribution of Gains Between Investing and Borrowing Countries," American Economic Review, Vol. 40 (May, 1953).

administrative and managerial skills to improve the quality and the quantity of their commodities they cannot compete equally in the world market with the industrialized countries. So it is asserted that the development strategies of LDCs should be inward-oriented.[15] However, researchers are not unanimous in their assessment of exports in less developed countries.

Some of the most important advantages of export for LDCs cited in the literature include the following. First, export serves as a vehicle for the transmission of technical knowledge, administrative, and managerial skill. Second, it is the main earner of seriously needed foreign exchange. Third, export acts as a magnet for attracting foreign capital into the country. Fourth, it liberates the country from depending entirely upon the small domestic market. Fifth, exports act as an engine of growth whereby several ancillary industries emerge in order to support those engaged in the export sector. Sixth, open trade allows the country to gain the advantages of specialization and to effectively utilize its capacity to the full. Finally, export encourages the country to be competitive thereby increasing efficiency and productiveness.[16] The pros and cons of these points of view will be analyzed in depth in Chapter II.

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[15]Gunar Myrdal, The Challenge of World Poverty (New York: Pantheon Books, 1970).

[16]Isaiah Frank, "The Role of Trade in Economic Development," in Richard N. Gardner and Max F. Millikan (Eds). The Global Partnership: International Agencies and Economic Development (New York: Praeger, 1968); Robert F. Emery, "The Relation of Exports and Economic Growth," Kyklos, Vol. 20 (1967).

The type of policies pursued by various governments differs, depending on the convictions they have about the effect of trade on growth. Intuitively one could hypothesize that those countries which consider trade to be detrimental would follow restrictive trade policies (inward-oriented), while those who believe that it has a positive impact on growth would implement facilitative policies (outward-oriented). In order to evaluate the merits of differing policies it is essential to determine a number of relationships between exports and economic growth. If it is true that the economic growth of a country is vitally related to its foreign trade, then it is most desirable to study the methods by which it can be manipulated to increase the rate of economic growth.

Statement of the Problem

The main purpose of this study is to explore how exports influence African Nations' economic growth. Those who doubt that foreign trade encourages growth feel that exports of less developed countries are composed of primary commodities with high concentration of few products and that their markets are highly concentrated. As a result, it is suggested that these countries will be hard hit through instabilities associated with primary production and export. On the other hand, others view the growth of a regional economy as dependent upon the increase of its exports. Such an increase in exports induces non-export sectors of the economy to expand in order to support the growth of the export sector. Therefore, it is essential to investigate the relationships between various characteristics of exports and economic growth in

order to provide a foundation from which to make policy decisions. The primary hypothesis of this study is that there is a positive association between rapid growth in exports and economic growth.

From this central hypothesis a series of secondary hypotheses are examined and these are offered in question form here.

(1) What is the relationship between commodity concentration and economic growth?

(2) To what extent are geographic concentration of exports and economic growth related?

(3) What is the relationship between export concentration and a country's population size?

(4) What types of variables are most strongly associated with economic growth?

(5) Is there a relationship between export instability and economic growth?

(6) What proportion of export instability is explained by: export quantity instability, terms of trade instability, export price instability, GDP instability, commodity concentration, geographic concentration, foreign trade as per cent of GDP, growth in exports, changes in per capita exports, and exports as per cent of GDP?

(7) What does the instability surface look like?

(8) What are the basic dimensions of the export pattern?

(9) Are there any associations between the patterns and export characteristics?

Expected Results

It is expected that the relationship between export and economic growth is positive. The results will indicate a negative association between size of exporting units and their dependence upon export of few products as well as their dependence on few trade patterns. This expectation is based on the notion that small nations have less diversity of natural resources and a large proportion of its limited capital may be concentrated in one or few sectors. In addition imports and particularly exports of small nations are likely to be concentrated with respect to both country of destination and origin.[17]

The higher the contribution of export to the gross domestic product the stronger the association between export and economic growth. Since economic growth is more jerky than smooth, it is expected that there will be a positive association between export proceeds instability and the rate of economic growth. Although it is premature at this stage to pin point variables that contribute to the greater explanation of the variation in export proceeds instability, it is expected that export price instability and export quantum instability account for the greater variation in export proceeds instability.

The emerging pattern will indicate a regional variation in instability of trade. Nations closer to the highly industrialized countries of Western Europe and those which have access to the major ocean routes will be more positively affected by export performance than other nations.

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[17]Simon Kutznets, Six Lectures on Economic Growth (Glenoc, Illinois: The Free Press, 1959), pp. 91-95.

Justification

The earth is endowed with varieties of resources which are not evenly distributed. There is also an uneven distribution of development over the earth's surface. Ullman, after examining the spatial aspects of underdevelopment, notes that some great areas of the world are not only relatively less developed than others but that within many countries there are sharp contrasts between developed and less developed regions.[18] Differences in resources coupled with the uneven spread of development spark differences in the regional distribution of supply and demand which form the basis for interaction.

Economic geographers attempt to understand regions of the earth's surface in terms of production, exchange and the consumption of its wealth. Such an understanding is facilitated by classifying information about economic activities on a regional basis. By categorizing countries on the basis of their trade characteristics and pin pointing the effects of the mixture of these trade characteristics upon growth, geographers can contribute to the better understanding of the problems of economic development in less developed countries.[19] From the identification of orderly relationships, such as pattern of trade and growth, geographic concentration of trade and growth, the geographer can make generalizations about the probable effects of proposed trade policies.

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[18]Edward L. Ullman, "Geographic Theory and Underdeveloped Areas," in Norton Ginsburg (ed), Essays on Geography and Economic Development. (Chicago: University of Chicago, Department of Geography, Research Paper No. 62, 1960), pp. 26-27.

[19]John Alexander, "International Trade: Selected Types of World Regions," Economic Geography, Vol. 36 (April, 1960), p. 98.

Geographers are interested in linkages between regions and the resulting interactions. Since nations are one of the better defined units of man's spatial organization, it is easier to find data on goods and services that cross national boundaries. Such cross national activity makes the study of international trade the subject matter of geographers.[20]

The geographer is also interested in the diffusion of ideas, techniques, information, and change. Trade between nations at different points in a continuum of development leads to the introduction of new ideas and innovations.[21]

Ullman contends that if the society is composed of great extremes there is likely to be less transmission of ideas and techniques than in a more democratic continuum. In his words, "such introductions float without much effect."[22] Since such communication is embodied within an exchange economy, an attempt to understand areal differences of international commodity exchange and the effect of these trade relations upon growth is a relevant geographic problem.

Furthermore, the topic of this research is one of current significance and debate. Trade relations among nations, particularly between developed and less developed countries, are hotly discussed issues in this decade. Trade forces nations to communicate. Nations with

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[20]Andreas Grotewold, "Some Aspects of the Geography of International Trade," Economic Geography, Vol. 37 (October, 1961), pp. 309-319.

[21]Richard Hartshorne, "Geography and Economic Growth," in Norton Ginsburg (ed), op. cit., p. 14.

[22]Edward L. Ullman, op. cit., pp. 30-31.

differing ideological, political, and socio-economic backgrounds, who otherwise are not inclined to face each other, counter each other in conferences and various other forums to discuss trade relations and to make better trade arrangements. Russett writes:

> People engaged in international trade are exposed to a wide variety of ideas and information that would otherwise never reach them; they must listen to viewpoints that they would otherwise never hear. Commerce can be a means by which the needs of groups in one country become known to those in another. Exporters are likely to develop a generalized interest in the well-being of their markets, an interest that transcends the marketing conditions, narrowly defined, for their products.... They may become attuned to the needs of the importing country over a range of non-economic matters. The greater the volume of the variety of commerce, the less narrow will be the merchandiser's conceptions of their interest.[23]

Because of its very transcendent nature and current significance, export deserves additional consideration by geographers.

Plan of the Work

The goal of this study is to analyze the general relationship between export characteristics and economic growth. The introductory chapter provided the general background, the purpose and the justification for the study and the expected results. Chapter II will provide a survey of views regarding the effect of export on growth. This chapter will serve as a framework to better understand the implications of the research questions to be tested. In Chapter III we will discuss the methodologies applied in this research and reveal the findings of the study. The final chapter will present the summary and conclusions.

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[23]Bruce M. Russett, International Regions and the International System (Westport, Connecticut: Rand McNally & Co., 1967) p. 124.

CHAPTER II

TO EXPORT OR NOT TO EXPORT?

To provide a more detailed perspective on the hypotheses formulated in the previous chapter the controversy between those advocating export and those who suggest inward-oriented trade policies is examined here.

Advantages of Export

Specific arguments of those who advocate that exports affect growth positively include the following.

Earner of Foreign Exchange:

Commodity exports are the main earner of foreign exchange in LDCs. The other sources of foreign exchange include invisible exports such as shipping insurance services and tourism, capital investment, loans, aid, gifts, and unilateral transfer from foreign investment and interest repayment. However, in many LDCs, particularly in many African countries, foreign exchange from these other sources is very insignificant. Gains from trade enable a country to pay for imports of capital goods which are essential ingredients of the industrial process. Industrial plants will be allowed to operate at full capacity because with newly available

foreign exchange it is possible to import essential material necessary for production.[1]

Efficient Resource Allocation:

Exports permit the country to allocate its resources in areas in which it enjoys comparative advantage. By enabling the country to pay for its imports, exports check domestic monopolies as well as prevent the domestic industry from becoming wasteful. In other words by importing similar products the country can induce a reduction in cost and an improvement in the quality of goods produced in home industries.[2]

Export as an Engine of Growth:

Exports encourage the expansion of ancillary industries which are set up to serve export base industries. If the multiplier effect of export base industry is very strong, exports can serve as an engine of growth in the development process. Melvill Watkins observes that the pace of development in new countries is determined by the exports that enable the country to pay its way in the world. Economic growth will be a process of diversification around an export base. Such diversification means a rise in income in the export sector. The spending of this income generates investment opportunities in other sectors, both at home and abroad.[3]

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[1]Isaiah Frank, op. cit., p. 48; Robert F. Emery, op. cit., p. 471.

[2]Isaiah Frank, p. 50.

[3]Melvill H. Watkins, "A Staple Theory of Economic Growth," Canadian Journal of Economic and Political Science, (May, 1963), pp. 142-146.

The inducements for domestic investment that result from increased export are defined as backward linkage, forward linkage, and final demand linkages. A backward linkage is a measure of inducement to invest in the home production of inputs needed by the export sector (e.g. fertilizer for food production). The impact of the export sector will be the greatest where the input requirements involve resources and technologies which permit home production. Forward linkage is a measure of the inducement to invest in industries using the output of the export sector as an input (e.g. cotton in textile industry). In this case increasing value is added in the export sector. Final demand linkage is a measure of the inducement to invest in domestic industries producing consumer goods for those engaged in the export sector. The effect of export on economic growth depends on the strength of these linkages.[4]

Linder observes that import capacity shapes growth possibilities and thus exports have a leverage effect on capacity utilization because imports are paid for by exports. The increasing demand for ancillary services by the export sector brings about a number of industries such as inland transportation, port facilities, banking, and machine service industries. These industries provide services not only to the export sector of the economy, but to the non-export sector as well. In addition such industries furnish employment opportunities for the indigenous population. Furthermore, the employees in the export sector are trained to become engineers, draftsmen, engine drivers, inspectors, machinists,

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[4]Albert O. Hirschman, The Strategy of Economic Development (New Haven, Conn.: Yale University Press, 1958), pp. 100-109.

accountants and clerks. Therefore, growth ultimately depends upon exports. In Linder's words, exports serve as a "potential super-engine" of growth.[5]

Exports as an Escape From Small Domestic Markets:

About 34 percent of the world's countries have less than 1 million people, while about 45 percent have between 1 and 15 people inhabitants.[6] This means that most countries have a limited domestic market and cannot gain from economies of scale. Exports liberate such countries from limitations imposed by small domestic markets and the broadened markets permits large scale operation. The cases of Israel, Jordan, Iraq, Trinidad, and Jamaica are cited as evidence of the close association between rapid growth in exports and increases in the growth of national product.[7] Each of the above 5 countries have less than 15 million people which means that their import substitute industries would have faced a dead end had it not been for the access to the international market.

Exports as a Source of Attraction for Capital:

Exports also act as an important magnet for attracting foreign capital. This is particularly so when the investment climate in the country is very good. Besides serving as an inducement for foreign

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[5]Staffan B. Linder, Trade and Trade Policy for Development (New York: Praeger, 1967), pp. 4-5.

[6]World Bank, World Bank Atlas (1976).

[7]John Pincus, Trade, Aid and Development (New York: McGraw-Hill, 1967), p. 74.

investment in the country, the rapidly growing export sector also encourages an increased flow of technological and market innovations, as well as managerial skills.[8]

Disadvantages of Export

The arguments of those who believe that exports do not yield economic growth are categorized and examined in some detail below.

Composition and Direction of Trade:

It is asserted that the structure of the LDC economies and particularly the composition and direction of their trade has not changed since colonial times. Exports from LDCs indicate a pronounced dependence on primary product exports for foreign exchange. Although the LDCs total share of primary exports is small they are very important to individual countries. For instance, in 1975 out of total exports of $212.4 billion for LDCs, primary products accounted for $172.4 billion, or nearly 82 percent. About 72 percent of this export was destined to developed market economies.[9] Radetzki observed that in 1959-61 out of total exports of $26.9 billion for LDCs, primary commodity sales accounted for $23.8 billion or 88 percent of their total export.[10] This indicates the absence of substantial change in the structure of LDCs export in 15 years. Despite a rapid growth of exports of manufactured goods from

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[8]Isaiah Frank, pp. 50-51; Robert Emery, p. 472.

[9]General Agreement on Tariffs and Trade, International Trade: UN Monthly Bulletin of Statistics (Geneva, 1976).

[10]Marian Radetzki, op. cit., p. 21.

LDCs, the dominant position of primary products has not substantially changed. In addition, a greater proportion of their products are exported to industrialized countries with whom they don't have equal bargaining power.[11]

Lagging Demand for Primary Goods:

Ragnar Nurkse observed that during the 19th century exports of primary products were expanding more than exports of manufactured goods. During this time, trade acted as an engine of growth because the industrial centers of Western Europe transmitted their economic growth to the newly settled periphery land through increased expansion of demand for primary products. But he argues that the process through which the then newly settled lands of North America and Australia benefited, is no longer available to the present day less developed countries. There is a tendency for exports of primary products to lag behind exports of manufactured goods.[12] Specifically he writes, "the expansion of external demand for the primary commodity exports of poorer countries appears in recent years.... to have lagged behind the rate of increase in both exports and national incomes of the industrialized countries."[13] Consequently, ".... the forces making for the diffusion of economic growth from advanced to less developed countries are not as powerful in the trade field as they were a hundred years ago."[14]

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[11]Ibid, p. 21.

[12]Ragnar Nurkse, Pattern of Trade and Development, op. cit., pp. 1-10.

[13]Ibid, p. 53.

[14]Ibid, p. 27.

Declining Terms of Trade:

Prebisch writes that there is a secular downward trend in commodity terms of trade (ratio of primary commodity price to manufactured goods price) relative to manufactured goods. Four reasons are given as evidence of this trend. First, manufacturers in more developed countries (MDCs) are becoming efficient in their use of these inputs. In other words, technology tends to reduce the quantity of raw materials needed for production of more finished products. Second, there is increased use of synthetic materials that compete with the use of natural substances. Third, primary products tend to have a low income elasticity and lag behind increases in income levels in MDCs which are the main importers. Fourth, technological progress is concentrated in MDCs. This inequality promotes a technological gap, which makes it difficult for less developed countries to operate on equal terms with the industrialized countries. Established industrial enterprises, in MDCs, have a firm hold on the markets and any attempt to break into these with manufactured goods by LDCs meet with formidable difficulty. The slow growth of import demand in MDCs for primary products and a rapid growth of demand for industrial products by LDCs results in the tendency for the price of LDCs' exports to deteriorate relative to the price of their imports.[15]

Berry points out that LDCs lack home markets of sufficient size to provide the basis for economies of scale in production, and because many

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[15]Raul Prebisch, "Commercial Policy in Underdeveloped Countries," American Economic Review, Vol. 48 (May, 1959), pp. 261-264; see also Gunnar Myrdal, The Challenge of World Poverty (New York: Pantheon Books, 1970), pp. 275-301.

of these countries experience chronic deficits in their foreign trade, they have insufficient capital to improve their methods of production. The end result is a slow pace of development.[16]

Unequal Exchange:

Arghiri Emmanuel advanced an unequal exchange thesis which attempts to explain why there is a secular decline in the terms of trade of LDCs relative to developed countries. He argues that the price of goods produced in any country is determined mainly by the wages in that country. Wage levels are influenced by the power of trade unions. Assuming that labor is immobile between countries, wage differences will persist. There is an abundance of unorganized labor in LDCs and wage rates there will remain low, while wages will remain high in developed countries as long as labor is organized and relatively scarce. Capital, on the other hand, is relatively mobile internationally and profit rates in different countries are equalized as a result. The price of goods produced in different countries will reflect wage rates of both MDC and LDCs. High wage countries will benefit from the lower wages in poor countries more so than if these goods were produced internally. On the contrary, low wage countries will lose because they will pay higher prices for goods produced in high wage countries than if they were produced internally. Larger quantities of factors used in the production of goods in low wage countries will be traded for smaller quantities of goods from high wage

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[16]B. J. L. Berry et al., The Geography of Economic Systems (Englewood Cliffs: Prentice Hall, 1975), p. 205.

countries. Unless corrective measures are taken, the developing countries will lose progressively by trading with rich countries.[17]

Economic Enclave:

It is also charged that export industries have created, within the less developed countries, an economic enclave which is organized by imported labor and capital. Singer writes:

> The production facilities for the export from underdeveloped countries which were so largely a result of foreign investment, never became a part of the internal economic structure of those underdeveloped countries themselves, except in the purely geographic and physical sense.[18]

As a result, the multiplier effect occurs in the heartland countries, from which the foreign capital and immigrant labor have come and to which the income is returned. In this connection Levin observes:

> Because the foreign factor did not spend his increased income within the export economy his propensity to consume domestically was zero and his added export income generated no expansion of income and employment at all in the rest of the export economy. Within the export economy, the foreign trade multiplier for his increased income was zero; it was in the country to which he remitted these added earnings that the foreign multiplier operated.[19]

Similar assertions are advanced by those who see an unbalanced growth between export and non-export sectors of the economy. A UN commission finds that export commodities are produced at the expense of food crops. Between 1960 and 1970 African efforts were concentrated

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[17]Arghiri Emmanuel, Unequal Exchange (London: New Left Books, 1972).

[18]H. Singer, op. cit., p. 475.

[19]J. V. Levin, The Export Economies: Their Pattern of Development in Historical Perspectives (Cambridge: Harvard University Press, 1960), p. 197.

on increasing the output of export crops, while staple food crops were, relatively speaking, neglected. Export crops grew at an annual rate of 4 percent while the output of domestic staples increased by less than 2.4 percent.[20] Lofchie observes that in many primary product exporting countries in Africa exports are politically supported. Government sponsored irrigation schemes benefited export crops. Export crops are awarded higher prices and this has encouraged a shift in land use patterns from food crops to cash crops. The whole process is further reinforced by the infrastructure that was built to facilitate the transport of exportable agricultural commodities.[21]

Export Instability:

It is also claimed that the degree of export instability is greater in LDCs than in developed countries, and that because of total fluctuation in total export earnings, this instability damages the LDCs' economic growth. Several factors are cited to give rise to this violent fluctuation in the LDCs' export proceeds. First, LDCs specialize in primary products that face lower price elasticities of demand and supply than do manufactured goods. Crops such as rubber, coffee, cocoa, hard fibers, and tea are characterized by long gestation periods and as a result there is a lag of several years in response of output to price. Although the price elasticity of minerals is higher than that of agriculture, it is not high enough to compare with the elasticity of

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[20]UN, Survey of Economic Conditions in Africa, 1972, p. 104.

[21]Michael F. Lofchie, "Political and Economic Origins of African Hunger," The Journal of Modern African Affairs, Vol. 13 (December, 1975), pp. 559-563.

manufactures. For each case the response of demand for raw materials depends on the demand for the finished products. The cost of raw materials constitutes a fraction of the final product. Other factors influencing fluctuation in export production include commodity concentration of exports, geographic concentration of exports and little control by primary producers over output of their agricultural and mineral output. Weather changes, pests, and diseases affect output of both annual and perennial crops, while mineral outputs are affected by widely fluctuating demand originating in the business cycle of developed countries.[22]

Instability in export proceeds has great side effects upon the attainments of economic goals of many LDCs. This is because most LDCs are foreign trade oriented and their export/GDP ratio is high. The difficulties that LDCs experience will be greater than those of a corresponding export instability in more developed economies because developing countries with a high export/GDP ratio lack flexibility in their production structures to respond to changes in their terms of trade. Developed countries with a diversified and flexible economy will have better facilities for effective monetary and fiscal policies to counter the shocks from the export sector.[23] More specifically, Myint writes:

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[22]Kathryn Morton and Peter Tulloch, Trade and Developing Countries (London: The Overseas Development Institute, 1977), pp. 98-100; see also UN, International Compensation for Fluctuation in Commodity Trade (New York: UN Department of Economic and Social Affairs, 1961), pp. 3-16.

[23]Marian Radetzki, op. cit., pp. 4-5 and 24-28.

> Unlike the industrially advanced export economies, LDCs cannot easily switch from one line of export to another. Moreover, while the industrially advanced export economies normally have a considerable home market for their major lines of manufactured exports, the underdeveloped export economies do not have much of a home market for their major lines of primary exports to absorb the surplus when the world market conditions turn against these products. Given the same ratio of export to national income, therefore, an underdeveloped export economy is likely to suffer more from a fluctuation in world market price than an industrially advanced export economy.[24]

Discriminatory Commercial Policies:

The LDCs face commercial policies in the industrialized countries that are discriminatory to their products. They are particularly vulnerable to adverse policy decisions in the advanced countries. Tariffs and quotas are continuously increased as the product becomes more processed. In other words high tariffs and stricter quotas are applied on manufactured goods. LDCs are encouraged to export their product in unprocessed form. David Wall points out four sources from which such discrepancies stem. These are

> First, the increased production of domestic agriculture in almost all developed countries; secondly, the development of discriminatory trading systems; thirdly, the extension of quantitative restrictions imposed on imports of semimanufactures and manufactures from developing countries; and finally, increased effective protection against the labor intensive exports of special interest to less developed nations, particularly low cost manufactured consumer goods and processed raw materials.[25]

The difficulties associated with trade in LDCs are considered to be complex. The following statements of Thoman and Conkling underscore this as well as some of the views mentioned earlier. They state:

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[24]H. Myint, op. cit., p. 148.

[25]David Wall, The Third World Challenge (London: The Atlantic Trade Society, 1967), p. 6.

> Few of the less developed countries possess sufficient reserves of natural resources, educated and trained human resources, and capital to keep pace with world growth in development and trade. Serious problems in deteriorating terms of trade, over specialization in the export of a few primary products, lack of adequate investment capital, and low levels of technology all mitigate against the chances of these economies moving forward toward what might be regarded as their logical places in the world scheme of things. Moreover, the very high rises of population growth in many of the less developed countries further weakens their positions in world trade as they are forced to substitute food crops for commercial crops in agriculture, to sell their limited mineral resources from weak bargaining positions, to invest heavily in consumer goods industries when producer goods industries are so vitally needed for long term development, and to concentrate on labor-intensive types of production when capital-intensive output has demonstrated a superiority except where wages and labor are low and efficiency high. The aggregate results of these and associated problems are that most of the less developed countries are trapped in economic conditions, sensitively reflected in world trade, over which they have little control and from which they cannot hope to rise without generous assistance from the outside.[26]

This short survey conveys the basic tenets of researchers who favor export oriented growth as well as those who advocate inward-oriented policies. The total ramifications of this debate are far reaching and beyond the scope of this thesis. There is a consensus among the researchers that export has an impact on the growth of countries. The question is whether growth is retarded or stimulated. The focus of this research is to investigate this relationship between export and growth.

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[26]Richard S. Thoman and Edgar C. Conkling, Geography of International Trade (Englewood Cliffs: Prentice Hall, 1967), p. 171.

CHAPTER III

METHODOLOGY AND FINDINGS

This chapter defines the study area, the dependent and independent variables, and the methods employed. Most importantly the findings of the study are revealed and discussed.

The Study Area

The study area comprises 40 countries in Africa. The availability of required data served as the selection criterion. Fourteen nations were not included because they did not have information for either one or more of the variables in the study (Afars and Isas, Botswana, Cape Verde Islands, Comores, Equatorial Guinea, Guinea Bissau, Lesotho, Namibia, Réunion, Rhodesia, Seychelles, Spanish Sahara, Swaziland). However, the 40 countries account for about 98 percent of Africas' population as well as 96 percent of the continent's trade.

Variable Selection

Many of the issues discussed in the second chapter provide the rationale for the selection of several variables included in the study. For example, commodity concentration, market concentration, instabilities in prices, and proceeds instability are considered to be detrimental to economic growth. Other variables such as population size and road density

are selected because they have a direct influence on the magnitude of export and thus have an indirect bearing upon growth. The rationale for selecting each variable is discussed in detail below.

Dependent Variable:

The gross domestic product (GDP) will serve as an overall index of economic growth. GDP measures the production of goods and services within the geographic boundary of a country. It differs from gross national product (GNP) in that it does not include net factor income from abroad. The net factor income represents the income from abroad received by residents as compensation for factor services rendered abroad and includes remittances of workers temporarily employed abroad, interest dividends, and income from direct investment abroad.[1] Such income from abroad is very rare for the majority of African countries. For practical purposes GDP and GNP are approximately equivalent.

Economic growth is the process whereby a country's GDP or GNP must increase by a rate of at least 5 to 7 percent, over a sustained period of time through continuing increases in per capita productivity. This is so because population growth in most LDCs ranges between 2 to 3 percent annually, the above rate of economic growth is considered to be essential for a healthy maintenance of economic activity. It is important to note that GDP (or GNP) is not an adequate index of the total welfare of the nation. GDP does not reflect income distribution. If per capita GDP (or GNP) were the sole indicator of development, some of the small oil producing nations would be among the most developed in the world.

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[1]World Bank, World Table (1976), pp. 5-6.

But income distribution is highly skewed and they are not ranked among the developed countries. GDP statistics include goods and services provided through the market. Consequently, they do not take into account values that lie outside the monetary sphere. This problem is significant when a comparison is made between developed and underdeveloped countries. GDP also can rise because of progress in narrow segments of the economy, while most people live as they always did.[2]

Economic development has a wider connotation than that purported by the GDP growth rate. It is conceived as a multidimensional process involving major changes in social structure, popular attitudes and national institutions as well as the acceleration of and the eradication of absolute poverty. It reflects the movement of an entire social system away from a condition of life widely perceived as unsatisfactory and towards a situation regarded as materially and spiritually better.[3]

The UN has computed a development index which incorporates the above characteristics of development. The development index is a weighted average of 18 social and economic characteristics. This index is considered as a more reliable and stable measure of development than average GDP or GNP. The development index provides a more justifiable

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[2]Theodore Morgan, Economic Development: Concept and Strategy (New York: Harper and Row, Publishers, 1975), Ch. 6; Simon Kutznets, Six Lectures on Economic Growth (Glenoc, Illinois: The Free Press, 1959), pp. 13-19; UN Research Institute for Social Development, Content and Measurement of Socio-economic Development (New York: Praeger Publishers, 1972), pp. 7-8.

[3]Michael P. Todaro, Economic Development in the Third World (New York: Longman, 1977), Ch. 3.

basis than average GDP for differentiating between MDCs and LDCs.[4] Certainly the results of this study would have been more forceful had I used the development index. Unfortunately data are available for most African countries only for a few of the 18 socio-economic characteristics used to compute the development index. Besides a detailed study of development of individual countries is beyond the scope of my thesis. Finally, I am not concerned with comparing developed and developing countries. As a result, I feel that using the growth rate of GDP as a surrogate for economic growth is adequate to serve my purpose. Interestingly, the correlation between the development index and GNP for a large sample of both developed and developing countries is .89.[5] This means that GNP measures approximately what the development index measures. GDP is a simpler common denominator and is reliable for comparative purposes.

Independent Variables:

Export Growth: Because of their low income and unattractive business environment, LDCs are said to have very little chance of obtaining foreign exchange in the form of foreign capital investment, expanding tourism, and loans. Therefore, exports remain the main source of foreign exchange. It is hypothesized here that there is a positive relationship between rapid rate of export growth and the rate of economic growth. The average annual growth rate of exports (1960-73) was used as a surrogate variable for export growth.

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[4]Morgan, op. cit., p. 80.

[5]UN Research Institute for Social Development, op. cit., p. 151.

Concentration Variables: These include the commodity concentration of African exports and imports, and market concentration of exports and imports. The concentration indices were computed by using the Gini-Hirschman formula.[6] The commodity import concentration of country A is defined as:

$$C_{jA} = \left[\sum_{j=1}^{n} \frac{(X_{jA})^2}{X_A} \right]^{\frac{1}{2}}$$

Where X_{jA} is the value of import of commodity j to country A, and X_A is the total value of import of country A.

The commodity export concentration of country A is defined as:

$$C_{iA} = \left[\sum_{i=1}^{n} \frac{(X_{iA})^2}{X_A} \right]^{\frac{1}{2}}$$

Where X_{iA} is the value of export of commodity i from country A, and X_A is the total value of exports of country A. These indices are based on the one-digit standard International Trade Classification (SITC) categories and the 1973 trade data.

The geographic export and import concentration indices are calculated in the same manner as above, but here the values of export and imports to and from particular countries are inserted rather than commodities. High indices in all four cases indicate that a particular country exports few products and trades with very few countries while

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[6]Michael Michaely, Concentration in International Trade (Amesterdom: North-Holland Publishing Co., 1962), pp. 7-8.

low indices mean that the country exports a wide variety of commodities and trades with large number of countries.

Countries which have high concentration indices for any of these variables are considered to lack flexibility in their economic activity and are subject to cyclical variations in the economic activity of developed countries. The slow or stagnant growth of LDCs is attributed to concentrated trade activity. In this connection Chenery and Syrquin write:

> The export pattern is quite sensitive to government policies and provides an index to the development strategy being followed. Government must bring about a transformation in export composition sufficient to offset market limitations; failure to do this is one of the commonest reasons why countries fail to complete transition without serious disruptions in other development policies and in the overall rate of growth.[7]

It is hypothesized that there is a negative association between economic growth and the four concentration indexes.

Instability Variables: It was asserted that in most LDCs export trade is heavily dependent upon a narrow range of primary commodities and that their export proceeds reflect the instabilities in world commodity markets. Such fluctuation in export proceeds, export prices, export quantity, and terms of trade of individual countries has a significant repercussion upon growth. Export proceeds instability, export quantum instability, terms of trade instability, and GDP instability are included to test this effect.

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[7]Hollis Chenery and M. Syrquin, Patterns of Development, 1950-1970 (London: Oxford University Press, 1975), p. 42.

The log variance method is used to compute the instability indices. This index is the average year to year changes corrected for trend influence. A high index shows a relatively high degree of fluctuation and vice versa. It can thus be measured by the variation of prices, by the changes in quantity (volume) of trade, or by the fluctuations in the proceeds received from the sales of the commodity.[8] The formula is as follows:

$$X_{I-I} = \text{antilog} \left[1/n \sum_{t=1}^{n} (\log \frac{X_{t+1}}{X_t} - m)^2 \right]^{\frac{1}{2}}$$

where

X_t = the value of a country's exports in year t

n = the number of years minus 1

m = the arithmetic mean of the difference between the log of X_t and X_{t+1} and X_{t+2}, etc.

X_{I-I} = export income instability index

The terms of trade are a measure of the relative export prices as compared with import prices. This is known as commodity terms of trade. When the export proceeds index is divided by the import price index it is known as income terms of trade. The commodity terms of trade indicates the change over time in the relative level of import prices as a percentage of import prices. The income terms of trade indicates the purchasing power of the country's exports over unit imports. The instability index measures the degree of fluctuation in the terms of trade.

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[8]Joseph D. Coppock, International Economic Instability (New York: McGraw-Hill Book Co., 1962), pp. 23-26.

A negative relationship between these instability indices and economic growth is hypothesized.

Size Factor: The population of a country is included as a market size variable intended to take into account the potential for economies of scale. All things being equal, it is assumed that the economic structure of a small nation will be less diversified than that of a large country. This is exemplified by the higher proportion of foreign trade turnover in small countries than in large countries. Exports are more likely to be concentrated in one or two commodities in small countries than in the case of large countries. Michaely observes,

> a positive relationship between the index of size of partner countries and the degree of grographic concentration of trade usually flows to large countries, while large countries whose trade usually has a large degree of geographic diversification, tend to trade with small countries.[9]

The implication is that the more dependent a country is upon trade, the greater the impact trade has upon economic growth. This relationship can be directly tested by investigating the relationship between the trade ratios and the concentration index.

The variables that reflect size of export and total foreign trade are the export/GDP ratio and the total foreign trade/GDP ratio (export plus import divided by GDP) respectively. The share of export in GDP is obtained by dividing the values of export by GDP for each year and summing these ratios and dividing the total by the number of years for which the ratios have been calculated. The formula follows:

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[9]Michael Michaely, op. cit., p. 47.

$$\left[\sum_{i=1}^{n} \frac{X_i}{GDP}\right]/N$$

where

X_i = value of total export in year i

N = number of years for which the ratios are calculated

The share of foreign trade in GDP is obtained in this way:

$$\left[\sum_{i=1}^{n} \frac{(X_i + M_i)}{GDP}\right]/N$$

where

X_i = value of total export in year i

M_i = value of total import in year i

The two variables indicate the importance of trade to a particular country. It is therefore hypothesized that there is an inverse relationship between the population size and the foreign trade ratio. It is also hypothesized that the larger a country is the more widely diversified the composition of its trade and the larger its trade partners.

Road Network Variable: The final variable selected is the road network density. This is obtained by dividing the total miles of all weather roads by the total area of the country. The more a country is internally linked by networks of primary, secondary, and tertiary road systems the greater the chance that its citizens will actively participate in economic activities. The greater the participation the more wide-spread the effect of export upon growth. Therefore, it is hypothesized that heavily linked countries will experience greater growth than sparcely linked countries.

Methods

The methods used in this study are both descriptive and analytic. The statistical methodologies include correlation, regression analysis

and principal components analysis. Simple correlation was used to test both the primary hypothesis and the secondary hypotheses. A stepwise multiple regression analysis was conducted to find the independent variables' contribution to the explanation of the variance in the dependent variable. This method helps to overcome the inadequacy of simple bivariate correlation, because in the real world casual relationships between variables are complex. In situations where a large number of independent variables are used, a stepwise regression technique is considered to be best to identify each variables' addition to the explanation of the variance in the dependent variable. It starts with a simple bivariate equation and proceeds adding one variable at a time until all of the independent variables are accounted for. In a single variable case we have the following equation:

$Y_i = a + bX_i$ where

Y_i = dependent variable

a = the Y intercept

b = the slope coefficient

X_i = independent variable

and in 4 variable cases we have

$$Y_i = b_0 + b_1X_{i1} + b_2X_{i2} + b_3X_{i3} + b_4X_{i4}$$

where

Y_i = the dependent variable

b_0 = the Y intercept

$b_{1,2,\ldots,4}$ = the slope coefficients

$X_{1,2,\ldots,4}$ = the independent variables

The order in which variables enter the equation depends on their contribution to the explanation of the remaining variance in the dependent variable. First, the independent variable that has the highest correlation with the dependent variable enters the equation. The second variable to enter is the one that has the next highest partial correlation with the dependent variable, while controlling for the effect of the variables already in the equation. This process is continued until all of the independent variables that contribute to the explanation of the variance in the dependent variable, in a significant manner, have entered the equation.[10]

A residual map will be prepared to show the magnitude of difference between the predicted values of economic growth accounted for by the independent variables and the observed value. Edwin Thomas defines residuals in the following manner:

> a residual from regression for a particular observation is the difference in magnitude between an observed value, whose numerical value is determined by factors included and omitted from investigation, and an estimated value, determined only by variables included in the study. .... Within a geographic context, a residual from regression is defined as that part of the magnitude which a phenomenon reaches within a given unit area which is independent of the areal association between the given phenomenon and the other factors included in the investigation.[11]

Where residuals are small we have a close correspondence between the actual and the predicted values. Large negative residuals indicate

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[10]Peter J. Taylor, Quantitative Methods in Geography (London: Houghton Mifflin Co., 1977), pp. 212-213.

[11]Edwin N. Thomas, "Maps of Residuals from Regression," in B.J.L. Berry and D. F. Marble (eds). Spatial Analysis: A Reader in Statistical Geography (Englewood Cliffs, N.J.: Prentice Hall, 1968), p. 330.

over-prediction, while positive residuals show underprediction. In short, residuals reflect areal variation in the degree of fit of the regression equation. From residual maps it will be seen where the regression equation overpredicts, where it underpredicts, and where it predicts most accurately. Poor prediction indicates that factors other than the variables included in the equation influence the dependent variable.

A principal component analytic procedure will be used in order to find out whether there is an emerging spatial pattern of trade in Africa. The base data will be comprised of a matrix of 40 African countries and their 12 export destinations. This technique is an important tool for structuring complex data into simple interpretable patterns. It does so by reducing the interdependent variables into a much smaller number of major dimensions. Each dimension is condensed from a cluster of variables that are highly intercorrelated and tell the same story. The major underlying components are arranged in such a way that the first component accounts for the greatest variance, the second accounts for the second largest variance, and so on until the remaining components explain an insignificant amount of variation.[12] The component scores of these underlying dimensions can be used as independent data sets and correlated with the dependent variable to see whether there is an association between specific types of trade patterns and economic growth.

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[12]R. J. Rummel, "Understanding Factor Analysis," Journal of Conflict Resolution, Vol. 11 (1967), pp. 445-448; see also Peter J. Taylor, op. cit., pp. 242-243.

Findings

The Primary Hypothesis:

The primary hypothesis that there is a positive association between growth in exports and economic growth is supported. The test indicates a correlation coefficient of + .74, which is significant at the .01 level (the correlation matrix is presented in Appendix A). The strength of the relationship between export and economic growth appears to be particularly strong for countries with higher growth rates than those with relatively lower growth rates. Countries were divided into two groups (Table 4). Seventeen countries in group I had a GDP growth of 3 percent or higher, while those in group II achieved less than 3 percent

TABLE 4

Countries Grouped on the Basis of GDP Growth Rates

Group I (above 3%)		Group II (below 3%)	
Algeria	Nigeria	Angola	Mauritius
Cameroon	Rwanda	Benin	Niger
Congo	S. Africa	Burundi	Senegal
Gabon	Tunisia	C.A.E.	Sierra Leone
Gambia	Zaire	Chad	Somalia
Ivory Coast		Egypt	Sudan
Kenya		Ethiopia	Tanzania
Libya		Ghana	Togo
Malawi		Guinea	Uganda
Mauritania		Liberia	Upper Volta
Morocco		Madagascar	Zambia
Mozambique		Mali	
.81, P<.01		.09, P>.05	

Source: World Bank, World Table, 1976.

annually. Three percent is used as the break point because the 3 percent figure approximates the median rate of growth of the 120 nations with a population 1 million and over. Fifty-eight countries with a population of 1 million and over in 1973[13] (49 percent of the 120 nations) achieved a growth rate of 3 percent or more. The relationship between export and growth for countries of varying growth experience is different. The correlation coefficient for group I is .81 (significant at .01 level), while that of group II is only .09 (not significant at .05 level). This means that there is a significant relationship between the two variables for countries with high growth rates. However, the relationship is very low or non-existent among countries with low growth experiences.

It was also hypothesized that the relationship between export and growth is stronger among the more developed countries, while it is lower for the least developed countries. To test this assertion countries were divided into two groups; one group consisting of 13 countries having per capita GDP above 300 dollars, and the other group of 27 countries with per capita GDP of less than 300 dollars (Table 5). The 300 dollar mark is considered to be the point of transition whereby manufactured exports exceed primary product exports. Chenery and Syrquin observe:

> The transformation of the composition of demand and production is half completed by the 300 dollar income level. Industrialization, as measured by the fall of primary output and rise of industry, is typical of the structural changes that make up this transition. Above the 300 dollar level, the value added in industry normally exceeds that in primary production, a condition which typifies the later stages of the transition.[14]

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[13]World Bank, World Table (1976).

[14]Chenery and Syrquin, op. cit., p. 42.

TABLE 5

Countries Grouped on the Basis of Per Capita GDP

Group I (above $300)	Group II (below $300)	
Algeria	Benin	Niger
Angola	Burundi	Nigeria
Congo	Cameroon	Rwanda
Gabon	C.A.E.	Senegal
Ghana	Chad	Sierra Leone
Ivory Coast	Egypt	Somalie
Liberia	Ethiopia	Sudan
Libya	Gambia	Tanzania
Mauritius	Kenya	Togo
Morocco	Madagascar	Uganda
S. Africa	Malawi	Upper Volta
Tunisia	Mali	Zaire
Zambia	Mauritania	Guinea
	Mozambique	
r = + .83, P<.01	r = + .30, P>.05	

Source: World Bank, World Table, 1976.

The correlation coefficient of the first group is .83, which is significant at .01 level, while that of the second group is only .30 (not significant at .05 level). From this it can be concluded that economic growth is affected by export only after countries have achieved a certain level of development.

A close look at the grouping of countries indicates a slight regularity. Eight of the 13 countries in group I of Table 5 are also included among the fast growing countries of group I, Table 4. The comparison indicates that exports have a stronger impact upon economic growth where countries are both more developed and fast growing, while the effect is weaker where countries are least developed and slow growing.

A time series analysis was conducted to investigate how economic growth responded to growth in export over a 14 year period in each of the 38 countries under consideration. Data were secured for the years 1960 to 1973. Annual percent changes in export were correlated with percent changes in GDP for each country (Table 6). The results are not consistent. Although the relationship between export and growth is positive in all but two cases, the hypothesis is significantly supported in only 16 of the 38 countries considered.

A close look at individual countries indicates the correlation index is high in oil exporting countries. For example Algeria, Libya, Nigeria, and Gabon have a coefficient of .84, .86, .76, and .62, respectively. Other mineral exporting countries such as Liberia, Sierra Leone, Morocco, and Tunisia also have a relatively high index (Figure 1). Among those which primarily export agricultural commodities only Uganda, Madagascar, Mauritius, Ghana, and Ivory Coast have a significant positive correlation coefficient. Second, none of the land-locked countries (Burundi, Central African Empire, Chad, Malawi, Mali, Niger, Rwanda, and Upper Volta) have a correlation coefficient that is significant. Third, north and west coast African countries have relatively higher coefficients than those of east and southern African countries. It is possible that nearness to the transportation routes and to the major market areas might have a reinforcing effect upon the impact of export on growth. Decreased transport cost means more revenue from export whereas greater distance reduces the proceeds gained from engagement in trade. But, as can be seen in the previous section, there is no positive significant association between economic growth and internal accessibility.

TABLE 6

A Time Series Analysis of Export and Growth in Africa (1960-1973)

Countries	Correlation coefficient	Agricultural products as % of total exports	Countries	Correlation coefficient	Agricultural products as % of total exports
Algeria	.84[b]	2.9	Mali	-.04	81.6
Benin	.09	71.4	Mauritania	.47	10.3
Burundi	.27	95.9	Mauritius	.73[b]	3.0
Cameroon	.26	72.7	Morocco	.55[a]	15.3
C.A.R.	.41	63.9	Niger	.37	32.8
Chad	.34	71.9	Nigeria	.76[b]	9.9
Congo	.55[a]	19.3	Rwanda	.34	73.2
Egypt	.79[b]	53.6	Senegal	.12	11.0
Ethiopia	.54	72.7	Sierra Leone	.81[b]	20.7
Gabon	.62[a]	33.1	Somalia	.40	83.5
Gambia	.59[a]	57.4	S. Africa	.13	19.3
Ghana	.69[b]	70.3	Sudan	.01	84.4
Guinea	.51	65.4	Tanzania	.26	76.5
Iv. Coast	.56[a]	74.2	Togo	.44	43.4
Kenya	.28	61.3	Tunisia	.81[b]	3.4
Liberia	.69[b]	21.1	Uganda	.79[b]	89.8
Libya	.86[b]	.1	Upper Volta	.36	83.6
Madagascar	.84[b]	63.9	Zaire	.20	11.8
Malawi	.46	84.9	Zambia	.40	1.2

[a]Significant at .05 level.

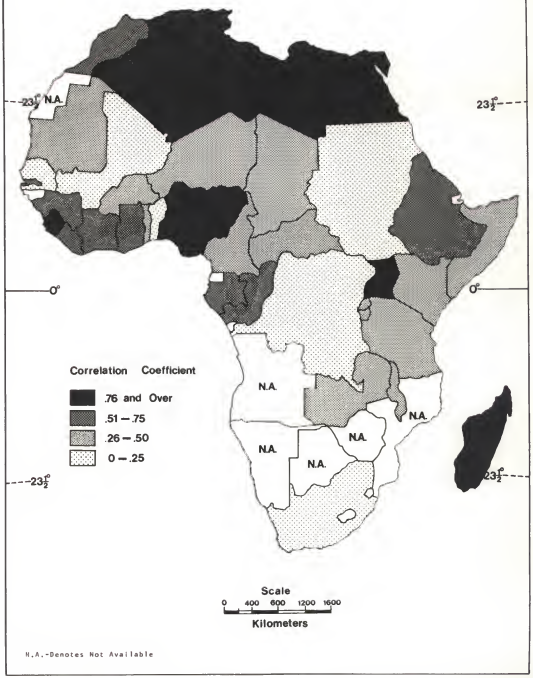
[b]Significant at .01 level.

Source: World Bank, World Table, 1976; UN, Yearbook of International Trade Statistics, 1976.

To see whether there is a relationship between level of development and export, the countries are ranked from high correlation coefficients to low correlation coefficients and the second from highest per capita GDP to lowest per capita GDP. Interestingly the coefficient of rank correlation between the two ranks is found to be .37 (which is significant

Figure 1

Export And Economic Growth Correlations
For African Nations (1960 - 1973)



N.A.-Denotes Not Available

at .05 level). This agrees with the earlier assertion that export performances have a significant influence upon economic growth for more developed countries. Most of the land-locked countries have the least per capita GDP.

The Secondary Hypotheses:

Commodity Concentration: It was asserted that the exports of LDCs are concentrated both in terms of commodities and geographic destinations and that this has a negative effect upon economic growth. In order to test this relationship the commodity export concentration index was correlated with the rate of growth of GDP. The correlation coefficient turned out to be .08 (not significant at the .05 level).

The commodity import concentration index was correlated with the economic growth index. The correlation coefficient is .44 (significant at the .01 level). This means that the higher the concentration of types of commodities imported the greater the growth of the countries. Many African countries are embarking upon an industrial expansion process. In order to carry out this program they need imports of capital goods such as heavy machinery and transport equipment. It is possible that the countries which import these materials in larger quantity are accelerating their growth process.

Geographic Concentration: The same procedure is followed to test the relationship between the grographic concentration index and the index of economic growth. Correlation coefficients of -.32 and -.09 are obtained for export direction and import concentration indices respectively (the first of these is significant at .05 level). The

negative association means that there is an inverse relationship between geographic concentration of export markets and the rate of growth. This relationship will have a marked effect if there is a positive relationship between geographic concentration of market and export proceeds instability. The correlation coefficient between the two is .20. Although the relationship is not significant, there is a slight indication that, where there is market concentration of African exports, there may be higher instability in export proceeds. There is a preponderance of cyclical variation in economic activities of industrialized countries. While such variation may not be serious to these countries, it can adversely affect the economic growth of African countries whose economy is inflexible. Such a situation is not conducive to economic growth, particularly if the concerned country is highly dependent upon a single market. Furthermore, there is a significant relationship between regional concentration of export markets and in instability in GDP (.41) and export price instability (.39). Both coefficients are significant at .05 level.

Size and Concentration: To what extent are the concentration indexes and size of a country related? Is there a negative relationship between the foreign trade/GDP ratio and the size of a country? The correlation between dependence on few products and size is -.01, while that between export market concentration and size is -.25 and that with the foreign trade/GDP ratio is -.34. The direction of association between these three variables and the size of a country is negative. However, only the association between the foreign trade turnover ratio and size is significant at the .05 level. The negative sign indicates

that large countries have less concentrated exports, more widespread markets, and the share of their trade turnover in GDP is low, while small countries depend on few countries as their major trade partners, their exports will consist of a few commodities, and their foreign trade/GDP ratio will be high. The economies of small countries will be as flexible as those of large countries. However, this assertion is significantly supported in our analysis only in the case of the size and foreign trade turnover ratio relationship.

Instabilities: Instability in export proceeds is commonly cited as undesirable if the economy of the country is to grow smoothly. The correlation between the export proceeds instability index and growth is .11. The association is low and not significant.

Earlier, it was argued that there is a secular decline in the terms of trade of LDCs. Such instability in the purchasing power of countries causes export proceeds to fluctuate and results in unwarranted difficulty in the development process. The correlation coefficient between growth in GDP and the terms of trade instability index is -.07, which is not significant.

It was also argued that the prices of primary commodities fluctuate more frequently than those of manufactured goods. This is considered not to be conducive to the economic growth of the concerned countries. The correlation between the two variables is -.05, which is very low and negative. Although the low coefficient does not provide a clear cut answer, the negative sign indicates a general tendency for economic growth to be slow with higher export price instability.

In summary, the analysis so far indicates that economic growth is significantly positively associated with growth in exports, commodity import concentration, the export ratio, and the foreign trade ratio, while it is significantly negatively associated with geographic concentration of exports. In all other cases the associations were not significant. The implication here is that countries should attempt to diversify their export markets and need not be very much concerned about their import market. This is because once they have the necessary funds in their possession they can buy from different markets.

Explaining GDP: A Multivariate Analysis:

The purpose of this section is to determine how much of the variation in GDP can be explained, and to identify those variables that are most important in explaining the variation in GDP. The residuals, that is, the variation in degree of fit of the regression equation, will be mapped.

The highest association is between growth in exports and economic growth. The next important variables that have significant association with growth are the share of export in GDP, the share of foreign trade turnover in GDP, the commodity composition of import, and the geographic concentration of export market. Simple bivariate correlation could be misleading because in the real world an event is affected by more than one variable. Stepwise regression analysis is used here to avoid such drawbacks. It was possible to ascertain the contribution of each independent variable controlling for the effect of the independent variables already in the regression equation.

Table 7 presents the results of stepwise regression analysis. Several observations can be made. The 14 independent variables included in the equation account for about 78 percent of variation in the dependent variable. About 54 percent of variation in the dependent variable is explained by the growth rate of export. Commodity composition of import accounts for the second largest variation (12.47) in the dependent variable. The third important variable in the regression equation is export quantum instability. It accounts for 3.22 percent of variation. Overall, the first five variables account for 73.52 percent of variation in the dependent variable. The additional explanatory power

TABLE 7

Stepwise Regression Analysis

Steps entered	Variables	R	R^2	Increase in R^2
1	Growth rate of export	.7370	.5431	.5431
2	Commodity import concentration	.8172	.6678	.1247
3	Export quantum instability	.8367	.7001	.0322
4	Geographic export concentration	.8499	.7223	.0222
5	Annual change in per capita export	.8574	.7352	.0129
6	Commodity export concentration	.8629	.7447	.0095
7	Export proceeds instability	.8678	.7530	.0083
8	Export/GDP	.8749	.7654	.0124
9	Geographic import concentration	.8785	.7718	.0064
10	Export price instability	.8803	.7749	.0030
11	Foreign trade turnover GDP	.8808	.7758	.0090
12	Population	.8811	.7763	.0005
13	Roads per 1000 square miles	.8812	.7766	.0002
14	GDP instability	.8813	.7767	.0001

Source: World Bank, World Table, 1976; UN, Yearbook of International Trade Statistics, 1976; UN, Statistical Yearbook, 1975,1976.

of the last 9 variables is marginal. In combination these variables add only 4.15 percent explained variation to the dependent variable. The only partial regression coefficient that is significant is export growth rate. It is significant at .01 level. All other BETA values are not significant.

Finally it can be observed from the least squares regression equation below that a country could increase its GDP by about 1.9 percent for every 5 percent increase in its exports.

$$Y = 2.82 + .38\ X_1$$

where Y = GDP growth

X_1 = Export growth

The estimate of standard error for the regression coefficient calculated is .06. The beta coefficient is significant.

According to the regression standard error of ±1.84, there is a 68 percent chance that any predicted value of Y will fall within a range of 1 standard error each side of the regression line (Figure 2), and 95 percent probability that it will fall within 2 standard errors from the observed regression line. Actually, 36 of 40 cases are within the 95 percent range. The four countries that fall outside this range are Libya, Benin, Chad, and Niger. The regression line underpredicted the Libyan experience, while it overpredicted the experiences of the other three countries. Libya has experienced a high rate of growth both in export as well as in GDP. Besides, it might have attracted large foreign investment. The share of export in GDP in Benin is small. Although it had high export growth, it did not have a marked effect on

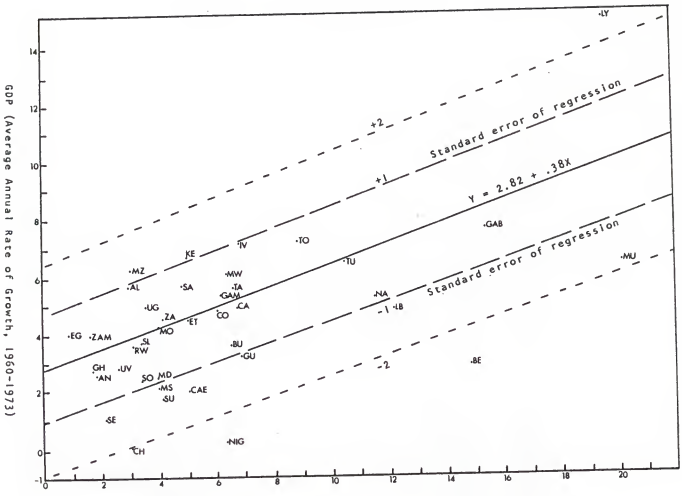


Figure 2. The Relationship Between the Rate of Export Growth and Gross Domestic Product (GDP) Growth Rate of 40 African Countries (1960-1973)

GDP. In the cases of Chad and Niger GDP did not grow at all. The share of agricultural production in GDP is high. Both countries have experienced climatic irregularities for several years. This might have affected production.

The inclusion of other independent variables in the equation have improved the prediction power of the equation although not markedly. The standard error decreased from ±1.84 in a single-variable case to ±1.58 in the multiple variable case. Only the rate of export growth is significantly related with the dependent variable. The slope of the regression line is not significantly shifted by the addition of the independent variables.

$$Y = 2.78 + \underset{(.12)}{.07X_1} - \underset{(.07)}{.02X_2} + \underset{(.06)}{.37X_3} + \underset{(.08)}{.06X_4} + \underset{(.07)}{.06X_5} +$$

$$+ \underset{(.1)}{.12X_6} + \underset{(.02)}{.04X_7} - \underset{(.03)}{.04X_8} - \underset{(.04)}{.02X_9} + \underset{(.02)}{.003X_{10}} + \underset{(.03)}{.01X_{11}} -$$

$$- \underset{(.07)}{.12X_{12}} - \underset{(.11)}{.01X_{13}} + \underset{(.04)}{.02X_{14}} \qquad 2$$

The numbers in parentheses are the corresponding standard errors of the beta coefficients.

where

Y = GDP growth

X_1 = Export/GDP ratio

X_2 = Foreign trade/GDP ratio

X_3 = Export growth

X_4 = Annual change in per capita export

X_5 = Export proceeds instability

X_6 = Commodity import concentration

X_7 = Commodity export concentration

X_8 = Geographic export concentration

X_9 = Geographic import concentration

X_{10} = Roads per 1000 square miles

X_{11} = Population

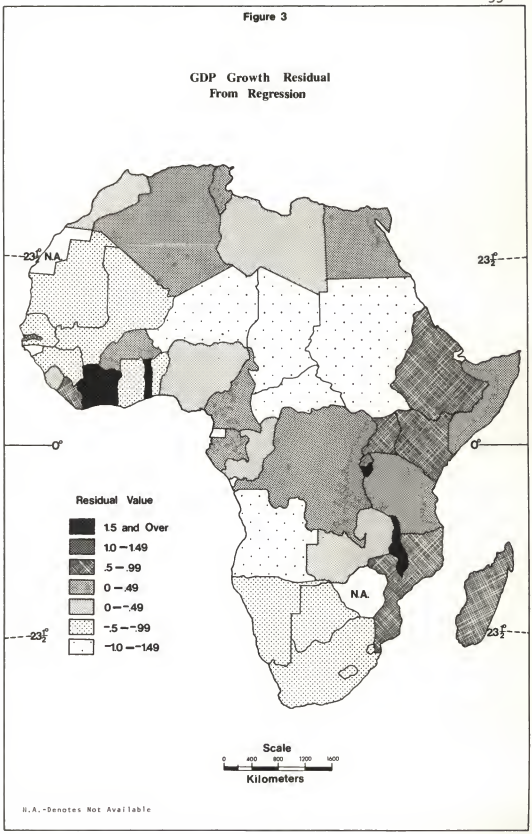
X_{12} = Export quantum instability

X_{13} = GDP instability

X_{14} = Export price instability

The residual map of the regression equation predicting the GDP growth rate from the 14 independent variables suggests that only 4 of 40 cases have residual values that lie beyond 1.5 standard positive residuals (Figure 3). The countries that fall beyond the 1.5 range are Ivory Coast, Togo, Burundi, and Malawi. Five cases lie between -1 and -1.5. These include Angola, Central African Empire, Chad, Niger, and Sudan. Some of the discrepancies between the predicted and observed value may be attributed to either measurement error, the importance of variables not included in the regression, or the irrelevance of the included variables. According to the time series analysis undertaken earlier, with the exception of Ivory Coast, the relationship between export and economic growth is not significant in the above countries. There is a preponderance of positive residuals along the east and negative residuals in North central, West coast and South African

Figure 3


GDP Growth Residual
From Regression
23½° N.A.
23½°
0°
0°
Residual Value
1.5 and Over
1.0 — 1.49
.5 — .99
0 — .49
0 — -.49
-.5 — -.99
-1.0 — -1.49
-23½°
N.A.
23½°
Scale
0 400 800 1200 1600
Kilometers
N.A.-Denotes Not Available

countries. Since most of the residuals are small, the difference between predicted and observed values may be attributed to error of measurement.

Export Instability:

Export proceeds instability of LDCs is a frequently raised issue. A brief attempt is made here to determine the variables that add to the explanation of the variation in export instability. The proportion of variation in export instability explained by the variables entered in the equation is 76.9 percent (Table 8). Export proceeds is significantly related with export commodity concentration and GDP instability. In all other cases the relationships are not significant. GDP instability accounts for 38.6 percent of the variation in export proceeds instability. The foreign trade ratio accounts for 11.1 percent of variation, while export commodity composition, and terms of trade instability account for 6.2 percent and 4.2 percent variation respectively. The four variables together account for about 60.2 percent of the variation in the dependent variable. The contribution of the last 6 variables to the explanation of the variation in the dependent variable is marginal. In combination these variables account for only 3.3 percent variation.

Five standard partial regression coefficients are significantly different from zero. The first of these is that for GDP instability. According to the beta value of 1.24, for every one unit rise or fall in GDP there is an increase of 1.24 units in export proceeds fluctuation. The next variable of importance is export/GDP ratio. Here for every 1

TABLE 8

Stepwise Regression Analysis:
Export Proceeds Instability on 15 Variables

Steps entered	Variables	R	R^2	Increase in R^2	BETA
1	GDP instability	.6215	.3862	.3862	1.24[a]
2	Commodity export concentration	.6693	.4479	.0617	.20[a]
3	Terms of trade instability	.7002	.4903	.0424	-.03
4	Export quantum instability	.7226	.5222	.0319	.31
5	Export/GDP ratio	.7371	.5433	.0211	-1.61[a]
6	Foreign trade/GDP ratio	.8091	.6546	.1113	.61[a]
7	GDP growth	.8309	.6905	.0358	.51
8	Commodity import concentration	.8426	.7099	.0195	.46
9	Population	.8581	.7363	.0264	-.16[a]
10	Geographic import concentration	.8626	.7440	.0077	-.13
11	Annual change in per capita export	.8698	.7566	.0126	.26
12	Growth rate of export	.8727	.7617	.0051	-.03
13	Geographic export concentration	.8741	.7641	.0024	-.07
14	Export price instability	.8761	.7675	.0035	.10
15	Roads per 1000 square miles	.8769	.7690	.0015	-.002

[a]Significant at .01 level.

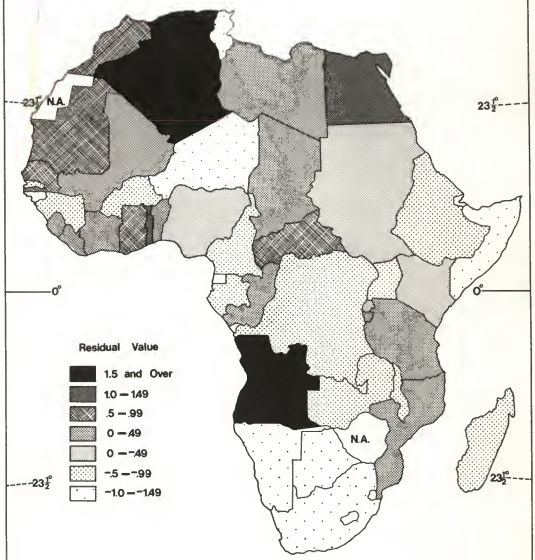
Source: World Bank, World Table, 1976: UN, Yearbook of International Trade Statistics, 1976; UN, Statistical Yearbook, 1975,1976.

unit increase in export ratio there is a decrease of 1.61 units in export proceeds instability. The deeper a country is committed to its export activity the more it would attempt to insure such irregularities will never occur in its revenue. There is an inverse relationship between size and export instability, while there is a direct association between size and export market concentration.

The residual map presented in Figure 4 indicates that north African countries, with the exception of Tunisia, have positive residuals, while

Figure 4

Export Proceeds Instability Residuals



N.A.-Denotes Not Available

south African countries have negative residuals. There are only two cases where the residuals exceed 1.5. The residual map for GDP corresponds very little with the map of export proceeds instability. In fact the relationship is inverse or negative. The residual values in both variables were ranked from high to low and correlated. The rank correlation coefficient is -.25.

Trade Patterns and Economic Growth:

Data were collected for 40 African countries' exports to 12 different destinations in 1973. Simple correlations between two sets of variables were computed (for example, the 40 countries' exports to USA were correlated with their export to France, and so on). The correlation matrix appears in Table 9. The indices are not high. There are only 5 cases where the correlation coefficients are significant. These are between USA and France (-.35); UK and France (-.36); Japan and France (-.32); West Germany and Africa (-.38); and Japan and Africa (-.32).

The first pattern that can be observed is that countries that have high trade with France have low trade with the U.K., the U.S.A., and Japan. Second, African countries that have high trade with each other tend to have low trade with W. Germany and Japan. Third, nations that trade with the U.S.A. tend to have high trade with W. Germany, the EFTA, and other north and south American countries.

As suggested earlier, principal components analysis is a means by which regularity and order in phenomena can be discerned. It takes several quantitative and qualitative observations and reduces them into simple and distinct interpretable dimensions. In this study data were

TABLE 9

Correlation Matrix for 12 Export Destinations of Africa

Destinations	US	UK	FR	WG	EF	EE	JA	CP	AS	AF	AM	OT
USA	1.0	-.06	-.35[a]	.24	.20	-.16	.07	-.05	-.12	-.25	.17	-.12
UK		1.00	-.36[a]	-.08	-.06	-.07	.21	-.13	-.13	-.23	.25	-.12
France			1.00	-.12	-.27	-.09	-.32[a]	-.20	-.24	.15	-.28	-.06
W. Germany				1.00	-.07	.26	.18	-.01	-.20	-.38[a]	.01	-.06
EFTA					1.00	-.22	.11	-.10	-.06	-.06	.13	.13
EEC						1.00	-.10	-.14	-.02	-.22	-.21	-.18
Japan							1.00	.18	-.05	-.32[a]	.02	.08
C.P.E.								1.00	.18	-.19	-.09	-.04
Asia									1.00	-.20	-.03	-.04
Africa										1.00	-.27	.01
America											1.00	.01
Other Countries												1.00

[a]Significant at .05 level.

Source: UN, Yearbook of International Trade Statistics (1975).

collected for 40 countries under the category of 12 export destinations (considered above). This formed a matrix of 480 pieces of information. Principal components analysis was used to reduce the above information into fewer basic dimensions, whereby countries can be grouped by their major trade partners. Components scores derived from such underlying dimension can be correlated with economic growth to see if there is a relationship between trade patterns and growth.

Because of the lack of high intercorrelations among the destinations, it was not possible to reduce the data, into, say 2 or 3 dimensions. Instead we have single variable dimensions. The rotated factor matrix (Appendix B) indicates 10 basic dimensions. Each of the components accounted for approximately equal variation as the other. The 10 components accounted for 97.25 percent of the variation in export destination of Africa. The implication is that groups of African countries do not trade with the same country or groups of countries but, instead, individually with different countries. The factor scores (Appendix C) underscore this condition.

Summary:

The results in this chapter have given us some clues about the theoretical discussion presented in the previous chapter. There is a significant positive relationship between export and economic growth. From the regression we were able to deduce that a 5 percent increase in the export of a country will produce an economic growth of about 1.9 percent. Economic growth is also positively related with the export/GDP ratio, foreign trade/GDP ratio, and import commodity concentration. There is a negative association between growth and export market

concentration. High dependence on export does not threaten economic growth. It is possible that countries that derive foreign exchange mostly from export may direct their human and economic resources towards export industries thus resulting in efficient production. However, the negative association between growth and export market concentration indicates that dependence on a few markets is not conducive to economic growth. So market diversification is essential. In all other cases the relationship is not significant.

The hypotheses that there is a negative association between economic growth and export proceeds instability, export-price instability and terms of trade instability have not been supported. However, there is a positive association between commodity export concentration and export-proceeds instability. This suggests a diversification of export products.

CHAPTER IV

SUMMARY AND CONCLUSION

Summary

The purpose of this study is to examine the relationships between export and growth in Africa. To provide a background for the hypotheses, the rationale and arguments of researchers who advocate export-led growth and those who postulate inward-oriented growth were surveyed. A group of dependent and independent variables were selected and defined. The hypotheses were tested empirically, using the experiences of 40 African countries.

The primary hypothesis that there is a positive association between the rate of export growth and economic growth was confirmed. To test whether there is a marked difference in the strength of association between export and growth among countries having different growth experience, the countries were categorized into fast growing and slow growing groups. The relationship is stronger for countries with higher economic growth than those with a lower rate of growth. When countries were divided into more developed and least developed groups and the relationship between export and growth was tested, the association is stronger among the more developed group than for the least developed group.

The investigation was extended to find the degree of association between export and growth in individual countries during a 14-year period. The empirical evidence is not consistent. On the basis of a time series analysis the association is significant in only 16 of the 38 countries. A closer examination of the data revealed that the association is strong for oil exporting countries. In most primarily agricultural commodity exporting countries the relationship is not significant. Among all other countries considered, with the exception of Uganda, Ivory Coast, and Egypt, the relationship between export and growth is not significant. Furthermore, exports and growth are not significantly related in all land-locked countries with the exception of Uganda and Congo.

Tests of the secondary hypotheses indicate that economic growth is positively significantly associated with import composition, the export/GDP ratio, the foreign trade/GDP ratio, and negatively associated with export market concentration. In all other cases the hypotheses are not supported. Instabilities in export price, quantity, proceeds, and terms of trade are specifically pointed out, by various researchers who postulate an inward-oriented growth, to be very harmful to economic growth. However, the low coefficients of association between these variables and economic growth do not warrant support of this assertion.

Although the direct relationship between export proceeds instability and economic growth is not strong, the analysis revealed that export proceeds instability is significantly associated with commodity export concentration and GDP instability. While there is an inverse relationship between growth and geographic concentration of export, there is a

direct relationship between export proceeds instability and both commodity and market concentration of exports. The results also indicate a significant positive relationship between export market concentration and terms of trade instability, GDP instability, and export price instability. In addition, export price instability is highly associated with terms of trade instability. The above complex relationships underscore the need for taking into account the relationships between a wide range of variables before drawing conclusions that have policy implications.

A stepwise regression analysis was undertaken to determine the amount of variation of the dependent variable explained by groups of independent variables and to establish which variables contribute most significantly to the explanation of this variation. The independent variables explain about 77 percent of the variation in the dependent variable. Export growth, import composition, export quantum, and export market concentration were determined to be very important in contributing to this variation. According to the regression equation, an increase of about 5 percent in the rate of export growth will induce an increase of about 1.9 percent in economic growth.

A close observation of the residual map indicates a close correspondence between the observed and predicted values in the majority of cases. Only few cases have residuals that lie ±1 standard error of regression. Overall, there is a preponderance of positive residuals for countries in eastern Africa and negative residuals for countries in the south and north central parts of the continent. High positive residuals indicate under prediction by the regression equation. Here economic growth might have been fostered by foreign capital investment

(Ivory Coast), remittances of workers temporarily employed abroad (Malawi), and invisible exports such as tourism (Burundi, Kenya). Negative residuals reveal over-prediction by the regression equation. In this case disruptions in economic growth might have occurred either due to political instabilities (Angola), climatic irregularities (Mali, Niger, Chad), low share of export in total production (Sudan), or dissipation of export proceeds through high cost of transport. In other countries the rapid rate of growth in exports could have been as a result of initial low start (central African Empire, Libya, Congo, Niger).

A principal component analysis was used to identify if there is a grouping of African countries on the basis of similarities of their export destination. Export data from 40 African countries to 12 export destinations were collected. The chief use of the principal component analysis is to reduce a set of variables into a smaller number of interpretable underlying patterns. Such occurrence would indicate that groups of African countries export to a similar country or groups of countries. An absence of such a pattern indicates that each African country trades with a different set of countries. Ten components were identified and they explained about 97 percent of variation in export destination of the 40 countries. But each component contributed an approximately equal percentage of the explanation of the variation in export destination. This confirms that each African country trades with a different set of countries, and the component scores also reveal this tendency.

Conclusion and Implications

There is a strong and positive association between export growth and economic growth. The impact of export on growth is markedly felt after countries have achieved a minimum level of economic development. In this study, this minimum level is construed to be a per capita GDP of 300 dollars. Export and growth are strongly associated beyond this level.

The impact of export on growth will vary from country to country depending on the type of commodities these countries export and their location relative to major consuming areas. This impact of export on growth is stronger for oil and other mineral exporting countries. It is possible that export-base industries in these countries have attracted more foreign investment and have had more success stimulating the non-export sectors of the economy.

The areal pattern of the correlation coefficients (time series analysis) indicates that those countries which have high coefficients of association between export and growth generally have a coastal location and tend to be nearer to Western Europe, whereas most land-locked African countries have low coefficients of association. Most land-locked African countries are impeded by a shortage of both internal as well as external accessibility. Their export proceeds are diverted towards the payment of high cost of overland transportation.

There is a substantial linkage between geographic concentration of exports and economic growth, export price instability, and GDP instability. Export price instability and terms-of-trade instability

are also strongly associated. Since geographic concentration of exports is significantly related with growth, fluctuation in prices offered can affect the purchasing power of these countries and thus influence economic growth negatively. Programs need to be intensified that are geared to reduce instabilities in price and quantity, to diversify markets and product.

Finally, since the primary hypothesis of this study is positively confirmed, export-facilitative policies will further strengthen the multiplier effect of trade upon growth.

Methodological Considerations

The relationship between export characteristics and growth is treated at the aggregate level. Trade constitutes only a part of GDP and to assert that export solely explains the variation in GDP would be erroneous. Furthermore, the reported GDP and trade data, in most LDCs, involve a wide margin of error. Kutznets considers that the estimates of production for industry groups such as agriculture, construction, mining, trade, banking, and insurance have a margin of error between 15 and 20 percent.[1] Since large segments of productive activity in Africa are in agriculture, construction, and service industries, the GDP and trade figures are subject to a wider margin of error than those of developed countries. Although these data are used with these constraints in mind, it should be pointed out that they are the best available.

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[1]Simon Kutznets, National Income and Its Composition, National Bureau of Economic Research, 1942, Vol. 42, Chapter 2.

One needs also to be vigilant when using statistical techniques such as simple correlations. It is important to note that simple correlations show only the degree of association between two variables and do not prove that the variation in one causes variation in the other. However, they are important in that they provide clues for further investigation.

The relationship between export and growth was investigated in individual countries in 14 years. It is clear that the direct impact of export on growth requires a time lag. This is because it will take some time before the increase in income generated by export expansion leads to an increase in economic growth as exhibited by the increase of GDP. In addition, the possibility of a reverse causation is there, that is, a rapid economic growth will create income and thus generate demand for domestically and foreign produced goods. But it should be noted that such an expansion of production for domestic needs is possible only when production for export is augmented.

Suggestions for Future Research

In this study the relationship between export and growth is treated at the aggregate level. But the results will provide more insight if the multiplier effects of export performance are investigated longitudinally in individual African countries. For instance, if increase in employment, ancillary industries that followed, schools and hospitals built, number of trained personnel added, increase in transportation and communication that emerged, etc. as a result of expansion in export base industry are studied in each African country, it would be possible to make more

convincing conclusions. Present data problems prevent such analysis. But perhaps with improved collection and estimation technique such analysis will eventually be possible and can provide an important venue for future research.

An attempt was made to find out whether African countries can be regionalized on the basis of aggregated 12 export destinations. As a result, it was not possible to reduce these countries into few dimensions. Such trade regionalization may be possible if the export destination base is widened by collecting data for 30 or 40 individual export destinations. Now, the sample of African countries that have as many as 40 common export destinations are very few. In the future it is hoped that many African countries will diversify their export markets as well as record these data on an individual export-destination basis rather than reporting at aggregate level such as total export to EEC or EFTA. Assuming this would occur, then component scores of the underlying patterns could be regressed on growth to see if there is a relationship between export destination pattern and growth.

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APPENDIX A

Correlation Matrix

Variables		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Export/GDP[a] (1960-73)	1	1.00	.96	.87	.81	.36	-.01	.14	.36	-.36	-.15	.09	.06	-.29	.29	-.03	.06	.11	.20	.53	-.25	.29	-.02	.31	-.18	.31	.24	-.22	-.07	-.42	.29	.11
Foreign trade turnover/GDP[a] (1960-73)	2		1.00	.38	.30	.30	.06	.03	.30	.32	-.15	.08	.13	-.34	.15	-.07	.03	.05	.09	.31	-.25	.36	-.06	.29	-.12	.36	.17	-.22	-.01	-.45	.29	.05
Growth rate of GDP[a] (1960-73)	3			1.00	.74	.34	.11	-.07	.44	.00	-.32	-.09	-.10	.07	.52	.28	.05	.16	-.05	.26	-.04	-.09	-.28	.47	.07	.48	.10	-.39	-.13	-.25	.07	.19
Growth rate of export[a] (1960-73)	4				1.00	.34	.17	.01	.12	.32	-.04	-.07	-.08	-.10	.52	.14	.41	.23	.04	.30	-.12	.02	-.08	.45	-.06	.30	.03	-.12	-.10	-.15	.16	.02
Mean annual change in per capita export[a] (1960-73)	5					1.00	.21	.03	.26	.09	-.11	.25	-.12	-.11	.15	-.09	.28	.16	.05	.45	-.02	-.01	.12	.32	-.19	.30	-.06	-.28	-.19	-.22	.09	.38
Export proceeds instability index[a] (1967-73)	6						1.00	-.13	-.06	.37	.20	-.13	.24	-.18	-.03	-.14	.25	.02	-.08	.07	.09	.02	-.11	.22	-.02	.03	-.23	-.11	-.13	.22	.06	-.06
Terms of trade instability index[a] (1967-73)	7							1.00	-.06	.11	.36	.26	-.09	-.04	.01	-.01	.11	.08	.02	.13	.05	-.10	.25	-.13	-.06	-.13	-.01	.05	-.17	.10	-.11	-.06
Comodity import concentration index[b] (1973)	8								1.00	.01	-.40	.11	-.09	.21	.31	.47	-.21	-.05	-.06	.32	-.04	.12	-.06	.22	.19	.08	.33	-.28	-.11	-.20	.09	.25
Comodity export concentration index[b] (1973)	9									1.00	.09	-.25	.21	-.01	.14	-.14	.25	.21	.18	.24	.23	.03	-.19	.22	-.18	.13	.19	-.17	.16	-.15	.21	-.18
Geographic export concentration index[d] (1973)	10										1.00	.23	.14	-.25	-.30	-.30	.16	.41	.39	-.17	-.26	-.02	.32	-.49	-.28	.02	-.42	-.07	.09	.89	-.24	-.40
Geographic import concentration index[d] (1973)	11											1.00	-.23	-.36	-.30	-.32	.03	.01	.18	-.06	-.14	-.23	.57	-.18	-.16	-.02	-.33	-.19	-.19	.19	-.21	.05
Roads per 1000 square miles[e] (1973-74)	12												1.00	-.13	-.09	.01	.05	.15	-.06	-.01	.22	.24	-.21	-.14	-.13	-.17	-.14	.12	-.04	.06	.68	-.21
Population in millions[a] (1973)	13													1.00	.56	.66	-.24	-.05	-.09	-.07	.24	.02	.01	-.03	.17	.19	.33	.01	-.10	.09	-.13
Total export (value) in 1973[a]	14														1.00	.87	.04	.10	-.02	.66	.05	.15	-.24	.41	.03	.16	.29	.05	-.14	-.21	.21	-.10
Total GDP in 1973[a]	15															1.00	.20	-.04	-.09	.35	.05	.12	-.25	.24	.09	-.03	.28	.26	-.08	-.14	.10	-.09
Export quantum instability index[d] (1967-72)	16																1.00	.06	.16	.28	.22	-.11	.24	.35	-.31	.02	-.04	-.24	-.14	.01	-.09	.22
GDP instability index[a] (1967-72)	17																	1.00	.09	.16	-.26	.06	-.05	-.03	-.33	.23	-.32	-.10	-.21	.53	-.02	-.02
Export price instability index[d] (1967-73)	18																		1.00	.19	.06	.01	.25	-.17	-.07	-.10	-.02	-.05	-.15	.07	-.11	-.03
Per capit GDP[a] (1973)	19																			1.00	-.12	.05	-.09	.48	-.01	.22	.12	-.07	-.13	-.22	.26	.07
Export to U.S.A[b] (1973)	20																				1.00	-.05	-.35	.24	.20	-.16	.07	-.05	-.12	-.25	.17	-.12
Export to U.K.[b] (1973)	21																					1.00	.36	-.08	-.06	-.07	.21	-.13	-.13	.25	-.12	
Export to France[b] (1973)	22																						1.00	-.12	-.27	-.09	-.32	-.20	-.24	.15	-.28	-.06
Export to W. Germany[b] (1973)	23																							1.00	-.07	.26	.18	-.01	-.20	-.38	.01	-.06
Export to E.F.T.A.[b] (1973)	24																								1.00	-.22	.11	-.10	-.06	-.06	.13	.13
Export to E.E.C.'s [b] (1973)	25																									1.00	-.10	-.14	-.02	-.32	-.21	-.18
Export to Japan[b] (1973)	26																										1.00	.18	-.03	-.32	-.02	.08
Export to Centrally Planned Economies[b] (1973)	27																											1.00	.18	-.19	-.09	-.04
Export to other Asia[b] (1973)	28																												1.00	-.20	-.03	-.09
Export to Africa[b] (1973)	29																													1.00	-.27	.01
Export to other Americas[b] (1973)	30																														1.00	.01
Export to other areas[b] (1973)	31																															1.00

Table value at .05 - .31; at .01 - .41

Source:

a World Bank, World Tables, 1976 (Washington, D.C.: IBF, 1976).

b UN, Yearbook of International Trade Statistics (New York: United Nations, 1977).

c International Monetary Fund, International Financial Statistics (Washington, D.C.: IMF, 1977).

d International Monetary Fund, Direction of Trade Annual, 1969-75 (Washington, D.C.: IMF, 1976).

e Ralph Uwechue (ed), African Yearbook and Who's Who 1977 (London: Africa Journal Limited, 1976).

APPENDIX B

Rotated Factor Matrix For Ten Principal Components

Destination	Component									
	1	2	3	4	5	6	7	8	9	10
USA	-0.948	0.146	0.068	0.030	0.087	0.040	-0.039	-0.107	0.119	0.010
UK	0.023	0.126	0.101	-0.934	0.070	0.090	-0.141	0.073	0.028	-0.132
France	0.477	0.207	0.318	0.433	0.135	0.272	0.283	0.249	0.340	0.299
W. Germany	-0.336	0.327	0.306	0.326	0.002	0.026	-0.139	0.200	-0.463	-0.352
EFTA	-0.113	0.028	0.362	0.049	-0.067	0.052	-0.068	-0.970	0.085	-0.070
EEC	0.132	0.129	-0.008	-0.010	0.112	0.087	0.157	0.073	-0.913	0.104
Japan	-0.006	0.144	0.010	-0.144	-0.035	-0.094	0.037	-0.081	0.073	-0.938
CPE	0.021	0.094	-0.082	0.069	0.029	-0.979	0.050	0.054	0.079	-0.088
Asia	0.046	0.106	-0.975	0.079	0.023	-0.080	-0.001	0.044	0.016	0.015
Africa	0.137	-0.926	0.127	0.123	0.013	0.111	0.142	0.039	0.161	0.164
Americas	-0.061	0.133	0.002	-0.139	0.006	0.052	-0.956	-0.068	0.123	0.029
Other Areas	0.067	0.010	0.020	0.052	-0.988	0.026	0.004	-0.066	0.093	-0.033

APPENDIX C

Component Scores of 40 African Countries

Countries	Component									
	1	2	3	4	5	6	7	8	9	10
Algeria	-0.104	-0.770	0.279	1.040	1.244	0.671	-0.592	-0.258	0.453	-0.310
Angola	-0.712	-1.029	0.229	0.193	0.527	0.931	0.493	-0.869	-3.366	0.846
Benin	-0.533	0.396	0.322	0.516	1.252	0.764	0.625	0.096	0.670	-0.369
Burundi	0.943	-4.051	0.333	0.250	0.366	0.538	-0.019	0.645	0.541	0.443
Cameroon	0.389	0.620	0.266	0.386	0.260	0.877	-0.273	0.414	0.039	-1.175
CAE	0.914	1.102	1.374	-0.150	0.692	0.815	0.168	0.736	0.329	0.945
Chad	0.914	1.186	0.277	0.611	0.798	0.114	0.712	0.738	0.487	2.125
Congo	0.142	0.599	0.247	0.305	0.624	0.462	0.325	-0.076	0.058	-0.745
Egypt	-0.770	0.787	-0.110	0.264	0.117	0.946	-5.323	0.140	-0.187	0.635
Ethiopia	-1.487	-1.203	-0.424	-1.019	0.653	0.184	0.391	0.321	0.420	0.091
Gabon	0.651	0.062	0.926	0.375	0.565	-1.976	0.110	-0.191	0.642	0.826
Gambia	0.855	0.760	1.102	0.652	-1.788	0.518	0.402	0.770	-0.819	-0.392
Ghana	-0.702	-0.644	0.395	0.538	-0.643	0.018	-1.421	0.294	0.314	-0.308
Ivory Coast	0.395	0.096	-0.020	0.397	0.475	-0.007	0.178	0.368	0.261	-0.793
Kenya	-0.279	-0.220	-0.449	-0.615	0.021	-1.559	0.250	-0.122	-0.018	-0.614
Liberia	-0.006	-1.613	0.551	0.409	0.729	0.179	0.407	0.202	0.541	-1.924
Libya	-0.943	0.426	0.408	0.715	0.612	0.045	0.361	-1.618	0.316	-2.387
Madagascar	-0.240	-0.753	0.385	0.096	0.437	0.732	0.566	0.878	0.456	1.462
Malawi	0.749	-0.312	-1.030	0.264	-2.337	0.540	-0.082	0.546	0.018	0.096
Mali	0.581	0.255	-2.389	0.262	0.123	-2.575	-0.214	0.275	0.440	0.850
Mauritania	-1.131	0.803	0.617	0.288	-0.493	-2.400	0.599	0.568	0.399	-0.262
Maurititius	0.920	0.506	0.019	-0.548	-1.376	0.918	0.332	-4.874	0.575	1.189

Contd..

Countries	Component									
	1	2	3	4	5	6	7	8	9	10
Morocco	0.576	0.750	0.706	0.429	0.253	-0.981	-1.101	-0.256	-0.288	-0.185
Mozambique	0.339	0.058	-0.282	-0.219	0.146	-0.536	0.313	0.504	-4.690	0.206
Niger	0.332	0.721	-0.424	0.775	0.561	1.031	0.743	0.394	0.736	1.403
Nigeria	0.310	-1.339	0.528	0.293	-0.497	0.805	0.354	-0.959	0.217	0.281
Rwanda	0.161	-0.130	-4.269	-0.032	0.013	0.755	0.112	-0.061	0.223	-0.554
Senegal	0.622	1.002	-0.267	0.355	0.440	-0.147	0.596	0.661	-0.072	1.167
Sierra Leone	0.122	0.002	0.722	0.423	-3.847	0.246	0.290	0.752	0.427	0.058
Somalia	0.533	0.314	0.318	-5.272	0.382	0.730	-0.036	0.387	0.296	-0.128
S. Africa	-1.642	-0.060	-0.302	0.095	-1.043	-0.090	0.596	-0.145	0.044	0.143
Sudan	0.113	0.156	0.217	-1.072	0.355	-0.176	-0.919	-0.051	0.163	-0.220
Tanzania	-0.018	-0.334	0.307	-1.633	-0.566	-1.308	-0.008	0.263	0.338	-0.025
Togo	0.656	1.175	1.085	0.134	0.629	0.960	0.617	0.593	0.039	-0.925
Tunisia	1.128	0.447	0.456	-0.089	0.342	-1.160	-0.188	-0.484	-0.053	-0.704
Uganda	-0.713	-1.347	0.367	-0.086	-0.088	-0.813	-0.467	0.710	0.306	0.822
Upper Volta	-0.146	0.608	-1.829	0.379	0.729	1.007	0.545	0.225	0.409	0.764
Zaire	1.100	0.609	-1.024	0.025	-0.639	0.439	0.103	0.514	-0.341	-2.790
Zambia	-4.377	1.060	0.184	-0.194	-0.219	0.338	0.818	-0.147	0.047	0.325
Guinea	0.358	-0.677	0.198	0.429	0.992	-1.836	-0.365	-1.883	-0.349	0.085

EXPORT AND ECONOMIC GROWTH IN AFRICA

by

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AN ABSTRACT OF A MASTER'S THESIS

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Available evidence indicates that most African countries' exports are dominated by a very few primary products. To the extent that exports are concentrated in few products, the vulnerability of their economy to changing foreign demand is increased. Most of African manufactured imports are overwhelmingly supplied by Western countries and Japan, while their primary exports form only an insignificant proportion of the imports of industrial countries. In short, African countries as a group are much more trade-dependent upon developed countries than the reverse. To many of these countries exports are the principal means of paying for imports of capital equipments that are the essential ingredients of the development process. The effect of export expansion upon economic growth is a widely debated issue. The purpose of this study is to examine the relationship between the rate of growth in export and economic growth in Africa.

The views of those who advocate export-led growth and those who advance an inward-oriented growth are presented. Those who see the benefits of trade to less developed countries assert that exports serve as earner of foreign exchange, stimulate the non-export sectors of the economy, serve as vehicles of transmission of knowledge, act as a magnet for attracting foreign capital, liberate the country from depending upon small domestic markets, and encourage the country to be efficient and productive. Those who consider that emphasizing export is costly allege that the exports of less developed countries are mainly primary products with substantial instability, suffer from lagging demand, face declining terms of trade, and create an economic enclave. Their exports also face discriminatory commercial policies in importing countries. Hence the LDCs are not able to reap the full benefits of exports.

The results of this study show that there is a significant positive relationship between export and growth. This relationship is stronger for countries with higher economic growth than those with a lower rate of growth. The impact of export performance is also stronger among the more developed African countries than it is among the least developed groups. A close examination of a time series analysis reveals that exports have a more marked effect upon growth for oil and other mineral exporting countries than for agricultural commodity exporting countries. The effect is also stronger for countries with coastal locations and those closer to Western Europe. Otherwise economic growth is not significantly related with composition of trade, direction of trade, and export price, quantum, and terms of trade instabilities.

It is concluded that countries need to attain a minimum level of development to be positively influenced by export performance. The evidence also suggests that the effect of export on growth is influenced by types of commodities exported. Beyond this it is hazardous to outline any rule of thumb that is universally applicable to all countries of Africa. Each country needs to develop its own trade strategy in line with its resource base and trade experience. Whether or not to expand export needs to be judged according to the contribution of exports to growth in comparison to other alternative growth strategies. If African countries are able to overcome the problems of poor infrastructure, artificial impedments such as tariffs and quotas in major importing countries, and effectively neutralize the competition of primary exports from established sources in developed countries, it is the belief of this researcher that exports can facilitate economic growth.