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Trade Liberalization and Patterns of Trade in Sub-Saharan Africa: A Panel Data Analysis.

By

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A project paper submitted to the School of Economics of Addis Ababa University in partial fulfillment of the requirements for the degree of Masters of Arts in Economics.

(M.A. in Applied Trade Policy Analysis)

May, 2010

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Abstract

This paper examines the impact of trade liberalization on sectoral export performance of Sub-Saharan Africa countries using export supply function between the periods 1980 to 2006. The underlying base of the study is the theoretical justification that trade liberalization will lead countries to specialize and export commodities of their comparative advantage. A static panel data analysis based on fixed effect and random effect model was adopted. The main findings are while trade liberalization has a significant positive impact on manufactured export performance; its impact on primary commodity export performance is not worth mentioning. Production capacity of countries in SSA is important factor for the export performance of countries both at aggregate and disaggregate levels. The other explanatory variables are more important in explaining the manufactured export performance.

Acknowledgements

My first gratitude goes to my advisor Dr. Girma Estiphanos for his meticulous comments and suggestions. I also want to extend my heartfelt appreciation to Dr. Adugna Lemi, Jonse Bane, Saba Yifredew and Atnafu G/Meskel for their useful support and advice.

My gratitude may not express the contribution of my families, Lechu, Taye and Brothers, who paved the way and putted their all round support through out my education.

Close classmate friends, Faris, Sol, Mati and others were also there in my short spell of stay in the AAU with all those hard times when there were monetary and other difficulties.

Gidisa Lachisa

May, 2010

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1. Introduction

The doctrine of import substitution industrialization trade policies that was pursued by many African countries during the period from the 1960s to the 1980s began to shift to market-oriented reforms starting from the early 1980s. The major reasons for the shift towards more market-oriented reforms were in response to the economic crises in Africa in late 1970s and early 1980s which were advocated by international financial institutions.

The market-oriented policy packages, usually referred to as "Structural Adjustment Programmes (SAP)", which contain trade liberalization as an integral part had taken different measures to liberalize import and to remove the most export-distorting interventions. While about 60 percent of African countries were undergoing and had undergone through a Structural Adjustment Programme by the second half of the 1980s (World Bank, 1994), most had undertaken the programme by the mid-1990s (UNCTAD, 2008).

In theory, trade liberalization is expected to have a positive influence on the long-term growth of the economy through a more efficient use of resources; increased competitiveness; flow of knowledge and investment; capital accumulation and technical progress; and export diversification. However, given a significant reduction in average tariffs, almost halved on average, in Sub-Saharan Africa (SSA) over the past 20 years (UNCTAD, 2008; Babatunde, 2009) Africa's share of world merchandise trade declined between 1990 and 2000, in terms of both exports and imports due to factors that are external or internal to the countries (Ackah and Morrissey, 2005) [1]. This, however, does not mean to imply anything about the performance of export in response to trade liberalization.

[1] Factors external to individual country include world prices, while factors internal to individual country is its export supply response which is constrained by structural rigidities in production capacity, and infrastructural and institutional barriers to trade. These are basically important for African countries dependent on primary (agricultural) commodities.

Based on the view that barriers to trade and anti-export bias would reduce export growth below potential, the link between trade liberalization and export performance is analyzed on the basis of the hypothesis that trade liberalization reduces anti-export bias and makes exports (especially non-traditional ones) more competitive in international markets, mainly by reducing exchange rate distortions and export duties (Santos-Paulino and Thirlwall, 2004). However, the empirical evidences are yet to prove the assertion of a strong influence of a liberalized trade policy regime on export performance.

There are many studies which investigated the link between trade liberalization and export performance based on orthodox supply tradition. Some of the studies have found a positive link between trade liberalization and export performance (Thomas et al, 1991; Weiss, 1992; Joshi and Little, 1996; Dijkstra, 1997; Santos-Paulino, 2000; Ahmed, 2000; Niemi, 2001; Santos-Paulino and Thirlwall, 2004; UNCTAD, 2008; and Babatunde, 2009). On the other hand, other studies have found little evidence to support the link (Greenaway and Sapsford, 1994; Shafaedin, 1994; Moon, 1997; and Morrissey and Mold, 2006).

The theoretical justification of the effect of trade liberalization on export performance and long-term economic growth is based on, among others, efficient use of resources and increased competitiveness. That means, countries move towards specializing in and exporting commodities of their comparative advantage. Resources, therefore, move towards that sector leaving the less competent sector in the economy. This implies that trade liberalization will have an impact on the structure (pattern) of export.

Investigating the effect of trade liberalization on export performance at an aggregate level or particular sector, which all previous research studies concentrated on, does not let know its impact on export structure. This paper takes a departure from the previous studies to address the effect of trade liberalization across different sectors. This approach, in addition to showing the change in the pattern of trade, will help countries, particularly SSA, to know

whether or not trade liberalization has the effect of locking them to a given sector (i.e., locking SSA countries in the primary commodity sector in which they have comparative advantage). Moreover, it gives insight into the significance, direction and magnitude of the effect of trade liberalization on export of different sectors in the economy.

2. Empirical Evidence of Trade Policy Reforms in SSA

The independence of many African countries from colonial powers in the early 1960s led to a surge of implementing import-substitution industrialization trade policies[2]. The doctrine which was adopted from 1960s to the 1980s was known in its protectionism through extensive state intervention in the economy. Among the trade policies, non-tariff measures and a highly complex tariff structure were used to restrict imports; export taxes and strict rules and regulation were in place to restrict exports; and rationing of foreign exchanges and highly overvalued exchange rate were common for countries outside the Communauté Financière Africaine (CFA) zone. However, the doctrine came to an end in response to the large-scale economic crisis in SSA in the late 1970s and early 1980s[3].

Advocated by international institutions like the World Bank (WB) and the International Monetary Fund (IMF), a market-oriented policy packages were introduced within many African countries in response to the economic crises. The policy packages, where much of which were undertaken in response to the conditionality attached to WB and IMF lending, had trade liberalization conditionality as an integral parts. As a result, starting from the mid 1980s, and especially in the 1990s, most SSA countries liberalized their trade regime

[2] Burundi, Ethiopia, Ghana, Madagascar, Nigeria, Senegal, Sudan, The United Republic of Tanzania, and Zambia are examples which adopted inward-oriented policies with significant trade restrictions (UNCTAD, 2008).

[3] As UNCTAD (2008) noted, the economic crises in Africa was due to the global economic crisis that followed the two oil crises of 1973 and 1979. On the other hand, inappropriate exchange rate and trade policies in the two decades were also seen to have contributed to the deterioration in economic performances (Kirkpatrick and Weiss, 1995)

to some extent, with a significant reduction of trade barriers, especially restrictions on imports. These reforms were basically intended in reducing tariff and non-tariff barriers, and in removing export taxes and providing export incentives to make imports easier and to encourage exports, respectively.

In conjunction to the unilateral trade policy reforms made in SSA countries in due of the Structural Adjustment Programmes, multilateral trade negotiations; regional trading agreements; and special trade related agreements between group of African countries and developed countries were also made. Given these facts, by examining the trends of tariff levels in SSA a broad picture of trade policy reform can be obtained. Table 1 (see appendices) shows a significant reduction in the average tariff rate in SSA countries. For all SSA the tariff rate which was 30.9% between 1980 and 1985 declined by half to 14.9% between 2000 and 2002. A percentage reduction in average tariff rate of 31.9% is registered for the year between 1990 and 2002; however, there is some disparity in the percentage reduction across different regions within SSA countries as shown in the last column of Table 1. West and East Africa regions showed a higher percentage reduction between 1990 and 2002, while Southern Africa region has the lowest average tariff rate (12.9%) between 2000 and 2002. The same trend can be seen from Table 2 (see appendices) which shows the average tariff rates in SSA countries. For example, Benin registered a tariff rate of 13.42% in 2006 which was 48.3% between 1980 and 1985. Although Mauritius registered the lowest average tariff rate (4.21%) in 2006, Gabon registered the highest (20.05%) in 2005. There are some countries which had an initial lower average tariff rate, but increased by some amount in their 2006 or 2005 records compared to the period between 2000 and 2002[4]. However, still these countries have an average tariff rate lower than the region's.

The evidences in Table 3 (see appendices), which shows the average tariff rates by sector in SSA countries, is consistent with the evidence in Tables 1 and 2.

[4] Countries that increased their average tariff rates includes: Cameroon; Congo, Rep.; Gabon; Madagascar; Rwanda; South Africa; Togo; Uganda; and Zambia. (Refer to Table 2)

That is, there is a reduction in average tariff rates across the sectors following the same path. For example, Kenya registered a reduction of average tariff rate by more than half in both the primary and manufactured products from 34.4% and 34.6% in 1994 to 16% and 16.2% in 2004, respectively. Though the manufactured product has some higher average tariff rate than the primary products, the gap is insignificant and the trend will move together as long as there is reduction in tariff rates in a given country[5].

In general, there is a remarkable decline in the average tariff rate in SSA countries following the policy reforms. In 1980s, 80% of countries in SSA had an average tariff rate of above 20%, but only 23% of countries had the average tariff rate in the1990s (Ackah and Morrissey, 2005). Moreover, all SSA countries except Djibouti and Gabon, which have an average tariff rate of 30.23 and 20.05 respectively, have a tariff rates below 20% in 2006 (UNCTAD, 2008). Although there was a continuous reduction in tariff rates, the average tariff rates of SSA are relatively higher as compared to the average tariff rates for all categories of developing countries (Ackah and Morrissey, 2005; Babatunde, 2009)[6]. SSA countries with regard to export also showed progress in reducing or totally eliminating export taxes and levies to avoid anti-export bias. In addition, Export Processing Zones (EPZs) were also established by the government in some of the SSA countries (Babatunde, 2009).

The majority of SSA countries, which were pursuing a pegged exchange-rate policy in the early 1980s, have liberalized exchange rates. Kirkpatrick and Weiss (1995) indicated that while five countries had adopted a relatively free-floating system by 1992, nine others had moved to a form of managed, adjustable-rate system. UNCTAD (2008) also showed the reduction of overvaluation by the early 1990s which were severe in the early 1980s in many

[5] The opposite is true according to Ackah and Morrissey (2005) where the average tariff rate of the agricultural sector is higher than the manufacturing in the 1990s.

[6] The average tariff rate for SSA is higher than the East Asian and the Latin America region but lower than the South Asian region tariff rates (Ackah and Morrissey, 2005; Babatunde, 2009).

countries of SSA. For example, the parallel market exchange rate premium had reached an average of 861%, 1,569% and 259% in Ghana, Mozambique and United Republic of Tanzania for the period 1981–1985, respectively. By comparison the figure declined to 3%, 17% and 22% for the period 1991–1995, respectively.

3. Theoretical Arguments of Trade Liberalization

The basic intellectual underpinnings behind trade liberalization is that nations benefit by specializing in the production of goods and services that they can produce most efficiently, and exchanging these for the goods and services that other countries produce most efficiently. This argument rooted its base on the theory of comparative advantage which arises from a free trade models associated with John Stuart Mill and David Ricardo, later modified by trade theories embodied in the factor proportion or Hecksher-Ohlin (H-O)(1933) theory and Stolper-Samuelson (1941) and Rybczsnski (1955) effects (Mwaba, 2000). In these traditional trade theories, technological progress is taken as an exogenous, which shows a static comparative advantage. That is, each country exports commodities in which it has comparative advantage as dictated by its relative factor endowments.

However, in the dynamic trade theory, as indicated by Olofin (2002), technological progress is endogenous to an economy. Referring to Olofin (1977) and Fisch and Speyer (1997), Olofin (2002) stressed the case that distribution of technological progress is considered decisive in determining the pattern of international trade. To further indicate the dynamism of the bases for trade, based on Schumpeter's (1942) dynamic theory of growth, foreign trade can be explained by the existence of dynamic competition. Therefore, a country's production and trade is not limited by its endowed resources (i.e. by static comparative cost advantage) only, but also by technological progresses which is determined by competition incentives. The trade theories developed by Posner

(1961), imitation and demand lag hypothesis; and Vernon (1966), product cycle theory, are also in line with this argument (Salvatore, 2004).

In countries such as SSA where technological progress is highly time and resource demanding, trade liberalization only has an effect on the structure of trade through static comparative cost advantage, at least in the short to medium term. Greenaway (1998) provided a good explanation of the effect of trade liberalization on LDCs economy. Accordingly, in the short to medium term, effective trade reform should impact on the composition of output, as resources switch from inefficient import substitute production to export oriented activities. In turn this should impact the level and composition of factor utilization and on the structure of trade (Harris and Kulkarni, 2004).

In other words, according to the argument given by the static comparative cost advantage, most SSA countries specialize in the production and export of primary commodities in which they are relatively more competitive. However, deep rooted dependence of countries on primary commodities, as asserted by different scholars, makes the countries vulnerable to the global economy. For the reason that, such commodities are characterized by low income elasticity of demand, volatile and secular declining prices and generally comes from sectors where the scope for technical progress is limited (Cashin, DcMermott and Pattillo, 2004; Alemayehu, 2010).

Contrary to this, there is a hope for poor developing countries, including SSA countries, to move towards production and export of labor intensive manufactured products as other developing and developed countries shift to specialize in high-tech, capital and skill intensive manufactured products. According to the argument of dynamic comparative cost advantage, liberalization of trade through creation of competitive environment improves technological progress. Therefore, it is more likely that trade liberalization will fasten the progress of transformation in both LDCs and DCs to their respective specialization than retarding it.

4. Model Specification

In analyzing the impact of trade reform on export performance, basically two approaches are followed. These are the export demand function theory and the export supply function theory. In this particular study, however, the export supply function will be used due to its importance in determining export performance in SSA than the demand side. UNCTAD (2008), identified Africa's weak supply response as the most important impediment to the continent's export performance, suggesting that future export policies should focus on ways to increase production for export. The share of Sub-Saharan African merchandise exports were declining over time and are small while world merchandise export is growing (Ackah and Morrissey, 2005). This implies that the weak performance is more likely an internal problem than external one.

Based on the assumptions that neither imports nor exports are perfect substitutes for domestic goods and the producer is assumed to maximize profits subject to a cost constraint, an export supply function that depends positively on the price of exports, negatively on input prices, and positively on productive capacity is specified. Thus, the standard export supply function is presented in terms of relative price (the price of a country's exports relative to the foreign price of related goods expressed in a common currency), and the economy's productive capacity to support export production. In formal terms, the relationship is given as (Babatunde, 2009):

$$X_t = f\left(\left(\frac{P_x}{P_f * E}\right)_t, PC_t, u_t\right) \quad (1)$$

Where X_t is the level of exports at time t; P_x is the domestic price; P_f is foreign price; E is nominal exchange rate; PC_t is the economy's productive capacity to produce exports and u_t is the error term at time t.

This traditional export supply function provides a framework to analyze the export response due to price and productive capacity changes. However, trade policy reforms are the other factors which influence the export performances. That is, trade liberalization in the form of less protectionism, more openness, and less distorted prices as a whole leads to the reduction of anti-export bias and a strong supply response of export. Trade liberalization may embody a number of different aspects of trade policy reforms. It is expected that tariff rate reduction will have a greater effect if the price responsiveness of export is more elastic. A liberalization indicator defined as a dummy variable that takes the value zero before the year of liberalization and one afterwards is also considered. The other channel by which trade liberalization may lead to better export performance is through access to imported inputs and capital goods. Restrictive trade regimes may make it difficult for potential exporters to obtain the input or equipment which they require in the production of exports. Trade liberalization increases the availability of such imported inputs.

Technological innovation is also important in export supply performance of a country. The theoretical justification is that foreign imported technology is potentially an important factor in determining an expansion in the export supply, particularly for developing countries where technological progress is lower. Trade policy reform through liberalization of exchange rate is therefore crucial policy measure as the overvalued currencies acted as a disincentive to import foreign technologies. That is, currency overvaluation can discourage export competitiveness, because it reduces entrepreneurial activity and/or import of foreign technology.

Allowing for the above considerations, the extended export supply function can be expressed as:

$$logX_{it} = \alpha + \beta_1 log\left(\frac{P_x}{P_f * E}\right)_{it} + \beta_2 logPC_{it} + \beta_3 logTR_{it} + \beta_4 TLD_{it} +$$

$$\beta_5 logIRM_{it} + \beta_6 logFIT_{it} + u_{it} \quad (2)$$

Where TR is tariff rate; TLD is trade liberalization as dummy variable; IRM is import of raw materials; and FIT is foreign imported technology. The model in equation (2) implicitly assumes an instantaneous adjustment of export supply growth such that $X_t^s = X_t$. In other words, it is assumed that export supply growth adjusts in each period to desired rates. The paper is intended to see the effect of trade liberalization on the export performance at sectoral level. Therefore, to make a more accurate comparison across the sectors, it is reasonable to use the same explanatory variables. The assumption will help by avoiding the inclusion of lagged dependent variable which varies across sectoral regressions.

Thus, the augmented export supply function can be re-expressed as:

$$logX_{it} = \gamma_i + \lambda_t + \beta_1 logREER_{it} + \beta_2 logPC_{it} + \beta_3 logTR_{it} + \beta_4 TLD_{it} +$$

$$\beta_5 logIRM_{it} + \beta_6 logFIT_{it} + u_{it} \quad (3)$$

It is expected that $\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 > 0$ and $\beta_6 > 0$.

Where γ_i and λ_t are country-specific and year-specific effects, respectively. $REER$ is relative price of exports measured by real effective exchange rate and the rest of the variables are as defined earlier. A separate regression will be made taking as dependent variable agricultural (primary) commodity export and manufacturing commodity export while keeping all explanatory variables the same using a representative proxy for each of the variables. Therefore, for each SSA economy, *X* is defined as real aggregate primary commodity and manufactured commodity export. An increase in production capacity of the economy is likely to have a positive effect on export performance.

However, the choice of the measure of productive capacity is inconclusive in the literature (Babatunde, 2009)[7]. For this study, real GDP is taken as a proxy for production capacity in both the regressions.

Tariff rate (TR) is measured as average nominal tariff rate; Trade Liberalization as Dummy (TLD) takes a value of zero before liberalization and one after liberalization, and IRM is measured as import of raw materials. As regards to the technological innovation where foreign imported technology (FIT) is positively related with an expansion of export supply, the cumulative sum of net foreign investments into the economy is taken as a proxy in order to capture the effect of foreign imported technology.

5. Data Sources and Handling the Missing Values

To investigate the effect of trade liberalization on export performances at sectoral levels the paper uses a panel data analysis. The study covers the whole Sub-Saharan African countries from a period 1980 to 2006; however, only eight countries based on availability of data for variables under consideration were used for the analysis. All the variables are transformed in to logarithm form. Data sources such as World Bank World Development Indicators CD ROM, World Bank African Development Indicator CD ROM and International Monetary Fund International Financial Statistics Yearbooks were used.

There are missing values in some of the variables used for this particular study. If these are not handled in some way it will result in a loss of relevant information. For this reason the paper used the widely accepted and superior approach, Multiple Imputation, to remedy the problem of missing data (King *et al,* 2001). According to them, the idea is by extracting relevant information from

[7] Babatunde, 2009 showed different studies used different measures of productive capacity. For example, Bond (1985) and Senhandji and Montenegro (1995) used trend or secular output; Muscatelli *et al* (1995) used the stock of fixed capital. In another dimension, Bayes *et al* (1995), Hossain *et al* (1997) and Ahmed (2000) measured capacity utilization as the predicted values of GDP. Milner and Zgovu (2004) however used Agricultural GDP and Babatunde (2009) by itself used Manufacturing GDP as a proxy for capacity.

the observed portion of the data set, each missing cells are imputed by multiple (around five) values. In each of these data sets, while the observed values are the same, the imputations vary depending on the estimated uncertainty in predicting each missing values.

The best guess or expected value for any missing value is, therefore, the mean of the imputed values across the data sets (Honaker and King, 2009). Simply expressed, given an imputed *m* data sets, the over all point estimate, $\bar{q}$, which is the average of the *m* separate estimate is given as (King *et al,* 2001):

$$\bar{q} = \frac{1}{m} \sum_{j=1}^{m} q_j \quad \text{Where } \mathbf{j} \ (\mathbf{j} = \mathbf{1, 2,\ldots, } \boldsymbol{m})$$

Based on this procedure and using *Ameliaview* multiple imputation software developed by King, after imputing the missing values taking j=5 the average values for each missing cells were calculated and used for analyses.

6. Results and Discussion

The descriptive statistics of variables used in the analysis is presented below. The mean value of the logarithm of merchandise export, primary commodity export and manufactured export, which are used as dependent variables in a separate regression, is 14.03, 13.80 and 11.30 respectively. The mean value of the logarithm of explanatory variables real effective exchange rate, production capacity (proxy by real GDP), foreign imported technology (proxy by foreign direct investment), tariff rate and raw material import, where as, is 4.90, 15.60, 13.80, 3.02 and 12.20 respectively. The standard deviation for all the variables under consideration ranges from 0.45 to 2.44.

Summary Statistics of Variables[8]

Variable	Mean	Std. Dev.	Min	Max
lnmex	14.02588	1.838678	10.75708	17.99169
lnprx	13.79785	1.610779	10.67232	17.04438
lnmax	11.29875	2.436117	6.017693	17.40869
lnreer	4.902312	0.566824	3.946038	8.263002
lnpc	15.59875	1.604275	13.23458	18.94428
lnfit	13.80032	0.4477105	11.02076	15.90371
lntr	3.016953	0.4695519	1.757858	5.928618
lnirm	12.20018	1.391389	7.458057	16.63647

The pairwise correlation matrix for the all the variables used for analysis is given in table 5 (see appendices). Real effective exchange rate and tariff rate are negatively correlated with both merchandise export, primary commodity export and manufactured export where as the other variables are positively correlated with these dependent variables. This correlation matrix shows that the results are accordingly with what would be expected.

The performance of merchandise export over time as depicted in Fig.1 (see appendices) shows an improvement for all the sample countries except Burundi and Zambia which has some fluctuations over time. Disaggregating in to sectoral export performance, the primary commodity export took the highest portion of the countries export for all sample countries except South Africa, where the share of manufactured export is greater than primary commodity export since around the year 1992. This shows that most SSA relied on export of primary commodities where the manufacture export is insignificant, particularly for countries such as Burundi, Mozambique and Nigeria.

In order to investigate the effect of trade liberalization on the performance of merchandise export a static panel data regression is considered in this particular study. However, to treat the individual effects as fixed or random in

[8] The detail summary statistics for the within and between is given in the appendices table 4

panel data analysis requires a practical examination using Hausman test (Verbeek, 2004). The test result given in Table 6 (see appendices) shows the acceptance of the null hypothesis, which reflects the consistency of both the fixed effect and random effect. Though the random effect is efficient in this case, for the practical purpose and specific nature of countries under investigation both models are used.

Panel Regression of Merchandise Export Performance and Trade Liberalization in SSA (1980-2006)

	Dependent Variable: Merchandise Export	
Explanatory Variables	Fixed Effect	Random Effect
Constant	-9.343	-6.901
	(-4.89)*	(-4.02)*
lnreer	-0.033	-0.064
	(-0.74)	(-1.50)
lnpc	1.612	1.464
	(15.36)*	(16.16)*
lnfit	-0.109	-0.112
	(-1.85)***	(-1.9)***
lntr	-0.096	-0.105
	(-1.21)	(-1.31)
lnirm	0.015	0.021
	(-0.42)	(0.60)
tld	-0.021	-0.001
	(-0.43)	(-0.02)
R-sq: Within	0.7616	0.7600
Between	0.9491	0.9488
Overall	0.9330	0.9338
F-statistic	107.53	673.64
Prob (F-statistic)	0.0000	0.0000
Durbin-Watson stat	.67216	.67216
Heteroscedasticity test	2927.06	1412.41
No of Observations	216	216
No of Countries	8	8

Note: (1) Absolute t-statistics are given in parenthesis ( ), (2) * indicates that a coefficient is significant at 1%, and *** indicates significant at 10%.

The fixed effect regression result revealed that there is a negative effect of real effective exchange rate on merchandise export performances in the cross-country regression analysis. Though the sign is as expected, it is statistically insignificant. The production capacity has a positive and significant impact on merchandise export performance in SSA in the period analyzed. This positive sign of the production capacity, which is proxied by real GDP of countries, suggests that the overall economic performance of SSA countries play an important role in their export performances. Import of raw material comes up with the expected sign, which is positive, but statistically insignificant. Foreign imported technology has a negative impact on export performance, which is the opposite of what is expected, and it is statistically significant at 10%. Although it is statistically insignificant the average tariff rate acts as a disincentive to merchandise exports. While the tariff rate is with the expected sign it is insignificant to explain SSA merchandise export performance. Contrary to this result, the included trade liberalization dummy variable based on Sachs and Warner measure of trade liberalization revealed the disincentive nature of trade liberalization on exports. Though the sign is in contrary to the expectation it is statistically insignificant.

The random effect regression results are fully consistent with the results obtained in the fixed effect regression except the slight difference in the magnitudes of the coefficients. That is, while the real effective exchange rate, production capacity, tariff rate and raw material import are with the expected signs, foreign imported technology and trade liberalization dummy come up with unexpected signs. However, only production capacity has the expected sign and statistically significant to explain merchandise export performance. The foreign imported technology is significant at 10% while it is having unexpected sign.

From these results while there is consistency in some of the aspects compared to the findings of other studies there is also a contrary result. For example, the disincentive nature of tariff rate is consistent with the finding of Babatunde (2009) and Santos-Paulino's (2000) export duties having a negative expected sign but statistically insignificant. On the other hand, trade liberalization dummy is in contrary to the findings of Ahmed (2000) and Santos-Paulino (2000) results that found a positive and significant relationship between trade liberalization dummy and export performance. However, the timing of trade liberalization date taken is different based on the difference in criteria's used[9].

In order to investigate the effect of trade liberalization on the pattern of trade and its relative impacts on sectoral export performance in SSA countries, the model is re-estimated at a disaggregate level. Accordingly, this study considered primary commodity and manufactured export performances separately for the sample countries. Consequently, the same procedure that followed in analyzing merchandize export performance is adopted for each sector.

[9] While Santos-Paulino (2000) used WTO membership as a base for the date of trade liberalization, in this particular studies Sachs and Warner measure of trade liberalization is used.

Panel Regression of Sectoral Export Performance and Trade Liberalization in SSA (1980-2006)

		Dependent Variable			
		Primary Commodity Export		Manufactured Export	
Explanatory Variables		Fixed Effect	Random Effect	Fixed Effect	Random Effect
Constant		-7.200	-5.699	-8.247	-5.246
		(-3.62)*	(-3.03)*	(-1.94)***	(-1.50)
lnreer		-0.056	-0.076	0.473	0.436
		(-1.24)	(-1.70)***	(4.86)*	(4.72)*
Lnpc		1.516	1.424	1.313	1.153
		(13.88)*	(14.26)*	(5.63)*	(6.35)*
Lnfit		-0.121	-0.122	-0.221	-0.242
		(-1.98)**	(-2.00)**	(-1.69)***	(-1.86)***
Lntr		-0.033	-0.037	-1.153	-1.195
		(-0.40)	(-0.44)	(-6.50)*	(-6.79)*
Lnirm		-0.048	-0.044	0.286	0.294
		(-1.31)	(-1.21)	(3.64)*	(3.76)*
Tld		-0.033	-0.019	-0.501	-0.493
		(-0.63)	(-0.38)	(-4.51)*	(-4.52)*
R-sq:	Within	0.6923	0.6917	0.5118	0.5106
	Between	0.8991	0.8984	0.7779	0.7924
	Overall	0.8793	0.8794	0.7543	0.7683
F-statistic		75.75	467.72	35.29	235.03
Prob (F-statistic)		0.0000	0.0000	0.0000	0.0000
Durbin-Watson stat		.71865	.71865	1.0796	1.0796
Heteroscedasticity test		3501.57	1543.72	1661.77	968.53
No of Observations		216	216	216	216
No of Countries		8	8	8	8

Note: (1) Absolute t-statistics are given in parenthesis ( ), (2) * indicates that a coefficient is significant at 1%, ** indicates significant at 5%, and *** indicates significant at 10%.

The fixed effect regression of primary commodity export performance revealed that tariff rate acts as a disincentive on export performance of the sector. Although the sign of tariff rate is negative as the expectation it is, however, statistically insignificant. The trade liberalization dummy is in contrary to the expectation of positive sign; nevertheless, it is also insignificant. Real effective exchange rate has a negative impact on export performance of primary commodities while production capacity has a positive effect as expected. The

production capacity is significant while real effective exchange rate is not. Both foreign imported technology and raw material import come up with a negative sign contrary to a positive sign expectation. Though the result shows the negative impact of raw material import on primary commodity export performance it is statistically insignificant. However, foreign imported technology has a negative and significant impact at 5% significance level. The random effect regression of the sector also shows the same result as that of the fixed effect regression. The real effective exchange rate having the expected negative impact on primary commodity export performance is statistically significant at 10% which was totally not in the case of fixed effect regression.

The manufactured export performances come up with interesting result where all the explanatory variables are significant in both the fixed and random effect regressions. The results under both regressions are consistent both in sign and significance except differences in the magnitude of the coefficients. The sign of real effective exchange rate is in contrary to the positive expected impact on manufactured export performance and it is as well statistically significant at 1%. The production capacity as the cases of merchandise and primary commodity export performance it is positive and significant. The effect of foreign imported technology is also in line with the results under merchandise and primary commodity export. Tariff rate and raw material import are statistically significant to explain the performance of merchandise export with a negative and positive impact respectively. The trade liberalization dummy, though it is still opposing the expected positive impact on export performances, it is statistically significant in manufactured export performance.

Comparing the above results and looking at the impacts of each variable on the export performance at the aggregate and disaggregate levels provide an interesting implication. The real effective exchange rate is included as an explanatory variable in a way that an increase in REER denotes a real appreciation of currency. Thus, the coefficient is negative for merchandise and primary commodity export as expected. This is in line with the finding of

Morrissey and Mold (2006). However, it is positive for manufactured export. This may be due to the fact that real appreciation of currency by encouraging import of raw and intermediate inputs may boost the export performance of manufactured export. This argument is consistent with the positive and significant effect of raw material import on the performance of manufactured export, while insignificant to explain merchandise and primary commodity export. Though it is expected on the importance of having a liberal trade policy to strengthen the technological base of countries, the effect of foreign imported technology proxied by foreign direct investment at both the aggregate and disaggregate level shows negative and significant results. The finding by other studies shows a different result. For example, while the study by Morrissey and Mold (2006) shows insignificant effect of FDI on SSA export performance, a study made on Cameroon by Njong (2008) shows a positive and significant effect. The unexpected finding of foreign imported technology may be related with the fact that a proxy FDI in SSA has been driven by market seeking motives than exporting. A supply of a considerable percentage of products to the domestic market might have resulted in the reduction of the supply of products to the international market by SSA countries.

Tariff rate is only significant to explain the export performance of manufactured goods while not the primary commodity export. This might result to question the theoretical arguments that trade liberalization will lead countries to specialize on sector of their comparative advantage, SSA countries to specialize in primary commodities. Although insignificant a reduction in tariff rate by 1% leads to an increase in primary commodity export only by 3.3% to 3.7%, while a 1% reduction resulted in an increase of 115% to 120% in manufactured export. This implies that SSA countries are moving towards the manufacturing sector as they liberalized their trade. This can be explained by the flying geese model where SSA can follow the ladder as other developing and developed countries move to the production and exports of high-tech manufactured commodities.

The production capacity proxied by real GDP is, however, an important determinant for the export performances of SSA at even disaggregate levels. It has both positive and significant impact in all the cases considered in this study. While this result is in line with the finding of Morrissey and Mold (2006), the finding of Babatunde (2009) shows the positive but insignificant effect of production capacity on SSA export performance.

7. Summary and Conclusion

The theoretical underpinning of trade liberalization is that countries will specialize in production and exports of commodities of their comparative advantage. It is evidenced that most countries in SSA, in response to either internal or external factors, have been undertaking trade and exchange rate policy reforms since the early 1980s. It was based on this premise that the paper gives emphasis to investigate the empirical evidence whether SSA countries who have been taking the reforms really moved to specialize in primary commodities on which they have comparative advantages.

The empirical evidence is rather in contrary to the premise where trade liberalization resulted in a more export performance of manufactured goods. Trade liberalization measured by tariff rate was insignificant to explain primary commodity export. Besides, the magnitude by which primary commodity export was improved for a percentage reduction in tariff rate was very small. Contrary to the premise, on the other hand, a percentage change in tariff rate resulted in a significant and by far higher proportionate change in manufactured export, on the sector where SSA countries are assumed not to have a comparative advantage. Trade liberalization dummy was, however, not in line with the premise as well come up with unexpected sign in both the cases. The result might have been reversed if other condition was considered as a measure of trade liberalization date other than the Sachs and Warner measure of trade liberalization used in this study.

Production capacity was significant in SSA countries export performance. This implies the important role of Production capacity in SSA countries export performance compared to other factors. Raw material import was found only significant to explain manufactured export performance. The relative importance of explanatory variables looks biased towards explaining the manufactured sector where all the variables were significant compared to the primary commodity where only few of them. Given the objective of this paper to investigate the relative importance of trade liberalization on the sectors considered, it is worth looking to consider a separate determinants and the dynamic effect in order to determine factors that can contribute to the performance of each sectors.

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Appendices

Table 1: The Pattern of Tariff Changes in SSA

	Average Scheduled Tariffs			% change
Regions	1980-85	1990-95	2000-02	1990-2002
All Sub-Saharan Africa	30.9	21.9	14.9	-31.9
West Africa	38.5	23.4	14.4	-38.5
Central Africa	33.1	20.4	16.4	-19.6
East Africa	32.5	26.1	16.0	-38.7
Southern Africa	19.5	17.7	12.9	-27.1

Source: Ackah and Morrissey (2005)

Table 2: Average Tariff rate Changes in SSA Countries

Country	1980-85	1990-95	2000-02	2006#
Benin	48.3	41.0	14.4	13.42
Botswana	N/A	30.0	12.5	8.74
Burkina Faso	N/A	23.5	14.0	12.2
Burundi	37.9	N/A	37.6	14.65
Cameroon	28.3	18.6	18.1	19.16*
Central Africa Rep	N/A	18.6	18.6	18.79*
Congo DR	23.7	29.4	15.6	13.05
Congo, Rep.	N/A	20.6	16.4	19.27*
Cote d'Ivoire	27.0	23.4	13.9	13.45
Ethiopia	29.0	31.0	21.6	16.44
Gabon	N/A	20.6	18.3	20.05*
Ghana	33.3	16.7	14.7	13.15**
Guinea	N/A	11.9	16.9	14.16*
Kenya	41.0	32.9	17.1	11.91
Lesotho	N/A	17.4	12.5	9.86
Madagascar	N/A	7.6	5.6	13.26
Malawi	19.4	22.2	13.2	12.88
Mali	N/A	17.0	12.9	12.58
Mauritius	36.2	29.0	19.3	4.21
Mozambique	N/A	N/A	13.7	12.69
Nigeria	33.8	33.6	24.6	11.68
Rwanda	N/A	35.0	13.1	19.71
Senegal	N/A	13.3	14.9	13.49
Sierra Leone	25.8	30.3	16.7	N/A
South Africa	29.0	9.6	6.0	8.31
Sudan	50.6	33.5	21.2	17.14
Tanzania	23.9	28.4	17.3	12.52
Togo	N/A	15.0	12.9	14

Uganda	N/A	17.0	10.7	12
Zambia	N/A	25.5	13.7	14.59*
Zimbabwe	10.0	16.7	18.5	16.66***

Data source: World Bank (2004) and UNCTAD (2008)
Note: #= Data taken from UNCTAD, * = Year for 2005, ** = Year for 2004, *** = Year for 2003, N/A= Not Available

Table 3: Average Tariff Rates by Sector in SSA Countries

Country	Year	Primary Products	Manufactured Products
Botswana	2001	15.8	16.3
Cote d'Ivoire	1996	18.6	18.8
	2001	11.8	12
	2002	11.7	11.9
	2003	11.7	11.9
Ethiopia	1995	27.4	27.9
	2001	18.6	18.9
	2002	18.6	18.9
Ghana	1993	14	14.1
	2000	13.8	13.9
	2004	12.5	12.5
Kenya	1994	34.4	34.6
	2000	17.7	17.9
	2001	18.9	19.2
	2004	16	16.2
Mauritius	1995	31.7	32.2
	1997	30.6	31.1
	1998	30.6	31.1
	2002	18.6	19.2
Mali	2001	11.8	12
	2002	11.7	11.9
	2003	11.7	11.9
	2004	11.7	11.9
Malawi	1996	27.4	28
	1997	25.7	26.2
	1998	20.3	20.6
	2001	12.9	13.1
Nigeria	1999	25.3	25.6
	2000	25.3	25.6
	2001	25.3	25.6
	2002	26.7	27.1
Uganda	2001	8.4	8.4
	2002	8.3	8.3
	2003	7.9	7.9
	2004	7	7
Zambia	1993	25.6	25.8
	1997	13.4	13.6
	2002	11.4	11.5

Zimbabwe	1999	18.6	19
	2001	19.1	19.5
	2002	15.3	15.6
Cameroon	1994	17.9	18.1
	1995	17.5	17.7
	2001	17.3	17.5
	2002	17.3	17.5
Senegal	2001	11.8	12
	2002	11.7	11.9
	2003	11.7	11.9
	2004	11.7	11.9
South Africa	2001	7.9	8.2
Tanzania	1997	22.6	22.4
	1998	22.9	22.7
	2000	15.9	16.2
	2003	12.9	13.3

Source: Babatunde (2009)

Table 4: Summary Statistics of Variables

Variable		Mean	Std. Dev.	Min	Max	Observations	
lnmex	overall	14.02588	1.838678	10.75708	17.99169	N =	216
	between		1.900515	11.30888	17.11063	n =	8
	within		.4534028	12.73898	15.69689	T =	27
lnprx	overall	13.79785	1.610779	10.67232	17.04438	N =	216
	between		1.659933	11.28723	16.17341	n =	8
	within		.4152585	12.49361	15.45153	T =	27
lnmax	overall	11.29875	2.436117	6.017693	17.40869	N =	216
	between		2.487227	7.627901	16.19205	n =	8
	within		.7046131	8.263004	13.13191	T =	27
lnreer	overall	4.902312	.566824	3.946038	8.263002	N =	216
	between		.2677293	4.5984	5.415845	n =	8
	within		.5082111	4.019571	7.74947	T =	27
lnpc	overall	15.59875	1.604275	13.23458	18.94428	N =	216
	between		1.692392	13.52395	18.58676	n =	8
	within		.2363783	15.09171	16.36751	T =	27
lnfit	overall	13.80032	.4477105	11.02076	15.90371	N =	216
	between		.250086	13.59448	14.31229	n =	8
	within		.3813987	10.50878	15.65578	T =	27
lntr	overall	3.016953	.4695519	1.757858	5.928618	N =	216
	between		.3547344	2.382974	3.529567	n =	8
	within		.3314512	2.034217	5.511829	T =	27
lnrmi	overall	12.20018	1.391389	7.458057	16.63647	N =	216
	between		1.267264	10.34807	14.55272	n =	8
	within		.7240273	6.662552	14.28393	T =	27

Table 5: Pairwise Correlation Matrix

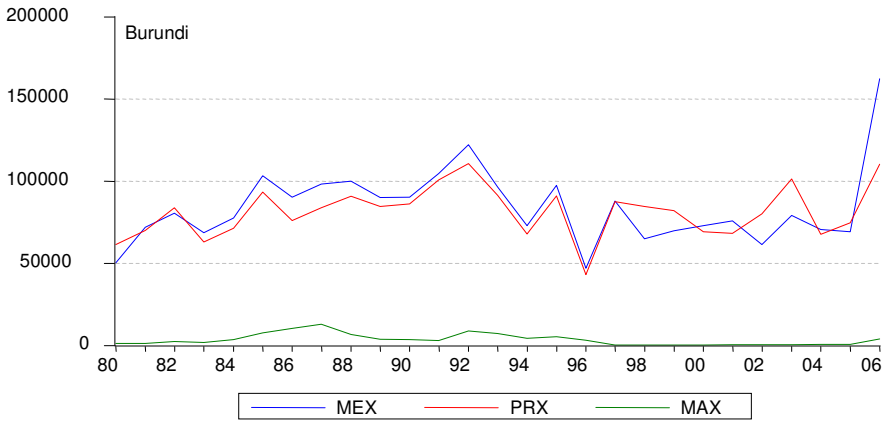
	lnmex	lnprx	lnmax	lnreer	lnpc	lnfit	lntr
lnmex	1.0000						
lnprx	0.9839	1.0000					
lnmax	0.8237	0.7462	1.0000				
lnreer	-0.0451	-0.0267	-0.0271	1.0000			
lnpc	0.9654	0.9390	0.7874	-0.0045	1.0000		
lnfit	0.4900	0.4885	0.3253	-0.1493	0.4868	1.0000	
lntr	-0.3949	-0.3068	-0.6414	0.3155	-0.3646	-0.3887	1.0000
lnrmi	0.8222	0.7694	0.7941	0.0053	0.8239	0.6175	-0.6449

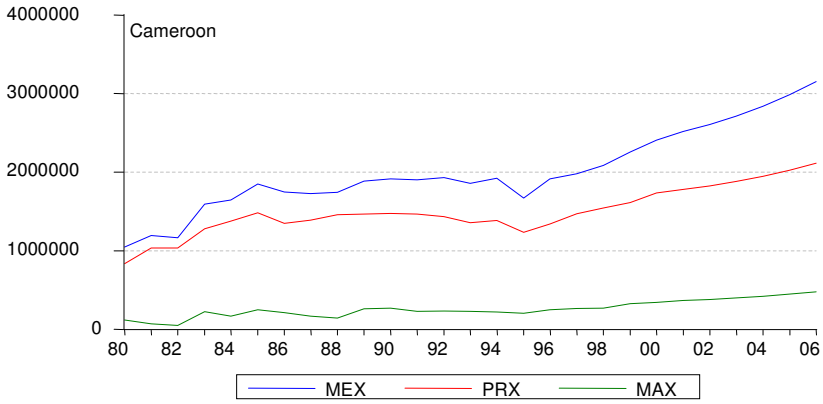
	lnrmi
lnrmi	1.0000

Table 6: Hausman Test for Fixed Effect Vs Random Effect

	Merchandise Export	Primary Commodity Export	Manufactured Export
Chi2(6)	7.71	4.48	0.10
Prob > chi2	0.2601	0.6118	1.0000

Figure 1. Trends in Export Performance of Merchandise, Primary Commodity and Manufactured Exports for the Sample Countries (Values are in ,000s)

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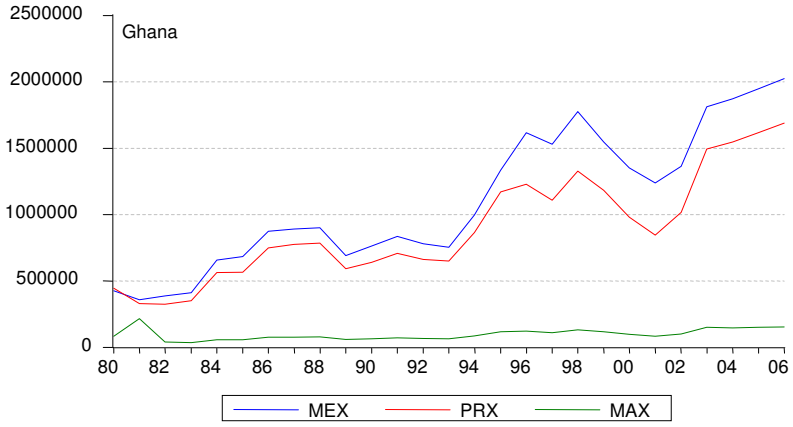
PRX
MAX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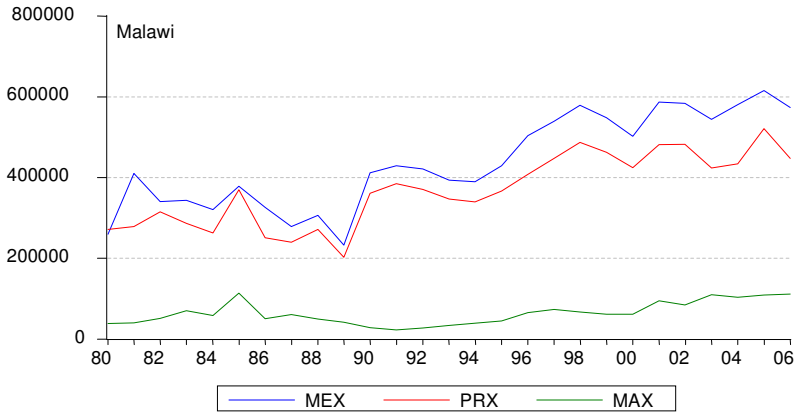
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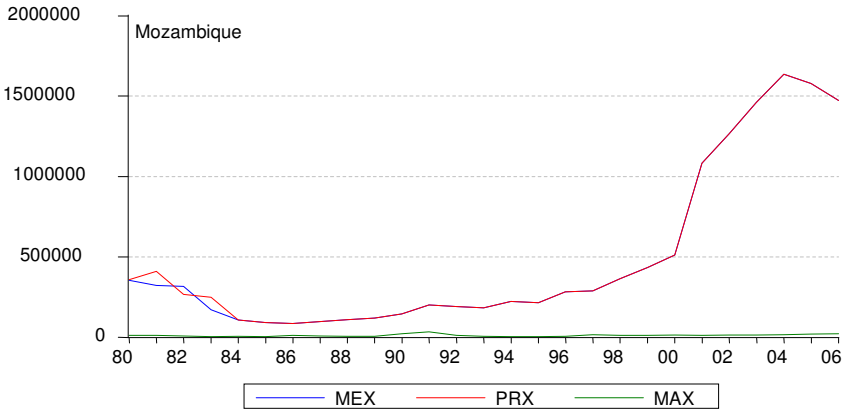
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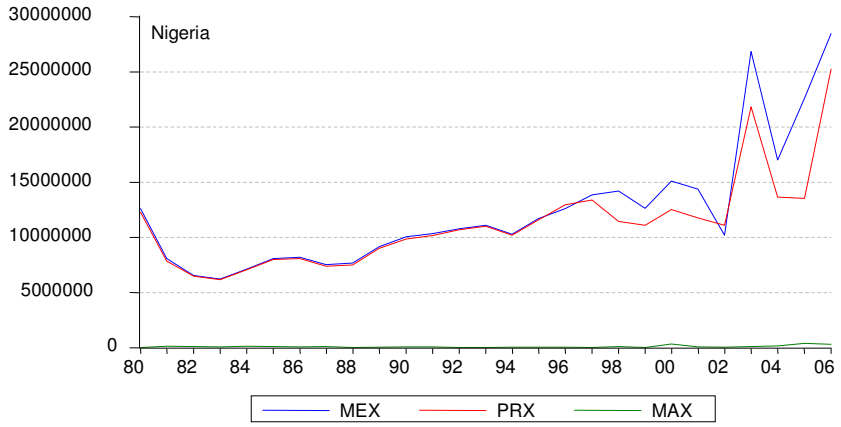
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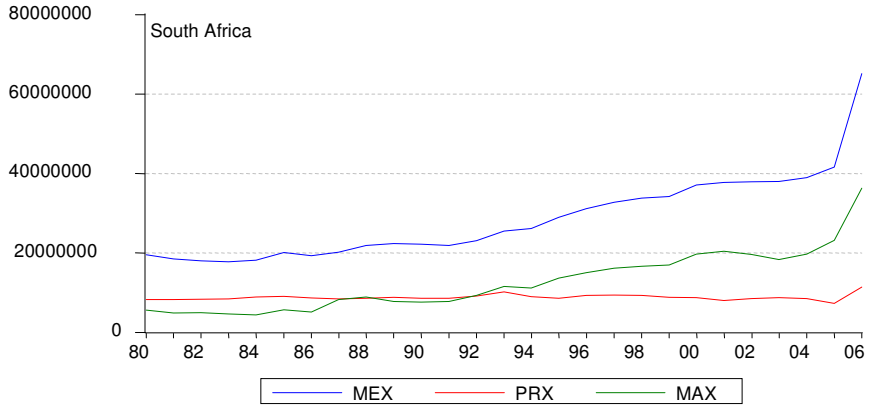
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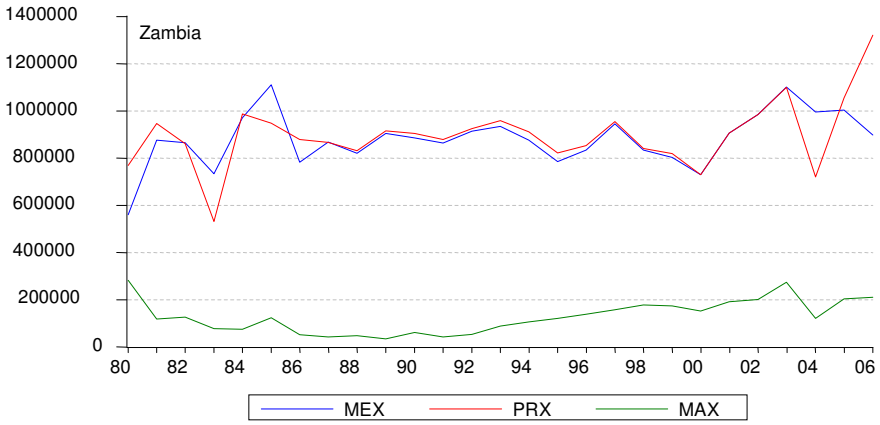
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MAX

Table A1: Description and Sources of Variables used in the Analysis

Variables	Description	Data Source
MEX	Merchandise Export (Constant 1987 US$)	World Bank Africa Development Indicators 2008/09
PRX	Primary Commodity Export(Constant 1987 US$)	World Bank Africa Development Indicators 2008/09
MAX	Manufactured Export(Constant 1987 US$)	World Bank Africa Development Indicators 2008/09
REER	Real Effective Exchange Rate to measure relative price	World Bank Africa Development Indicators 2008/09
PC	Production Capacity which is proxy by GDP at market price (Constant 2000 US$)	World Bank Africa Development Indicators 2008/09
FIT	Foreign Imported Technology proxy by Foreign Direct Investment , net inflows (Current US$)	World Bank Africa Development Indicators 2008/09
TR	Average Tariff Rate	hhttp://siteresources.worldbank.org/INTRANETTRADE/Resources/tar2002.xls
RMI	Raw Material Import (Constant 1987 US$)	World Bank Africa Development Indicators 2008/09
TLD	Trade Liberalization Dummy	UNCTAD Economic Development in Africa 2008

Table A2: List of Countries used for Empirical Analysis

Burundi
Cameroon
Ghana
Malawi
Mozambique
Nigeria
South Africa
Zambia

Declaration

I, the undersigned, declare that this project work is my original work and has not been presented, in part or whole, in any other university or college. All sources of the materials used for this project work have been duly acknowledged.

Name _____

Signature _____

Date _____