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SOCIOECONOMIC FACTORS OF STOCK MARKET DEVELOPMENT: ROLE OF TERTIARY EDUCATION

Abstract

Considering economic growth and banking sector development as economic factors and tertiary level of education as a social factor, this paper explores their effect on stock market development in Bangladesh during the period 1976 to 2015. This paper reveals a significant positive impact of banking sector development and economic growth and an insignificant positive impact of tertiary level of education on stock market development both in the short-run and in the long-run. The positive long-run effect of socioeconomic factors on stock market

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development suggests that over time the rise in tertiary education, economic growth, and banking sector development contributes into the stock market development. Hence, government should give special attention into the development of tertiary education in addition to accelerating economic growth and banking sector development to ensure broad base stock market.

Key words:

Stock Market Development, Banking Sector Development, Tertiary Level of Education.

JEL: C01, C02, C32.

Introduction

Consumption growth, investment growth, and export growth- of an economy have the largest effect on the unemployment (Banerji et al. 2015). Okun's Law proposed that «a one percent increase in unemployment is associated with a three percent decrease in output» (Okun 1962). Besides, Harvard economist (Mamkiw 1994) assures the Okun's Law after a slight change that «a one percent increase in unemployment is associated with a two percent decrease in output». Since Okun's law indirectly mentions the objective of economic growth in order to reduce unemployment (Marth 2015), the main question here is whether sustainable economic growth is possible without generating desired level of employment. Stock market development raises the consumption, investment, and export growth of an economy, eventually creating more opportunities of employment (Thomas 2006). For example, a broad base stock market acts as catalyst for the expansion and growth of an economy by boosting domestic savings and investment, hastening capital movement, and channeling funds from inefficient sectors to productive sectors (Tachiwou 2009). With the high association of the stability of economic growth, a stock market attracts investors from home and abroad to invest that eventually creates opportunities for expanded production, export, employment, and so on through spreading risk and making availability of long-term capital (Shahbaz et al. 2008). Hence, the stock market development encourages domestic savings, proliferate investment and production, shrink unemployment, and eventually raise economic growth (see also Levine and Zervos 1998).

The previous studies, such as Naceur et al. (2007), Law and Habibullah (2009), and Yartey (2010), identified several macroeconomic variables such as banking sector development, per capita GDP, money supply, domestic saving, exchange rate, and foreign direct investment as factors of stock market development. However, only a few studies revealed the role of tertiary level of education on stock market development. Moreover, giving high emphasis to increase stock market capitalization to prevent economic stagnation and to maintain stable economic growth, numerous countries becomes more inquisitive to explore the factors of stock market development (Shahbaz et al. 2008). This paper avoids the inclusion of money supply, stock market liquidity, and foreign direct investment due to the high correlation between banking sector development and money supply, between banking sector development and stock market liquidity, between foreign direct investment and level of education (Te Velde 2005), and between per capita GDP and foreign direct investment. Hence, this paper only considers economic growth and banking sector development as macroeconomic factors and tertiary level of education as a social factor to perceive the impact of socioeconomic factors on stock market development. This paper uses stock market capitalization[1] to GDP as proxy of the stock market development[2] (Gracia and Liu 1999; Yartey 2008). The integral parts of the stock market capitalization are number of outstanding shares and market price of the outstanding shares. Therefore, increase in any part of stock market capitalization will contribute into stock market development. Next, increase in economic growth contributes to raise stock market capitalization through making availability of funds for investment (Raza and Jawid 2012). Again, the banking sector supplies the life blood of an economy through disbursing loans to efficient sectors that kindle expansion and new investment opportunities for the firms, eventually increasing stock market capitalization.

However, there is still not enough acknowledgement of the influence of tertiary education on stock market development. Here, we try to assess the significance of tertiary level of education into stock market development. The following questions could be important to answer. Is more financially well-informed personnel more likely to participate or invest in stock market and subsequently make the market more vibrant with high market capitalization? Does tertiary education contribute to financial instruments related knowledge? If learning opportunities are limited, is it a hurdle to risk diversification, making proper investment, and making transactions? To find out the answer of these questions in case of a developing country like Bangladesh, we have taken tertiary level of education as a

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[1] Stock market capitalization = (Market value of all publicly traded share × Number of all outstanding share) at a point of time.

[2] $$\text{Stock Market Development} = \frac{\text{Stock Market Capitalization}}{\text{Gross Domestic Product in Current Market Price}} \times 100$$

social factor of stock market development. Hence, the objective of this paper is to explore whether the tertiary level of education contributes to stock market development along with the other macroeconomic variables namely banking sector development and economic growth in Bangladesh. This paper reveals that tertiary education has not significant impact on stock market development. Hence it proves that tertiary education couldn't increase the participation of concerned knowledgeable personnel and stock market doesn't consist of investor with sound knowledge. In addition, the foreign direct investment, positively influenced by Tertiary level of education (Te Velde 2005), is increasing in Bangladesh with the increased level of tertiary level of education.

This paper has been organized in following ways. Introduction has been placed in section-I. Literature review has been provided in section-II. Data Source, Data Definition, and Descriptive Statistics have been presented in section-III. Econometric methodology, results, and interpretation have been provided in section-IV. Conclusion and policy implications have been provided in section-V. References have been provided in last section.

Literature review

A number of studies have been conducted on the macroeconomic determinants of the stock market development. For example, Calderon-Rossell (1991), Garcia and Liu (1999), Boyd et al. (2001), Wongbangpo and Sharma (2002), Naceur et al. (2007), Raju and Khanapuri (2009), Cherif and Gazdar (2010), Bayar (2016), and Ho (2017) identify the macroeconomic determinants such as stock market liquidity, economic development, banking sector development, real income level, saving ratio, financial liberalization, economic growth, and so on. However, Calderon-Rossell (1991) suggests that economic development and stock market liquidity are the core determinants of stock market development. Next, Garcia and Liu (1999) find that banking sector development has significant positive impact on stock market development through a panel study consisting 15 developed and developing economies. Analyzing 40 emerging countries' data, El-Wassal (2005) finds that economic growth has significant positive impact on the stock market development. Investigating 18 Asian countries, Raza and Jawid (2012) come to the same conclusion. Considering 12 Middle Eastern and North African countries, Naceur et al. (2007) find that the banking sector development has significant positive impact on stock market development. Using dynamic panel regression, Law and Habibullah (2009) identify that the per capita real GDP and banking sector development have significant positive impact on the stock market development of 27 countries. Similarly, by investigating the macroeconomic factors of the stock market development of 42 emerging economies, Yartey (2010) reached a similar conclusion. Using the ARDL Bounds Test approach to find out the impact of macroeconomic determinants on the stock market development of Istanbul, Bayar (2016) finds that economic growth has significant positive impact on stock market development unlike banking sector development. Besides, Ho (2017) identifies the macroeconomic factors of the stock market development by analyzing inflation rate, banking sector development, trade openness, inflation, economic growth, and real interest rate in case of South Africa.

However, there is a dearth of studies considering the tertiary level of education as a factor of stock market development. Pillay (2011) finds that the tertiary level of education has significant positive impact on the financial development. Since financial development influences stock market development (El-Wassal 2005), it can be concluded that tertiary level of education ultimately affects stock market development. In other perspective, the increase in the tertiary level of education specifically raises the participation in share market, ultimately growing the size of market capitalization (Spataro and Corsini 2013). Furthermore, tertiary education increases the knowledge of people about share market in an economy which has underlying positive impact on market capitalization in the long-run (Rooij et al. 2007). In addition, tertiary level of education in an economy attracts foreign direct investment, which has positive impact on the stock market development (Te Velde 2005).

Even though numerous studies examined macroeconomic determinants of the stock market development, most of the analyses revealed the significant role of banking sector development and economic growth in stock market development. However, few papers explored the role of tertiary level of education in stock market development. There is not even a single study in Bangladesh considering the role of tertiary level of education in stock market development. Furthermore, conclusions of the previous studies are very mixed due to methodological differences and variation of sample study period. Hence, this paper explores the role of education in tertiary level along with the impact of economic growth and banking sector development on stock market development in Bangladesh by employing a set of time series econometric tools and a considerably large sample period.

Data source, data definition, and descriptive statistics

The data of per capita GDP used as a proxy of economic growth and banking sector development have been collected from the World Development Indicators of the World Bank. The market capitalization data has been collected from time series data of the Central Bank of Bangladesh. Data for tertiary level of education have been collected from the Statistical Year Book (SYB) of Bangladesh. The definition of variables is given below:

Stock Market Development (SMD): Stock market development has been defined as the stock market capitalization as percentage of gross domestic product in current market price. The integral parts of the stock market capitalization are number of outstanding shares and market price of the outstanding shares. The empirical studies (Demiruge-Kunt and Levine 1996; Gracia and Liu 1999, and Hossain and Kamal 2010) have considered stock market capitalization as proxy of stock market development. Furthermore, Yartey (2008) has argued that the size of market capitalization is the core indicator of stock market development.

Per Capita GDP (PGDP): The GDP has been divided the size of the population of the economy. It is proxy of economic growth.

Banking sector development (BSD): The banking sector development represents the amount of domestic private sector credit provided by banks as percentage of GDP. Beck and Levine (2001) have taken domestic credit to the private sector by banks as the percentage of GDP as proxy of banking sector development.

Tertiary level of education (TLE): It represents the number of students enrolled for tertiary education in public universities.

The descriptive statistics have been provided in Table 1. From Table 1, it can be concluded that the distribution of BSD is normal except SMD, TLE, and PGDP. BSD has relatively small variability and TLE has the highest variability.

Table 1

Descriptive Statistics

Name of variables	Mean	Std. Dev.	CV	JB Statistics
SMD (% of GDP)	5.1411	7.3842	143.63%	24.6589*** (0.0000)
BSD(% of GDP)	21.3104	12.3635	58.02%	2.6166 (0.2703)
TLE (In million)	0.2755	0.6445	139.56%	8.0356*** (0.0180)
PGDP(in USD)	424.267	262.9987	61.99%	15.8728 (0.0004)***

Note: ***P<0.01 indicates significant at 1% level, **P<0.05 indicates significant at 5% level, *P<0.10 indicates significant at 10% level.

Econometric methodology, results, and discussion

The model

To identify the socioeconomic determinants of stock market development, the following model will be estimated-

$$SMD_t = A.BSD_t^{\delta_1}.TLE_t^{\delta_2}.PGDP_t^{\delta_3}.e^{\varepsilon_t} \quad (1)$$

The logarithmic transformation of Equation (1) is given below-

$$\ln SMD_t = \delta_0 + \delta_1 \ln BSD_t + \delta_2 \ln TLE_t + \delta_3 \ln PGDP_t + \varepsilon_t \quad (2)$$

Let, $\ln A = \delta_0$. t represents the time period from 1976 to 2015. $\delta_1, \delta_2, \delta_3$ represent the elasticity of stock market development (SMD) with respect to banking sector development (BSD), tertiary level of education (TLE), and economic growth (PGDP) respectively in Equation (2). ε_t represents the random error term.

Unit Root Test

At first step we need to check out whether each variable contains unit root or not. In this regard ADF test has been applied to check whether each variable contains unit root or not. The framework of this test is given below-

$$X_t = \rho_0 + \rho_1 t + \delta X_{t-1} + \sum_{j=1}^{m} \Phi_j \Delta X_{t-j} + u_t \quad \text{[With constant and trend terms]} \quad (3)$$

$$X_t = \rho_0 + \delta X_{t-1} + \sum_{j=1}^{m} \Phi_j \Delta X_{t-j} + u_t \quad \text{[With constant term only].} \quad (4)$$

Here, X is the variable under investigation. The variable is of $I(1)$ if $\delta = 0$. Appropriate lag length of Equation 3 and Equation 4 would be selected by the AIC and SBIC. Apart from ADF test, PP test will be applied to get overwhelming conclusion. The results of unit root test have been represented in Table 2.

Table 2

Results of ADF Test and PP test at Level Form

Model with constant term [Level Form]				
Variables	ADF test	P-value	PP test	P-value
$\ln SMD$	–0.7873	0.8113	–0.5706	0.8656
$\ln BSD$	–3.2276**	0.0258	–3.8035***	0.0060
$\ln TLE$	–0.2108	0.9286	0.2386	0.9248
$\ln PGDP$	0.6453	0.9892	0.6000	0.9880
Model with constant and trend terms [Level Form]				
Variables	ADF test	P–value	PP test	P–value
$\ln SMD$	–3.6282**	0.0406	–2.5644	0.2977
$\ln BSD$	–3.9535**	0.0189	–4.3705***	0.0067
$\ln TLE$	–1.9883	0.5893	–1.9883	0.5893
$\ln PGDP$	–1.0362	0.9268	–1.0362	0.9268
Model with constant term [Difference Form]				
Variables	ADF test	P–value	PP test	P–value
$\ln SMD$	–4.1840***	0.0022	–4.1840***	0.0022
$\ln TLE$	–5.8040***	0.0000	–5.7957***	0.0000
$\ln PGDP$	–5.3707***	0.0001	–5.3707***	0.0001
Model with constant and trend terms [Difference Form]				
Variables	ADF test	P–value	PP test	P–value
$\ln SMD$	–4.1278**	0.0125	–4.1278**	0.0125
$\ln TLE$	–5.7743***	0.0001	–5.7634***	0.0002
$\ln PGDP$	–5.3108***	0.0005	–5.3108***	0.0005

Note: ***P<0.01 denotes significant at 1% level, **P<0.05 indicates significant at 5% level, *P<0.10 indicates significant at 10% level. Appropriate lag length for these test has been selected by SBIC.

The test results suggest that all variables are integrated of order one ($I(1)$) except banking sector development (BSD) which is stationary at level form ($I(0)$).

The Bounds Testing Approach to Cointegration

The ARDL bounds testing procedure developed by Pesaran, Shin and Smith (Pesaran and Pesaran 1997; Pesaran and Shin 1999; Pesaran et al. 2001) would be applied, within an autoregressive distributed lag (ARDL) framework. To implement the bound test procedure, it is essential to model equations as conditional ARDL framework, which is given below-

$$\Delta \ln SMD_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta \ln SMD_{t-i} + \sum_{i=0}^{p} \alpha_{2i} \Delta \ln PGDP_{t-i} + \sum_{i=0}^{q} \alpha_{3i} \Delta \ln BSD_{t-i} + \sum_{i=0}^{r} \alpha_{4i} \Delta \ln TLE_{t-i} +$$
$$\alpha_5 \ln SMD_{t-1} + \alpha_6 \ln PGDP_{t-1} + \alpha_7 \ln BSD_{t-1} + \alpha_8 \ln TLE_{t-1} + \eta_{1t} \quad (5)$$

$$\Delta \ln PGDP_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln PGDP_{t-i} + \sum_{i=0}^{p} \beta_{2i} \Delta \ln SMD_{t-i} + \sum_{i=0}^{q} \beta_{3i} \Delta \ln BSD_{t-i} + \sum_{i=0}^{r} \beta_{4i} \Delta \ln TLE_{t-i} +$$
$$\beta_5 \ln PGDP_{t-1} + \beta_6 \ln SMD_{t-1} + \beta_7 \ln BSD_{t-1} + \beta_8 \ln TLE_{t-1} + \eta_{2t} \quad (6)$$

$$\Delta \ln BSD_t = \delta_0 + \sum_{i=1}^{m} \delta_{1i} \Delta \ln BSD_{t-i} + \sum_{i=0}^{p} \delta_{2i} \Delta \ln PGDP_{t-i} + \sum_{i=0}^{q} \delta_{3i} \Delta \ln SMD_{t-i} + \sum_{i=0}^{r} \delta_{4i} \Delta \ln TLE_{t-i} +$$
$$\delta_5 \ln BSD_{t-1} + \delta_6 \ln PGDP_{t-1} + \delta_7 \ln SMD_{t-1} + \delta_8 \ln TLE_{t-1} + \eta_{3t} \quad (7)$$

$$\Delta \ln TLE_t = \gamma_0 + \sum_{i=1}^{m} \gamma_{1i} \Delta \ln TLE_{t-i} + \sum_{i=0}^{p} \gamma_{2i} \Delta \ln PGDP_{t-i} + \sum_{i=0}^{q} \gamma_{3i} \Delta \ln SMD_{t-i} + \sum_{i=0}^{r} \gamma_{4i} \Delta \ln BSD_{t-i} +$$
$$\gamma_5 \ln TLE_{t-1} + \gamma_6 \ln PGDP_{t-1} + \gamma_7 \ln SMD_{t-1} + \gamma_8 \ln BSD_{t-1} + \eta_{4t} \quad (8)$$

The bounds testing approach for testing the existence of long-run relationship between the variables in levels is applicable irrespective of whether the underlying time series variables are purely *I*(0), *I*(1) or fractionally integrated. Here, each variable is as previously defined. The bounds test for examining evidence for a long-run relationship can be conducted using the F-test. The F-test tests represent the joint significance of the coefficients with one period lagged levels of the variables in Equation-5, Equation-6, Equation-7, and Equation-8, that is : $H_0 : \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$, $H_0 : \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$, $H_0 : \delta_5 = \delta_6 = \delta_7 = \delta_8 = 0$, and $H_0 : \gamma_5 = \gamma_6 = \gamma_7 = \gamma_8 = 0$. The estimated critical values for the F-test are taken from Narayan (2004a, b, 2005). The F-test has a non-standard distribution and hinged on also upon the number of regressors and whether the ARDL model comprises an intercept and/or a trend. If the estimated F statistics fall beyond the critical bounds, a conclusive decision can be identified regarding cointegration without understanding the order of integration of the regressors. For example, if the empirical study displays that the calculated F-statistic is larger than the upper bound of the critical values, the null hypothesis of no cointegration is not accepted. Once cointegration is measured, the second stage includes estimating the long-run and short-run coefficients of the cointegrated equation. The mathematical derivation of the long-run and short-run parameters can be found in (Pesaran et al. 2001). The bound test approach results have been presented in Table 3.

Table 3

Bounds Test Results

	90% level		*95% level*		*99% level*	
K	*I* (0)	*I* (1)	*I* (0)	*I* (1)	*I* (0)	*I* (1)
3	2,59	3,47	3,11	4,09	4,32	5,64
Functional Forms				F- Statistic	AIC	SBIC
$F_{\ln SMD}(\ln SMD / \ln PGDP, \ln BSD, \ln TLE)$				5,9258***	0,3800	0,9200
$F_{\ln PGDP}(\ln PGDP / \ln SMD, \ln BSD, \ln TLE)$				3,5821*	–2,4756	–2,0823
$F_{\ln BSD}(\ln BSD / \ln SMD, \ln PGDP, \ln TLE)$				3,1021	–1,9436	–1,4235
$F_{\ln TLE}(\ln TLE / \ln SMD, \ln PGDP, \ln BSD)$				0,9230	1,7812	2,2923

Note: ***P<0.01 denotes significant at 1% level, **P<0.05 denotes significant at 5% level, *P<0.10 denotes significant at 10% level. Appropriate lag length for these test has been selected by SBIC. If the value of F-statistic exceeds the value of *I*(1), cointegration exists. If the value of F-statistic lies below the value of *I*(0), no cointegration exists. If the value of F-statistic lies in between the value of *I*(0) and *I*(1), decision will be inconclusive. K denotes the number of regressors.

From the bound test results, it is concluded that there exists cointegrating relationship among the variables. Therefore, in the long-run all variables will move together. Due to existence of long-run relationship among the variables, the long-run equation will be estimated by the ARDL approach suggested by the Pesaran et al. (2001).

Estimation of Long-Run Equation

The long-run equation would be measured by the following $ARDL(m, p, q, r)$ specifications-

$$\ln SMD_t = \phi_0 + \sum_{j=1}^{m} \phi_{1j} \ln SMD_{t-j} + \sum_{j=0}^{p} \phi_{2j} \ln PGDP_{t-j} + \sum_{j=0}^{q} \phi_{3j} \ln BSD_{t-j} + \sum_{j=0}^{r} \phi_{4j} \ln TLE_{t-j} + \varepsilon_t \quad (9)$$

The proper lag length for Equation (9) would be chosen by AIC and SBIC. The estimated long run coefficients have been provided in Table 4.

Table 4

Long-Run Equation Results

Dependent Variable: $\ln SMD$			
Explanatory Variables	Long-Run Coefficients	t-statistic	P-value
$\ln BSD$	0,9472*	1,7959	0,0809
$\ln TLE$	0,1268	1,1687	0,2502
$\ln PGDP$	1,4462***	2,8187	0,0078
Constant	-12,1796***	-5,9091	0,0000

Note: ***P<0.01 indicates significant at 1% level, **P<0.05 indicates significant at 5% level, *P<0.10 denotes significant at 10% level. Appropriate lag length for these test has been selected by SBIC.

From the estimated results, it can be said that both economic growth (PGDP) and banking sector development (BSD) have significant positive impact on stock market development in the long-run (Calderon-Rossell 1991; Garcia and Liu 1999; El-Wassal 2005; Yartey 2010; Ho 2017). Tertiary level of education (TLE) has positive impact on stock market development (SMD) in the long-run but it is not statistically significant. Over the time more economic growth and more improvement is banking sector will contribute into the stock market development. The long-run parameters are stable suggested by CUSUM test and CUSUMSQ test (Borensztein et al. 1998) since all values lie within the critical bounds during the estimation period. Therefore, the long-run coefficients can be used for policy implications. The results have been provided in Figure 1, and Figure 2.

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Stability of the Long-Run Parameters

Figure 1

CUSUM Test

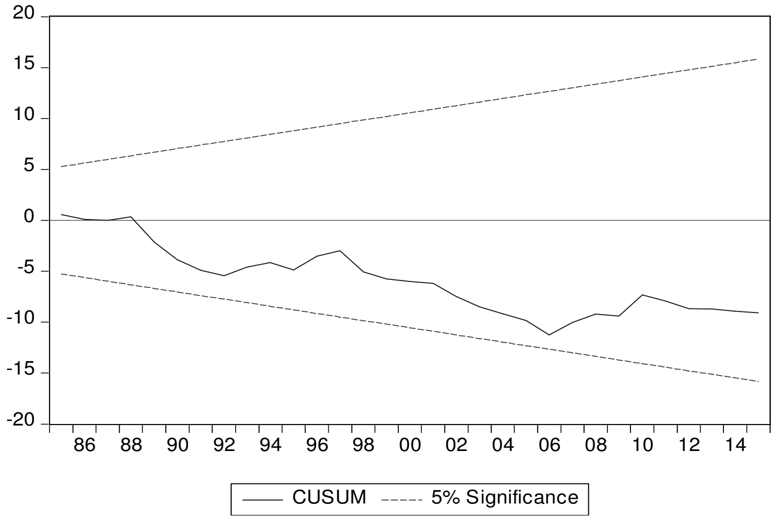
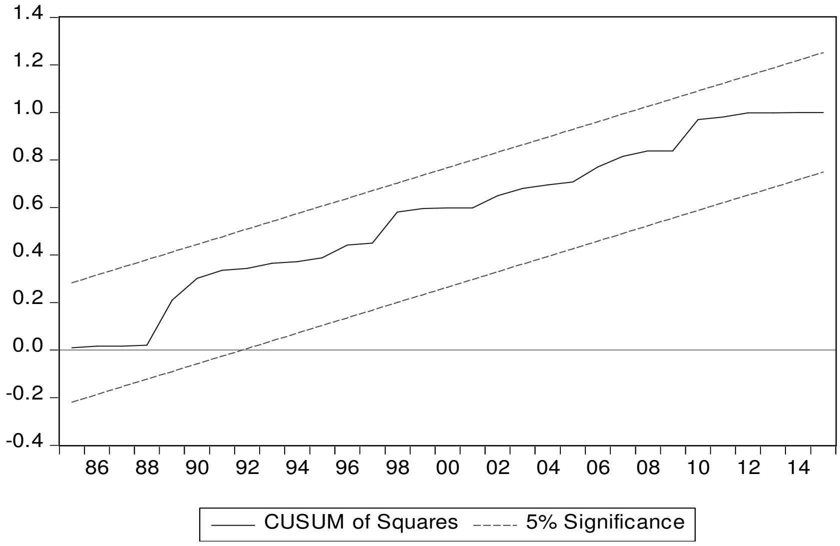


Figure 2

CUSUMSQ Test



Estimation of Short-Run Equation

The short-run equation would be estimated in the following specification-

$$\Delta \ln SMD_t = \varphi_0 + \sum_{j=1}^{k} \varphi_{1j} \Delta \ln SMD_{t-j} + \sum_{j=0}^{l} \varphi_{2j} \Delta \ln PGDP_{t-j} + \sum_{j=0}^{w} \varphi_{3j} \Delta \ln BSD_{t-j}$$

$$+ \sum_{j=0}^{v} \varphi_{4j} \Delta \ln TLE_{t-j} + \lambda ECM_{t-1} + \eta_t \tag{10}$$

Here, λ indicates the speediness of change to approach into the long-run equilibrium or relationship if there is any shock to the stock market development (SMD) due to alterations in economic growth (PGDP), banking sector development (BSD), and tertiary level of education (TLE). It is assumed that the sign of λ will be negative and significant and $|\lambda| < 1$. The ECM_{t-1} is the lagged one period of random error term which has been derived from the Equation-9. The proper lag length for Equation-10 would be selected by AIC and SBIC. The estimated results of short-run equation have been represented in Table 5.

Table 5

Short Run Estimation Results

Dependent Variable: $\Delta \ln SMD$			
Explanatory Variables	Short-Run Coefficients	t-statistic	P-value
$\Delta \ln BSD$	0.7323	1.5570	0.1287
$\Delta \ln TLE$	-0.0325	-0.2998	0.7661
$\Delta \ln PGDP$	1.2629*	1.7838	0.0834
$ECM(-1)$	-0.2724**	-2.7220	0.0102
Constant	-0.0009	-0.0117	0.9907
Sensitivity Analysis			
Tests	Chi-Square Statistic	P-value	
Serial Correlation	1.7246	0.1453	
ARCH	0.1653	0.6867	
Normality	1.8647	0.3942	
Misspecification	2.2879	0.1178	

Note: ***P<0.01 denotes significant at 1% level, **P<0.05 denotes significant at 5% level, *P<0.10 denotes significant at 10% level. Appropriate lag length for this test has been selected by SBIC.

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From the estimated results, it can be delineated that PGDP has significant positive impact on SMD in the short run. Even though BSD has positive impact on SMD in the short run, the impact is not statistically significant. TLE has insignificant negative impact on SMD.

The coefficient of ECM(-1) is negative and statistically significant with desired magnitude ($|-0.2724| < 1$). If there is any shock to the SMD due to changes in PGDP, BSD, and TLE, it will adjust by 27.24% in the first year. The entire convergence process will take approximately 3.67 years to approach into the long run equilibrium if there is any shock to the SMD due to changes in PGDP, BSD, and TLE. Therefore, the speed of adjustment is significantly faster to adjust the disequilibrium. The short-run parameters are stable suggested by CUSUM test and CUSUMSQ test (Borensztein et al. 1998) since all values lie within the critical bounds during the estimation period. Therefore, the short run coefficients can be used for conclusion and policy implications. The results have been provided in Figure 3 and Figure 4.

Stability of the Short-Run Parameters

Figure 3

CUSUM Test

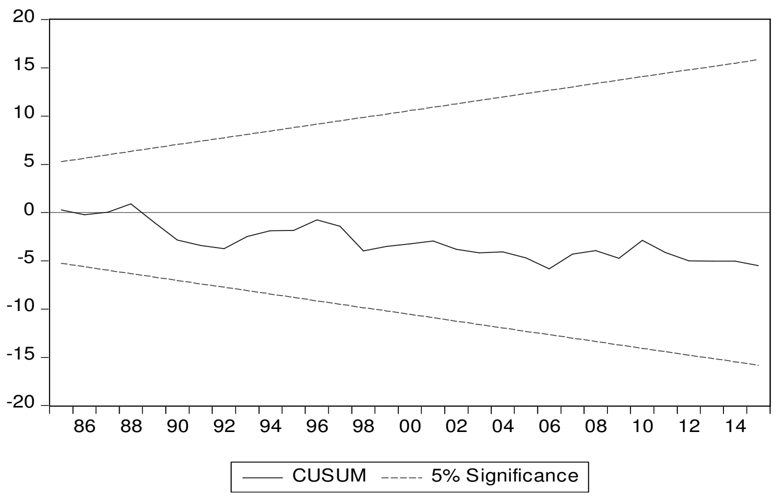
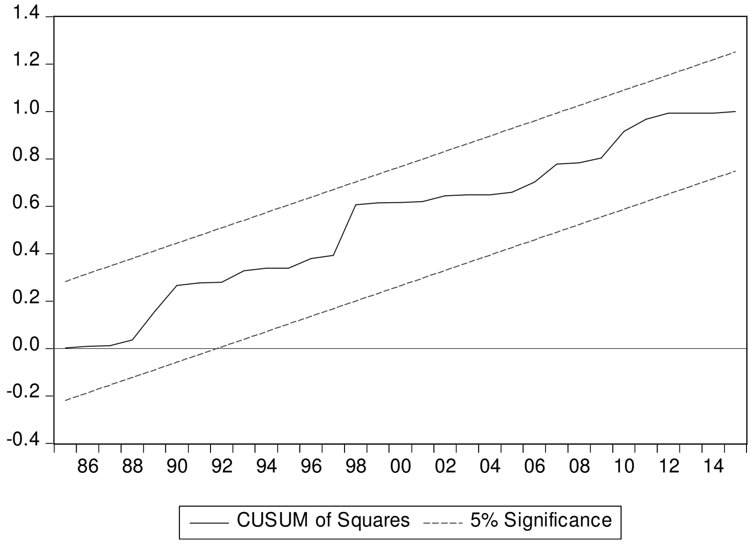


Figure 4

CUSUMSQ Test



Structural Break Point test

It is assumed that structural break may prevail in Stock Market Development (SMD) variable in 1997 and 2010 since Bangladesh stock market has gone through two market crashes in 1997 and 2010. However, we have checked structural break from 1996 to 2014. In this regard, to check structural break Chow Break Point test (Chow 1960) and Multiple Break Point test (Andrews 1993, 2003) have been applied. Both test results suggest there is no structural break. Therefore, it is not necessary to separate the impact within two or more periods by using dummy variables. If there exists break we can trap the break by using dummy variables. The break point test results have been presented in Table 6.

Table 6

Structural Break Test

Chow Break Point Test		Multiple Break Point Test	
1996	0.2599 (0.7726)		
1997	0.4629 (0.6332)		
1998	0.5033 (0.6088)		
1999	0.1596 (0.8531)		
2000	0.5521 (0.5806)		
2001	0.7736 (0.4691)		
2002	0.7820 (0.4653)		
2003	1.6672 (0.2034)	Zero Break	3.4624 [11.47]
2004	1.6770 (0.1911)		
2005	1.3527 (0.2717)		
2006	1.2959 (0.2865)		
2007	1.3471 (0.2881)		
2008	2.1586 (0.1306)		
2009	1.4293 (0.2531)		
2010	1.8400 (0.1739)		
2011	1.4775 (0.2421)		
2012	1.0468 (0.3618)		
2013	0.1179 (0.8891)		
2014	0.0349 (0.9658)		

Note: ***P<0.01 denotes significant at 1% level, **P<0.05 denotes significant at 5% level, *P<0.10 denotes significant at 10% level.

Causality analysis

Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996), based on augmented VAR modeling, introduced a modified Wald test statistic (MWALD). This procedure has been found to be superior to ordinary Granger – causality tests since it does not require pre-testing for the cointegrating properties of the system and thus avoids the potential bias associated with unit roots and cointegration tests as it can be applied regardless of whether a series is I(0), I(1) or I(2), non-cointegrated or cointegrated of an arbitrary order. The VAR framework of Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996) approach is given below-

$$\begin{bmatrix} \ln SMD_t \\ \ln PGDP_t \\ \ln BSD_t \\ \ln TLE_t \end{bmatrix} = \begin{bmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \end{bmatrix} + \sum_{i=1}^{k} M \begin{bmatrix} \ln SMD_{t-i} \\ \ln PGDP_{t-i} \\ \ln BSD_{t-i} \\ \ln TLE_{t-i} \end{bmatrix} + \sum_{j=1}^{d_{\max}} W \begin{bmatrix} \ln SMD_{t-k-j} \\ \ln PGDP_{t-k-j} \\ \ln BSD_{t-k-j} \\ \ln TLE_{t-k-j} \end{bmatrix} + \begin{bmatrix} \eta_{1t} \\ \eta_{2t} \\ \eta_{3t} \\ \eta_{4t} \end{bmatrix} \quad (11)$$

$$M = \begin{bmatrix} \phi_{11i} & \phi_{12i} & \phi_{13i} & \phi_{14i} \\ \phi_{21i} & \phi_{22i} & \phi_{23i} & \phi_{24i} \\ \phi_{31i} & \phi_{32i} & \phi_{33i} & \phi_{34i} \\ \phi_{41i} & \phi_{42i} & \phi_{43i} & \phi_{44i} \end{bmatrix} \quad (12)$$

$$W = \begin{bmatrix} \delta_{11k+j} & \delta_{12k+j} & \delta_{13k+j} & \delta_{14k+j} \\ \delta_{21k+j} & \delta_{22k+j} & \delta_{23k+j} & \delta_{24k+j} \\ \delta_{31k+j} & \delta_{32k+j} & \delta_{33k+j} & \delta_{34k+j} \\ \delta_{41k+j} & \delta_{42k+j} & \delta_{43k+j} & \delta_{44k+j} \end{bmatrix} \quad (13)$$

Here, k is the lag length in a usual VAR framework in level form of variables. The value of k has been selected by the AIC and SBIC. $d_{\max}$ is the maximum order of integration. Here, $\ln SMD$, $\ln PGDP$, and $\ln TLE$ are integrated of order one (I(1)) and $\ln BSD$ is integrated of order zero (I(0)). Therefore, maximum order of integration will be one ($d_{\max}$ =1) for Equation (11). $C's$, $\phi's$, and $\delta's$ are the parameters to be estimated. $\eta's$ are the random error terms distributed identically and independently with mean zero and finance covariance matrix. The results of granger causality analysis have been provided in Table 7.

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Table 7

Results of Causality Analysis

	$\ln SMD$	$\ln PGDP$	$\ln BSD$	$\ln TLE$
$\ln SMD$		6,7310** (0,0345)	0,5035 (0,7774)	0,7032 (0,7036)
$\ln PGDP$	0,2353 (0,8890)		4,1428 (0,1260)	1,0613 (0,5882)
$\ln BSD$	9,2606*** (0,0098)	7,9844** (0,0185)		1,9721 (0,3713)
$\ln TLE$	2,6367 (0,2676)	1,5063 (0,4709)	0,6363 (0,7275)	

Note: ***P<0.01 specifies significant at 1% level, **P<0.05 specifies significant at 5% level, *P<0.10 indicates significant at 10% level. The lag length criteria for the equation has been chosen by SBIC.

There exists short-run unidirectional causalities from economic growth to stock market development ($\ln PGDP \Rightarrow \ln SMD$), from stock market development to banking sector development ($\ln SMD \Rightarrow \ln BSD$), and from economic growth to banking sector development ($\ln PGDP \Rightarrow \ln BSD$). The economic growth causes stock market development and stock market development causes banking sector development have been found by the past studies (Raza and Jawid 2012). In Bangladesh economic growth causes stock market development has been found by the Hossain and Kamal (2010).

Conclusion and policy implications

This paper finds out the importance of tertiary level of education on the stock market development during the period 1976 to 2015 considering the effect of economic growth and banking sector development. Since the tertiary level of education is growing rapidly in Bangladesh, it motivates to identify whether tertiary education contributes into the stock market development in the long-run. This paper finds that tertiary level of education has an insignificant positive impact on stock market development in long-run unlike the insignificant negative impact in short run. However, the positive effect of tertiary level of education denotes that the growth in tertiary education contributes into the stock market development in the long-run (see also Rooij et al. 2007 and Spataro and Corsini 2013). The lack of financially literate people in stock markets of Bangladesh is largely accountable for the speculation-based investment (LankaBangla Financial Portal 2015). Moreover, the lack of sufficient basic knowledge in investing sways the participants to depend on rumors in making investing decisions on Bangladeshi stock market. Additionally, the inefficient market system is another reason of this scenario (Miazee et al. 2014). Thus, to have a broad-based stock market in the economy, government should give more emphasis on the quality education in tertiary level to increase the financial literacy. Bangladesh Securities and Exchange Commission, controlling body of stock market, has already started business literacy training service to the participant of stock market. It includes asset management, financial statement analysis, portfolio management and security analysis, technical analysis, internal audit risk management and control, and compliance in corporate governance.

Besides, both banking sector development and economic growth have a significant positive impact on stock market development in the long-run. Since banking sector development can play a big role in developing a country's stock market in the long-run, government should create a favorable environment for a sound banking system in the economy (Garcia and Liu 1999; Yartey 2010). A country's banking sector will grow through the mobilization of resources (providing more credit to the deficit units- growing corporate firms and industries by collecting from surplus units). Therefore, to grow the banking sector, it is essential to ensure the quick and effective mobilization of resources. Moreover, a country's continuous economic growth will contribute to the development of stock market (Calderon-Rossell 1991, El-Wassal 2005). The empirical results conclude that the short-run and long-run parameters are stable during the estimation period.

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