

Economic Integration In Africa: Trade Flows Within Various Blocs

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Abstract

From the premise that trade is an important instrument of economic development, this chapter suggests that current efforts to increase the access of African export to lucrative industrialized markets need to be supported with attempts to boost trade among African nations themselves. The chapter uses trade flows among the member nations of the Economic Community of West African States (ECOWAS) subregion to determine impediments to the growth of these trade flows among the nations of Africa.

The study revealed that trade flows among the nations of the subregion are impeded by inadequacies in transportation infrastructure. Transport bottleneck increased transaction cost. They also appear to have limited production, product specialization and market size in the region. However, trade among the members of this subregion has been growing faster than intra-region trade in the other regional/economic groupings in the continent. It is also observed that despite its shortcomings, transport infrastructure within ECOWAS is more developed than in any other region. Thus, the inadequacies observed in the ECOWAS region are likely to apply, with even greater intensity, to the other subregions. The implication is that policy makers in the continent need to address these deficiencies in transportation infrastructure in order to hasten the continent's economic development through growth in intra-continental trade.

Introduction

Trade has always been a major component of the economic development of nations (see for instance, Krueger 1990, Grossman and Helpman 1990). Huge and increasing exports have been credited with the rapid economic miracle that was South Korea, Taiwan, and Hong Kong (Amsden 1991) before the setbacks of 1997-99. It is only with regard to Africa that little appears to have been studied and written about the role of trade in development, although some work has been done on the external economic relations of some countries in the continent. Endoziem, although some work has been done on the external economic relations of some countries in the continent. Endoziem (1973) for instance, studied Nigeria's attempts to achieve geographical and commodity diversification in her export trade in the first decade of her independence. In a somewhat related study, Anyamele (1992) established that Nigeria's neglect of her agriculture in the 1970's and the 1980's resulted in shortages in her traditional commodities not only for exports but for domestic consumption.

In more recent times, a new interest has been rekindled in the possibilities of trade as one of the vehicles for alleviating the continent's dire poverty and to stimulate economic growth. In a strong paper on the subject Jeffrey Sachs of Harvard University's Institute of International Development advanced proposals for opening the lucrative US market to goods from deserving African countries (Sachs 1997). The proposals formed the basis of the Africa Trade and Opportunities Act, which became law earlier this year.

The act promises to be a major boost to the continent's export trade with the USA. There are reasons, however, for one not to bank too much hope on this prospect. For one thing, in the much talked about textile trade, the continent can expect stiff competition from South American and Caribbean nations, which have similar concessionaire entry into the U.S. market. China and other South Asia Nations also have established textile links in the US a more serious concern is that the current state of manufacturing in the African continent makes it unlikely that the continent's manufactured good will meet the high and ever changing tastes and preferences of US consumers. Pakistan found out how that much in her declining export of hand woven carpets to the US (Nwabuzor 1998). Increased export of manufactured goods to advanced economies will surely help Africa but there are obvious impediments. There seems to be a need to examine the possibilities of increasing trade among the African nations themselves.

Africa's Trade With The Rest Of The World

The external sector of Africa's economy has, admittedly, shown some improvement in recent years. The continent's exports to the rest of the world stood at \$105 billion in 1997. This was a robust 8 percent growth over the figure for 1995. Africa's imports also soared by 7.6 percent during the same period. Imports stood at \$106.7 billion in 1997, up from nearly \$100 billion in 1995. Seen, side-by-side with global developments in trade, the picture given by these figures for Africa is not as impressive as it appears. World trade has been growing at the rate of 9 percent annually in recent years. African's share of this boom in world trade has remained very small. Indeed the continent's share of world trade actually declined to under 2 percent in 1997. There is thus a need to increase Africa's share of this booming world trade.

Trade Among African Nations

There is a long history of lucrative trade between African nations. Cairo in the north, Lagos and Dakar in the west, Nairobi and Mombasa in the east and Cape Town in the south are well-established historical regional trading centers in the continent. South Africa has, during the past three years, developed into an economic powerhouse in the southern subregion, where it exports a wide range of manufactured goods to member nations of the South African Development Community. However, the magnitude and direction of the trade among the nations of the continent have not been fully documented nor has there been an examination of the obstacles to the growth

of such trade. We hope this chapter will begin the process of filling the gap created by this lack of information on intra-African trade. Although we will be looking at trade flows in the various economic blocs in the continent, we shall use the ECOWAS region as the principal focus of our analysis.

As of 1999, eight major trading or economic regions exist in the continent. The Economic Community of the Great Lakes Countries (CEPGL) links Burundi, Rwanda and Zaire. There is the Economic Community of Central African States (ECCA) to which Burundi, Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, Rwanda, Sao Tome and Principe and Zaire belong. ECOWAS is the largest single grouping. Its members are Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo. The Mano River Union (MRU) links Guinea, Liberia and Sierra Leone. In the central and eastern parts of the continent, a Preferential Trade Area (PTA) brings together Angola, Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, Sudan, Swaziland, Uganda, Tanzania, Zambia and Zimbabwe. The Southern African Development Community (SADC), is made up of Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, South Africa, Tanzania, Zambia and Zimbabwe. A Central African Customs and Economic Union (UDEAC) includes Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon as members. Finally, the West African Economic and Monetary Union links Benin, Burkina Faso, Cote d'Ivoire, Mali, Niger, Senegal and Togo. In examining the flow of trade within each of these regions, we will ignore the fact that some countries belong to more than one group and that some of the economic unions have not been functioning effectively.

There have been modest increases in the flow of trade among African countries and within the various trading regions of the continent during the past seven years. As is clear from Table 14.1, trade among African nations grew by only an annual average of 11.2 percent between 1992 and 1997. Trade within the ECOWAS region, however, showed a larger average annual growth, 14.7 percent during the same period. To complete the picture, it should be noted that Africa's exports to the EEC, which is the major trading partner of the continent, had an average annual growth of only 3.5 percent during the same period.

A closer examination of the trade within the various regions of Africa, however, tells a less encouraging story. Over the twenty-three-year period from 1970 to 1993, growth rates in trade between the nations of each of the identifiable regional trading blocs have been very modest. As can be seen from Table 14.2, only trade among the nations of the ECOWAS region showed any significant increase. In the case of Mano River Union, trade among countries of the region was virtually stagnant during the period. The picture is even more depressing when one compares the annual volume of inter-country trade among countries of a region with the total exports of that region as has been done in the second half of Table 14.2. Only the ECOWAS region showed

modest increases in the ratio of the regional trade to total imports. For ECOWAS, that ratio was up from 8.6 percent in 1993 to 3 percent. In 1970, Intra-regional trade as a percentage of total exports was static in some regions during the period—CEPGL and SADC—although there is evidence that the SADC picture has started to change dramatically with the end of apartheid in South Africa in 1994. Two regions, MRU and UDEAC, actually showed a decline in this ratio during the period. Their respective ratios in 1993 were .05 and 2.3 percent down from .2 percent and 4.9 percent in 1970.

Table 1- Africa's Trade Growth, 1992–1997, in Percentages

Year	Trade within ECOWAS	Trade within Africa	Exports toEEC
1992	62.5	8.9	3.3
1993	8.3	11.4	-13.9
1994	-1.7	32.3	6.5
1995	19.8	11.9	13.2
1996	19	7.2	12.4
1997	9.1	11.2	2.2

Source: Constructed by the authors from African Development Indicators 1996; Economic Commission for Africa, Addis Ababa, Ethiopia.

The above picture may reflect the declining purchasing power of the continent itself. Recent statistics suggest that Africa's market intensity, a measure of the degree of concentrated purchasing power, declined from 0.20 to 0.19 between 1987 and 1998 (Economic Commission for Africa 1999) when compared to a world intensity of 1.0. The figures further suggest that trade among the countries of the continent, and within its various regions, has not shown much improvement over the years. It becomes necessary to examine the factors that have deterred larger flows of trade among the nations of Africa and, in particular, among the members of the various economic blocs. The analysis is again limited to the West Africa region where some data is available.

Table 2- Volume of Trade Between The Nations of Each Trading Region

Value of Intra-Regional Trade (in US \$Millions)						
Regional Group	1970	1980	1985	1990	1992	1993
CEPGL	3	2	9	7	12	14
ECCA	29	98	118	168	156	169
ECOWAS	86	693	1026	1539	1501	1699
MRU	1	7	4	3	1	1
PTA	306	693	407	837	676	746
SADC	100	107	198	356	199	338
UDEAC	22	84	85	139	120	129
UEMOA	54	476	431	625	502	578
Intra-Regional Trade as a Percentage of Total Exports of the Region						
CEPGL	0.4	0.1	0.8	0.5	0.7	1.1
ECCA	1.2	1.5	2.1	2.2	2.1	2.5
ECOWAS	3	10.2	5.3	7.9	7.4	8.6
MRU	0.2	0.8	0.4	0.1	0	0
PTA	9.6	12.1	5.5	7.6	6	7
SADC	5.2	5.1	4.7	5.2	4.2	5.1
UDEAC	4.9	1.8	1.9	2.3	2.1	2.1
UEMOA	6.4	9.9	8.7	12	9.3	10.4

Source: CIA Fact book, Various Issues

Obstacles to Increased Trade Flows among West African Nations: Some General Observations

There is a direct correlation between the level of infrastructural development and trade. (Bougheas and others, 1999). It may therefore be useful to look specifically at the state of transport infrastructure in the West Africa region, and see how it impacts trade flow. Available statistics and ratios on this are summarized in Table 3 below.

Table 3- Roads and Railway Network in the ECOWAS Region

Country	Paved Roads (miles)	Unpaved Roads (miles)	Paved/Unpaved Ratio	Railways (miles)
Benin	2656	5604	0.46	578
Burkina Faso	2001	1050	0.19	622
Cape verde	858	242	3.5	None
Ivory Coast	3579	42752	0.08	660
Gambia	932	1708	0.55	None
Ghana	9353	28208	0.33	953
Guinea	4964	25306	0.2	1086
Guinea-Bissau	444	3906	0.11	None
Liberia	628	9652	0.06	490
Mali	1773	13003	0.14	641
Mauritania	851	6749	0.12	704
Niger	779	9084	0.08	None
Nigeria	26005	6100	4.26	3557
Senegal	4214	10366	0.4	904
Sierra Leone	1284	10390	0.12	84
Togo	2376	5143	0.46	525

Source: CIA Fact Book, various issues

It is clear that the region is not well served by a good network of roads and of railways that are crucial for the movement of goods. Only Nigeria and Cape Verde, for instance, have more than three times the mileage of paved roads to non-paved ones. For the rest of ECOWAS nations, that ratio is below 0.6. Similarly, only Nigeria and Guinea can boast of more than 1,000 miles of railway lines. Four countries, Cape Verde, the Gambia, Guinea-Bissau and Niger have no railway lines at all. As to actual transportation equipment, cars, lorries (trucks), railway wagons and so on in the ECOWAS sub-region, reliable statistics are not available. We do know, however, that the nations of tropical Africa are we behind all other parts of the world in such indicators as number of cars and of trucks and buses. This is quite evident from Table 4 below. The conclusion from this general review is that inadequate transport infrastructure is a deterrent to trade flows within the continent.

Obstacles to Intra-African Trade: A Theoretical Framework

In addition to the general observations already made, we can also examine the determinants of trade among African nations by using a modified form of the gravity model. The model relates bilateral trade between nations to such variables as distance between the countries and the gravity GDP. Applying this model to trade flows within the ECOWAS region during 1981-1992, Deme (1995) established that the rate of growth of imports between industrialized nations. The analysis here will attempt to extend Deme's work by using the more up to date statistics for 1991-97, which are now available.

Table 4- Available Cars, Telephones, Trucks and Buses in Selected Countries In 1993

Country	Number of Passenger Cars (000)	Number of Buses (000)	Number of Telephones (000)
Brazil	77	7	39
Egypt	21	7	39
France	415	87	521
Germany	484	33	547
Ghana	6	3	3
Kenya	5	6	8
Mauritius	48	10	73
Mexico	76	35	75
Rumania	55	11	113
South Africa	87	14	88

Source: Derived from Table 7-4 in Ball and McCulloch, *International Business*:

The Challenge of Global Competition, pg. 222

A basic tenet of the gravity model is to link trade flows with economic size, which is approximated by output. It is also linked with factors that inhibit trade flows such as tariffs as well as factors that increase transaction costs such as transport bottlenecks. In that scenario, exports represent production, and the ratio of an exporter's domestic market to its foreign market production. The implication is that an increase in national production will mean an increase in export supply while an increase in the domestic market production ratio will lead to lower export supply.

The domestic market to foreign market production is a function of population size. A rise in population size increases the ratio and decreases export supply. The export supply equation is specified as follows:

$$\text{Log}(\text{EXECW}_{ij,t}) = \alpha + \beta_1 \text{Log}(\text{DGDP}_{i,t}) + \beta_2 \text{Log}(\text{DPL}_{i,t}) + \beta_3 \text{Log}(\text{ECWGDP}_t) + \beta_4(\text{TRC}) + \beta_5(\text{RPRDPL}) \quad (1)$$

Where $\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 > 0$, $\beta_4 < 0$, and $\beta_5 > 0$

(1)

EXECW_{t} , is the export supply to ECOWAS countries in time period t, and DPL_{t} is population size of a member country in time period t, and ECWGDP_{t} is gross domestic product of all ECOWAS countries in time period t. We further propose that the level of exports will increase among ECOWAS countries as the transaction cost (TRC). Also, we expect a positive relationship between exports and per capita paved road (RPRDPL) of a country. A rise in national production will increase import demand. Similarly, it is expected that a rise in population size will increase domestic market to foreign market production ratio and lower the import demand. We thus have the following specification for import demand:

$$\text{Log}(\text{TIM}_{ij,t}) = \alpha + \beta_6 \text{Log}(\text{DGDDP}_{i,t}) + \beta_7 \text{Log}(\text{DPL}_{i,t}), \quad (2)$$

where $\beta_6 > 0$ and $\beta_7 < 0$,

(2)

where $\text{TIM}_{ij,t}$ is the import demand of country i from ECOWAS countries in time period t . In equilibrium, export and import will equal each other. This implies that $\beta_1 = \beta_6$ and $\beta_2 = \beta_7$.

The equality of the parameters in equilibrium is relaxed as the model pertains to commodity trade. Linnemann (1996) used a variant of the gravity model that included artificial trade impediments such as embargoes and preferential trade arrangements. Distance and preferential trade arrangements were also used by Deme (1995). Trade resistance is specified here as transaction cost. It is a function of the ratio of official to parallel market exchange rate and the ratio of paved road to unpaved roads. This may be specified as follows:

$$(\text{TRC}_t) = 1/(X_1 + X_2)$$

where X_1 is the average ratio of official to parallel market exchange rate and X_2 is ratio of average paved road to unpaved road.

(3)

$\text{TRC}_{i,t}$ is the transaction cost of trade between country, i and ECOWAS as countries in period t , using multiplicative interactions. Linnemann defines trade flows by imports (TIM) as a function of export supply, import demand, and trade resistance factors. Following in that tradition one can express trade flows as follows:

$$\text{TIM}_{ij} = \alpha (\text{EXECW}_i)(\text{TIM}_j) / (\text{TRC}_{ij})$$

(4)

Where TIM_{ij} represents trade flow from country, j to ECOWAS countries, EXECW_j is the export supply of country j . TIM_j is the import demand of country, and TRC_{ij} is the trade resistance factor between country, i ECOWAS. Substituting the values of equations (1), (2), and (3) in to equation (4), we have:

$$\text{DGDP}_{i\beta_1} \text{ECWGDP}_{\beta_2}$$

$$\text{TIM}_{ijr} = \alpha$$

$$\text{DPL}_{i\beta_3} \text{TRC}_{\beta_4}$$

(5)

Taking the natural log of equation (5), Linneman specifies the final trade flows model as:

$$\text{LogTIM} = \alpha + \beta_1 \text{log DGDP} + \beta_3 \text{lohgECWGDP} + \beta_3 \text{logDPL} + \beta_4 \text{TRC} + \beta_5 \text{RPRDPL} + \beta_6 \text{logEXECW} + e$$

Where e is the error term. The current study transforms the gravity model to account for the contribution of infrastructure to trade flows among member countries of ECOWAS, and uses the ratio of paved roads to unpaved roads as a proxy for infrastructure or transaction cost to trade. The variables are in log form except the transaction cost, which is in level form. In line with other studies, we use ratio of official to parallel market exchange rate as a measure of transaction cost. Bougheas et al (1999) argue that transport costs are not only a function of distance but also of the availability

of public infrastructure, such as road, port, and telecommunication networks. They used motorway network as a measure of infrastructure. Their study finds a positive relationship between trade flows and infrastructure.

Following that tradition, it is postulated that trade flows will be a function of domestic output, foreign output, size of domestic population, infrastructure, and transaction cost between trading countries and preferential trade arrangement. This forms the basis for the econometric model that we estimate. The model that we specify for this study is a log-linear model of the gravity model of trade flows with modifications to account for the contribution of infrastructure in trade flows among the member countries of ECOWAS. This is as follows:

$$\text{Log}(\text{TIM}_t) = \alpha + \beta_1 \log(\text{DGPT}) + \beta_2 \log(\text{ECWGDPT}) + \beta_3 \log(\text{DPLt}) + \beta_4 (\text{TRCt}) + \beta_5 (\text{RPRDPL}_{,t}) + \beta_6 \log(\text{EXECW}) + e$$

(6)

Estimation Technique

Since the study involves different time periods and various countries, we are presented with cross sectional data. To obtain estimates that are valid requires that we pool all the observations for the different countries. In econometric analysis, pooling assumes that the regressions parameters do not change over time and that they do not differentiate between various cross-sectional units of Gujarati (1995) Pindyck and Rubinfeld (1991), conclude that pooling cross-sectional data and time series data create new problems for regression analysis. Such models have either problems with specification of the disturbance term will have errors from time series as well as cross-sectional disturbance or a combination of both.

Pool cross-section and time series models can be estimated with the covariance model or the error-component model. The error-component model assumes that the mean effect of the random deviations about the mean are equated to the error-components U_{it} and V_i respectively. Pindyck and Rubinfeld (1991) show that if both Mv^2 and Me^2 are 0, the entire term consists of a single combined disturbance and the appropriate procedure would be to apply the ordinary least-square hereafter (OLS) regression to the pooled data. The error-component methods of estimation are more efficient. The estimation procedure involves two-steps or stages. The first step is to estimate the equation on (OLS) regressions and decompose the residuals, subtract the individual means from the regression as well as the constant term. The second step is to estimate the equation with the results from the first step. Thus, our equation of the trade flows log TIM is specified as:

$$\text{LogTIM}_{it} = \alpha_0 + \beta_1 \log \text{DGDP} + \beta_2 \log \text{ECWGDGDP} + \beta_3 \log \text{DPL} + \beta_4 \text{TRC} + \beta_5 \text{RPRDPL} + \beta_6 \log \text{EXECW} + U_{it}$$

(7)

$i=1, \dots, N; \quad t=1, \dots, T$

$$U_{it} = V_i + e_i + Z_{it}$$

(8)

where v_i is the cross-section error-component, e_t is the time series error component and z_{it} represents the combined error-component. The results obtained from this method appear to be more reliable than results from the covariance model estimation. The use of pooled data usually raises problems associated with the properties of time series. Our own analysis here did not however, indicate integration among the variables.

Estimation

$$\text{LogTIM} = -7.98 + 1.24\log(\text{DGFP}) + 0.64\log(\text{EGWGDP}) - 0.64(\text{TRC}) + (5.42) (1.40) (-4.89) - 0.67\log(\text{DPL}) - 0.001(\text{RPRDPL}) - 0.04\log(\text{EXECW})$$

$$(-3.00) \quad (-3.40) \quad (-0.83)$$

$$R^2=0.63 \quad F(6,105)=33.83 \quad \text{Durbin Watson Statistics} =0.95$$

Obviously, this result shows that there is serial correlation problem with the model. The next step is to find a way of reducing the effect of serial correlation. As discussed above, we estimate the model, subtract the residuals from the model and estimate the equation with the results. Furthermore, we test for consistency of the individual coefficients across time as well as equality for each member country. The test for equal variances for the residuals show a Chi-Squared (15) $\chi^2=226.37$, the F statistic is equal to 8.20. This result indicates that we do not accept the null hypothesis that the variances are equal. These statistics are highly significant. The results of the new equation are as follows:

$$\text{LogTIM} = -6.94 + 0.81\log(\text{DGDP}) + 0.71\log(\text{ECWGDP}) - 0.16(\text{TRC})$$

$$(-1.49)(3.18) \quad (2.34) \quad (-1.30)$$

$$-0.31\log(\text{DPL}) - 0.001(\text{RPRDPL}) + 0.031\log(\text{EXECW})$$

$$(-1.07) \quad (-0.97) \quad (0.45)$$

$$R^2=0.63 \quad F(6, 105)=8.93 \quad \text{Durbin-Watson Statistic}=1.15$$

The above result shows that the problem of serial correlation has been significantly reduced; the signs appear to confirm our theoretically specified sign for variables. From the results we see that domestic output is a significant determinant of trade flows among the members of the ECOWAS trading group. Also, the output of the trading members significantly impacts trade flows in the region. The domestic population does not influence trade flows in the region. This is also the case with the infrastructure in the region. These results do not, however, contradict the general observation already made, namely, that the level of infrastructure is inadequate to facilitate trade flows.

Conclusion

In this paper, we examined trade flows among the nations of Africa using the Economic Community of West African States as case in point. In particular, we specified a modified gravity model to analyze these trade flows and to determine the impact of infrastructure on them. The analysis revealed that while trade flows among ECOWAS member nations have been growing; inadequate

infrastructure has deterred this growth. There is also a strong indication that these impediments have tended to increase transaction costs. While we attempted to use the ratio of official to parallel exchange rates in combination with the ratio of paved to unpaved roads reveal both problems of restrictive tariffs and poor infrastructure, the results obtained were inconclusive. A highly significant correlation was found in the first equation but such an indication was diminished significantly in the second equation.

These findings are consistent with earlier studies, which linked trade flows with such variables as domestic output, partner output and population or market size. Nevertheless, we suggest a need to interpret these results with caution given the sort of approximations we have had to make. There is clear need, for instance, for another study that specifically aggregates variables such as motorways, ports and railway terminals as a proxy for levels of available transportation infrastructure which is then linked to trade flows.

Even with the inadequacies already noted, the study does reveal an urgent need to improve the transport infrastructure in the ECOWAS region in order to spur a substantial growth in intra-regional trade. The removal of physical impediments to the movement of goods between member nation of the region may, in fact, be more important than the creation of a common currency which now appears to be receiving priority attention from member governments. The good news is that some member states in the region appreciate the need to improve transportation facilities in the region. Recently, Nigeria announced plans to link up with Ghana by rail (Guardian, January 15, 2000). Two other member states, Benin and Togo, will naturally benefit from the rail link. What the region truly needs is for the rail link to reach Dakar and also completion of the Trans-ECOWAS motor way.

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