An Econometric Assessment of Livestock Export and Its Impact on Economic Growth in Somalia.

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ABSTRACT

Livestock holds a major role in Somalia's economy as it is postulated to be the largest sector, largest employer and a major income source for most households. This research, hence studies the role of livestock exports on economic growth in Somalia. The neoclassical production function model with an extension was employed in this study and the data were taken from the food and agricultural organization and the world bank from the period 1990 to 2015. This study utilized estimations on reliable econometric models such as Engle-Granger and Johansen co-integration tests and the Granger causality test. The outcomes of the study indicate that, cattle export, Sheep export and goat export have a positive and significant relationship with economic growth, whereas exports of camel have been found to have a negative and significant impact on economic growth. Based on the findings, this study recommends for implementation of policies that advances the effectiveness of veterinary services and the competence of staff in the quest for enhancement livestock production. Moreover, the study advocates that, the government finance research activities on enhancing the value of camels as well as enhancing the quality of transports for camels.

Keywords: Livestock-Export, Economic Growth, The Engle-Granger and Johansen Cointegration test, Granger causality, Somalia

1.0 INTRODUCTION

The livestock industry dominates Somalia's economy, creating almost 60 percent of the economy's job opportunities, creating about 40 percent of Somalia's GDP and 80 percent of foreign currency earnings (European Commission, 2009). Consequently, the economy is boosted by the quantity of meat and animals exported and this has steadily changed livelihoods especially in the rural areas.

In 2014, Somalia exported a total record of 5 million livestock to the Gulf of Arabia markets, sheep and goats totaling 4.6 million, with 340,000 cattle and 77,000 camels which were estimated to the tune of $360 million thereby contributing 40% to the country's GDP. This is the maximum recorded number of live animals that Somalia exported in the past 20 years. (FSNAU, 2014).

Classical economist like Adam Smith and David Ricardo projected that, international trade is the core source of economic growth for every nation and a more economic gain is reached from specialization. Again, growth assumption according to literature shows that, exports are a major source of economic growth. This assumption from classical economist has several numbers of theoretical rationalizations; I: In the short run, there is the Keynesian arguing that, export growth leads to income growth through the foreign exchange multiplier. II: from increasing exports more foreign exchange is gained, which contribute to growth by importing capital goods, manufacture goods and technology. III: The economies of scale, technological development, and growth lead by competition. VII: The export sector may produce positive externalities, such as more efficient management, better production techniques, and expertise about product design which lead to economic growth. Availability of foreign exchange reserves can increase exports, which can be used to import capital goods. Obtainability of capital goods will upsurge domestic production and improve deficits in the balance of the payments. Export can lead to the increase of investment level, as the resultant increase in wealth creation and job opportunities because of these economic growths can be observed (Jordaan & Eita, 2007); (Awokuse, 2007); (Kónya, 2006).

Additionally, country can enhance activities that chief to develop through R&D services which can be absorbed from advanced economies through trade(Chen, 2009); (Yanikkaya, 2003).

Livestock export is vital to many developing economies especially countries located in the Horn of Africa. Humans get a main sources of protein from animals and these animals again provide income, employment and foreign exchange for country. For many peasant farmers and families, livestock serves up as a stock of wealth, provides draught power and source of organic manure for crop production, also serves as means of transport and plays a role in social functions. The consumption of livestock products in the world has increased rapidly. This enhance in the sector provides opportunities poor families to enhance their daily lives and livelihood.(Leonard, 2007). Somalia's export sector depends mainly on a very few of these livestock such as camel, cattle, goat and sheep. Though the country is reliant on agricultural exports, only one researcher (Isak & Ali, 2015) has investigated the Contribution of Livestock and crop production on Somali export. To the greatest knowledge of the author no study has been conducted on the effect of livestock export on economic growth. Hence, this research fills the knowledge gap in the literature through an econometric study of the impact of livestock export (camel, cattle, goat, sheep) on Somalia's economic growth. The general aim of this research is to study scientifically the relationship between livestock export and economic growth in Somalia. Specifically, this study examines the impact of camel, cattle, goat and sheep exports on the growth of Somalia's economy. The study further investigates the direction of causality within livestock exports and economic growth.

This study goes further to throw more light on Somalia's economy and this serves as Frontlines of key contributions: First, this study elucidates further on the significance, nature of relationships and causality test of livestock exports and economic growth of Somalia. Secondly, there are a few literatures (AssociatesAustralia & Hassall, 2006) & (Vlad et al., 2015) that even focalized on the broad influence of livestock export on the economy. These literatures concentrated on the developed economy (Australia), and the developing economy (Romania) respectively whilst employing conventional approaches. Our study, unlike these earlier studies, specifically focalized on the influence of livestock export on economic growth of the developing economy, Somalia is using recent econometric model approaches such as the Engle-Granger, Johansen Cointegration and Granger causality test. These recent approaches reveal further the long-run equilibrium and causal effect of livestock (camel, cattle goat and sheep) exports on the economic growth of Somalia.

Therefore, this study has major relevance to key stakeholders because the knowledge of exports is crucial as it is the core creator of employment and affects the growth and development of Somalia's economy. The study is a wroth information portal for policy makers in international trade as such essential information is needed in formulating policies. Policy makers, economists and other interested groups need information on the precise factors that affect exports, the influence of experts from different sectors of economic growth (GDP) in all countries because it contributes to reducing poverty and creating jobs (Martine Hvidt, 2015).

It is expected that this study aids policy makers in an attempt to accelerate economic growth via examining the role of diversification in reducing the export instability and provide relevant information on four of livestock animals to foreign and local potential investors who require to it invest their capital in the sector.

The other aspects of the study are organized as follows: Section two based on empirical review. Section three data description and methodological framework. Section four Empirical results, analysis and discussions of the outcomes. And Section five concludes the study along with recommendations.

2.0 EMPIRICAL REVIEW

From study and available literature, economic growth has direct relationship with export especially for developing countries as empirical research conducted within the last two decades explore economic growth and the influence by export using cross-sectional multidimensional level and time series data analysis with varied findings.

Most studies conducted economic growth and export relationship since the early 70s to the late 1990s are grouped into three main categories, with several studies examining export and economic growth correlation in the early 70s as seen in (Chenery & Strout, 1966), (Michaely, 1977), (Balassa, 1978), (Heller & Porter, 1978) and (Kormendi & Meguire, 1985). Researchers measured the correlation coefficient and explored the nature of relationships between exports and economic growth. These researchers found that a positive and significant correlation existing between economic growth and export within a country.

Regression analysis method was also used by some studies in the 70s and 80s with the likes of (Voivodas, 1973); (Balassa, 1985) (Ram, 1987).

Findings from the above researchers depicted a positive and highly significant value of the coefficient of growth of export variable after using neo-classical growth equations.

Again, the use of causality between economic growth and export using the Granger Causality test i.e. VAR method was employed by other researchers like (Dodaro, 1993) ,(Ahmad & Kwan, 1991) ,(Bahmani-Oskooee et al., 1991) and (Chow, 1987). Due to the not taking into accounts standard unit roots and cointegration, therefore their findings and results lead to uncertainties when using as inference.

AssociatesAustralia and Hassall (2006), estimated livestock export industrial Value, Outlook and Contribution to the Economy in Australia. The Authors employed a general equilibrium model to determine lives of sheep, dairy cattle, cattle and goat export sector of the national economy of Australian. The General equilibrium modelling incorporates all sectors of the Australian economy, within one dynamic framework. Average annual live export between 2000 to 2004 were used for analysis. The findings of the study displayed that the lives of sheep, dairy cattle, cattle and goat exports are contributing to GDP 39%, 8%, 52% and 1% respectively.

Vlad *et al.* (2015) studied the seasonality and forecasting in Romanian's trade with live Animals. Authors were examined dynamics and seasonality in Romania's international exchanges regarding live animals and animal products. They were initially drawn an overview of Romania's trade of agro-food and live animals based on the time series data, and then focused on the average rhythm of growth with modelled aspects of the seasonality in a time series from 2004 to 2013 by adapting additively and multiplicative methods. Findings of the study indicates that the live animal trade in Romania is one of the top three sectors with positive balance of trade and the rhythm of growth in the exports increased faster than for the imports.

Tiffin and Irz (2006) studied 85 countries by investigated the causality between GDP (gross domestic product per capita) and (AVAPW) agricultural value added per work. Using time range 1960 to 1971.The granger causality test was employed to examine the direction of causality. findings of the study indicated that AVAPW causes GDP. But in the in the case of developed nations outcomes are not quit clear.

The recent study by Verter and Bečvářová (2016) investigated the role of agrarian export in economic performance of Nigeria. Using time range 1980 to 2012 by employed Granger least square and granger causality test. Both of these methods confirmed that exports improving wellbeing of Nigeria.

Gilbert et al. (2013) Studied the impact of agricultural exports on economic growth of Cameroon with the reference of coffee, banana and cocoa by employed cointegration analysis. The findings of the study indicate mix outcomes. Banana export and Coffee export have a positive and significant effect on economic growth. While, cocoa export has gotten insignificant and negative impact on economic growth. Finally, the study suggested that the policies implementation aimed to enhance the quality and productivity of these cash crops and specifically value addition to cocoa and coffee before exporting to enhance the economic growth of Cameroon.

Forty-two (42) of selected under-developed countries have been studied, for their contribution of agricultural export to economic growth, using panel cointegration method. As independent variable both agriculture and non-agricultural export were used to determine the dependence variable which is economic growth (GDP). The findings of the study indicated that, 33 developing countries had positive elasticity for agriculture exports. By the same token for 37 countries, the elasticity of non-agriculture export was also positive. Based on empirical findings, the study recommended that low income countries should adopt balanced export promotion policies, but rich countries might reach high economic growth from non-agriculture exports. (Sanjuán-López & Dawson, 2010).

The study, therefore, seeks to examine the impact of livestock export on economic growth of the developing economy, Somalia using recent econometric model approaches. It is envisaged that the study will provide key information to policy makers in their efforts to stimulate the growth of the economy as the study look for to reveal the long run and causality effect of livestock export on the economic growth of Somalia.

3.0 DATA AND METHODOLOGY

This section designates the nature and source of data for the study. The study further elucidated the econometric procedures.

3.1 Nature and Source of Data.

This study is mainly based on secondary data. It comprises of annual export data of paramount livestock in Somalia and for other control variables stated in the model. The two main sources of data are the following: The Food and Agricultural Organization statistic data on countries' trade (FAOSTAT) and The World Bank Development Indicators (WDI). The time series data covers 1990 – 2015. The study period of 25 years was selected because of the availability of data for all the variables under studied.

Table 1. Description of the variables and their anticipated signs.

Variable	Variable name	Expected sign	Empirical findings
GDP_t	Gross domestic product (Dependent Variable)		(Mahmood & Munir, 2017) &(Syed et al., 2015)
TLf_t	Total labor force	+	(Faridi, 2012)&Gilbert et al., 2013)
CA_t	Gross Domestic Fixed Capital Formation	+	(Shah & Farooq, 2015) &(Yifru, 2015).
ER_t	Exchange Rate	+	(Aman et al., 2017)
$CAMLX_t$	Camel Export	+	(Samanter;Hassan, 1990) & (Kadle et al., 2018)
$CATLX_t$	Cattle Export	+	(FAO, 2015) & (Kulshreshtha et al., 2012)
$GOUTX_t$	Goat Export	+	(FAO, 2015) & (Kulshreshtha et al., 2012)
$SHEPX_t$	Sheep Export	+	(Babiker et al., 2011).

3.2 Model specification

This study employed Neoclassical Production Function Model , developed by Solow (1956). The model seeks to estimate the long-run economic growth of Somalia by taking into cognizance the Capital Accumulation and Labour, in this study did not emphasis on the non-economic variables of the classical growth theory. The following models were assessed based on the Neoclassical Production Function:

$$Y = F(L_t, K_t) \qquad (1)$$

Where Y depicts the output; L denotes Labour and K denotes capital.

This production function is expanded by adding livestock exports as shown in equation 2.

$$Y_t = F(L_t, K_t, CAML_t \ CATLX_t, GOATX_t, SHEPX_t) \qquad (2)$$

To reflect the price competitiveness in the international markets, the model 2 is re-written in equation 3 by adding Exchange Rate as follows:

$$GDP_t = f(TLf_t, CA_t, ER_t, CAML_t \ CATLX_t, GOATX_t, SHEPX_t, \mu) \qquad (3)$$

GDP_t Is the Gross Domestic Product, TLF_t Is the Total Labour Force, CA_t Is the Gross Domestic Fixed Capital Formation, ER_t ,Exchange Rate $CAML_t$ Is Camel Export, $CATLX_t$ is Cattle Export, $GOATX_t$ Is Goat Export, $SHEPX_t$ is Sheep Export and μ is the Random disturbance.

From the Equation 3, the study derived the Equation 4 by taking the natural logarithm on both sides of equation 3 in order to discard the differences in the units of measurements for the variables and to minimize the gap between independent variables and dependent variables.

$$GDP_t = \beta_0 + \beta_1 lnTLf_t + \beta_2 lnCA_t + \beta_3 lnER_t + \beta_4 lnCAML_t + \beta_5 lnCATLX_t + \beta_6 lnGOATX_t + \beta_7 lnSHEPX_t + \varepsilon_t \qquad (4)$$

β_0 Is the Constant Term and $\beta_1, \beta_2, \beta_3. \beta_4, \beta_5, \beta_6$ and β_7 are the parameters of independent variables to be estimated.

3.3 Estimation of the Econometric Models

This section entails the procedures for the estimation of the specified models. The study assessed the long run relationship and causalities between Livestock Exports and Economic Growth of Somalia uses Stata 13.0.

3.3.1 Investigation of Stationarity and Non-Stationarity of the Variables

Unit Roots Test

In this study, time-series data of macro-economic nature was used for the estimation of the model. The data generating processes exhibit trends and volatility which could result in a non-stationary issue. A non-stationary time series has a different meaning at different points in time and its variance increases with the sample size.

As a rule, a non-stationary data, are unforeseeable and cannot be demonstrated. So that a non-stationary data should transform in to into stationary, in order to achieve a reliable outcome. (Gujarati, 2004).

Augmented Dickey-Fuller is used in this study to examining the presence of the unit root problem. The following in equation 5 is evaluated:

$$DX_t = \alpha + PX_{t-1} \varepsilon_t \qquad (5)$$

3.3.2 Co-integration test

The study seeks to examine the presence of a cointegration relationship among livestock export and economic growth of Somalia. Co-integration is the statistical implication of the existence of the long run relationship between the variables which, are individually non-stationary at their level form, but stationary after the first difference (Gujarati, 2004) .Two main procedures were used in this study to test for co-integration:(Engle & Granger, 1987) test and (Johansen, 1988) co-integration test. By using the fallowing equations 6 and 7.

$$\varepsilon_t = Y_t - \beta_0 - \beta_1 X_t \qquad (6)$$

$$\Delta Y_t = \alpha\beta' Y_{t-1} + \sum_{t=1}^{p-1} \Pi i \Delta Y_{t-1} + \varepsilon_t \qquad (7)$$

3.3.3 Granger causality

To reveal the direction of the causality among the utilized variables, the Granger causality test was used. In such multivariate time series analysis, the causality test was performed to check which variable causes the other. Given two variables X and Y; X is said to Granger Impact Y if lagged values of X forecast Y. If lagged values of X forecast Y and at the same time lagged values of Y forecast X, then there is a bi-directional causality between X and Y. Considering the bivariate time series: Y_t and X_t ; The Series Y_t fails to Granger impact X_t if the coefficients of the regression Y_t on lagged Y's and lagged X's of the latter are zero.

Thus, considering the Equation 8:

$$Y_t = b_0 + \sum b_j Y_{t-j} + \sum c_j X_{t-j} + \varepsilon_t \qquad (8)$$

Then, if $c_j = 0$ and $j = 1, 2. . . K$, X_t fails to cause Y_t. The study tests the hypothesis that $H_0 : C_j = 0$ against H_1: $C_j \neq 0$ by using a Chi-test. In this study, we specifically examined if camel export, cattle exports, goat export and sheep export Granger cause economic growth (proxy by GDP) or vice versa. This is mathematically estimated as shown in Equation 9-16.

$$lnGDP_t = b_0 + \sum_{i=1}^{n} b_j lnGDP_{t-j} + \sum_{i=1}^{n} c_j \, lnCAMLX_{t-j} + \varepsilon_t \qquad (9)$$

$$lnCAMLX_t = b_0 + \sum_{i=1}^{n} b_j lnCAMLX_{t-j} + \sum_{i=1}^{n} c_j \, lnGDP_{t-j} + \varepsilon_t \qquad (10)$$

$$lnGDP_t = b_0 + \sum_{i=1}^{n} b_j lnGDP_{t-j} + \sum_{i=1}^{n} c_j \, lnCATLX_{t-j} + \varepsilon_t \qquad (11)$$

$$lnCATLX_t = b_0 + \sum_{i=1}^{n} b_j lnCATLX_{t-j} + \sum_{i=1}^{n} c_j \, lnGDP_{t-j} + \varepsilon_t \qquad (12)$$

$$lnGDP_t = b_0 + \sum_{i=1}^{n} b_j lnGDP_{t-j} + \sum_{i=1}^{n} c_j \, lnGOATX_{t-j} + \varepsilon_t \qquad (13)$$

$$lnGOATX_t = b_0 + \sum_{i=1}^{n} b_j lnGOATX_{t-j} + \sum_{i=1}^{n} \Sigma c_j \, lnGDP_{t-j} + \varepsilon_t \qquad (14)$$

$$lnGDP_t = b_0 + \sum_{i=1}^{n} b_j lnGDP_{t-j} + \sum_{i=1}^{n} c_j \, lnSHEPX_{t-j} + \varepsilon_t \qquad (15)$$

$$lnSHEPX_t = b_0 + \sum_{i=1}^{n} b_j lnSHEPX_{t-j} + \sum_{i=1}^{n} c_j \, lnGDP_{t-j} + \varepsilon_t \qquad (16)$$

4.0 RESULTS AND DISCUSSION OF THE STUDY

The study seeks to investigate the Impact of livestock export on economic growth in Somalia. In this section discusses the results from the descriptive statistics, cointegration test, and Granger causality test.

4.1 Table 2: The Summary (Descriptive) Statistics

	GDP	TLF	CA	ER	CAMX	CATLEX	GOATX	SHEPX
Mean	2.26E+07	72.75	20.2162	14390.49	32133.58	26819.69	44,334.35	184486.8
Std. Dev	1.36E+07	0.4012482	0.9004263	8916.054	96367.11	23266.68	44482.39	465828
Min	1738800	72.1	18.36769	1749.167	0	0	290	10500
Max	3.93E+07	73.4	23.04865	31900	498810	80114	152221	1764316
Skewness	-0.3219623	0.3712964	1.036051	0.4195699	4.615666	0.8064336	1.488558	3.151096
Kurtosis	1.514702	1.719089	6.463409	2.127906	22.88477	2.810977	3.931013	10.98729
Obs	26	26	26	26	26	26	26	26

The descriptive statistics as shown in Table 2 revealed that GDP at market prices is 2.26million shillings with a 1.36 million standard deviations. The average fixed capital formation is 20.2162 million shillings with a 0.9004263 standard deviation. The mean value of the labour force is about 73,000 people with a 0.4012482 standard deviation. The average exchange rate is 14390.49 with an 8916.054 standard deviation. On the average camel export is 32133.58 million shillings. During the period 1990 to 2008, the quantity of camel in Somalia that was exported was below the average export. Beyond 2008, however, there was an upshot in camel exportation, possibly due to some key interventions of the government, leading to an increment in export of camel over the main export. The average cattle exported in Somalia is 26819.69 million shillings. Cattle export in Somalia stood below its average from 1990 to 1995, though it witnessed an increase a year later. After these periods, cattle have been exported above its main export. On average, goat export is 44,334.35 million shillings. During the period 1990 to 2001, the number of goats exported were below its mean value, but beyond the year 2001, the quantum of goats exported in Somalia experienced a dramatic increase above its mean value. On average, sheep export is 184486.8 million shillings.

From 1990 to 2002 sheep has been exported below its mean value, but after that period onward, sheep export experienced a dramatic increase above its mean value. This could be attributed to many reform programs that have been put in place by the government.

All the variables except GDP are positively skewed. The GDP is negatively skewed. The kurtosis coefficient values of GFCF, CAMLX and SHEPX reflect the peak while the kurtosis coefficients of GDP, TLF, ER, CATLX and GOATX indicates the flatness. Overall, the skewness and kurtosis coefficients demonstrate that all the variables are normally distributed.

4.2 Unit Root Analysis

The result of augmented Dicker Fuller test was applied to all variables mentioned in the model of this study at level I (0) and first difference I (1) data at present in table 3. The lag length of this study is two and its decision is taken according (AIC) to the Akaike information criterion lag selection technique (Akaike, 1979).

Table 3: Augmented Dickey–Fuller unit root test.

Variables	Test at level form I (0)			Variables	Test at level form I (1)		
	ADF test statistics	5% Critical value	P-value		ADF test statistics	5% Critical value	P-value
lnGDP	-3.093	-3.600	0.1078	DlnGDP	-2.061	-1.950	0.0000*
lnTLF	3.042	-3.600	0.1206	DlnTLF	-1.916	1.771	0.0357**
lnCA	-1.802	-3.600	0.7039	DlnCA	-3.763	1.771	0.0007***
lnER	-1.858	-3.600	0.6761	DlnER	-3.116	1.771	0.0030***
lnCATLX	-2.754	-3.600	0.2145	DlnCATLX	-6.008	-1.771	0.0000***
lnSHEPX	0.121	-3.600	0.9953	DlnSHEPX	3.415	1.771	0.0014***
lnGOATX	-1.517	-3.600	0.8231	DlnGOATX	-2.974	-1.771	0.0041***
LnCAMLX	-2.115	-3.600	0.5375	DlnCAMLX	-2.100	-1.771	0.0279**

***, ** and *indicates level of significant at 1% ,5% and 10% respectively.

The Augmented Dickey Fuller (ADF) test statistics as shown in Table 3 failed to reject the null hypothesis of the presence of a unit root in all our time series data at levels as the p-values of all the series were greater than 0.05 (p> 0.05). However, after the 1st differences, we rejected the null hypothesis of the presence of a unit root in the variables as all the p-values of unit root tests were less than 0.05 (p< 0.05). In other words, after the first differences, the ADF test statistics of all the variable series data were greater than the critical value. So, this showed that, the series data is stationary at first difference and hence the variables are considered as integrated of order one or I (1) process.

4.3 Tests for Co-integration

All the variables are integrated of order one I (1), meaning the variables share common trend and long run equilibrium. Then the next step is to evaluate the long-run relationship between livestock export and economic

growth in Somalia using Johansson maximum likelihood methods and Engel and Granger procedure. To proceed with Johansen co-integration method, the lag order and deterministic trend assumption for the VAR was computed.

Table 4: Test for the number of co integration vectors

Maximum rank	trace statistic	5%critical Value	1% critical Value	Max statistic	5% critical value	1% critical value
0	815.3217*	156.00	168.36	545.0195*	51.42	57.69
1	270.3022*	124.24	133.57	80.4539*	45.28	51.57
2	189.8483*	94.15	103.18	60.2633*	39.37	45.10
3	129.5850*	68.52	76.07	54.3457*	33.46	38.77
4	75.2392*	47.21	54.46	32.2691*	27.07	32.24
5	42.9702*	29.68	35.65	28.4847*	20.97	25.52
6	14.4855	15.41	20.04	14.0039	14.07	18.63
7	0.4815	3.76	6.65	0.4815	3.76	6.65

* indicates that both trace and max static is significant at 5% and 1%

The Table 4 shows the co-integration test results for the economic growth model based on the maximum and trace Eigen values. According to the test, there are total eight vectors of targeted variables, and the six out of eight are integrated at 5% and 1% level of critical value. Both Trace and max statistics are greater than the critical value of 5% and 1% for all these 5 vectors therefore, the null hypothesis of no Co integrated vector was rejected against the alternative hypothesis of Co integrated vector at 5% and 1% level of significance level.

Table 5: Unit root test of Residual

	Test Statistic	1%Critical Value	5% Critical value	10% critical value
Z (t) **p-value for Z(t) =0.0165**	-2.574	-2.896	-1.860	-1.397

Null Hypothesis: Residual has a unit root.

The outcomes in Table 5 showed that the ADF test statistic in absolute term is greater than the set of critical values provided b**y (**Davidson & MacKinnon, 1993) at 5% and 10%. The test- statistics value is greater than the critical values at 5% and 10%, so the null hypothesis of no co-integration was rejected for the entire model. The evidence of co-integration by both methods indicates the existence of the long run relationship among the variables.

This confirms that sheep export, camel export, cattle export, goat export, labour force, gross fixed capital formation and exchange rate are long-run determinants of economic growth of Somalia.

4.4 Discussion of the Impact of Livestock on Economic Growth of Somalia.

This section discusses the effect of the stated four livestock export on the economic growth of Somalia. The variables are: goat export, sheep export, cattle export and camel export which are the main livestock export in Somalia.

Table 6: Long Run Relationship between Livestock Export on Economic Growth

lnGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnTLF	51.59954	8.311756	6.21	0.000***	33.30549	69.89359
lnCA	1.169958	1.277046	0.92	0.379	-1.640802	3.980718
lnER	0.9377401	.071148	13.18	0.000***	0.7811444	1.094336
lnCATLX	0.1342421	.0357961	3.75	0.003**	0.0554554	0.2130288
lnSHEPX	0.1910905	.0475657	4.02	0.002***	0.086399	0.2957819
lnGOATX	0.0774765	.0377264	2.05	0.065*	-0.0055586	0.1605117
lnCAMLX	-0.1233828	.0137926	-8.95	0.000***	-0.1537402	-0.0930254
cons	-220.0292	37.48509	-5.87	0.000***	-302.5333	-137.525

Prob > F = 0.0000

R-squared   = 0.9851

Adj R-squared = 0.9756

Durbin-Watson statistic =2.103538

Number of obs = 19

***significant at 1%, ** significant at 5% *significant at 10%

Almost all the coefficients are individually significant at the 1% level of significance, except lnGOATX which is significant only at 10%. It can also be observed that there is a positive significant relationship between the dependent variable lnGDP and five independent variables: the lnLF, lnER, lnCATLX, lnSHEPX and lnGOAX. This means that if one of these independent variables increases, the dependent variable will also increase and vice versa. These results confirmed to expectations as revealed in the extant literature with the exception of lnCAMLX which is contradictory to our expectations.

4.4.1 The Impact of cattle Exports on Economic Growth.

The findings from the Table 6 revealed that cattle export (lnCATLX) has a positive and significant impact on economic growth of Somalia. A 1% increase in cattle export results to increase 0.13 percent in economic growth. This result suggests the importance of cattle for Somalian economy.

This study supports the evidence provided by (FAO, 2015) report , in 2015 the income from cattle export contributed immensely to the GDP of Somalia. The outcomes of this study is in line up with the findings of (AssociatesAustralia & Hassall, 2006) in their study on the Live Export Industry: Value, Outlook and Role of Australia economy . Authors highlighted the significance of the live export industry in terms of gross value, impacts on regional businesses, domestic livestock markets and all of Australian economy. It was being found that the Live sheep and cattle exports are a major sector of the Australian livestock industry earnings. more than $830 million FOB in export earnings annually between 2001 and 2005 With approximately 4.2 million sheep and 57,3000 of cattle exported live in 2005, the trade accounted for 12% of the total sheep and lamb turnoff and 7% of total cattle turnoff.

The study further supports the report of (Kulshreshtha et al., 2012) which revealed the economic effects of livestock production in Canada. They vehemently assert that cattle production in Canada (and its various regions) intimately ties to economic activities, including slaughtering and meat production industries. Each of these live cattle production farms contributes to the economy, through direct impacts on the national / regional economy. For Canada as a whole, the cattle sector contributes $13.2 billion to a gross domestic product, and is directly or indirectly associated with the creation of 228,811 full time jobs.

4.4.2 The Impact of Sheep Exports on Economic Growth.

The results from the Table 6 revealed that sheep export (InSHEPX) has a significant and positive impact on economic growth of Somalia. A 1 percent increase in sheep export results to increase 0.19 percent in economic growth. This study affirmed the recent study of (Babiker et al., 2011). who investigated Sudanese live sheep and mutton exports competitiveness. found that mutton and sheep exports are profitable and internationally competitiveness. Livestock sector of Sudan provides livelihood for about 17% and it contributes about 19% of GDP.

4.4.3 The Impact of goat Exports on Economic Growth

The results as shown in Table 6, further revealed that goat export (lnGOATX) has a positive and significant effect on economic growth of Somalia. A 1 percent increase in goat export results in a 0.07 percent increase in economic growth and depicts to be less elastic in this study reveals.

4.4.4 The Impact of Camel Exports on Economic Growth.

The results shown Table 6 revealed that camel export (InCAMLX) has a negative and significant effect on economic growth of Somalia. The study shows that 1 percent increase in camel export resulted in decrease of economic growth by 0.12 percent. The main aspects of contributes to the negative impact of camel export on economic growth of Somalia is that, according (Samanter;Hassan, 1990): have been found I. Devaluation on Export and II. The high rate of Slaughtering of Camels. They further explained the other reasons for decline of camel's contribution to economic growth stems from the fact that most livestock carriers are mainly designed to transport only for cattle, sheep and goats, but not camels. The reason for this is that camels can be obtained from very few areas in the world and their export is very limited because camel meat is consumed in a few countries. The space available on livestock carriers is also not suitable for camels, which need to stand in a 3.5-meter-high space. These limitations cause delay in its transportation since most of the ships cannot accommodate camels. The waiting time for a suitable ship sometimes often extends into several months and consequently results in increases in the price of camels, which during that time have to be taken care of (watering, feeding and health care).

Kadle et al. (2018) has investigated the comparative concert of serological methods for diagnosis brucellosis in camels under the Somali context. Authors were found that the brucellosis disease was severe and dominant in majority of camels that were tested. And this might be another reason for why the camel export has negative influence on economic growth of Somalia.

4.5 The Control Variables.

This study employed three control variables: gross domestic fixed capital formation, labour force and exchange rate. The first two factors are initial inputs in the production function model that the study seeks to investigate their impact on economic growth of Somalia. The study, further seeks to incorporate the price competitiveness in the international markets, hence utilized the exchange rate to ascertain its indirect influence on economic performance via export channel. The essence of using these variables is to improve on the validity and reliability of our results.

4.5.1 The Impact of Total Labour force (TLF) on economic growth.

The long-run result between total labour forces(InTLF) and economic growth shows that there a positive and significant relationship. The outcome of the study indicates that 1 percent increase in total labour forced results to increase Economic Growth by 51 percent. This means that labour force expansion and economic growth in this study moves in the same direction. This is supported by (Faridi, 2012), who used labor as one of the independent variable in his model and found relationship between labor and GDP have positive and more elastic in Pakistan's economy. (Gilbert et al., 2013) also investigated the relationship between labor force expansion and economic growth in Cameroon confirmed that one of the sources of economic growth in Cameroon is vigorous or active labor force.

4.5.2 The Impact of gross domestic fix capital formation (lnCA) on economic growth

The Long-run relationship result between fixed capital formation (InCA) and economic growth indicates that there is a positive relationship but statistically insignificant. This positive sign indicates the direct of the relationship between capital and economic growth by confirming the neoclassical theory mentioned in model. And insignificance condition of the capital is indicating a low level of investment and low capital intensive economy of Somalia. This result is in line with the recent studies by (Yifru, 2015). Who investigated the Effect of agricultural exports on economic growth in Ethiopia, whereas (Shah & Farooq, 2015) looked at the Agricultural export and economic growth in Pakistan. Both researchers confirm that capital formation does not contribute to GDP.

4.5.3 Impact of exchange rate (lnER) on economic growth.

The exchange rate had positive sign and statistically significant in explaining the economic growth in the long run. The appreciation of real exchange rate increases by 1 percent results to increase economic growth by 0.93 percent. The finding of the study recommends that the need to shift in the structure of both production and trade towards livestock with demand elasticity and high value added (quality) by livestock since the relationship found is elastic. This result is in line with the work of (Aman et al., 2017) who studied at the association between exchange rate and economic growth in Pakistan for period 1976–2010 used the two and three stage least square techniques. found that the exchange rate has a positive relationship with economic growth (GDP).

4.6 Model Appropriateness

The study performed the following two key post-estimation diagnostic tests: The Autocorrelation tests and the Heteroscedasticity tests for determining the strength and stability of the models utilized in the study.

4.6.1 The Autocorrelation Test

In this study, auto correlation is employed using the Breusch-Godfrey serial correlation LM test. Autocorrelation refers to the existence of a relationship between the error terms across observations of a time series. The assumptions of the classical linear model are seriously violated when the error covariance's are statistically different from zero.

Table 7: **Breusch-Godfrey LM test for autocorrelation**

F-Statistics	1.192	Prob>F(1,10)	0.3005
Chi-Statistics	1.192	Prob > chi2	0.2749

H0: no serial correlation

From the test results presented in Table 7, the probabilities of both the F-statistic (0.3005) and the Chi-Statistics (0.2749) are more than 0.05. Therefore, H_o is not rejected, meaning autocorrelation is absent in our model.

4.6.2 The Heteroscedasticity Test

Furthermore, the study executed the Breusch-Pagan-Godfrey Heteroscedasticity test in the search to ensure that the residuals are randomly dispersed throughout the range of the independent variables. The variance of the error should therefore be constant for all values of the independent variable.

Table 8: Breusch-Pagan test for heteroscedasticity

F-Statistics	0.32	Prob > F	0.9275
Chi-Statistics	1.44	Prob > chi2	0.9843

Ho: Constant variance

From the test results presented in table 8, both the probabilities of the F - statistic (0.9275) and the Chi-statistics (0.9843) are greater than 0.05 indicating the absence of Heteroscedasticity. Therefore, the errors are homoscedastic.

4.7 The Misspecification test

In order to avoid the case of omitted variable bias, the study performed the Ramsey RESET test. Misspecification of variables occur as a result of omitting influential or including non-influential explanatory variables. The Ramsey RESET test of misspecification was therefore applied. The test results are shown in Table 9.

Table 9: Misspecification test

Ramsey Reset Test

F(3 , 8)	2.13	Probe > F =	0.1746

Ho: model has no omitted variables.

From table 9, the probability F-statistic (0.1746) is more than 0.05, so the study failed to reject the null hypothesis of the model has no omitted variables. Hence, the model is correctly specified. Therefore, the long run results were favourable in all tests and thus useful for analyses and forecasting

4.8 The Long run causality test

The study indicates the Granger Causality test among the utilized variables as shown in Table 10

Table 10: The Granger Causality test

Null Hypothesis			chi2	df	Prob>chi2
lnGDP	Does not Granger Cause	lnCAMLX	11.666	2	0.003***
lnCAMLX	Does not Granger Cause	lnGDP	7.1831	2	0.028**
lnGDP	Does not Granger Cause	lnCATLX	5.4945	2	0.064**
lnCATLX	Does not Granger Cause	lnGDP	23.623	2	0.000***
lnGDP	Does not Granger Cause	lnGOATX	10.959	2	0.004***
lnGOATX	Does not Granger Cause	lnGDP	59.706	2	0.000***
lnGDP	Does not Granger Cause	lnSHEPX	11.492	2	0.003***
lnSHEPX	Does not Granger Cause	lnGDP	28.924	2	0.000***

***significant at 1%** significant at 5%

In Table 10 the causal association between livestock exports and economic growth of the country "Somalia "was examined with the application of the Granger Causality test. Both the null hypothesis of camel and cattle exports does not Granger Causes Economic Growth and Economic Growth does not Granger Cause camel and cattle exports was rejected in the study. Similarly, both the null hypothesis of sheep and goat exports does not Granger causes Economic Growth and Economic Growth does not Granger cause sheep and goat exports were rejected. These outcomes provide evidence of bi-directional Causality between camel and cattle export and economic growth as well as goat and sheep exports and economic growth. The finding of this study indicates that livestock export impact Economic Growth and the vice versa.

5.0 CONCLUSION AND POLICY RECOMMENDATIONS

The rationale of this study is to examine the strength of livestock exports contribution towards the economic growth of Somalia using time series data covered for the period of 1990 to 2015. So as to attain the objective of the study, the study used the standard theoretical neoclassical production function model, with some extensions. Descriptive and time series techniques were used to determine the trends of livestock exports and to evaluate the impact of livestock exports on Economic Growth (GDP) respectively.

(Augmented Dickey Fuller) the Unit root test, a co-integration test (Johansen's procedure and Engle and Granger) to know the existence of long-run relationships among economic growth and livestock exports, Granger-causality tests, the Breusch-Pagan-Godfrey Heteroskedasticity test, the Breusch-Godfrey Correlation test and Ramsey RESET test of misspecification was used to test for appropriateness of the estimations so as to avoid any spurious regression.

The findings show that livestock export variables have varied effects on economic growth of Somalia. A significant and positive association is found between cattle export and Economic Growth. Similarly, a positive significant effect has been found between sheep export and economic growth and a positive and significant relationship is found between goat export and economic growth. The reverse was true with camel export which shows a negative and significant effect on economic growth in Somalia.

As regards of control variables, Total labour force has a significant and positive impact on economic growth. It is equally revealing that real exchange rate has a significant and positive impact on GDP. Finally, Granger causality of cattle, camel, sheep and goat exports and economic growth is bi-directional running in both directions. By the way The results are indicating a need to promote value added livestock export expansion policies in order to achieve high economic growth in Somalia.

The study recommends the following policy measures to improve the livestock export earnings:

1: The findings from the study indicates that camel export has a negative and significant impact on Economic Growth of Somalia.

This effect was resonated by Samater and Hassan, found that, space available on livestock carriers is not suitable for camels and the waiting time for shipment is sometimes prolonged and this causes an increase in prices of camels, due to extra time used in watering, feeding and health care.

As a policy, the government should improve the quality of transports by providing separate shipment for camels, and there should be research funding by the government on improving the value of camels raised for export.

2: The study depicts that, cattle export has a positive and significant impact on GDP in Somalia, so in order to increase the contribution of cattle export on economic growth, the government of Somalia should promote livestock production using hybrid and prevent environmental hazards that endangers the animals like water erosion, deforestation and wildlife quarry as well as measures on drought.

3: Additionally, the results highlights that, sheep export has a positive and high impact on Somalia's economic growth. By promoting sheep exports, the government of Somalia should put in place the policies to improve the animal health and disease control by providing well established and highly efficient veterinary service system. This can be achieved by increasing the competence of livestock export i.e. Sheep (acceptance of interior & exterior borders of Somalia) this will serve as a stimulus system for export product interventions. The veterinary service should be able to implement at veterinary strategies, such as low level epidemiological surveys, outbreak control and vaccinations.

4: Equally goat export has a positive and significant impact on economic growth of Somalia, so by promoting goat export and their contribution to the economy, the government should support and improve the highly concentrated Agro-ecological zones of these livestock like the arid and semi-arid north – Somaliland and Puntland.

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