Creating Favorable Macroeconomic Environment for Manufacturing Industry in Kenya

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Abstract

Kenya's vision 2030 which is a development blue print seeks to transform Kenya into a newly industrialized middle-income country that offers high quality life to all its citizens. To achieve its goal, it recognizes the role of manufacturing sector in creation of employment and wealth as well as its vital contribution to the economy's GDP. The big four agenda launched by the president of the republic of Kenya in 2017 identified manufacturing as a key pillar to propel Kenyan economy and aims to raise the sector's contributions to the GDP from 9 percent to 15 percent by 2022. The agenda seeks to concentrate on improving specific sectors in the manufacturing industry; textile and apparel, food and beverages, leather, timber, cement, automotive, chemicals, and pharmaceutical. Creating a favorable macroeconomic environment is a key enabler to achieve the manufacturing sector goals. According to Dunning, J.H. (2004), among the macroeconomic factors that affect manufacturing are economic development and growth, level of inflation, exchange rate, interest rate and foreign direct investment. This paper seeks to look deeper into macro-economic factors and to analyze their impact on the manufacturing sector. Augmented Dickey Fuller, Phillips Perron and Zivot- Andrews test are used to test for presence of unit root among the variables. The results reveal that variables are integrated of order zero, one and two. In this regard, the study adopts ARDL bounds test. The results reveal that inflation, exchange rate and gross domestic product as the determinants of manufacturing sector in Kenya. The study therefore recommends that Kenyan government should stabilize the flow of foreign exchange through diversifying revenue base of the economy, provision of incentives to encourage the consumption of locally produced goods and ensure that the proceeds of corrupt practices are not domiciled in foreign accounts. The government should achieve prudent management of national financial resources as well as borrowings from abroad, initiate policies to minimize capital flight through repatriation of earnings or outright withdrawal by foreign interests. With regard to negative effect of rise in GDP to manufacturing sector, Kenyan government should pursue policies and programmes aimed at controlling the underground economy. Such policies may include improvement of cross-sectoral cooperation involving customs, national police, Kenya Defence Forces.

Key Words

Kenya, Manufacturing, GDP.

1.1 Introduction

Economic recovery of any country requires increase in productive inputs for instance labour, land, capital and technology. The productivity of these inputs can be enhanced by ensuring their stability in the face of global meltdown (Alao, 2010). However, dynamism in macroeconomic policy has become progressively important within the productivity sector as the manufacturing has become more capitalized and mostly dependent on international markets. As a result of this the sector is vulnerable to changes in interest rate, foreign direct investment, exchange rate and the size of country's GDP(Odior, n.d.)

Studies show that increased industrial productivity is a sure way of boosting economic growth thus improving living standards of people in any given country. Formulation and implementation of good productive schemes have succeeded in pulling many countries out of global financial crisis and placed path of economic growth and development. This implies that countries that are not doing well economically should resort to increasing their productivity through formulation and implementation of good productive policies. For instance, Japan from the end of second World War and USA from 1970s adopted policies that ensure increased productivity and the results have turned out to be good (Alao, 2010).

In Kenya, agriculture is the backbone of the economy contributing about 32.6 percent of GDP. The sector also provides livelihoods in terms of employment, income and food security to more than 80 percent of the Kenyan population. Among the crops produced for export are tea, coffee and pyrethrum for exports. The reliance on these primary commodity exports whose prices are prone to fluctuations has led to persistent unfavourable terms of trade and a weak balance of payments position. One strategy frequently mentioned with regard to reducing this dependence is industrialization. The Kenyan government has continuously put emphasis on industrialization not only as a way of diversifying the economy but also as economic growth engine (*KER-2017-Popular-Version-1 pp14.pdf*, n.d.).

In the year 2018, manufacturing sector's output in Kenya declined by 1.1 percent. This contraction was attributed to to decrease in food products, tobacco, beverages, leather and related products, plastics and non-metallic subsectors. This decline can also be linked to uncertainty that was caused by general elections, high inflation, high cost of production and competition from imported products and. The ban on production and use of plastics may also have contributed to the adverse

effects on the capacity of output of the sector. Further, the decline in 10.8 percent in food subsector as a result of inadequate raw material for some key agro-based industries may have contributed to dismal performance of the manufacturing sector (Republic of Kenya, 2018). The manufacturing sector for the last decade witnessed a decrease in number of projects approved by Kenya Industrial Estate (KIE) from 543 in 2014 to 280 in 2017. The number of manufacturing projects registered by Kenya investment authority decreased to 40 in 2017 as compared to 43 that were registered in 2016. Although manufacturing sector is recommended as the one that can solve problems associated with overreliance on export of primary agricultural products it only contributes 8.4 percent of GDP. The sector's contribution in GDP has been fluctuating since 1980. The trend in the contribution of the manufacturing sector in GDP is shown in Figure 1.

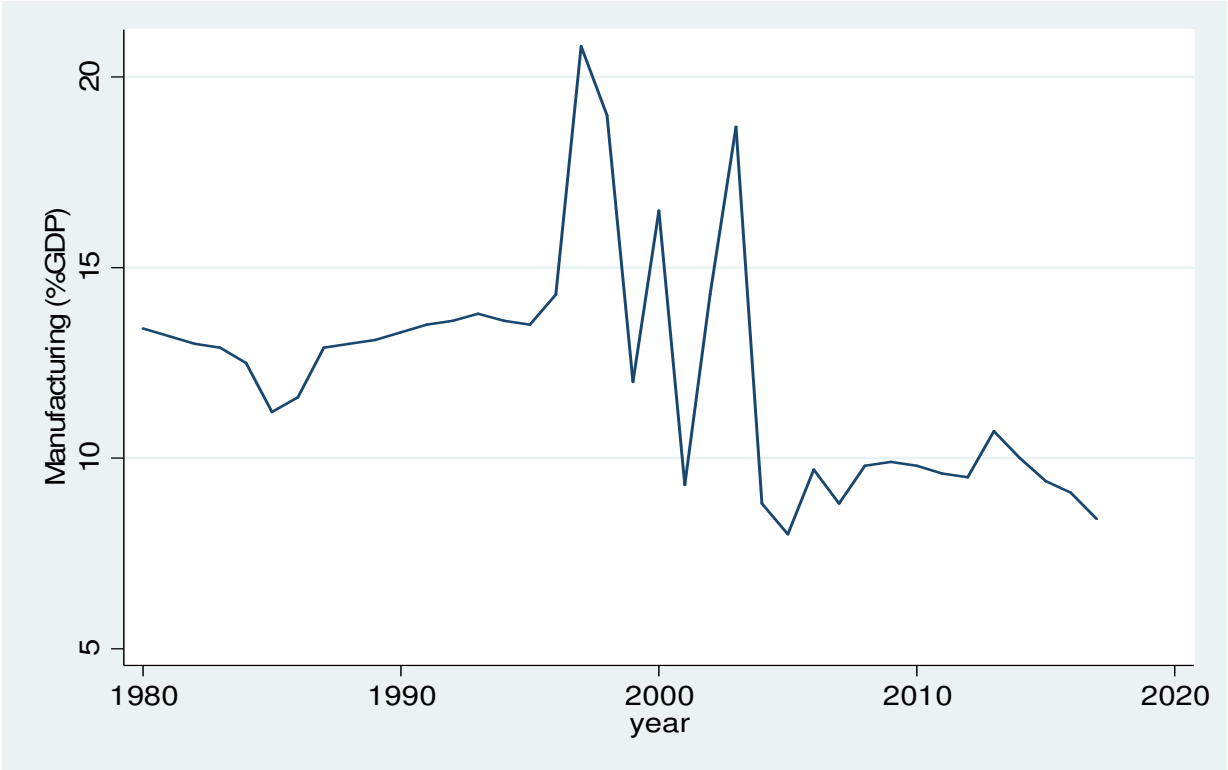

Figure 1: Share of Manufacturing Sector in GDP. Data obtained from Republic of Kenya; Economic Survey (various issues).

From Figure 1, it is observed that between 1980 and 2007, highest share of manufacturing in GDP of 20.8 percent was recorded in 1997. Thereafter there were fluctuations but from 2013 to 2017 there has been a negative trend in the portion of manufacturing share in GDP.

Comparing both growth in agricultural share in GDP and manufacturing share in GDP, it is revealed that for the last five years, the latter has been growing slowly than the former. The trends in these growth are illustrated in Figure 1.

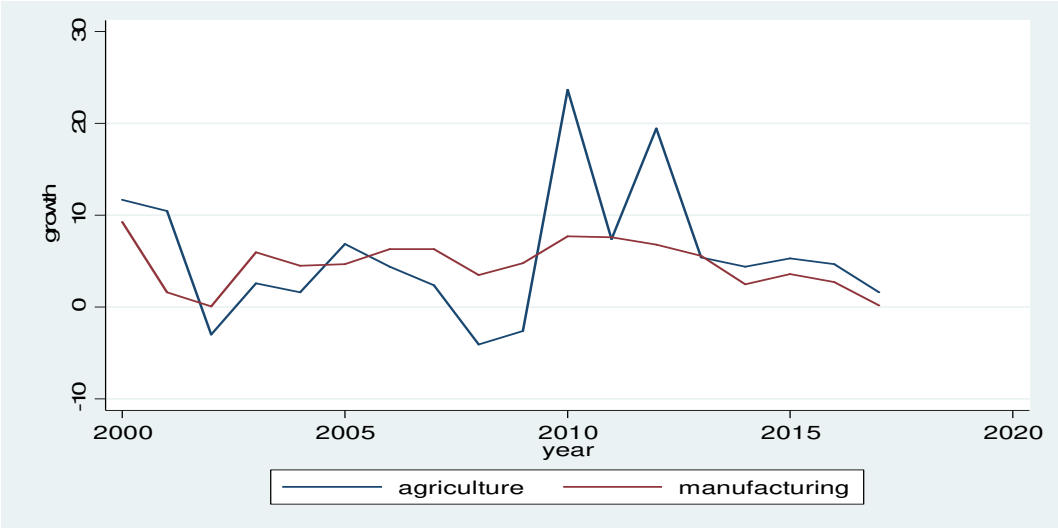

Figure 2: Agriculture and Manufacturing Growth Rates (% increase in GDP). Data obtained from **Republic of Kenya; Statistical Abstract, Economic Survey (various issues).**

From Figure 2, it is evident that both agriculture and manufacturing growth as a percentage of GDP has been fluctuating since 2000. From 2002 to 2004, 2006 to 2009 manufacturing sector grew faster than agricultural sector. From 2010 to 2017, manufacturing sector growth decreased as compared to that of agriculture.

Most developing countries would prefer manufacturing sector to grow faster than agricultural sector. The reason behind this is that despite the fact that both sectors may compete for scarce resources for instance skilled labour and raw material, they complement each other. First, manufacturing sector relies on agriculture sector as source of raw material, food for their workers. The agricultural exports also generate foreign exchange which is used to import capital goods for the manufacturing sector and importation of other raw material not available in the country. It can therefore be argued that growth in the manufacturing sector results to increase in the agricultural sector (Todaro and Smith, 2012). Second, expansion of the manufacturing sector alienates the problem of balance of payment by producing import substitues thus reducing imports. In the short

run the problem may not be solved since there will be importation of capital goods for the sector. Further, the problem of balance of payment can be resolved if the sector enhance country's export oriented strategy (Abor and Quartey, 2010). Third, expansion of manufacturing sector is good since it create job opportunities. As the manufacturing sector expand, it is generally expected that more labour will be absorbed (Kianian, Tavassoli and Larsson, 2015). Lastly, the sector relieves fluctuations in prices thus encouraging stability in incomes. Manufacturing output is stable unlike agricultural output that is affected by non-economic factors for example drought, floods and other climatic factors (Abor and Quartey, 2010).

1.2 Macroeconomic Variables that affect Manufacturing Sector

Capital formation has a great role in the manufacturing sector. Economists for instance Rosentein-Rodan postulates that investment ratio to GDP of between 12 and 15 percent is good to diversify and thus resulting into economic growth in a country. If a country maintains such level of investment and especially in manufacturing sector, an economy can be allowed into a take off stage. This is however possible if this share of investment in GDP is accompanied by other factors for instance quality of the people in the country and their desire to learn and acquire new skills of production. Nevertheless, capital formation remain a key determinant of the manufacturing sector and can be treated as a catalyst in presence of other factors (Todaro and Smith, 2012) Exchange rate is another factor which affect manufacturing sector. High exchange rate discourages imports thus expanding the manufacturing sector since its output act as import substitutes (Enekwe, Ordu and Nwoha, 2013). McKinnon (1973) and Shaw (1973) argued that financial deepening due interest rate deregulation has a direct influence on factor productivity through higher real rates of interest. The interest rate is seen important determinant of the manufacturing sector through the provision of capital it commands in the finance of manufacturing sector. In addition, McKinnon (1973) and Shaw (1973) emphasize the role of internal and external finances in the expansion of manufacturing sector in developing countries. While McKinnon emphasizes the role of internal finance where investors have to accumulate savings before obtaining capital goods, Shaw stresses on the role of external finance and development of the financial institutions in the capital accumulation.

The above factors influence manufacturing sector from the supply side. From the demand side, there are three factors that influence the manufacturing sector namely income and import

substitution. Rising income is important because it influences the demand for manufacturing output. There is a positive relationship between demand for manufacturing output and the level of income. When incomes increases, consumption of manufactured goods rises too, in most cases more rapidly than income. The rise in incomes therefore provides an ample opportunity for the expansion of the manufacturing output to meet domestic demand. However, this may not be true for all manufacturing products as a result of different income elasticities (Nicholson and Snyder, 2012). According Todaro and Smith (2012), manufacturing sector and import substitution have a positive relationship. Import substitution strategy aims at making economic agents in country to switch from consumption of foreign goods to domestic goods.

1.3 The Statement of the Problem

Kenya's vision 2030 which is a development blue print seeks to transform Kenya into a newly industrialized middle-income country that offers high quality life to all its citizens. To achieve its goal, it recognizes the role of manufacturing sector in creation of employment and wealth as well as its vital contribution to the economy's GDP. The contribution of manufacturing sector in GDP has been fluctuating since 1980. However, in 1980s and 1990s, manufacturing sector provided a substantial share of the country's GDP but this dwindled in 2000s. For instance in 1980, the manufacturing sector contributed 13.4 percent of GDP but decreased to 11.2 in 1985. The sector grew after twelve years later to 20.8 percent of GDP in 1997. Since then, the portion of manufacturing sector in GDP declined reaching 8.4 percent of GDP in 2017. The big four agenda launched by the president of the republic of Kenya in 2017 identified manufacturing as a key pillar to propel Kenyan economy and aims to raise the sector's contributions to the GDP from current level of about 8 percent of GDP to 15 percent by 2022. The agenda seeks to concentrate on improving specific sectors in the manufacturing industry; textile and apparel, food and beverages, leather, timber, cement, automotive, chemicals, and pharmaceutical. Creating a favorable macroeconomic environment is a key enabler to achieve the manufacturing sector goals. According to Dunning, J.H. (2004), among the macroeconomic factors that affect manufacturing are; economic development and growth, a consumption possibility of a society, a level of inflation, a possible current account balance, and a state of public finances. Currently, there is no conclusive study touching on the effect of macroeconomic variables on manufacturing sector in Kenya. Odhiambo (1991) investigated the effect of macroeconomic variable on Kenya's manufacturing sector but the study is deficient in terms of econometric methodology. For instance, the study failed to carry out unit root testing, a critical test for time series study. The paper seeks to use time series data running from 1980 to 2017 to estimate the effect of macroeconomic variables on the manufacturing sector in Kenya.

2.0 Literature Review

The manufacturing sector being one of the traditional sectors that exists in a macroeconomic environment is most likely to be affected by changes in macroeconomic conditions. According to solow (1956) macroeconomic conditions can affect manufacturing sector positively or negatively thus making it a pertinent issue to policy makers to pay attention to macroeconomic changes and how they affect the manufacturing sector. Various macro-economic variables that are likely to affect the sector are: private sector credit, consumer price index, infrastructure, labor force, real exchange rate and fixed capital formation.

Imoughele and Ismaila (2014) investigated the effect of monetary policy on manufacturing sector in Nigeria using econometrics tests procedures. The findings were that money supply had a positive effect on performance of manufacturing sector while company lending rate, income tax rate, inflation rate and exchange rate negatively affect the performance of the sector. Eze, Onyekachi and Ogiji (2013), using an error correction model sought to find out how fiscal policy affects the sector and the study identified that there is a long run relationship between fiscal policy and manufacturing sector output, government tax revenue having a significant negative impact on the sector. Government expenditure had a significant and positive impact on the manufacturing sector. The study recommended that the expansionary fiscal policies should be encouraged as they play a key role in improving manufacturing sector output in Nigeria

Investigating the impact of micro-economic policies on manufacturing sector in Croatia, Tkalec and Vizek 2009, used Multiple Regression to assess how personal consumption, investment and interest rates, the real effective exchange rate, government consumption, fiscal deficit and foreign demand. The findings were that changes in fiscal conditions, the real effective exchange rate, government consumption, fiscal deficit, and foreign demand affected the performance of the manufacturing sector.

3.0 Methodology

3.1 Theoretical Framework

The study methodology is anchored on Augmented Solow growth model and the endogenous growth theory. Solow model put emphasize on investment in human capital as the determinant of economic growth. This investment can be achieved through capital formation. Accumulation of capital however depends on interest rate. A reduction of interest rate in an economy triggers inflation which leads to increase in investment since economic agents have capital to buy goods and services. With regard to endogenous growth theory, capital accumulation is important for economic growth but emphasize is placed on technological progress.

3.2 Empirical Model

The study adopts Odior (2013) model to estimate the effect of macroeconomic variables on manufacturing sector in Kenya. Odior (2013) model borrows from Augmented and endogenous growth theories. The adopted model incorporates informal sector GDP to take care of the informal sector which is substantially high in Kenya. Mathematically, the relationship between manufacturing sector and macroeconomic variables is shown in equation 3.1.

$$lnManu_t = \beta_0 + \beta_1 lngdp_t + \beta_2 fdi_t + \beta_3 intrate_t + \beta_4 exchrate_t + \beta_5 lninfl_t + \mu_t \quad \ldots\ldots 3.1$$

Where $lnmanu$ is natural logarithm of monetary value of manufacturing output measured Kenyan shillings , $lngdp$ is natural logarithm of GDP measured Kenyan shillings, fdi is natural logarithm of FDI measured Kenyan shillings, $lnintrate$ is natural logarithm of lending interest rate

,$lnxchrate$is natural logarithm of exchange rate, $lninfl$ is natural logarithm of inflation rate, while β_0 , β_1, β_2 , β_3 , β_4 , and β_5 are parameters. μ is the white noise error term and t is time trend.

3.3 Variable Definition and Data Source

In the empirical analysis, time series data running from 1980 to 2017 was used. The monetary value of the manufacturing output, inflation rate, lending interest rate, exchange rate and FDI were obtained from World Bank data base. GDP was obtained from KNBS economic surveys. The monetary value of the manufacturing output, FDI, GDP are measured in Kenyan shillings. Lending interest rate, inflation rate are measured in percentages while exchange rate is a ratio.

3.4 Diagnostic Tests

Stationarity is key attribute of time series data. Presence of a stationary series avoids the problems of spurious regression and inconsistent estimates (Verbeek, 2004). Presence of a unit root signify presence of a non-stationary series. Equation 3.2 is the starting point in testing for presence of unit root.

$y_t = \alpha + \rho y_{t-1} + \mu_t$……...3.2

Where y_t represent variable whose stationarity status is to be checked, y_{t-1} represent the lag one of the variable of interest while μ_t is error term that is independent and identically distributed. Equation 3.2 can be manipulated further by subtracting y_{t-1} from both sides to give;

$\Delta y_t = \alpha + \delta y_{t-1} + \mu_t$……...3.3

Where $\delta = \rho - 1$ ……..3.4

Dickey fuller test is used to test for presence of a unit root. To test for presence of a unit root, equation 3.2 is estimated the coefficient of the explanatory variable (δ) examined. If it is found to

be equal to zero the given variable is said to be non-stationary. If it's negative, then it is said to be stationary (Dickey and Fuller, 1979). The shortcoming of the dickey fuller is that the error term is not serially correlated. If this assumption is violated, then Augmented Dickey Fuller is the most appropriate where lags of the dependent variable shown in equation 3.4 is introduced as explanatory variables as a remedy for serial correlation among the error terms. This is shown in equation 3.5.

$\Delta y_t = \alpha + \delta y_{t-1} + \sum_{n=1}^{n} \alpha_k \Delta y_{t-k} + \mu_t$ ……..3.5.

Where n in the equation is chosen so that it's large enough to ensure absence of serial dependence of the error term.

Another alternative to ADF test is Phillips-Perron (PP) unit root test. Unlike ADF test which includes lags of the dependent variable as a remedy to the problem of serial correlation, PP test estimate equation 3.3 but use some form of t statistic to correct the problem of serial correlation. The idea behind the PP test is that it's a non-parametric statistical method which makes it robust in presence of serial correlation (Gujarati, 2003).

The drawback of both ADF and PP unit root tests is that if there is structural break, the two tests tend to bias unit root test in favour of accepting null hypothesis implying presence of unit root. To correct this Zivot-Andrews test is the most preferred.

4.0 Empirical Results and Data Analysis

4.1 Descriptive Statistics

Descriptive statistics deals with measures of central location and measures of spread. Table 4.1 shows the descriptive statistics of all the variables considered in the model.

Table 4.1: Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Manufacturing output	38	6428.41	1577.86	4207.18	10938.68
Inflation	38	10.55	7.38	0.93	41.99
Interest rate	38	18.40	6.41	10.58	36.24
Exchange rate	38	55.71	30.55	7.42	103.41
GDP	38	1603222	2103506	52589.8	7749426
FDI	38	18989.84	34538.98	7	128817.8

Source: *Author's Computation based on data from various sources*

Table 4.1 shows that a total of 38 observations were considered in the study. Standard deviation shows how the values are spread from their mean and is useful for comparison purposes. For example, the data shows that inflation deviates from the mean of 10.55 by 7.45. The minimum value of inflation within the period of study was 0.93 while the highest is 41.9. Generally, descriptive statistics are important in helping to point out presence of outliers.

4.2 Diagnostic Tests

To ensure validity of the results, the study had to investigate whether assumptions of OLS hold. Among the assumptions of OLS that were investigated include serial correlation, multicollinearity and normality of the error term.

4.2.1 Serial correlation

To test whether there was correlation among the error terms, Breusch Godfrey test was adopted. The test results are as shown in Table 4.2.

Table 4.2: Serial correlation

Breusch-Godfrey LM test for autocorrelation H0: no serial correlation			
lags(p)	Chi2	Degrees of freedom	Prob> chi2
1	0.007	1	0.9315

Source: *Author's Computation based on data from various sources*

From Table 4.2 it was evident that serial correlation was absent since the p-value was insignificant leading to the acceptance of the above null hypothesis.

4.2.2 Multicollinearity

To test for relationship among the variables on the right hand side of the equation, the study adopted a Variance Inflation Factors (VIF) test. Presence of multicollinearity is revealed by a VIF index of greater than 10 (Nachtscheim, 2004). VIF is calculated from the coefficient of determination as shown below.

$$VIF = \frac{1}{1 - R^2}$$

Where; R^2 is the coefficient of determination. The VIF indices are shown in Table 4.3.

Table 4.3: VIF Test for Multicollinearity

Variable	VIF	1/VIF
GDP	3.99	0.25
Echange rate	2.87	0.35
FDI	2.20	0.45
Interest rate	1.63	0.61
Inflation	1.35	0.74
Mean VIF	2.41	

Source: *Author's Computation based on data from various sources*

The variance Inflating factors revealed absence of multicollinearity since all variables considered in the study had a VIF of less than 10.

4.2.3 Normality Test

Shapiro wilk test was used to check for normality of the error term. The results are presented in Table 4.4

Variable	Obs	W	V	z	Prob>z
Res	38	0.97203	1.063	0.128	0.45

The null hypothesis of this test shows that the error term is normally distributed. The P value of 0.45 implies that we do not reject the null hypothesis pointing to presence of a normally distributed error term.

4.3 Stationary Test

Augmented Dickey Fuller (ADF), Phillips Perron (PP) and Zivot-Andrews (Z-A) test were applied on each variable to test for presence of a unit root. The results are illustrated in Tables 4.4 and 4.5.

Table 4.4: Augmented Dickey Fuller and Phillips-Perron Tests

Augmented Dickey Fuller					Phillips-Perron		
		Statistic	Critical value (5%)	Order of Integration	Statistic	Critical value (5%)	Order of Integration
Value of manufacturing output	Level 1st D	-3.247	-2.966	zero	-17.891	-12.884	zero
GDP	Level 1st D 2nd D	8.077 (-2.458) (-9.459)	-2.966 (-2.969) (-2.972)	Two	4.885 (-11.44) (-52.05)	-12.884 (-12.85) (-12.82)	two
Inflation rate	Level 1st D	-4.613	-2.966	Zero	-28.002	-12.884	zero
Lending interest rate	Level 1st D	-1.663 (-5.833)	-2.966 (-2.969)	One	-4.874 (-36.31)	-12.884 (-12.85)	one
Exchange rate	Level 1st D	-0.571 (-5.702)	-2.966 (-2.969)	one	-0.648 (-35.19)	-12.884 (-12.85)	one
FDI	Level 1st D	-1.900 (-6.454)	-2.966 (-2.969)	one	-7.813 (-40.37)	-12.884 (-12.85)	one

Results in Table 4.4 suggest that variables considered in the study are integrated of different orders. The value of manufacturing output and inflation are stationary at levels. Lending interest rate, exchange rate and FDI are integrated of oder 1 while GDP is integrated of order 2. However, due to shortcomings of the above two unit root tests, the study investgated for presence of unit root using Z-A test. The results are shown in Table 4.5**.**

Table 4.5: Zivot Andrews Unit Root Test

Trend and intercept						
Variables	Year of structural break	Level		First difference (Second difference)		Order of integration
		t-statistics	5% critical value	t-statistics	5% critical value	
Value of manufacturing output	1998	3.680	-4.42	-7.301	-4.42	one
GDP	2008	-2.873	-4.42	-4.866	-4.42	One
Inflation rate	1994	-4.906	-4.42	-	-	zero
Deposit interest rate	1994	-2.633	-4.42	-6.067	-4.42	One
Exchange rate	2000	-2.656	-4.42	-5.698	-4.42	one
FDI	2003	-3.712	-4.42	-5.910	-4.42	One

From Table 4.5, value of manufacturing output is revealed to be integrated of order one when ZA test is used contrary to the first two tests. However, inflation remains to be integrated of order zero in line with both Augmented Dickey Fuller and Phillips Perron. Z-A test reveal presence of structural break for each variable at different periods. According to Murunga (2014), the established structural breaks of most macroeconomic variables in Kenya coincide with identifiable poor and erratic climatic conditions, trade liberalization, economic and political shocks.

4.4 Regression Results and Discussion

Since all the unit root test revealed variables that are integrated of different orders, the study adopted Pesaran ARDL Bounds Test model. This model can be applied regardless of the order of integration among the variables. The model is also the most efficient in small sized data, a common characteristic among the developing countries (Pesaran and Pesaran, 1997). Further, Pesaran ARDL model also yields estimates that are consistent and asymptotically normal (Pesaran and Shin, 1998). The study therefore adopted ARDL Bounds Test model. The model involves estimation of conditional error correction model (ECM) and use of lag selection criteria to establish ARDL Specification for the short run. Presence of long run relationship between variables imply presence of an error correction representation. The error correction term illustrates the speed at which long run equilibrium is restored once there is short term shock. The general error correction model formulated from equation 2.1 is as shown in equation .3.6.

$$\Delta lnmanu_t = \beta_0 + \sum_{i-1}^{n} \beta_i \Delta \ln(gdp)_t + \sum_{i-1}^{n} \alpha_i \Delta \ln(fdi)_t + \sum_{i-1}^{n} \gamma_i \Delta \ln(ntrate)_t + \sum_{i-1}^{n} \rho_i \Delta \ln(exchrate)_t + \sum_{i-1}^{n} \delta_i \Delta \ln(\mathrm{in}fl)_t + \eta(ECT)_t + \varepsilon_t \dots\dots\dots\dots\dots\dots 3.6$$

Where η measures the speed of adjustment. Having subjected the data to pre-estimation tests, minimum Akaike information Criteria (AIC) was used to determine optimal lag length in estimation of equation 3.6. The results obtained are shown in Table 4.6.

Table 4.6: ARDL Bounds Test Regression Results

D.Manufacturing	Coefficient	Standaard Error	T	P value
ECT	-3.495478	.5808834	-6.02	0.001
Long Run				
Lninflation	-457.3221	101.6031	-4.50	0.003
Lninterest rate	3440.804	427.4362	8.05	0.000
Lnexchange rate	501.0673	206.2005	2.43	0.015
lnGDP	-1125.049	349.17	-3.22	0.015
LnFDI	242.431	211.021	1.15	0.288
Short Run				
Manufacturing				
LD.	1.729296	.4301549	4.02	0.005
L2D.	.8727887	.3265285	2.67	0.032
L3D.	.6535358	.3542005	1.85	0.108
Lninflation				
D1.	1946.285	411.9909	4.72	0.002
LD.	984.7898	322.134	3.06	0.018
Lninflation				
D1.	-15273.1	4229.639	-3.61	0.009
LD.	-5534.791	3415.855	-1.62	0.149
L2D.	2432.633	2227.862	1.09	0.311
L3D.	-2935.007	1835.483	-1.60	0.154
Lnexchange rate				
D1.	2875.072	1943.091	1.48	0.183
LD.	366.3546	1952.157	0.19	0.856
L2D.	-6797.101	1967.537	-3.45	0.011
L3D.	-7655.662	2185.289	-3.50	0.010
LnGDP				
D1.	2362.902	6226.916	0.38	0.716
LD.	-1925.687	6278.29	-0.31	0.768
L2D.	-10064.05	4013.89	-2.51	0.041
L3D.	-6835.095	2758.474	-2.48	0.042
LnFDI				
D1.	-896.7069	560.8251	-1.60	0.154
LD.	-634.3782	362.2838	-1.75	0.123
L2D.	-321.5437	183.3566	-1.75	0.123
Constant	34306.75	11018.17	3.11	0.017

$^{*}p^{<0.1;}$ $^{**}p^{<0.05;}$ $^{***}p^{<0.01}$
R-squared = 0.9672
Adj R-squared = 0.8452
Sample Size : 1984-2017

Regression results in Table 4.6 suggest that the explanatory variables considered in the model explain about 85 percent variation in value manufacturing output in Kenya. The coefficient of error correction term (ECT) is negative and statistically significant implying presence of long run relationship among the variables running from the explanatory variables to value manufacturing output. The ECT implies that it takes a period of 3.5 years for long term equilibrium in the value of manufacturing output to be restored when there is a short term shock.

The results revealed that a one percent increase in GDP results to 1.125 units decrease in value of manufacturing output on average holding other factors constant. Its coefficient is statistically significant meaning GDP is an important determinant of the manufacturing output in Kenya. This outcome contradicts Onakoya (2018) study while studying macroeconomic dynamics and manufacturing output in Nigeria. This finding may be true for Kenya given a large size of the informal sector. The country's GDP may be rising but this may be due to smuggling of goods in the country thus negatively affecting manufacturing sector.

This study finds that in Kenya inflation negatively affect manufacturing sector in the long run. The coefficient of inflation is statically significant implying inflation is important determinant of manufacturing sector in Kenya. This finding is in agreement to that Nwakoby and Uchenna (2015) while investigating the influence of finance and macroeconomic variables on manufacturing capacity utilization in Nigeria.

This study reveals a positive relationship between interest rate and manufacturing sector in Kenya in the long run. The coefficient of interest rate is significant implying interest rate is important in influencing manufacturing sector in Kenya. This finding contradicts economic theory which shows that increase in lending interest rate discourages borrowing of loans thus leading to a fall in manufacturing sector output. The study finding contradicts a study by Nwakoby and Uchenna (2015).

This study finds that in Kenya, the high exchange rate although positive, its coefficient is statistically significant. This means exchange rate influence the manufacturing sectoral growth. The result of this study is in line with the Keynesian absorption approach which postulates that

currency devaluation increases exports and reduces imports. The finding is also in line with a study by Onakoya (2018). Lastly, the study finds that in Kenya, FDI although positive, is not statistically significant in influencing the manufacturing sectoral growth.

4.5 Conclusion

From the findings of the study it's revealed that movements in the value of manufacturing sector of the Kenyan economy are explained partly, by its own shocks as well as by variations in GDP, exchange rate and interest rate. Upward movements in GDP and inflation contract manufacturing sector while upward movement in interest rate expands the manufacturing sector. A major implication of the findings is that the value of manufacturing sector output in the Kenya is very sensitive to input prices as determined by variations in exchange rate. In addition, growth in Kenya's GDP shrinks its manufacturing sector.

4.6 Recommendations

Based on the findings of this study, it is strongly recommended that the Kenyan government should take drastic economic measures to stabilize the flow of foreign exchange. In this regard, government should diversify the revenue base of the economy, provide incentives to encourage the consumption of locally produced goods, ensure that the proceeds of corrupt practices are not domiciled in foreign accounts, achieve prudent management of national financial resources as well as borrowings from abroad, initiate policies to minimize capital flight through repatriation of earnings or outright withdrawal by foreign interests, etc.

Government should also pursue policies and programmes aimed at controlling the undergroung economy. Country's GDP may be growing but individuals could be involved in smuggling of cheap Kenya's manufactruring sector substitutes. Such policies may include improvement of cross-sectoral cooperation involving customs, national police, Kenya Defence Forces.

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