Do the Quality of Institutions, War and Macroeconomic Factors Matter for Stock Market Development? The Evidence from Sri Lanka

N.P. Ravindra Deyshappriya[1]

Abstract

This paper models the impacts of the quality of the institutions, war and macroeconomic factors on stock market development of Sri Lanka over the period of 1990 – 2012 using the co-integration analysis and error correction model. According to the both long run and short run models, war and institutional quality are the most influential negative and positive factors of stock market development respectively. In addition, macroeconomic factors such as capital formation, floating exchange rate regime, inflation, real interest rate, per capita GDP andforeign direct investment also ensure the stock market development in Sri Lanka. Therefore, the current study highly recommended to accommo date the appropriate policies to ensure the quality of the institutions and peaceful environment along with macroeconomic stability.

Keywords: Co-integration, Institutional Quality, Error Correction Model, Macroeconomic Factors

1. Introduction

1.1. Background of the Study

Stock market is one of the key players of the financial system of the economy. Similarly, stock markets act as the engine of the economic growth by providing the long term capital requirement which essential for the long run investment. Despite, there are no consensus about causal relationship between financial development and economic growth; empirical studies by Levine (2003), Levine and Zervos (1998) Bencivenga and Smith (1991), Carporale et al (2005) and Christopoulos and Tsionas (2004) have already confirmed the finance-led growth hypothesis for both and developed and developing economies.

However, the stock exchanges in emerging and developing countries are less efficient and underdeveloped compared to those are in developed economies. In particular, the performances of the stock market in Sri Lanka is lagging behind compared to the other South Asian counterparts; though Sri Lanka has been maintaining higher and stable macroeconomic conditions compared to other South Asian economies. Consequently, it is important to examine whether the macroeconomic factors influence the stock market development of Sri Lanka. Further, the association between quality of the institutions, War and stock market development are also crucial to be modelled.

The figure 01 illustrates the daily behavior of All Share Price Index (ASPI) and S & P SL 20 index which was introduced in 2012 after canceling the Milanka Price Index. The vertical dotted line in figure 01 differentiates the war period and post-war period.

[1]Graduate School of International Development, Nagoya University, Japan. Email:ravipdn@yahoo.com, Tel: +81-90-6462-0679

Therefore, the graph clearly depicts the impact of war on All Share Price Index of Colombo Stock Exchange in Sri Lanka. After finishing the war in 19th of May 2009, the price index has rocketed and reached a peak despite the world economic crisis happened.

Figure – 01: Behavior of All Share and S & P SL 20 Price Indices

Source: Created by Author based on Colombo Stock Exchange Data

The stock market performances of Sri Lanka is still at under-developed stage compared to the key markets in the region such as India, Pakistan and Bangladesh. The figure 02 compares the position of Sri Lanka among them in terms of Number of listed companies.

Figure – 02: Number of Listed Companies in Selected South Asian Economies and Sri Lanka
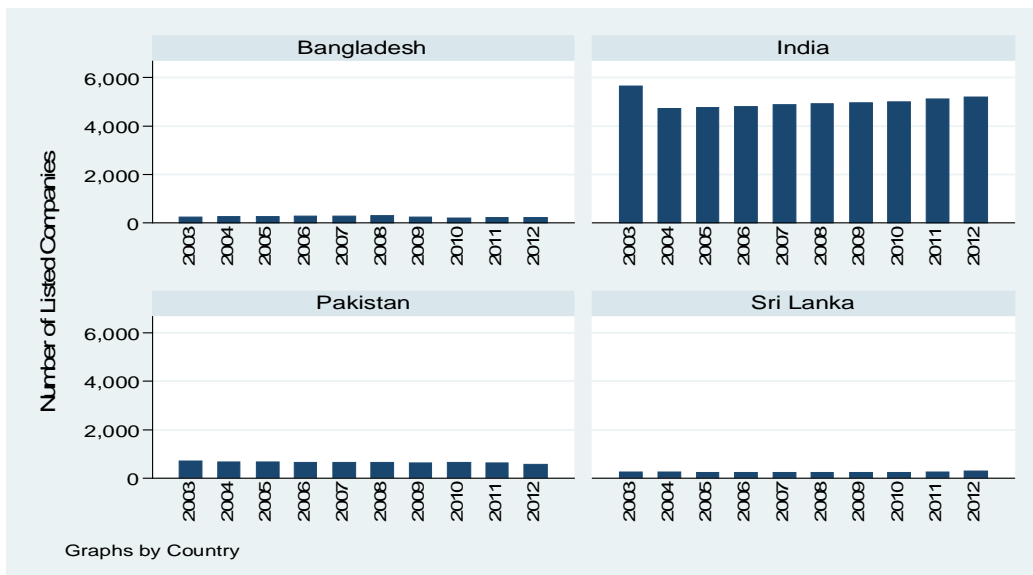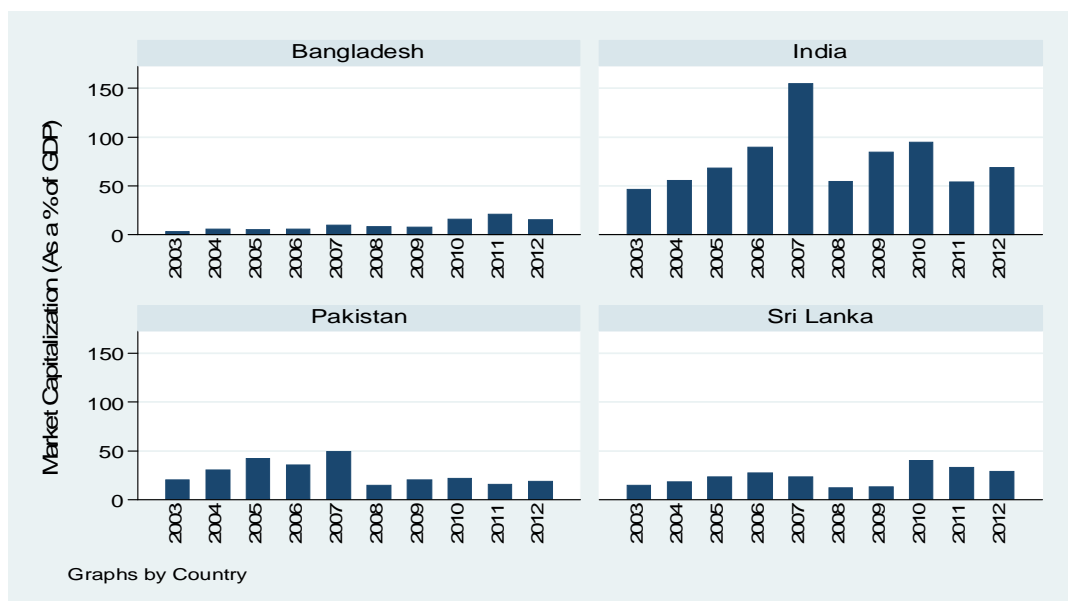

Source: Created by Author based on World Bank Data

It is quite obvious that India is an outlier among others, in term of number of listed companies. The main reason is, Indian stock market system consists of 22 major stock exchanges while Sri Lanka, Bangladesh and Pakistan have one, two and three respectively.Moreover, according to the 2012 statistics; the number of listed companies in Colombo Stock Exchange in Sri Lanka is 287 while Bangladesh, India and Pakistan is 229, 5191 and 573 respectively.

Even though, Sri Lanka has long been maintaining a smooth economic and social status compared to the other region counterparts, the listed number of companies in the stock exchange is obviously low.

In addition to that, market capitalization as a percentage of GDP of Indian stock exchange also recorded highest values by beating other three markets. Specifically, the market capitalization as a percentage of GDP in India has exceeded 154% in 2007 while Sri Lanka was only 23.3%. In fact, the stock market of India is a collection of 22 stock exchanges and as a result of that; it has become the leading stock market in South Asian region in terms of market capitalization and trade volume. Apart from that, the value of market capitalization as a percentage of GDP of each country has been affected by global financial crisis happened in 2008 and it can be easily understood in the figure 03. As a result of the adverse effect of the financial crisis, the market capitalization of India as a percentage of GDP has sharply dropped down to 54.4% in 2008 from 154.6% in 2007 and to 12% from 23.4% in Sri Lanka.

Figure – 03 : Market Capitalization (As a % of GDP) of Selected South Asian Economies

Source: Created by Author based on World Bank Data

In overall, the number of listed companies and market capitalization of Colombo Stock Exchange are not sufficient in accordance with the country's current economic and social development. Especially, the stock market development of Pakistan and Bangladesh even under the vulnerable economic and social conditionsfurther highlight the under-development of the stock market in Sri Lanka.

1.2. Problem Statement and Objective

It is a common fact that macroeconomic factors affect stock market development. Despite, Sri Lanka has been experiencing stable economic conditions and higher level of educational and social indicators; stock market activities are not well-developed. Therefore, it is timely important to examine whether the macroeconomic factors affect stock market development. In addition, determinants of the development of stock market with reference to the Colombo Stock Exchange in Sri Lanka have not been sufficiently addressed. Similarly, there is a miss-match between the empirical findings and the existing condition in Sri Lanka. Moreover, the impacts of the quality of the institutions and war on the stock market havenot beenexamined relevant to the stock market in Sri Lanka.

Therefore, the key research question that based on the current paper is whether the macroeconomic factors, the quality of the institutions and the war affect the stock market development in Sri Lanka?

The key objective of this paper is to examine the impacts of macroeconomic factors, quality of institutions and war on stock market development in Sri Lanka. Therefore, the study is based on a case study of Colombo Stock Exchange in Sri Lanka. Particularly, the long run and short run impacts of macroeconomic factors, quality of institutions and war on stock market development have been examined.

2. Literature Review

Most of the empirical studies have paid their attention on how the financial development or the stock market development affect the economic growth. Especially, scholars such as Beck and Levine (2003), Levine and Zervos (1998) Bencivenga and Smith (1991), Carporale et al (2005) and Christopoulos and Tsionas (2004) have highlighted the contribution of the finance sector on economic growth.

However, the empirical studies that addressed the determinant of stock market development are considerably rare in the literature. Further, there is no empirical study that examined the impact of macroeconomic and institutional factors on stock market development in the context of Sri Lanka. However, it is worth to review the available empirical works on determinants of stock market development.

A study by Garcia and Liu (1999) have based on both developed and developing countries. They have selected 15 countries for their study over the period of 1980-1995. This study has examined the impact of macroeconomic factors on stock market development and they have observed that stock market liquidity, savings and income significantly influence the stock market development. Similarly, Garcia and Liu (1999) concluded that both banking sector and stock market development are complementary rather than substitution. Despite, Garcia and Liu (1999) found that political stability is not a significant factor of stock market development; Girma and Shortland (2008) have confirmed that democracy and political stability enhance the financial development. Their findings are based on the pooled analysis of both developed and developing countries over the period of 1975 – 2000. A Study based on the MENA countries by Naceur et al (2007) has highlighted contribution of economic stability, savings, financial intermediary and stock market liquidity on stock market development. They have analyzed the data from 12 MENA countries using the fixed and random effect panel data analysis. As Garcia and Liu (1999), they also confirmed that banking sector and stock market development are more complementary rather than substitution. Additionally, Demirguc-Kunt and Levine (1996) have stressed that banking sector development significantly affect the stock market development.

Further, Garcia and Liu (1999) have mentioned that both macroeconomic and institutional factors affect stock market development, despite they have considered only about the macroeconomic factors. Thus, IMF working paper by Yartey (2008) has taken the impact of both macroeconomic and institutional factors in to account. This study have applied dynamic panel data analysis based on GMM method for 42 emerging countries during 1990 – 2004. Especially, the political risk index has been used as a proxy for the quality of the institutions. According to the results of Yartey (2008), GDP, investment, stock market liquidity, capital inflow and banking sector development. Additionally, political risk and law and order also highly link with the stock market development.

Another study by Perotti and Peter (2001) has also examined the impact of trust and rule of law on stock market development. Initially, they have applied a correlation analysis for 48 countries and observed that trust and rule of law positively link with the stock market development. Later, they have employed the OLS regression analysis for the same 48 countries over the period of 1980-1995 and reconfirmed the same relationship.However, a study by Cherif and Gazdar (2010) have also considered about the macroeconomic and institutional factors. Their analysis based on the 14 MENA countries and GMM panel data analysis from 1990 to 2007. Similarly, the results indicated that interest rate, stock market liquidity, income level and saving rate highly associate with the stock market development.

In addition to them, La Porta et al (1997 and 1998) and Pistor et al (2000) have also emphasized the contribution of legal and institutional factors on stock market development in transition and emerging economies. However, unlike Yartey (2008) and Cherif and Gazdar (2010) this study has stressed that institutional factors are not quite important on stock market development.

Apart from them, Mansor (2011) has conducted a co-integration analysis based on VAR model in the context of the stock market development of the Thailand. He has analyzed the impact of the macroeconomic variables on stock market development. Mansor (2011) has stressed that real GDP, aggregate price level and the investment ratio as the key factors of the stock market development in Thailand. Further, this study has indicated that there is a bi-directional causality between stock market development and real GDP. A broad analysis on financial development economic growth has been done by Mishal (2011) for Jordan. However, this study also specify the development of stock market development as well. Accordingly, GDP growth and banking sector development positively affect the stock market development in Jordan. Another study on the stock market development in Jordan has been conducted by El-Nader &Alraimony (2013) over the period of 1990-2011. Their study have based on the VECM analysis in which the market capitalization was used as the stock market development. In fact, scholars such as Yartey (2008), Naceur (2007) and Garcia & Liu (1999) have also used the market capitalization as a proxy for the stock market development. According to El-Nader &Alraimony (2013), money supply, stock market liquidity, capital formation and credit to private sector are positively related with the stock market development in Jordan while GDP and the remittances are negatively.

An application of error correction model was done by Kemboi and Tarus (2012) in the context of quarterly data from Nairobi Stock Market in Kenya over the period of 2000 – 2009. According to the econometric analysis, banking sector development, stock market liquidity and income level positively linked with the stock market development. However, the macroeconomic stability was not a crucial factor of explaining the development of stock market in Nairobi, Kenya. Apart from them, the impact of macroeconomic variables on discount rate has been examined by Leroy and Porter (1981) while Fannery and Protopapadakis (2002) have confirmed the direct relationship between macroeconomic factors and stock returns. This link has been also evidenced by Patroet al. (2002).

The studies that directly address the impact of macroeconomic and institutional factors on stock market development in Sri Lanka cannot be found. However, Gunasekarage et al (2003) has focused on how the selected macroeconomic variables affect the All Share Price Index. According to them inflation, money supply and treasury bills are the significant factors of explaining the changes in All Share Price Index of Colombo Stock Exchange in Sri Lanka. Their study was based on the monthly data form 1985 to 2001and VECM analysis was utilized. However, they have ignored most of the important macroeconomic factors that affect the stock market. Similarly, All Share Price Index is not a good proxy for the stock market development according to the literature. In addition to Gunasekarage et al (2003), Menike (2006) also modeled the macroeconomic determinants of stock price. According to Menike (2006)Money Supply, Exchange Rate, Inflation, Treasury Bill Rate were the key determinants of stock price. The analysis based on the sector-wise stock price in Colombo Stock Exchange in Sri Lanka during the period of 1991 – 2002. Further, the analysis based on the OLS regression. However, both of these studies are away from the scope of stock market development. Since there is a crucial gap to be filled regarding the stock market development in Sri Lanka, it is important to examine how the key macroeconomic factors and the quality of the institution affect the stock market development in Sri Lanka.

3. Methodology

3.1. Data and Sample Period

The econometric model that quantified the determinants of the stock market development in Sri Lanka is based on the time series data over the period of 1990 – 2012. The data were collected from the World Bank Data series and the Political Risk Services International Country Risk Guide of International Country Risk Guide. The Table 01 provides a detailed explanation about the variable included in this study.

Table 01: Description of the Variables

Variable Code	Variable Description	Data Source
MC/GDP	The Ratio of Market Capitalization to GDP	World Bank
CF/GDP	The Ratio of Capital Formation to GDP	World Bank
CRDT/GDP	The Ratio of Credit to the Privet Sector to GDP	World Bank
ERPOLICY	Exchange Rate Policy	Dummy Variable
INFL	Inflation	World Bank
SAV/GDP	The Ratio of Saving to GDP	World Bank
RINTEREST	The Real Interest Rate	World Bank
WAR	The Civil War	Dummy Variable
INSQUL	Quality of the Institutions	www.prsgroup.com
PERCAP	Per Capita Income	World Bank
FDI	Foreign Direct Investment	World Bank
SMLIQ	Stock Market Liquidity	World Bank

Source: Created by Author

3.2. Econometrics Procedures

Unit Root Test

The study applied the Augmented Dickey Fuller (ADF) unit root test (Dickey and Fuller – 1981) which is more commonly used by many time series studies. The theoretical background of ADF test can explained as follows.

$$\Delta Y_t = \alpha_{0t} + \theta_i Y_{t-1} + \alpha_{i1} + \sum_{j=1}^{p} \delta_j \Delta Y_{t-j} + \varepsilon_t \qquad (1)$$

$$\Delta Y_t = \alpha_{0t} + \theta_i Y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta Y_{t-j} + \varepsilon_t \qquad (2)$$

In accordance with the above theoretical background, Y_t refers to any time varying variable for time period t. Further, $\Box\Box\,Y_t \Box\Box\,Y_t \Box\Box\,Y_t 1$ and the t is the time trend term and a_{0i} is the constant. P is the number of lagged terms and e_t is the error term which is white noise. According to the above model, the hypothesis can be expressed as follows.

Null Hypothesis	H_0: $q_1 = 0$
Alternative Hypothesis	H_1: $q_1 < 0$

According to the null hypothesis, the series is non-stationary or the there is a unit root problem. Conversely, the alternative hypothesis states the series is stationary and no unit root problem exists. According ADF test, if the null hypothesis is rejected; Y_t is stationary and it is known as $I(0)$ variable. Otherwise, the series is non-stationary and then the series should be differenced and tested for higher integration.

Co-integration Test

It is a common fact that there is a long run relationship among the time series variables. The current study employed the Engle – Granger Test due to the limited number of observations.

According to Engle and Granger (1987) Error Correction Model, if the variables are non-stationary but the linear combination of series is stationary; then the co-integration exists among the variables. The process of checking the co-integration based on Engle - Granger method can be explained as follows. Assume that there are two time series variables called *Xt* and *Ytt*hose are Non-Stationary and so called*I(1)* variables. First, the Ordinary Least Squared (OLS) regression should be run as follows.

$$Y_t = \beta_0 + \beta_1 X_t + u_t \qquad\qquad (3)$$

After running the OLS regression, the residual series of the OLS regression should be checked for the unit roots.

$$U_t = Y_t - \beta_0 - \beta_1 X_t \qquad\qquad (4)$$

Then, if residual series(U_t) is Stationary and so called *I(0)*, Xt and Yt are co-integrated. It implies that there is a long run relationship between *Xt* and Yt.

After that, the long run (General Model) model should be constructed by getting the difference of the *I(1)* variables explained in the equation (3).

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 \Delta X_t + \beta_3 Residual_{t-1} + u_t \qquad\qquad (5)$$

After estimating the long run model, the dynamic model (Short Run Model) should be estimated using the statistically significant variables in the long run model. The equation (6) indicates the short run dynamic model.

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \cdots + \beta_{1n}\Delta Y_{t-n} + \beta_2\Delta X_t + \beta_3\Delta X_{t-1} + \cdots + \beta_{3n}\Delta X_{t-n}$$
$$+ \beta_4 Residual_{t-1} + u_t \qquad\qquad (6)$$

The coefficients in front of the variable called *Residual$_{t-1}$* in both equation (5) and (6) are known as the error correction term which explains the speed of adjustment process. In other words, the rate at which the disequilibrium of the previous time period is corrected towards the long run equilibrium.

3.3. Empirical Models

An application of Engle-Granger method incorporating the variables of this study also formulates both long run and short run dynamic models. The long run model which was estimated can be given as below.

$$\Delta MC/GDP_t =$$
$$\beta_0 + \beta_1 MC/GDP_{t-1} + \beta_2\Delta CF/GDP_t + \beta_3\Delta CRDT/GDP_t + \beta_4 ERPOLICY + \beta_5\Delta INFL_t +$$
$$\beta_6\Delta SAV/GDP_t + \beta_7\Delta RINTEREST_t + \beta_8 WAR + \beta_9\Delta INSQUL_t + \beta_{10}\Delta PERCAPGDP_t +$$
$$\beta_{11}\Delta SMLIQ_t + \beta_{12}\Delta FDI_t + \beta_{13}RESID(-1) + u_t \qquad\qquad (7)$$

In addition to this long run model, the short run dynamic model was estimated based on the equation (8).

$$\Delta MC/GDP_t = \beta_0 + \beta_1 MC/GDP_{t-1} + \beta_2\Delta CF/GDP_t + \beta_3\Delta CF/GDP_{t-1} + \beta_4 ERPOLICY +$$
$$\beta_5\Delta INFL_t + \beta_6\Delta INFL_{t-1} + \beta_7\Delta RINTEREST_t + \beta_8\Delta RINTEREST_{t-1} + \beta_9\Delta SAV/GDP_t +$$
$$\beta_{10}\Delta SAV/GDP_{t-1} + \beta_{11}WAR + \beta_{12}\Delta INSQUL_t + \beta_{13}\Delta INSQUL_{t-1} + \beta_{14}\Delta PERCAP_{t-1} +$$
$$\beta_{15}\Delta SMLIQ_t + \beta_{16}\Delta FDI_t + \beta_{17}RESID(-1) + u_t \qquad\qquad (8)$$

The above long run and short run models have been estimated using the OLS method.

4. Results and Discussion

4.1. The Results of Augmented Dickey Fuller Unit Root Test

The stationary of the data series were checked by employing the Augmented Dickey Fuller (ADF) Test. The results of ADF test was summarized in the table 02.

Table – 02: The Results of Augmented Dickey Fuller Unit Root Test

Series	Prob. (Level)	Prob. (1st Difference)	Obs
MC/GDP	0.2630	0.0011	20
CF/GDP	0.3394	0.0055	22
CRDT/GDP	0.4898	0.0010	22
INFL	0.0020	0.0001	22
SAV/GDP	0.0550	0.0011	21
RINTEREST	0.0290	0.0000	22
INSQUL	0.1950	0.0004	20
PERCAPGDP	1.0000	0.0582	18
SMLIQ	0.0521	0.0050	22
FDI	0.2398	0.0002	21

Source: Computed by Author based on the World Bank Data

As the table 02 indicates all the variables are non-stationary at the level form; since the null-hypothesis of series are non-stationary cannot be rejected at the 5% significance level. Hence, the variables are called *I(1)* variables. However, the series are stationary at the first difference; since the null hypothesis of non-stationary can be rejected due to the significance probabilities.

4.2. Results of Engle-Granger Co-integration Test

Since, the data series are *I(1)*; there is a possibility of having conintegration among the variables. The study employed the Engle-Granger Co-integration Test to capture the long run relationship among the variables. According to the method of Engle-Granger, first the OLS regression should be estimated using the non-stationary data. The following table 03shows the estimated OLS regression with *I(1)* variables. The main objective of this regression is to get the residual series of the regression. Hence, the further explanations of coefficient or the validity of the model are not needed to be highlighted.

Table – 03: Results of OLS Regression of Engle-Granger Co-integration Test

Dependent Variable: MC/GDP
Sample (adjusted): 1990 - 2011
Method: Least Squares
Included observations: 21 after adjustments

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	-67.0064	91.6133	-0.7314	0.4831
CF/GDP	2.5610	1.6920	1.5136	0.1644
CRDT/GDP	0.1983	0.4577	0.4333	0.6750
ERPOLICY	11.0838	8.8010	1.2593	0.2396
INFL	0.1571	0.5738	0.2739	0.7903
SAV/GDP	-0.3646	1.3212	-0.2759	0.7888
RINTEREST	0.0943	0.5971	0.1579	0.8780
WAR	-29.2828	18.4645	-1.5858	0.1472
INSQUL	91.5400	113.7146	0.8049	0.4416
PERCAPGDP	-0.0217	0.0156	-1.3928	0.1971
SMLIQ	2.9976	1.1893	2.5202	0.0328
FDI	0.0178	0.0167	1.0689	0.3129

R-squared	0.8022	D-W stat	1.9761	
Adjusted R-squared	0.5605	F-statistic	3.3188	
S.E. of regression	5.6688	Prob F	0.0411	

Source: Computed by Author based on the World Bank Data

The second step of the Engle – Granger method is related to the test of unit root of the residual of the estimated OLS regression. If the residual series is stationary at the level form, the variables are co-integrated. The order of integration of the residual series was tested using the Augmented Dickey Fuller (ADF) Test and the result is given in the table 04.

Table – 4: Results of ADF Test on Residual of OLS Regression of Engle-Granger Co-integration Test

	t-Statistic	Prob.*
Exogenous: Constant		
Lag Length: 4 (Automatic based on SIC, MAXLAG=4)		
Augmented Dickey-Fuller test statistic	-3.4518	0.0324*
Test critical values:		
1% level -4.2000		
5% level -3.1753		
10% level -2.7289		

Source: Computed by Author based on the Residuals of OLS Regression in Table 03

According to the result of the ADF test, the residual series is stationary at the level form. Hence, the variables are co-integrated and thus there is a long run relationship between the dependent variables market capitalization and other independent variables.By following the Engle-Granger method, both long run general model and the short run dynamic process were constructed.

4.3. Results of the Long Run (General) Model

The long run model explains the log run determinants of the stock market development. The table 05 have four models and from model one to four were estimated by adding more variables at a time. As the table 05 states, the 4th model is the precious model among all the four models based on the higher R-squared value and highly significant negative error correction term and F-Statistic

Table – 05: Results of the Long Run (General) Model

Dependent Variable: ΔMCGDP
Sample (adjusted): 1991 - 2011
Method: Least Squares
Included observations: 21 after adjustments

Variables	Model 1	Model 2	Model 3	Model 4
C	20.9751**	-1.7638	18.6071	15.1434**
	(2.8013)	(-0.3223)	(1.3423)	(2.8703)
MC/GDP(-1)	-0.2939	0.0832	-0.5121	0.2404
	(0.1890)	(0.2632)	(-1.0245)	(1.2243)
ΔCF/GDP	1.5807*	1.4523*	1.9089	2.2789***
	(2.0980)	(1.9317)	(0.1336)	(4.8401)
ΔCRDT/GDP	-0.3884	-0.6932*	-0.2545	0.2898
	(-1.2950)	(-1.8434)	(-0.4967)	(1.5434)
ERPOLICY		2.5853	0.5845	3.7701*
		(0.8632)	(0.1604)	(2.5356)
ΔINFL		0.1824	0.3967	0.4947**
		(0.6434)	(1.0023)	(3.5123)
ΔSAV/GDP		1.8402*	0.8646	1.0001*
		(1.8715)	(0.7243)	(2.2589)
ΔRINTEREST			0.3270	0.7902**
			(0.5601)	(3.8624)
WAR	-8.8468*	-9.3023*	-10.1003	-17.3989***
	(-2.1045)	(-2.2.32)	(-1.5023)	(-5.3323)
ΔINSQUL	-21.6634	-15.4321	-10.2861	86.4204*
	(-0.2732)	(-0.4532)	(-0.0809)	(2.0612)
ΔPERCAP				0.0590***
				(4.4323)
ΔSMLIQ				1.4498**
				(3.5923)
ΔFDI				0.0398***
				(6.2312)
RESID(-1)	-0.8768*	-1.3583**	-0.7334	-1.6109***
	(-1.911)	(-2.2321)	(0.3523)	(-5.6734)
R-squared	0.4579	0.6091	0.7102	0.9794
Prob(F-statistic)	0.0347	0.0647	0.1759	0.0023

Source: Computed by Author based on the World Bank Data

According to the model 4 explained in the table 05, the ratio of capital formation to GDP, Floating Exchange Rate, Inflation, the ratio of savings to GDP, real interest rate, institutional quality, per capita GDP, stock market liquidity and foreign direct investment are positively related with stock market development in long run and statistically significant. In contrast, the war negatively affects to the long run stock market development with a higher statistically significant. Especially, the higher capital formation leads for the smooth running of the existing industries and also provides motivation for new industries to be established. In particular, the investments in the infrastructure essentially attracts the both international and local investors' eyes in to the economy. Consequently, the higher level of capital formation lifts up the position of existing company expanding their network and ensuring the higher revenue in the long run. In addition, the attracted of the new industries may list in the stock market in the long run. The similar results were found by Yartey (2008) andEl-Nader &Alraimony (2013) as well.

A dummy variable was included in order to capture the impact of exchange rate policy changes in the economy. Sri Lanka experienced fixed exchange rate regime up to January 2001 and the floating exchange rate was introduced from 23rd of January 200. As the model 4 elaborates, the exchange rate variable is positive and statistically significant in the long run.

It emphasizes that floating exchange rate introduced in 2001 positively influences the stock market development in the long run. In fact, Sri Lanka has been experiencing imperfect capital mobility where the capital account is not fully liberalized. According to the Mundell-Fleming model, the floating exchange rate is the appropriate exchange rate regime for the country where the capital account is not liberalized. The main reason is, the floating exchange rate sharpen the effectiveness of both monetary and fiscal policy when the capital mobility is imperfect. Apart from the floating exchange rate regime, the inflation rate also shows a positive relationship with stock market development. However, it does not mean that higher inflation rate ensure the higher level of stock market development. It is a common fact that both inflation and market capitalization are nominal variables and the increment of the general price level due to the inflation may be reflected by the market capitalization. Similarly, moderate level of inflation acts as a motivator for the business firms to growth; since the firms entertains the higher level of price for their products. Thus, there is a positive relationship between inflation and market capitalization in the long run.

The amount of the saving is one of the crucial determinant of stock market development in the long run. Saving is the prerequisite for the investment which is essential stock market to perform well. There are two main streams which the savings can expand the stock market activities. First, when the individuals' savings increase; there is a potential of mobilizing the portion of savings from banking sector to stock markets as an investment. Secondly, the gross domestic savings also have a remarkable impact on stock market development since the domestic savings are essentially needed to build the new capital structures and compensate the depreciations of existing capital stock which ensure the smooth running of the economy. Garcia & Liu (1999) and Naceur (2007) have also confirmed the positive link between savings and stock market development. In addition to the Savings, the real interest rate is also positively related with stock market development in the long run. This is also mainly due to the mobilization of the savings from the banking sector to stock market in the long run. Especially, the investors can predict and foresee the risk attached to the stock market transaction in the long run. At the same time, they can access to the more reliable information in the long run which can be used to avoid the risk and uncertainty. Similarly, when the real interest rate is high; people can get higher level of interest earning for their savings as well. Ultimately, these is a higher possibility of transferring some sort of saving to purchase stocks as a diversification of investment. Apart from that, if the domestic interest rate is higher than that of foreign interest rate; there can be a capital inflow. Especially, the foreign investors respond to the interest changes in the long run compared to the short term interest changes. Hence, if the hike of real interest rate exists in the long run; they will invest on domestic assets ensuring the higher level of capital inflow to the economy. The most of these capital inflows come through the stock market transactions which is desirable for expansion of the stock market activities.

According to the estimated coefficient for the dummy variable of War in the model 4, the war has negatively affected to the stock market development in Sri Lanka. Especially, the magnitude of the estimated coefficient is the second highest and it is significant at 1% level. Sri Lanka had been suffering from 30 years long civil war which created enormous adverse impact on the economy. Especially, the lack of credibility about the economy caused to reduce the inflow of the capital which also restrict the development of the stock market. The negative impact of the War finished by 19th of May 2009 after wiping out the terrorism in the Northern and Eastern provinces of Sri Lanka.

Thereafter, the stock market indices have reached an all-time high by reflecting the impact of the peacefulness on the stock market. The figure 1 has provided a visual evidences on this regard.

In addition to the macroeconomic determinants, the current study also assesses the impact of the quality of the institution as well. Particularly, Garcia & Liu (1999) have emphasized that institutional quality is one of the key determinant of the stock market development other than the macroeconomic determinant.

However, Garcia & Liu (1999) have only focused about the macroeconomic determinants in their study. The Political Risk Index introduced by International Country Risk Guide was used as the proxy for the institutional quality. The estimated coefficient in the long run model stressed that the quality of the institutions play a crucial role in stock market development. Moreover, the estimated coefficient for the institutional quality is the highest positive coefficient compared to other estimated coefficients. Further, the Political Risk Index is a composite index which takes six sub fields in to account; such as Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruptions. Hence, it is apparent that stock market activities is highly sensitive to the changes of each sub fields mentioned here. In fact, the quality of the institution is the key factor that highly links with the credibility of the economy and individual investors always keep in touch with the quality and effectiveness of the institutions since it reflects the effectiveness of the overall economy as well. Yartey (2008) has also employed the Political Risk Index to represent the quality of the intuitions and has obtained a positive relationship with the stock market development.

As the model 4 exhibits, per capita GDP is one of the factor that stimulates the stock market activities. On the one hand, when the economy is growing faster; there is a higher demand for financial assets through the demand for long term capital requirements. After finishing the war, currently there are several mammoth investment projects are being carried outin Sri Lanka. Similarly, the private sector is also booming remarkably. Thus, higher level of per capita income and economic growth ensure the stock market development as well. On the other hand, the increase of per capita GDP results to increase the income of the individuals as well. Consequently, individuals have a higher motivation to invest on stocks other than saving in the banking sector. The scholars such as Yartey (2008), Naceur (2007) and Garcia & Liu (1999) have also highlighted the positive relationship between per capita GDP and stock market development in relation to different economies.

However, sometimes individuals are hesitate to invest in the stock market due to the lack of liquidity of the markets. The previous studies by Garcia & Liu (1999) and El-Nader &Alraimony (2013) have also utilized the Total Value Traded as a proxy for the stock market liquidity. Stock market liquidity which was included in the model 4 is highly statistically significant with a positive coefficient. It implies that stock market performs well under the higher liquidity. When the stock markets have higher liquidity, the risk attached to the market is low and investors can transform the stocks in to money easily and quickly. Therefore, individuals prefer to invest on the stocks when there is a more liquid stock market.

The inflow of foreign direct investment has remarkably increased after finishing the war with the favourable economic and political climate in Sri Lanka. The most of the foreign direct investments come through the stock market and therefore this study attempts to capture the impact of foreign direct investment on stock market development by employing the foreign direct investment as an explanatory variable. The long run model has estimated positive coefficient for foreign direct investment which is significant at 1% level. Especially, the some of the multinational companies came as foreign direct investment have listed in the Colombo Stock Exchange and perform well in the stock market. Such listing directly increase the market capitalization of Colombo Stock Exchange. In addition to that, the error correction term implies the speed of adjustment of the stock market development. In other words, error correction term stresses the rate at which the previous year disequilibrium of market capitalization is corrected towards the equilibrium. As the model 4 indicates, the speed of adjustment in the long run is considerably high. Specifically, the speed of adjustment of the disequilibrium of market capitalization is 161% annually. Moreover, the higher speed of adjustment in the long run is mainly due to the stable economic conditions and symmetric information in the long run. Additionally, the negative sign and the statistical significance of the error correction term emphasize the validity of the model along with the higher R-Squared (0.9794) and statistically significant F-Statistics.

Moreover, several diagnostic tests were conducted to check whether the model is consistent with the OLS assumptions. Therefore, the normally distribution of the residuals were checked by applying the Histogram Normality Test. The result of the test is visible in the figure 04 below.The null hypothesis of the test is, the residuals are normally distributed.

According to the probability value attached to the Jarque – Bera Statistic, the null hypothesis is accepted. Therefore, the residuals of the long run model is normally distributed and hence the OLS assumption has not been violated.

Figure – 04: The Result of the Histogram Normality Test for the Long Run Model
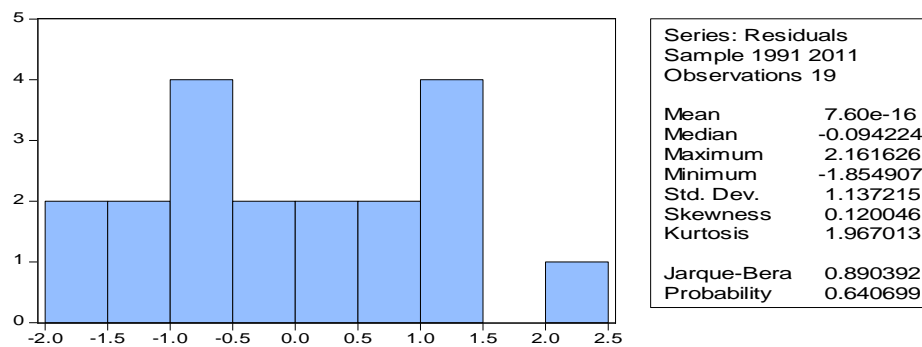
Source: Created by Author based on the OLS regression in table 05

Serial correlation is a common problem when handling the time series data. Therefore, the Correlogram Q – Statistics Test was carried out to check whether the error term is serially correlated. The null hypothesis of the test is, residuals are not serially correlated. According to the result explained in the table 06, the null hypothesis cannot be rejected at any of the lag selected due to the insignificant probability value. Thus, the residuals of the long run model are not serially correlated. Consequently, the validity of the long run model is further confirmed.

Table – 06: The Result of the Serial Correlation Test

Correlogram Q - Statistics
Sample: 1991 2011
Included observations: 19

Autocorrelation	Partial Correlation	Lag	AC	PAC	Q-Stat	Prob
. |*. |	. |*. |	1	0.114	0.114	0.2879	0.592
***| . |	***| . |	2	-0.380	-0.398	3.6741	0.159
. *| . |	. | . |	3	-0.105	0.001	3.9501	0.267
. |*. |	. | . |	4	0.097	-0.045	4.1992	0.380
. | . |	. | . |	5	0.064	0.015	4.3145	0.505
. *| . |	. *| . |	6	-0.178	-0.201	5.2861	0.508
. *| . |	. *| . |	7	-0.137	-0.070	5.9094	0.550
. *| . |	. **| . |	8	-0.079	-0.232	6.1361	0.632

Source: Created by Author based on the OLS regression in table 05

4.4. Results of the Short Run (Dynamic) Model

Apart from the discussed long run model, the short run model for the stock market development was also estimated incorporating the significant variables of the long run model. The short run model clearly explain the short run dynamic process and the speed of adjustment towards the long run equilibrium. There are four models were constructed for the short run also by changing the independent variables.

However, model 1, 2 and 3 are not precise according to the econometric theory due to the insignificant error correction term. Therefore, the explanation of the short run dynamic process is based on the model 4 which is highly a line with the econometric theory. The result of the short run model has been summarized in the table 07 below. According the estimated coefficient, the ratio of current level of capital formation to the GDP is negative and significantly related with the stock market development. Basically, increment of the current level is highly based on the current savings. Hence, when the current level of capital formation or investment increasing, the savings do not mobilize towards the stock market. Especially, the savings rate of Sri Lanka is considerably low compared to the other countries and sometimes it is not sufficient to maintain the even the predicted investment rate in the economy. However, if the capital formation of the previous year has increased; it positively affects to the stock market development. Capital formation includes both establishment of new business and the improvements of the infrastructure of the economy.

On the one hand, the businesses started up in the previous year may be listed in the stock market in the current period and it probably increase the market capitalization. On the other hand, the development of the economic infrastructure in the current year will absorb more foreign investment not in the current year but in the next year. The reason is, especially foreign investors take times to invest on the domestic assets, because they check the stability of the recent developments of the capital structures. Consequently, the estimated coefficient for the lag of capital formation is positive and statistically significant at 1% level.

Table – 07: Results of the Short Run (Dynamic) Model

Dependent Variable: DMCGDP
Sample (adjusted): 1992 2011
Method: Least Squares
Included observations: 21 after adjustments

Variable	Model 1	Model 2	Model 3	Model 4
MC/GDP(-1)	-0.1986	-0.2984**	-0.4484**	-1.1459***
	(-1.4971)	(-3.0108)	(-3.5626)	(-38.837)
ΔCF/GDP	1.4058	-1.1445	-3.8358*	-2.3258**
	(1.7149)	(-1.2111)	(-2.3828)	(-10.527)
ΔCF/GDP(-1)	-0.2443	0.7409	1.7053	4.7505***
	(-0.2893)	(0.9531)	(1.6270)	(27.428)
ERPOLICY	5.2777	7.9659***	10.2932***	-4.9298***
	(1.6502)	(3.4114)	(6.0611)	(-11.963)
ΔINFL		-0.5602	-0.5390	-0.8818***
		(-1.6533)	(0.1860)	(-21.359)
ΔINFL(-1)		-0.0850	0.1587	-1.5147***
		(-0.2672)	(0.7058)	(-30.536)
ΔRINTEREST		-0.9821	-2.1080	-4.3218***
		(-1.7673)	(-2.2712)	(-26.785)
ΔRINTEREST(-1)		0.1532	0.1463	-0.4747**
		(0.3564)	(1.4264)	(-9.7631)
ΔSAV/GDP		2.0240**	2.3749**	
		(2.5571)	(5.7624)	
ΔSAV/GDP(-1)		3.0669**	4.4611***	
		(2.8418)	(11.1260)	
WAR			-0.5569	-9.8465***
			(-0.3149)	(-28.955)
ΔINSQUL			-301.857***	277.53***
			(8.0317)	(25.384)
ΔINSQUL(-1)			-17.3178	285.96***
			(-0.3727)	(25.501)
ΔPERCAP(-1)				0.1213***
				(36.622)
ΔSMLIQ				1.8151***
				(25.749)
ΔFDI				0.0528***
				(38.574)
RESID(-1)	-0.6450	-0.0077	0.6688	-0.2971**
	(-1.4067)	(-0.0156)	(1.7432)	(-4.4587)
R-squared	0.3630	0.8332	0.9968	0.9997
Prob(F-statistic)	0.0542	0.0023	0.0001	0.0001

Source: Computed by Author based on the World Bank Data

Even though, the flexible exchange rate policy enhances the stock market development in the long run; the estimated model for the short run dynamics provides an inverse relationship between floating exchange rate and stock market development. The estimated coefficient for the exchange rate policy variable by the dynamic model is negative and highly statistically significant. The Central Bank of Sri Lanka introduced the floating exchange rate in 23rd of January 2001. However, the economic indicators of Sri Lanka turned in to worse during the first two years after introducing the flexible exchange rate. Especially, the economic growth rate dropped down to lowest in the history and recorded a negative value of -1.5. Similarly, the exchange rate depreciated due to the lack of supply of foreign reserves. Under these critical economic structures in the economy happened in the short run, both local and international investors lost their credibility about the Sri Lanka economy. Hence, the stock market activities restricted and underperformed. However, the floating exchange rate was successful as a policy variable in the Sri Lanka economy few year after its arrival. Especially, the flexible exchange rate reasoned to increase the effectiveness of the monetary and fiscal policy under semi-liberalized capital account of Sri Lanka and it also caused to absorb the more foreign investments as well. Thus, the exchange rate policy variable negatively affected to the stock market development in the short run despite positively in the long run.

Inflation has become one of the adverse factors of stock market development. According to the short run dynamic model, both current and previous year inflations negatively associate with the stock market development of Sri Lanka in the short run. Especially, during the war period and 2008 there was a dramatic hike in the general price level due to the war expenditure and the World food price crisis. Consequently, the inflation of Sri Lanka reached an all-time high in 2008 recording 22.5% which was highly driven by the headline inflation. The dramatic increment of the general price level essentially damages the stability of the economy and it reduces the real value of the money followed by the lower purchasing power as well. Such kinds of consequences directly affect to the stock market transactions adversely. Similarly, the cost push inflation push the business firm bad to worse and hence they are unable to maintain their share prices as they expected. Thus, inflation is a critical factor of stock market development in the short run. The inverse relationship between stock market development and inflation is also investigated by Yartey (2008), Naceur (2007) and Menike (2006).

Further, the impact of the real interest rate in the short run was also examined using the short run dynamic model. According to the estimated coefficients, both current and previous year real interest rates negatively and significantly link with stock market development in Sri Lanka. When the interest rate is increasing, the individuals save money in the banking sector in order to have a higher and risk free interest rate in the short run. Therefore, stock market suffers from lack of funds for a short period when the interest rate is increasing. Similarly, individuals are not willing to mobilize their saving toward the stock market, since they can earn more stable and riskless interest rate payments from the banking sector compared to the risky stock price and dividends from the stock market. Additionally, the foreign capital inflow cannot be expected in the short run; despite the real interest rate has increased. The main reason is the foreign capital inflows always have time lag of responding to the domestic economic changes. Thus, the real interest rate is negatively affect to the stock market development in the short run; though it positively enhances the stock market activities in the long run by absorbing more capital inflows.

The war has become the worst factor that has the largest negative coefficient (-9.8465) in the short run model. Further, the coefficient is significant at 1% level confirming the negative impact on stock market development. It is obvious that, the negative impacts created by the War affect to the decisions of the all of the economic agents irrespective of the time. Specially, stock market is highly sensitive to the sudden changes in the economic and political vicinity.

Moreover, there are many economic key points such as Central Bank of Sri Lanka, International Airport at Katunayaka, Galle Harbour and many other major places were attacked by the terrorists during the war period. Therefore, there is no doubt about the inverse relationship between war and stock market development. Apart from the War, the quality of the institutions have also been playing a major role in stock market development. According to the error correction model, both previous year institutional quality and the current year institutional quality coefficients are positive and those are the highest among all other estimated coefficients. Further, the both coefficients are highly statistically significant. It reflects that, the quality of the institutions is the key driver of stock market development in the short run. Similar results have been found by Yartey (2008) as well.

Similarly, the previous year per capita income, the current stock market liquidity and foreign direct investment also positively related with the stock market development.

Further, the coefficients of all them are statistically significant at 1% level. In fact, increase in per capita income, stock market liquidly and foreign direct investment provide more confident about the economy and will get in more capital inflows which essential for the stock market development. These findings have also been confirmed by the scholars such as Yartey (2008), Naceur (2007), El-Nader &Alraimony (2013) and Garcia & Liu (1999). As the error correction model indicates, the speed of adjustment in the short run is considerably lower than the long run. Specifically, the speed of adjustment of the disequilibrium of market capitalization is 29.71% annually. Moreover, the lower speed of adjustment in the short run is mainly due to the less confidence about the economic condition, unavailability of the appropriate information and the risk attached to the stock market in the short run. Apart from that, the negative sign and the statistical significance at the 5% level of the error correction term emphasize the validity of the model along with the higher R-Squared (0.9997) and statistically significant F- Statistics at 1% level.

In order to check whether the error term is distributed normally, the Histogram Normality Test was carried out. The result of the test is visible in the figure 05 below.

Figure – 05: The Result of the Histogram Normality Test for the Short Run Model
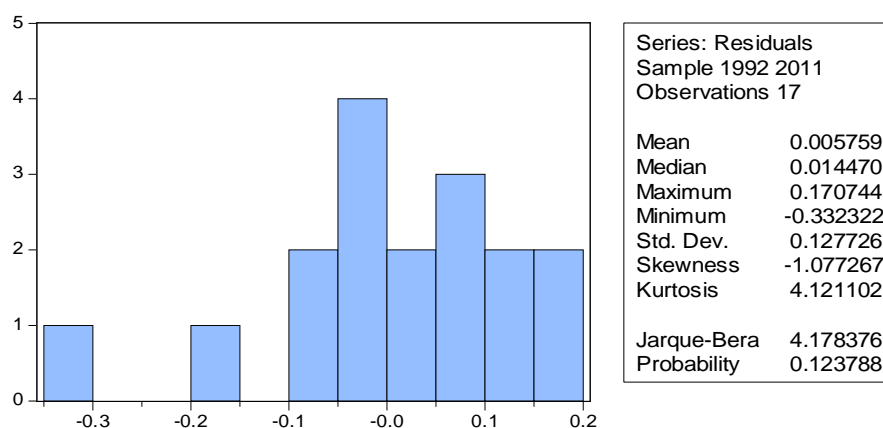
Source: Created by Author based on the short run regression in table 07

The null hypothesis of the test is, the residuals are normally distributed. According to the probability value attached to the Jarque – Bera Statistic (0.1237), the null hypothesis is accepted. Therefore, the residuals of the long run model is normally distributed and hence the OLS assumption has not been violated.

Table – 08: The Result of the Serial Correlation Testfor the Short Run Model

Correlogram Q – Statistics
Sample: 1992 2011
Included observations: 17

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.***| .		.***| .		1	-0.356	-0.356	2.5637	0.109
. *| .		. **| .		2	-0.135	-0.300	2.9540	0.228
.	.		. *| .		3	0.046	-0.155	3.0022	0.391
.	.		. *| .		4	-0.010	-0.119	3.0046	0.557
.	.		. *| .		5	-0.046	-0.136	3.0619	0.690
.	.		. *| .		6	0.029	-0.083	3.0862	0.798
.	.		. *| .		7	-0.024	-0.102	3.1054	0.875
.	.		. *| .		8	-0.058	-0.162	3.2246	0.919

Source: Created by Author based on the short run regression in table 07

The Correlogram Q – Statistics Test was carried out to check whether the error term is serially correlated, since the serial correlation is much more common among the time series data. The null hypothesis of the test is, residuals are not serially correlated. According to the result explained in the table 08, the null hypothesis cannot be rejected at any of the lag selected due to the insignificant probability value. Thus, the residuals of the long run model are not serially correlated. Consequently, the validity of the long run model is further confirmed.

5. Conclusions

The study applied the Engle-Granger Co-integration test to capture the long run relationship between stock market development and its determinants. According to the Engle – Granger Co-integration test there is a long run relationship between stock market development (Market Capitalization) and both macroeconomic factors and quality of the institutions.

According to the long run model, factors such as capital formation, floating exchange rate regime, inflation, savings, real interest rate, per capita GDP, stock market liquidity, foreign direct investment, institutional quality positively associate with the stock market development while the war affects negatively. As the short run dynamic model highlighted, the previous year capital formation, current and previous year institutional quality, previous year per capita GDP, foreign direct investment, stock market liquidity positively affect the Stock Market Development. In contrast, floating exchange rate, inflation, war and real interest rate affect stock market development negatively. According to the both long run and short run models, war and institutional quality are the most influential factor of stock market development compared to the other macroeconomic determinants. In particular, war is the most adverse factor of stock market development while the institutional quality ensures the development of the stock market. Therefore, the current study highly recommended to accommodate the appropriate policies to ensure the quality of the institutions and peaceful environment along with macroeconomic stability.

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