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Determinants of Export Performance in East Africa Countries

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The main objectives of this study are to identify and analyze variables which have impact on export performances of seven East Africa countries and suggest possible solutions to improve export performance in East Africa. Using data from World Development Indicators database we conducted panel data analysis for the period of 1990-2014. Empirical results show that labor force, industrialization, foreign direct investment, and exchange rate have positive impact on export value. On the other hand, inflation has negative impact on export performance while GDP growth is the only variable that does not affect the export value of East Africa countries. Finally, we suggest some recommendations, including the need of replacing agricultural exports by the industrial export, improving infrastructural facility as well as the quality of human capital and the need of policies for attracting international investors.

Keywords: export performance, East Africa, panel data analysis, international trade

Introduction

Export is an activity in which products are made or grown domestically but shipped and sold abroad (Griffin & Ebert, 1995). Exports are believed to be important role of economic growth, which facilitates the process of economic development. Exports are a component of aggregate demand. Rising exports will help increase aggregate demand and cause higher economic growth. Export contributes to improving the payments of balance, rate of employment, and living standards; therefore, a number of governments attempt to help and encourage their exporters to export more (Doaei, Kazemi, & Hosseini Robat, 2010). The main objective of this study is to analyze the determinant of export performance in East Africa during 1990-2014 and to suggest possible solutions to remedy the problem of poor export performance and make an important step towards understanding why East Africa export was actually worse. The thesis is organized as follows: first part we reviewed previous researches related to our study to identify factors influencing export performance; second part we extended the methodology of study; third part was empirical results and interpretation, and we concluded the study with conclusions and some recommendations.

Literature Review

Several literature reviews indicated the most frequently important variable used to explain export performance. To identify factors influencing export performance in East Africa we used variable that seems to be important for our research such as growth domestic product, labor force, industrialization, foreign direct

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investment, inflation, and exchange rate. In this chapter we will review similar variables that the other researchers used and their results.

Researches concerning the relationship between exports and GDP are important and primary topic of research in the economic. F. S. T. Hsiao and M. W. Hsiao (2006) carried out relationship among foreign direct investment, export, and gross domestic product for eight East and Southeast Asian economies using Granger causality test and analyzed annual panel data for the period between 1986 and 2004 and found that there is bidirectional causality between exports and gross domestic product. Rodrik (1999) investigated a regression analysis on pooled cross section and time series data for 1964-1994. Using export growth rate as a function of a wide range of determinants in a sample of 37 sub-Saharan Africa countries, it was established that gross domestic product has a statistically significant effect on growth of export. Xu (2000) used empirical support for the hypothesis that primary exports positively affect economic growth. Xu used a VAR approach for 74 countries as a sample over the period 1965-1992 and found that 55 of the 74 countries demonstrate positive effects of primary export growth on long-term gross domestic product growth. Kumar (1998) focused study on the determinants of export performance in the developing countries and confirmed that gross domestic product has a positive effect on exports. Tyler (1981) studied the measure of export growth by taking 55 countries over the yearly time period 1960-1977, finding a positive relationship between export growth and economic growth. However, as previous researchers investigated, gross domestic product is most important to evaluate the performance of export, which means that in a country the domestic production has a positive relation with export performance.

Labor force is an important factor to be included on determinant of export. According to theory of factor endowment, an industry should export goods which are produced using the relatively abundant resources of the home country. Majeed and Ahmed (2006) worked study on the determinants of exports, using panel data ranging from 1970 to 2004 over 75 developing countries. The exports equation was specified with foreign direct investment, gross domestic product, GDP growth rate, Communication facilities, real effective exchange rate, indirect taxes and labor force as exogenous variables. The estimation strategy was based on the random effect model. All the variables carry significant magnitudes with correct sign except foreign direct investment which is insignificant although it has its expected sign. Moreover, products of exportation manufactured by labor intensive industries can improve export base of any developing country.

Industrialization is also one of the important factors that lead to overall development of a country. Industrialization contributes huge production of goods. Countries' number of industry has positive influences on the export performance and all developed countries of the world are industrialized.

Belso-Martinez (2006) studied the relationship between industrial districts (or clusters) and the export performance in SMEs. She showed that there is a positive and significant relation between the firm location in the district and networks (network of competitor and network of institutions) and the EP of Spanish SMEs in a given area. Mamoru (2005) pointed out that export-led industrialization was the backbone of East-Asian economic miracle that began in the 1980s. Gao, Murray, Kotabe, and Lu (2010) found that industry in stability, stage of the industry, technology diffusion and number of rivals in the industry are important determinants of countries' export performance. Nicholas (2008) investigated the cause between export, industrial and production of agriculture in Tanzania using yearly time-series data from 1970 to 2005. Results show that agricultural growth increased export. Export is also Granger's cause of industrial production and agriculture. Hasan, Mitra, and Ramaswamy (2007) using state and level of industry data on unemployment rates and trade

protection from India found that unemployment rate declines trade performance. Zalk (2014) argued that no countries have attained rapid and sustained growth and high income levels without industrialization. He further advises that there should be physical transformation of raw materials into value-added products.

Empirical studies have found a significant and positive relationship between foreign direct investment and export performance. Sharma (2003) evaluated India's export behavior, but with a focus on the influence of increasing foreign direct investment in India on export supply capability. Sharma argued that the success of the East and South East Asian countries suggests that foreign direct investment is important variable of export promotion. Zhang (2006) forwarded in his study of foreign direct investment and China's export performance that one of FDI's major potential growth-contribution is to promote countries' exports. According to world trade organization, annual report which dealt with aspect of the relationship between trade and FDI to know whether FDI and trade are substitutes (negatively correlated) or complements (positively correlated) concludes that FDI is positive for both home and host countries' exports. Generally, many other studies indicated that FDI actually has a positive effect on export performance of host countries.

Exchange rate is also one of important factors that affect export value. In general, depreciation of a country's currency tends to encourage its exports. The depreciation of the currency makes its goods cheaper in international markets to compete other similar goods produced other country in the world. Bahmani and Ltaifa (1992) analyzed the effects of exchange rates on exports and results showed that exchange rates adversely affect exports. Sivri and Usta (2001), while studying the determinants of export growth in Turkey found that real exchange rate does not appreciably account for changes in exports. Fang, Lai, and Miller (2006) analyzed the impact of exchange rate depreciation on exports for eight Asian economies (Philippines, Malaysia, Indonesia, Japan, Singapore, Chinese Taipei, Republic of Korea, and Thailand) and they found that depreciation contributes exports for most countries, but its contribution to export growth is low and varies across countries. Wang, Buckley, and Clegg (2002) in their study found that exchange rate is one of the most important factors influencing China's exports with aggregated data for the period 1983-1999. Telak and Yeok (1998) showed that in the presence of high import content, export is not adversely affected by currency appreciation. Their justification for this result is in the presence of high import content appreciation results lower import price which in turn reduce cost of export. In response to the Sarkar's (1994), Nag and Upadhaya (1994) stated that exchange rate and exports performance of India is co-integrated from 1985 onwards.

The relationship between inflation and trade has been a subject of research, theoretical as well as empirical. Iyoha (1973) took sample of 33 less developed countries using OLS technique to estimate the results and found negative relationship between inflation and trade in the less developed economies. Muhammad (2010) examined relationship between trade openness and inflation in Pakistan using annual time-series data for the period 1947 to 2007. The empirical analysis shows a positive relation between trade and inflation in Pakistan. There are few studies on relation between export and inflation. This research is going to be one of the first such empirical evidence regarding to export and inflation.

Methodology

In this study the determinants of export performance in East Africa will be studied. The study is based on the seven East Africa countries states (Ethiopia, Madagascar, Kenya, Sudan, Mozambique, Tanzania, and Zambia) and covers the time period from 1990 up to 2015 and will employ annual data.

Originally, East African countries were selected but after checking the availability of all East African countries' data, seven countries were chosen from East African countries for which data on most of the variables were available. Data were analyzed using Stata 12 to perform the econometric analysis technique.

Data Source

In order to estimate export function annual secondary data were used for the study covering the period 1990-2014 over a sample of seven countries of East Africa countries. The countries are Ethiopia, Kenya, Madagascar, Mozambique, Sudan, Tanzania, and Zambia. Originally, East African countries were selected but after checking availability of data seven countries were chosen for which data on most of our chosen variables were available. Data for percentage growth of gross domestic product, gross domestic product, labor force, GDP percentage of industry value added, inflation, GDP percentage of foreign direct investment, and exchange rate were collected from World Development Indicators (WDI) in 2015.

Description of Variable

Table 1

Description of Variables

Variable	Description	Source
EXP	Export of goods and service	Data files of OECD National Accounts and World Bank national accounts data.
GDPG	Percentage growth of gross domestic product	Data files of OECD National Accounts and World Bank national accounts data.
GDP	Gross domestic product	Data files of OECD National Accounts and World Bank national accounts data.
LF	Labor force	Key indicators of the Labor Market Database and International Labor Organization.
IND	Industry value added as percentage of GDP	Data files of OECD National Accounts and World Bank national accounts data.
INF	Inflation	International Financial Statistics and data files and International Monetary Fund (IMF).
FDI	GDP of foreign direct investment as a percentage	International Financial Statistics and Balance of Payments databases, International Monetary Fund (IMF), World Bank, International Debt Statistics, and OECD GDP estimates.
EXCH	Exchange rate (units of local currency relative to the U.S. dollar)	International Financial Statistics and International Monetary Fund.

Model Specification

We specify the model showing the relationship between export value and selected variables as determinant of export to find out whether it has positive or negative effect on export performance. Linear regression model is as below:

$$EXP = \beta 0+\beta 1GDPG +\beta 2LF+\beta 3IND+\beta 4INF+\beta 5FDI+\beta 6EXCH +\varepsilon i$$

where,

Exp: Exports, is the value of all goods and other market services exported or provided to the other rest of the world, including the merchandise value, insurance, freight, all transport, travel, royalties, fee of license, and other services, such as telecommunication, financial, information, business, construction, and government services.

GDPG: Growth of Gross Domestic Product, represents annual growth rate of GDP percentage at prices of market and it's based on constant local currency. Aggregates are based on constant 2005 U.S. dollars.

LF: Labor Force, the rate of participation which is the proportion of the population ages 15 years and older and economically active.

IND: Industry, consists of value added in manufacturing (also reported as a subgroup separately), mining, electricity, construction, water, and gas.

INF: Inflation, is calculated and measured by the index consumer price.

FDI: Foreign Direct Investment, is net inflows in the economy report from foreign investors, and is divided by gross domestic product.

EXCH: Exchange Rate, is measured by calculating an average annual and it's based on monthly averages (units of local currency relative to the U.S. dollars) and determined by national authorities.

μ: represents an error term.

Correlation Analysis

Table 2

Correlation Results

Variables	EXP	GDPG	LF	IND	INF	FDI	EXCH
EXP	1.0000						
GDPG	0.0054	1.0000					
LF	0.2647	0.0311	1.0000				
IND	0.6094	0.0095	-0.0670	1.0000			
INF	-0.0781	-0.1902	-0.2548	0.2267	1.0000		
FDI	0.2987	0.1548	0.1596	0.2213	-0.1433	1.0000	
EXCH	0.1426	-0.1070	0.4634	-0.1874	-0.2060	0.0758	1.0000

Among the factors affecting export performance of East African countries, the effect of GDP is quite low. According to the result, GDP and export performance of selected African countries have no relation. While labor force is positively correlated to export performance, it has only 26% determining power on countries export. Among the variables taken into consideration, industry has the most significant correlation with export performance. With correlation value of 0.6094, it could be concluded that industrialization has 60% determining power on countries export performance. Unlike other factors, inflation is negatively correlated to export performance. Although the effect is quite insignificant, increase in inflation results in decrease in export performance. With 29% determining power, FDI has positive impact on Export performance. Finally, the positive effect of exchange rate on export is seen to be around 14%.

Empirical Results

We perform Hausman test to know whether fixed effect (FE) model or random effect (RE) model is appropriate, fixed effect model is more suitable to run then we go through Heteroscedasticity test and we faced Heteroscedasticity. To correct this Heteroscedasticity error, we perform FGLS (Feasible Generalized Least Square) method running the data with Homoscedasticity.

Gross domestic product growth was found to be statistically insignificant. Therefore, GDPG is the only variable that does not affect the exportation of East Africa countries but this is different from the previous researchers. Ngeno (1996) in his study of the determinants of Kenya's export statistically found when domestic

product increases growth of export increases. Rodrik (1999) used analysis of regression on pooled cross section and time series data for 1964-1994. Using export growth rate as a function of a wide range of determinants in a sample of 37 sub-Saharan Africa countries, it was established that gross domestic product has a statistically significant effect on export growth. The reason may be that much of East Africa countries' agricultural and other local products are used locally and not sold in international market.

Table 3

Regression Results With FGLS

Variables	FGLS X
GDPG	-0.0718637 (-0.69)
LF	0.1406623*** (3.90)
IND	0.7015112*** (14.34)
INF	-0.0425703*** (-3.55)
FDI	0.1575714*** (3.16)
EXCH	0.0019964 ** (2.08)
Constant	-4.432894 (-1.42)
Observations	165
R-squared	0.5124
F-prob	0.0000
Number of country	7

Notes. () Robust standard errors; * significant at 10%; ** significant at 5%; *** significant at 1%.

The next variable, labor force was significant at 1% level and as we estimated the hypothesis—its coefficient is a positive sign. This indicated that the increase of labor force results the increase of the value of exportation in East Africa countries. If the labor force was raised by one percent, the value of export would rise by 0.14%. Majeed and Ahmad (2006) in their study of determinants of developing countries' exports found that the impact of labor force on growth of exports is positively significant. Labor makes essential contributions to the agricultural and rural economies in all sub-Saharan African countries.

Industrialization had a positive sign and was significant at 1% level. These results denote that the value of export increases as industrialization increases. Statistically, 1% increase in industrialization would increase value of export by around 0.70%. This result highlights the importance of industrialization in East Africa countries. Zalk (2014) argued that no countries have reached rapid and sustained economic growth and high level of income without industrialization. He recommended that there should be physical transformation of raw materials into value-added products.

In regard to the inflation, the variable's coefficient had a negative sign but significant at the level of 1%. The increase of 1% in inflation would decrease export by 0.042%. Iyoha (1973) took 33 less developed countries as a sample using OLS technique to estimate the results and found that relationship between inflation and trade in the less developed countries is negative.

Foreign direct investment had also positive effect on export and was significant at 1% level. Increase of foreign direct investment by 1% raised the value of export on by 0.157%. Our finding is similar to that of Sharma (2000) who investigated the determinants of export performance using yearly data for the period 1970-1998 in India and found that the coefficient of foreign direct investment had a positive sign.

Exchange rate was also significant to the value of export. The coefficient of exchange had positive sign at the 5% level. Result indicates that the increase of exchange rate in 1% would rise about 0.002. According to Sharma, a fall in domestic prices due to exchange rate depreciation makes exports cheaper in the international markets resulting into their increased demand. Oztang (2000) also had similar studying and revealed that rate of real exchange is a statistically significant determinant of export performance.

Conclusion and Recommendation

International trade significantly played a crucial role in the historical economic growth achievement. Countries with higher international trade involvement achieve a higher and faster economic growth than those that have less involvement in international trade (Medina-Smith, 2001; Palley, 2011).

This research is performed to evaluate factors affecting export performance in East Africa countries. Data for percentage growth of gross domestic product, labor force, industry value added as percentage of GDP, inflation, foreign direct investment as a percentage of GDP and exchange rate were collected from WDI 2015.

Using annual data for 1990-2014, we have examined the determinants of export performance in East Africa countries. The empirical results show that labor force, industrialization, FDI, and exchange rate have positive impact on export value but inflation has negative impact on export value and GDPG is the only variable that does not affect the exportation of East Africa countries for the period of 1990-2014.

This study fills several gaps in the literature and has empirically investigated of the determinants of export performance in East Africa countries but there are other possible factors contributing to the export performance in East African countries such as trade policy, fiscal policy, consumption of the government.

Based on the finding of our study, we recommend the following:

- FDI is positively significant on export performance in East Africa. So the governments must increase the motive on international investors to attract more investors to improve export value and bring foreign exchange which are important for economic development.
- LF variable is positively significant with export so it's important to increase the productivity of labor in East Africa countries. Governments should spend more funding on improving education and skill and should also offer training.
- Industrialization also has a positive effect on export performance. East African countries need to replace agriculture exports by the industrial export. The industrialization will reduce dependence on imports by initiating the process of import substitution.
- Weak infrastructures are the main trade constraints in East Africa. Governments should make sure good infrastructural facility by improving transportation system and supply of energy such as electricity, gas and water.
- Corruption is now recognized to be one of the Africa's greatest challenges and has a negative effect on investment growth. So it's important that governments should take some steps to solve these problems and should make policy of transparency and accountability, increase the salary of employee to prevent corruption.

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Appendix

Data Statistic Results

Table 1

Pooled Ordinary Least Square Results

Source	SS	Df.	MS		Number of obs = 165	
					F(6, 158) = 27.68	
Model	6,552.7123	6	1,092.11872		Prob.> F. = 0.0000	
Residual	6,234.45622	158	39.4585837		R-squared = 0.5124	
					Adj R-squared = 0.4939	
Total	12,787.1685	164	77.9705398		Root MSE = 6.2816	
X	Coef.		Std. Err.	T	P > T	95% Conf. interval
GDPG	-0.0718637		0.1205642	-0.60	0.552	-0.3099891 0.1662616
LF	0.1406623		0.0462477	3.04	0.003	0.0493189 0.2320057
IND	0.7015112		0.0638342	10.99	0.000	0.5754328 0.8275897
INF	-0.0425703		0.0181625	-2.34	0.020	-0.078443 -0.0066977
FDI	0.1575714		0.0971137	1.62	0.107	-0.0342371 0.34938
EXCH	0.0019964		0.0009558	2.09	0.038	0.0001086 0.0038841
CONS	-4.432894		3.753941	-1.18	0.239	-11.84727 2.981486

Table 2

Fixed Affect Results

Random-effects GLS regression	Number of obs =165
Group variable: country	Number of groups = 7
R-sq: within = 0.4662	Obs per group: min. = 21
between = 1.0000	Avg. = 23.6
overall = 0.7824	Max. = 24
	Wald $chi^2(12)$ = 546.48
corr(u_i, X) = 0 (assumed)	Prob. > chi^2 = 0.0000

X	Coef.	Std. Err.	z	P > z	95% Conf. interval	
GDPG	0.2188872	0.0872588	2.51	0.012	0.047863	0.3899114
LF	1.065103	0.2379057	4.48	0.000	0.598816	1.531389
IND	0.5473354	0.0781941	7.00	0.000	0.3940778	0.700593
INF	-0.0175773	0.0131152	-1.34	0.180	-0.0432826	0.0081281
FDI	0.2094321	0.073385	2.85	0.004	0.0656002	0.353264
EXCH	0.0010147	0.0012242	0.83	0.407	-0.0013846	0.0034141
Country						
2	24.75073	3.664	6.76	0.000	17.56942	31.93204
3	5.551596	2.262413	2.45	0.014	1.117349	9.985843
4	2.142092	1.577527	1.36	0.175	-.9498036	5.233987
5	28.42547	7.43768	3.82	0.000	13.84789	43.00306
6	-6.649547	2.181185	-3.05	0.002	-10.92459	-2.374503
7	10.44121	2.469641	4.23	0.000	5.600799	15.28161
_cons	-84.32815	19.60159	-4.30	0.000	-122.7466	-45.90975
Sigma_u	0					
Sigma_e	4.2786734					
Rho 0	(fraction of variance due to u_i)					

Table 3

F-test Results

H0: POLS is appropriate so H0 is rejected meaning that the FE method is more appropriate.

F test thatallu_i = 0:	F(6,152) = 31.42	Prob. > F = 0.0000

Table 4

Random Effect Results

Random-effects GLS regression	Number of obs = 165
Group variable: country	Number of groups = 7
R-sq: within = 0.3681	Obs per group: min. = 21
between = 0.6296	avg = 23.6
overall = 0.5124	max = 24
	Wald $chi^2(6)$ = 166.07
corr(u_i, X) = 0 (assumed)	Prob> chi^2 = 0.0000

x	Coef.	Std. Err.	z	P > z	95% Conf. interval	
GDPG	-0.0718637	0.1205642	-0.60	0.551	-0.3081652	0.1644377
Lf	0.1406623	0.0462477	3.04	0.002	0.0500186	0.2313061
IND	0.7015112	0.0638342	10.99	0.000	0.5763985	0.826624
INF	-0.0425703	0.0181625	-2.34	0.019	-0.0781682	-0.0069724
FDI	0.1575714	0.0971137	1.62	0.105	-0.032768	0.3479108
EXCH	0.0019964	0.0009558	2.09	0.037	0.0001231	0.0038697
_cons	-4.432894	3.753941	-1.18	0.238	-11.79048	2.924696
Sigma_u	0					
Sigma_e	4.2786734					
Rho 0	(fraction of variance due to u_i)					

Table 5

Hausmann Test Results

H0: Random is appropriate so the fixed effect is the best to accept and reject ramdom effect.

	---- Coefficients ----			
	(b) fixed	(B) random	(b-B) Difference	Sqrt (diag(V_b-V_B)) S.E.
GDPG	0.2188872	-0.0718637	0.290751	
LF	1.065103	0.1406623	0.9244403	0.2333672
IND	0.5473354	0.7015112	-0.1541758	0.0451609
INF	-0.0175773	-0.0425703	0.024993	.
FDI	0.2094321	0.1575714	0.0518607	.
EXCH	0.0010147	0.0019964	-0.0009817	0.0007649

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$chi^2(6)$ = (b-B) [(V_b-V_B)^(-1)](b-B) = 33.62

Prob. > chi^2 = 0.0000

(V_b-V_B is not positive definite)

Table 6

Heteroscedasticity Test (Wald Test) Results

H0: homoscedasticity, H0 is rejected H0 meaning that there is heteroscedasticity of variances. To correct this error, we perform an FGLS method (Feasible Generalized Least Square method).

Modified Wald test for groupwise heteroskedasticityin fixed effect regression model
H0: $sigma(i)^2 = sigma^2$ for alli
chi^2 (7) = 369.08
Prob. > chi^2 = 0.0000