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Does consumption expenditure induce the economic growth? An empirical evidence from Sri Lanka

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ABSTRACT

Indeed, consumption expenditure is a very important element of increasing the economic growth, which was confirmed by enough empirical studies in different countries. But in Sri Lanka there is no evidence regarding the relationship between the consumption expenditure and economic growth. In order to test this relationship, this study used both multiple regression and Johansen and Juselius cointegration techniques by using time series data during the period of 1975 to 2014 of the following variables: exports, gross domestic product, consumption expenditure of households, and official development assistant. In this study, both techniques confirmed that the consumption expenditure positively impact on the economic growth and moves with the economic growth in the long - run period. Thus, this study strongly confirmed that the consumption expenditure in Sri Lanka induces the economic growth over the sample period. Therefore, this study recommends, if the policy makers should develop the policy to promote the consumption expenditure, the economic growth should be positively moved, so policy makers have to design consumption promotion policy.

Keywords: Gross domestic product, consumption expenditure, multiple regression test and Co-integration test

1. INTRODUCTION

Expenditure is a term of economics that is a turning instrument of a country's economy both positively and negatively. Most of the issues in economy arise by the expenditure which

has been confirmed by the economic history of nations. The expenditure consists of following parts: consumption expenditure, investment expenditure, government expenditure and trade openness expenditures. In a closed economy, the first three of the mentioned expenditures are very important to correlate the economic growth or gross domestic product.

In households' behaviour, the consumption expenditure and savings are very important components which depend on the income of them. The households maintain the equilibrium among the consumption and savings through their budget constraints and needs. In the income of households, the consumption takes a major role because it is a life line of household members. Thereby, the consumption expenditure interrelates on the socioeconomic feature of country. A household in a country spends its income on the following consumption goods: durable and non-durable goods. Thus, the expenditure on durable and non – durable goods are called consumption expenditure. In economics, the term of consumption is a key concept, which means the utilization of goods and services for getting the satisfaction by individual or society. Meanwhile, the economic growth is substituted by the gross domestic product, which means the total money value of all final goods and services that produced within the geographical boundary of a country.

In macroeconomic aspect, the relationship between the consumption expenditure and economic growth arises the grate attention among the policy makers and economists. Concerning the relationship between the consumption expenditure and economic growth, there are two point of views among the economists. One says that the consumption is a function of household income, while, others confirm that the consumption accelerate the gross domestic product. So, this relationship is needed an important study based on Sri Lankan case. In this circumstances, in order to achieve the objectives of the study, the following sub-sections, namely, introduction, review of literature, objective of the studies, methodology, results and discussion, conclusion and policy recommendation are deemed.

2. REVIEW OF LITERATURE

In order to test the relationship between the consumption expenditure and economic growth, this study search the empirical studies connecting this relationship for using the literature. But, in the research circle, there are no studies, directly connecting the consumption expenditure and economic growth. However, when this study continuously searched some scholarly articles were connected with the government expenditure and economic growth. Thus, so as to extend the objective of this study, they are used as literature. In the meantime, in Sri Lankan context there is no evidence to do a research, connecting the relationship between the consumption expenditure and economic growth.

Volkov (1998) explored that the government expenditure have both short and long run relationship on the economic growth in Ukraine. Test (2011) explored that the consumption expenditure cointegrated with the economic growth, which supports to Keynesian consumption function. Dandan (2011) noted that the government expenditure maintain the postive relationship on the economic growth of Jordan. Garba (2013) pointed out that the public expenditure maintain a positive long run relationship with the economic growth in Nigeria. Udoka and Anyingang (2015) revealed that aggregate expenditure had a positive impact on economic growth and development of the Nigerian economy, recurrent expenditure had a significant relationship on the growth and development of the Nigerian economy. The

result also indicated that capital expenditure also had a significant effect on the growth and development of the Nigerian economy. Al-Fawwaz (2015) indicated that there is positive impact for both total government expenditure on the economic growth in Jordan that supported to Keynesian model. Muigai (2016) concluded that the consumption expenditure positively effect on the gross domestic product in Kenya. Lingxiao et al., (2016) indicated that there exists a unidirectional long-run relationship from government expenditures to economic growth in Romania. Ebong et al., (2016) summarized that the consumption expenditure of government induces the economic growth of Nigeria. In the meantime, Kaur and Mishra (2017) asserted that there was no long-run relationship between public expenditure and economic growth in Rajasthan.

Based on the literature, most of them concluded that the expenditure positively correlated on the economic growth. Therefore, this study also assumes that the consumption expenditure should induce the economic growth. As stated earlier, in Sri Lanka the connection between the consumption expenditure and the economic growth is still not econometrically studied. Thus, it seems a research gap on this topic, so, this study takes a step to full the research gap on the consumption expenditure and economic growth in Sri Lanka.

3. OBJECTIVES OF THE STUDY

The general objective of this study is to test the correspondence between the consumption expenditure on the economic growth in Sri Lanka.

Sub – objectives are:

1. To test the impact of household expenditure on the economic growth
2. To examine the long –run relationship between an household expenditure and the economic growth

4. METHODOLOGY

In this section, this study discusses the following materials: data, the variables, tools and analytical technique, which use the objective of the study.

5. DATA AND VARIABLES

In this study the annual time series data for the period of 1975 to 2014 of the following variables: gross domestic product (GDP) is proxy for the economic growth, exports (EXP), consumption expenditure (HEX), money supply (MS) and official development assistant (ODA) were employed, which were collected from the annual reports of the Central Bank of Sri Lanka from various years. Based on the economic theory, the independent variables in this study would be expected the positive relationship with the gross domestic product. This relationship was confirmed by using the confidential ellipse. In the meantime, the households' expenditure was the main independent variable. Thus, in order to find out the volatility of such variable, the descriptive statistics for the variables were used.

In this study, there were two objectives, the first objective is to test the impact of households' expenditure on the economic growth and second objective is to test the long run relationship between the households' expenditure on the economic growth. Therefore, So as to examine the impact of households' expenditure on the economic growth of Sri Lanka, this study used the linear multiple regression model with support of ordinary least squares (OLS) technique. Then, the Johansen cointegration technique was employed to test the long run relationship. In order to achieve the two objectives, first of all this study organized the relationship between the dependent and independent variables. Then, the relationship was extended as linear multiple regression model. The considered function and multiple regression model of this study are as follows:

$$GDP_t = f(EXP_t, HEX_t, MS_t, ODA_t)$$

$$GDP_t = \beta_0 + \beta_1 EXP_t + \beta_2 HEX_t + \beta_3 MS_t + \beta_4 ODA_t + \varepsilon_i \qquad (1)$$

For easy calculation, the equation (1) was transformed as logarithmic form. Therefore, the logarithmic equation is;

$$\log(GDP_t) = \beta_0 + \beta_1 \log(EXP_t) + \beta_2 \log(HEX_t) + \beta_3 \log(MS_t) + \beta_4 \log(ODA_t) + \varepsilon_i \qquad (2)$$

where: economic growth is represented by the gross domestic product (GDP), export is indicated by EXP, the consumption expenditure is mentioned by HEX, the money supply is noted by MS, official development assistants is lighted by ODA, the coefficients of the variables in the model are shown by β and the error term of the model is powered by ε_i.

To validate the multiple regression model of this study, the CUSUM plot, R- squared, F- statistic and Durbin Watson statistics were considered, and also to confirm the serial correlation effect of the estimated model, the Brush – Godfrey serial correlation test was employed. Moreover, to test the impact of fiscal imbalance in this study the coefficient of households' expenditure in the estimated model and its probability value were used.

In order to achieve the second objective of this study, the following analytical techniques such as unit root test, cointegration test and vector error correction techniques (VECM) were employed. In this study to test the stationarity of the variables the Augmented Dickey Fuller (ADF) test was applied because most of the literatures used the ADF test for knowing the stationarity of the variables. Therefore, this study also followed the ADF test for identifying the stationarity of the variables. In order to select the optimum lag equation, this study used the Akaike Information Criterion (AIC) and Schwartz Bayesian Information Criterion (SBIC). As stated earlier, to test the long run relationship between the variables the Johansen and Juselius cointegration test was employed that can be written as:

$$\begin{pmatrix} \Delta Y_t \\ \Delta X_t \\ \Delta W_t \end{pmatrix} = \Gamma_1 \begin{pmatrix} \Delta Y_{t-1} \\ \Delta X_{t-1} \\ \Delta W_{t-1} \end{pmatrix} + \pi \begin{pmatrix} Y_{t-1} \\ X_{t-1} \\ W_{t-1} \end{pmatrix} + e_t$$

Therefore, the long run relationship between the trade openness and economic growth in Sri Lanka was tested using above cointegration VAR model. This cointegrating vector was

derived from two likelihood ratio tests, namely, Trace test and Maximum Eigen value test. Both approaches are limited as;

1. Trace test

$$\lambda_{trace} = -2 \ln Q = -T_i \sum ln(1 - \lambda_t)$$

2. Maximum Eigen value test

$$\lambda_{Max} = -2 \ln(Q : r|r+1) = -Tln(1 - \lambda_{t+1})$$

Trace statistics investigates the null hypothesis of "r" cointegrating relations against the alternative of 'n' cointegrating relation , where 'n' is the number of variables in the system equation for r = 0, 1,…… n-1. Maximum Eigen value investigates the null hypothesis of "r" cointegrating vectors that are tested against the alternative hypothesis of "r+1"cointegrating vectors. After identifying the number of cointegration equation, the vector error correction model (VECM) was employed to test the long run model among the dependent and independent variables and the short run disequilibrium. For this purpose, this study considers the following Vector Auto Regressive (VAR) model with different lags. The VAR model with different lags is written as follows;

$$Y_t = V + A_1 Y_{t-1} + A_2 Y_{t-2} \dots \dots \dots \dots A_i Y_{t-i} + \mu_t$$

where: Y_t is a (K x1) vector variable, V is a (Kx1) vector of parameters. A_1……. A_i are (KxK) matrices of parameters and μ_t is a (Kx1) vector of disturbances having zero mean and sum of covariance matrix is identically and independently distributed over a time. Any VAR model can be rewritten as vector error correction by using some algebra which can be expressed as;

$$\Delta Y_t = V + \Pi Y_{t-1} + \sum_{i-1}^{p-1} \Phi_i + \Delta Y_{t-i} + \mu_t$$

where: $\Pi = \sum_{j=1}^{p} A_j - I_k$ and $\Phi_i = - \sum_{j=i+1}^{p} A_j$

If cointegration between the independent and dependent variables has been identified, the Vector Error Correction Model (VECM) can be applied to test the short- run properties of the identified cointegration equation. In order to test the autocorrelation effect of the vector error correction model the study used the Breusch – Godfrey Serial correlation LM test.

6. RESULTS AND DISCUSSION

In this study the following variables: exports, households' consumption expenditure, money supply and official development assistant are considered as independent variables. Thus, in order to test the relationship between these variables with economic growth, the
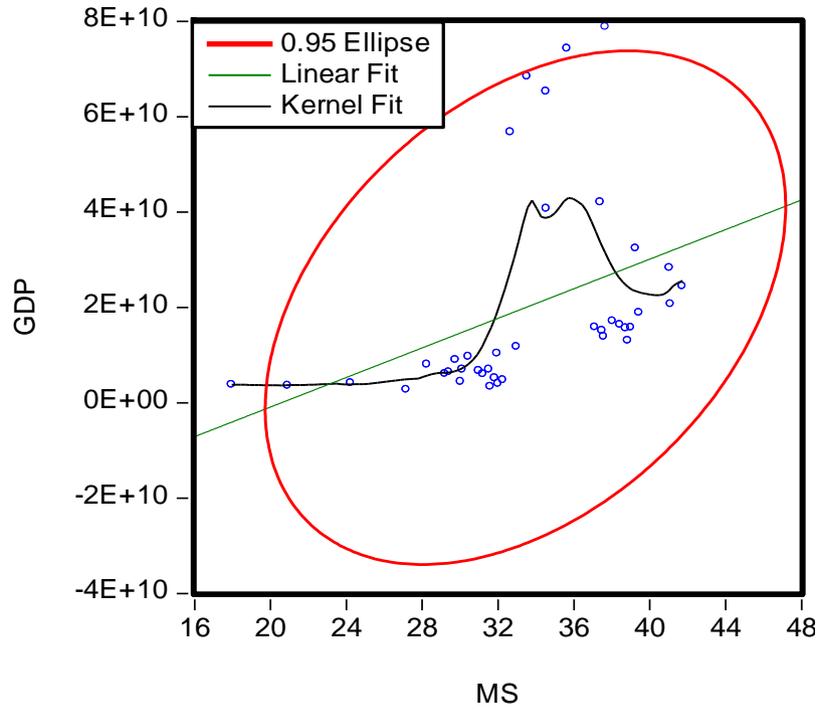
confidential ellipse is applied. The following Figure shows the relationship between the independent variables and gross domestic product respectively.
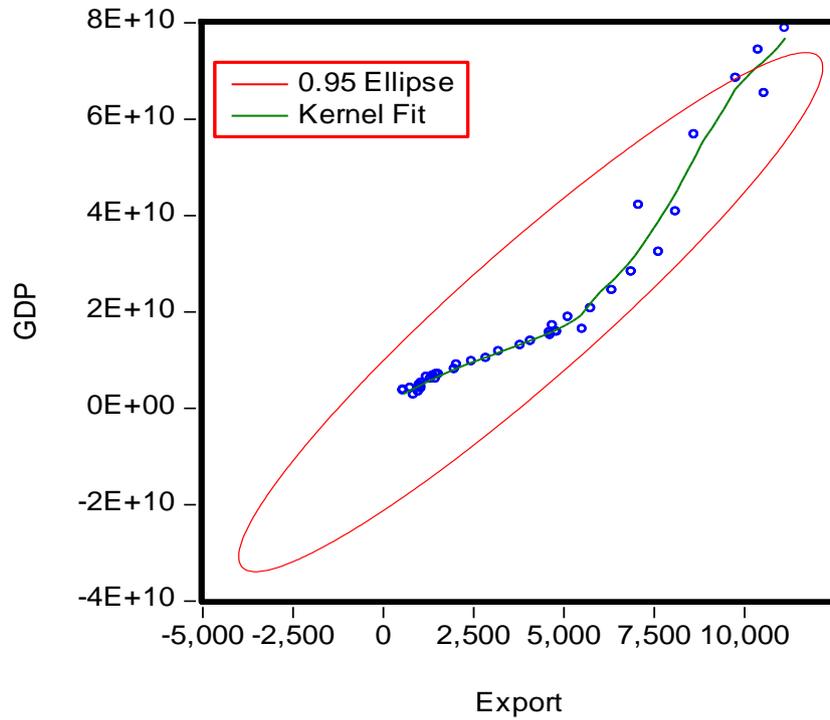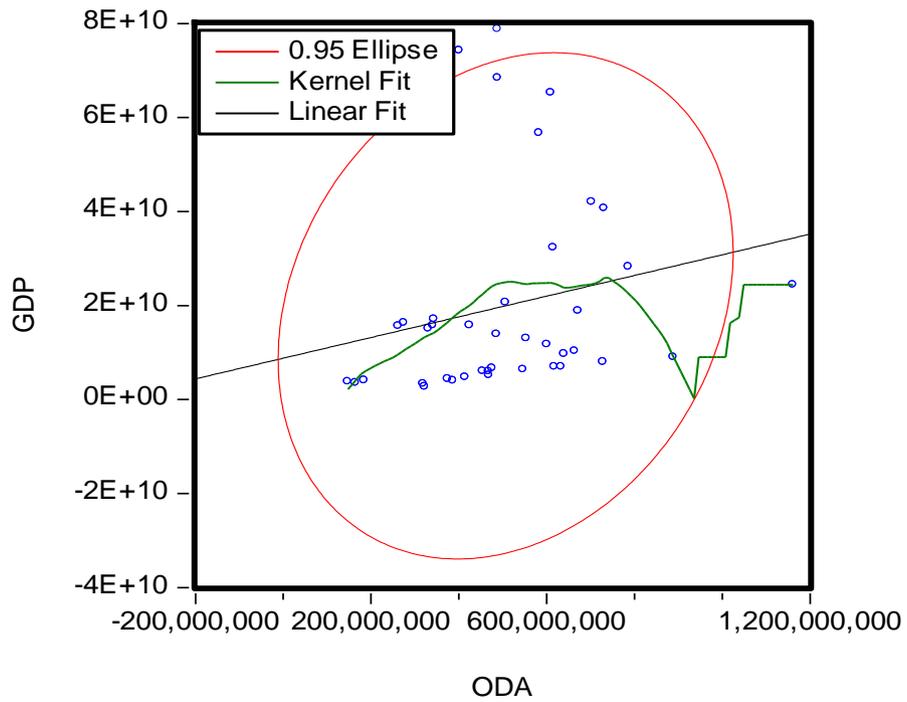

(a)
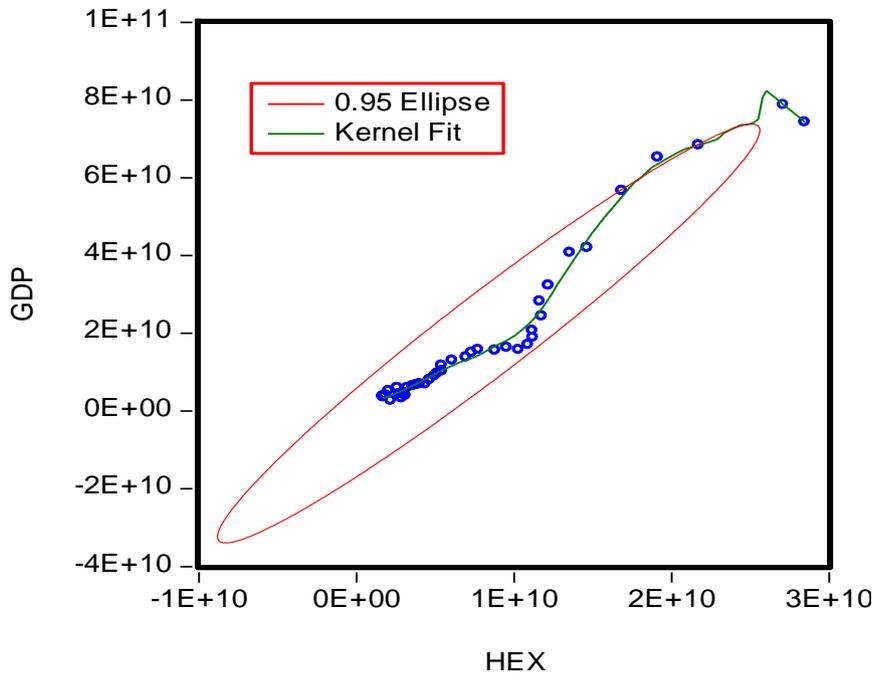
(b)

(c)

(d)

Figure 1(a-d). Relationship between the independent and dependent variable
Source: E- views software

According to the Figure 1, this study confirmed that the independent variables of this study are positively correlated with the gross domestic product. Because whole observation among the variables are limited within the confidential ellipse and show the positive Kernel fit. Therefore, this study strongly believe that the consumption expenditure induces the economic growth in Sri Lanka. However, as mentioned in the methodology this study consider the descriptive statistics of the variables for confirming the risk position of the consumption expenditure for supplying the economic growth compared to other variables.

The following table shows that the descriptive statistics of considered variables.

Table 1. Descriptive statistics

Variables	Mean	Median	Max	Min	Std. Dev.	Observation
GDP	1.99	1.24	7.88	2.73	2.11	
MS	33.4	32.8	41.7	17.95	5.38	
EXPORT	4082.8	3507.6	11130	558.0	0.72	40
HEX	8.39	5.78	2.85	1.66	1.39	
ODA	5.07	4.87	1.16	1.48	1.48	

Source: E-views Software

Table 2. Estimation results of regression model

Variable	Coefficient	Std. Error	t- statistic	Probability
LOG(EXPORT)	0.353947	0.067117	5.273546	0.0000
LOG(HEX)	0.983843	0.069926	14.06984	0.0000
LOG(MS)	-1.321732	0.248236	-5.324494	0.0000
LOG(ODA)	0.143668	0.066052	2.175062	0.0363

R-squared: 0.97	Durbin-Watson stat: 2.37

Source: E-views Software

Descriptive statistics in Table 1 show that the key variable (consumption expenditure) represents 83.9 percent of the GDP over the sample period, with a maximum of 28.5 percent in 2013. In the meantime, the volatility of the consumption expenditure 1.39 which is shown in the standard error of the particular variable. In Sri Lanka the average of the gross domestic product over the sample period is 19.9 percent. But, the standard deviation of the GDP is 2.11 which is also show that the GDP is in less risk. According to the Table 1, the money supply is in high risk because the standard deviation of the money supply is higher than the standard deviation of the other variables. Likewise, the export is in less validity because the standard deviation of the export variable is less compared to standard deviations of the other variables.

In order to test the impact of the consumption expenditure on the economic growth, as discussed in the methodology, this study uses the multiple regression techniques by using the OLS technique. The following table shows the results of regression output.

In Sri Lanka, the consumption expenditure positively impacts on the economic growth over the study period at 1% significant level that means if the consumption expenditure is increased by one unit the gross domestic product is also pushed by 0.98 unit. Otherwise, if the households' expenditure is decreased by one unit the gross domestic product is also declined by 0.98 unit. Thus, both variable jointly move in the same sign. But, the money supply in estimated equation has negative relationship with the gross domestic product, however it is positively correlated in the single manner (see Figure 1). Furthermore, to confirm the autocorrelation effect of the fitted model this study considers the Breusch – Godfrey serial correlation LM test. Thus, the outcome of this test shows as:

Table 3. Breusch-Godfrey Serial Correlation LM Test

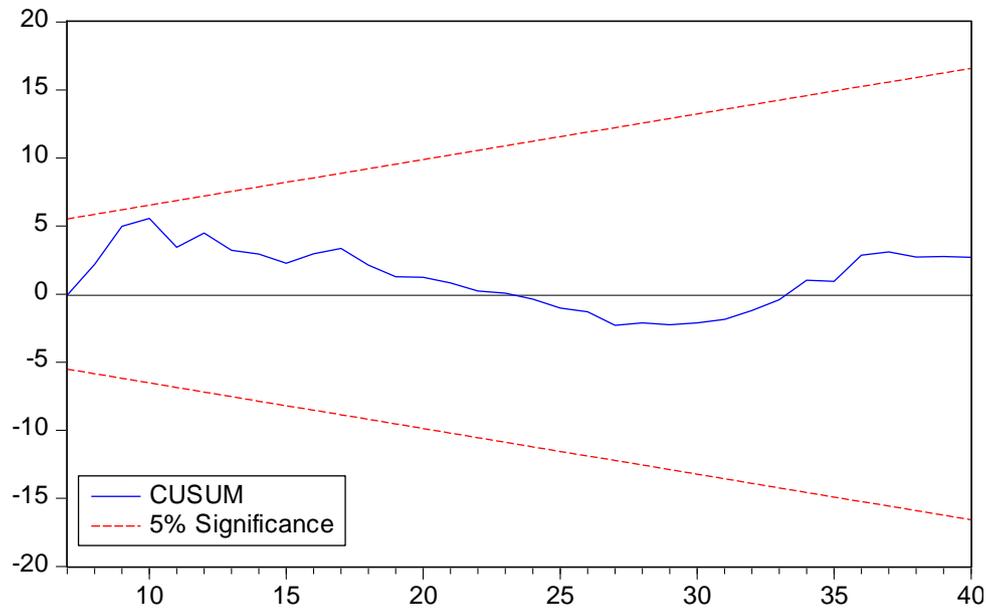| F- statistic 0.668476	Prob. F(4,30)	0.6189
Obs* R- squared 3.191566	Prob. Chi- square (4)	0.5263

Source: E-views Software

Figure 2. CUSUM plot of the fitted regression model

Source: E-views Software

Based on the Table 3, the F- statistic for the Breusch – Godfrey serial correlation LM test is 0.67 and its probability value is 0.61. Likewise, the R- squared of this test is 3.19 and its probability value is 0.53. Therefore both the F – statistic and the R- squared are greater than 5% significant level. Therefore, the estimated model is not suffering from the autocorrelation effect. After confirming the serial correlation effect of the fitted model, which is needed the confirmation whether it is desirable or not. So, in order to test the appropriation of the fitted model, this study use the CUSUM test. The following Figure 2 shows the CUSUM plot.

In the Figure 2, the CUSUM line is situated between the grid lines which indicates in the red line. Thus, the fitted multiple regression model is stable because the CUSUM line is situated between the grid lines. In order to confirm the integrated order of the variables, the Augmented Dickey Fuller (ADF) test is applied. The integrated order of the variables are as:

Table 4. Integrated order of the variables.

	Level			1st difference		
Variables	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend	None
Export	[2.961514] (-2.943427)	[-0.463578] (-3.536601)	[5.047273] (-1.950117)	[-2.859179] (-2.945842)	[-7.675418] (-3.536601)	[-1.735218] (-1.950394)
MS	[-3.102833] (-2.938987)	[-2.909383] (-3.529758)	[0.936334] (-1.949609)	[-6.530530] (-2.941145)	[-6.724141] (-3.533083)	[-6.353238] (-1.949856)
GDP	[5.462414] (-2.938987)	[1.860651] (-3.529758)	[7.683692] (-1.949609)	[-1.095266] (-2.945842)	[-5.137534] (-3.533038)	[-0.390969] (-1.950394)
HEX	[3.557942] (-2.941145)	[2.378576] (-3.533083)	[2.280928] (-1.950117)	[-0.218847] (-2.943427)	[-1.256709] (-3.536601)	[1.623179] (-1.950394)
ODA	[-3.073293] (-2.938987)	[-3.061888] (-3.529758)	[-0.325446] (-1.949856)	[-9.352059] (-2.941145)	[-9.438154] (-3.533083)	[-9.443268] (-1.949856)

[ ] denotes the Augmented Dickey Fuller test statistic, ( ) denotes the test critical value in 5%
Source: Calculated from secondary data

Table 5. Johansen Cointegration test statistics

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Trace statistics	0.05 critical value	Probability value
H0: r = 0*	201.8675	69.81889	0.0000
H0: r≤1*	61.53625	47.85613	0.0016

H0: r≤2	29.59318	29.79707	0.0528
H0: r≤3	9.140503	15.49471	0.3525
H0: r≤4	2.883879	3.841466	0.0895

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Max -Eigen Statistics	0.05 critical value	Probability value
H0: r = 0*	140.3313	33.87687	0.0000
H0: r≤1*	31.94307	27.58434	0.0129
H0: r≤2	0.442534	21.13162	0.0620
H0: r≤3	0.163701	14.26460	0.5805
H0: r≤4	0.079093	3.841466	0.0895

*Indicates cointegration vectors
Source: Calculated from secondary data

In order to test the long run relationship between the consumption expenditure and the gross domestic product, this study uses the Johansen cointegration technique. Based on this technique, Table 5 shows the Trace and Maximum Eigenvalues which has two cointegration vectors. In as mush, both tests indicate that the probability values of the vectors have a lower probability value. Therefore, the long run model is as:

Table 6. Long – run model and its outputs

Variables	Coefficient	Standard errors	t- statistics
Log(EXPORT(-1))	- 0.31628	0.09505	3.32749
Log(HEX(-1))	1.397893	0.08600	16.2540
Log(MS(-1))	0.168597	0.16868	1.01079
Log(ODA(-1))	0.021883	0.01955	1.11949

$$\log(GDP) = -6.793 - 0.316\ln(Export(-1)) + 1.398\log(HEX(-1)) + 0.169\log(MS(-1)) + 0.0218\log(ODA(-1))$$

Source: Calculated from secondary data

Based on the Table 6, the long run model indicates that the consumption expenditure positively maintains the relationship with the gross domestic product. Therefore, this study concludes that the consumption expenditure has long run positive association with the gross domestic product in Sri Lanka. Having found the long run model of cointegration vector, this study moves to find out the short run behaviour of the key independent variable or error correction model. By the reason of two vector in the Johansen cointegration test are

cointegrated, this study uses the Vector Error Correction Model (VECM) to find out the short run behaviour of the key variable. The following table indicates the details of the vector error correction model.

Table 7. Results of Vector Error Correction Model

Variables	Coefficient	Standard Error	t- statistics
CointEq1	-0.050344	0.015039	-0.33475
D(GDP(-1))	0.675365	0.35335	1.91134
D(GDP(-2))	-0.12537	0.21480	-0.5836
D(GDP(-3))	0.296917	0.22792	1.30271
D(GDP(-4))	0.191761	0.16461	1.16491
D(Export(-1))	-0.456722	0.18180	-2.51218
D(Export(-2))	0.565683	0.20203	2.79996
D(Export(-3))	0.002706	0.15458	0.01751
D(Export(-4))	0.193559	0.14338	1.34999
D(HEX(-1))	-0.406722	0.14965	-2.71779
D(HEX(-2))	0.029580	0.11921	0.24813
D(HEX(-3))	-0.016666	0.12784	-0.13036
D(HEX(-4))	-0.282694	0.24596	-1.14933
D(MS(-1))	0.019878	0.03318	0.55905
D(MS(-2))	-0.053691	0.20214	-0.26561
D(MS(-3))	0.232244	0.20045	1.15860
D(MS(-4))	-0.437995	0.21417	-2.04506
D(ODA(-1))	0.025003	0.06718	0.37219
D(ODA(-2))	0.207059	0.07320	2.82881
D(ODA(-3))	0.083990	0.06855	1.22529
D(ODA(-4))	-0.206409	0.07441	- 2.77399
Constant	0.008899	0.05888	0.15113

(All Variables are in natural logarithm)
Source: Calculated from secondary data

So as to test the serial correlation effect of the estimated VECM model, this study uses the Breusch – Godfrey Serial correlation LM test. The following table shows the serial correlation LM test of the explored model.

Table 8. Breusch – Godfrey Serial correlation LM test

F – statistic	0.450578	Prob. F(4,17)	0.7700
Obs* R- Squared	5.839577	Prob. Chi- Square (4)	0.2115

Source: Calculated from secondary data

In the Table 8, the serial correlation LM test statistic observed R- squared probability value is 0. 2115 which is greater than 0.05 critical values. Therefore, this model is not suffering from the serial correlation effect.

7. CONCLUSION AND POLICY RECOMMENDATION

In this study, there were two objective which were achieved by using different econometric analytical technique. In order to test the first objective, this study used the multiple regression technique supporting the ordinary least squared method. The second objective of this study was tested by using the Johansen cointegration technique. In order to attain both objectives this study considered the following variables: gross domestic product, consumption expenditure, exports, money supply, and official development assistant during the period of 1975 to 2014. Here, the gross domestic product was as dependent variable and others were independent variables. In this study the consumption expenditure was key independent variable.

Based on the multiple regression technique, this study found that the household expenditure had positive relation on the gross domestic product in Sri Lanka which was confirmed at one percent consequence level over the sample period. In the meantime, the Johansen cointegration technique was used to investigate the long run relationship between the consumption expenditure and economic growth. According to this technique, it was established that the consumption expenditure had long – run relationship on the gross domestic product.

From both techniques, this study concluded that the consumption expenditure is an inducing factor for the economic growth in Sri Lanka. By this reasons, the policy makers should implement the household friendly policy to promote the economic growth through the consumption expenditure.

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