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Stock market development and economic growth in Sri Lanka

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Abstract: This paper investigates the relationship between stock market development and economic growth in Sri Lanka using quarterly data from 1996 to 2011. The stationarity of the data are tested using Augmented Dickey Fuller (ADF) test. It was found that all variables are stationary on first differencing. The relationships between economic growth and indicators of stock market development were investigated using Johansen co-integration tests, and vector error correction model (VECM). Co-integration results indicate the existence of long-run association between stock market development and economic growth in Sri Lanka. VECM results show unidirectional causality from stock market development to economic growth despite different variables used to measure the stock market development. The findings support the theoretical prediction that development of stock market would play a key role in economic growth. The study therefore concludes that stock market development leads the economic growth in Sri Lanka and efforts should be devoted to develop the stock market.

Keywords: stock market; economic growth; Sri Lanka.

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1 Introduction

The contribution of the financial markets to economic growth has received considerable attention with the emergence of the endogenous growth theory. Theoretical models interpreted in conflicting inferences about whether stock markets and banks act as substitutes or complements of each other for example Boyd and Prescott (1986) and Stiglitz (1985). However, Levine and Zervos (1998) found that stock market liquidity and market development are strong predictors of the economic growth. According to Levine (2001) well-functioning stock markets are expected to influence growth through increased capital accumulation and by influencing the efficiency of capital allocation. Hence, development of stock market is one of the key factors for the economic growth. However, Singh (1997) argued that stock market may not be important in attaining higher economic growth. Further, Harris (1997) investigated on 49 countries over the period 1980-1991 and found no significant relationship between stock market and economic growth. He utilises two stages least squares technique whereby the sample size is divided into two sectors: developed and less developed countries. Accordingly, stock market has some explanatory power in developed countries whereas in developing countries, stock market and economic growth do not appear to be robustly correlated. Given these conflicting views, it is left to empirical investigation to determine whether or not stock market development (SMD) accelerates economic growth in developing countries like Sri Lanka.

In Sri Lanka, after financial liberalisation process in 1977, new financial institutions were setup, new financial instruments were introduced. Stock market developed by way of establishing Colombo Stock Exchange (CSE), and Securities Exchange Commission. In this way, the Sri Lankan government takes several steps to develop the stock market.

Although many empirical studies have investigated the relationship between financial market development and economic growth in the world, the role of SMD in the economic growth of Sri Lanka is not well researched. This study is an attempt to fill this gap. Hence, this study investigates how SMD is related to economic growth of Sri Lanka. We examined the causality among the indicators of SMD and GDP. In addition, we also tested the causality between economic growth indicators and the SMD indicators and bank-based financial development indicator (credit to private sector is used as a proxy for bank-based financial market development). The aim of this paper is to contributing to the existing literature using latest data by linking the SMD for the economic growth in Sri Lanka.

The rest of paper is organised as follows: Section 2 presents Sri Lanka's SMD and economic growth. Literature review is summarised in Section 3. Section 4 describes the data and methodology. Section 5 presents empirical results of the study while concluding remarks and policy implications are presented in Section 6.

2 SMD and economic growth in Sri Lanka

2.1 Stock market in Sri Lanka

The CSE operates the only share market in Sri Lanka. The CSE's origin story runs back to the 19th century. The trading of shares in limited liability companies began with the inception of the Colombo Share Brokers Association (CSBA) in 1896. In 1904 the CSBA changed its name to the Colombo Brokers Association (CBA). The share market was opened to the public in July 1984 as the CBA recognised the importance of mobilising local savings to meet the capital requirements of the growing private sector of the country. In 1985, a formal stock exchange was established in Sri Lanka. It was then called the Colombo Securities Exchange (GTE) Limited and in 1990 came to be known as the CSE. The CSE was one of the first Exchanges in the region to have in place a depository for listed securities with the implementation of its clearing and settlement house and in 1991 successfully installed an automated electronic clearing and settlement system-Central Depository System (CDS). The CSE introduced its Automated Trading System (ATS) in 1997. This has enhanced the transparency and efficiency of the securities market in Sri Lanka. In recognition of the technology, systems and regulation, the CSE was admitted to the World Federation of Exchanges (WFE) in 1998, becoming its first South Asian member. It was also a founding member of the South Asian Federation of Exchanges (SAFE) in 2000.

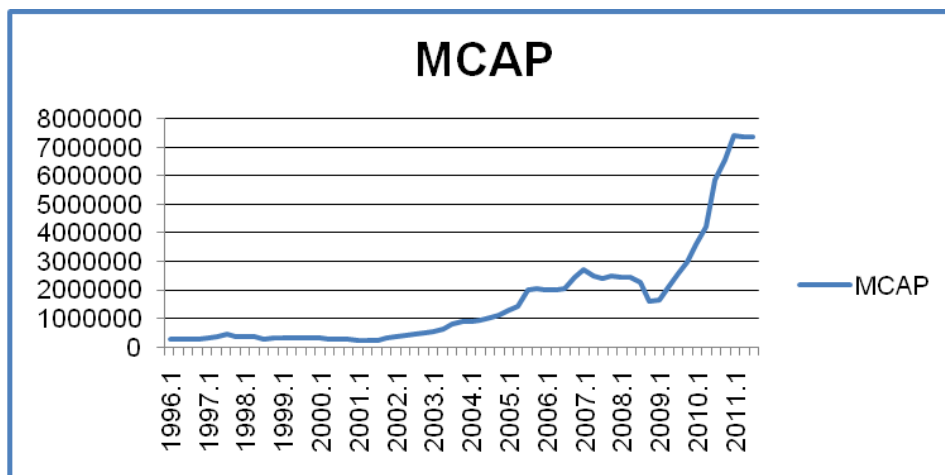
The Sri Lankan equity market moved into a new phase of growth after the end of the three decade long war in 2009. The CSE was ranked the second best performing market in the world by Bloomberg that year. With the economy also strengthening after the cessation of the war and interest growing in the CSE as an investment destination, market activity reached unprecedented levels in year 2010. The CSE was again ranked as the second best performing stock exchange in the world by Bloomberg News and was also ranked the top performing broad equity market index from among members of the WFE. The rankings reflect the growth of the ASPI – which reflects the performance of the share market as a whole. After significant growth in two consecutive years 2009 and 2010, the equity market moved towards a more stable status in 2011.

The CSE's strong commitment to Sri Lanka's development activities has been the basis of its growth and evolution as a conduit for resources of savers and investors. As at the date of publication the CSE is home to 279 listed companies. During the year 2011 the CSE was a significant source of finance for these companies and helped raise a total of approximately Rs. 47.2 billion through Initial Public Offerings (IPO) and Rights Issues. Rs. 19.2 billion in the year 2011 is the highest amount raised through IPOs. The CSE generated an equity turnover of Rs. 546.2 billion during the year 2011 and in 2010 the turnover was Rs. 570.3 billion the highest trading activity in CSE history, surpassing the previous record of Rs. 142.5 billion for the year 2009. At the rate of over 303.7%, the growth in the turnover (in USD) of the CSE was ranked the highest among all member

exchanges of the WFE in the year 2010. Market Capitalisation of the CSE stood at Rs. 2,213.9 billion as at the end of 2011 reflecting a slight increase of 0.15% over the previous year. The preservation of Market Capitalisation was a challenge faced by the exchanges in the world amongst market downturns. For example among WFE member exchanges, it was only five exchanges that were able to preserve their Market Capitalisations even with new listings during 2011.

Figure 1 shows the trends of market capitalisation during the period 1996–2011 in Sri Lanka. Market capitalisation in Sri Lanka shows a significant improvement after 2009.

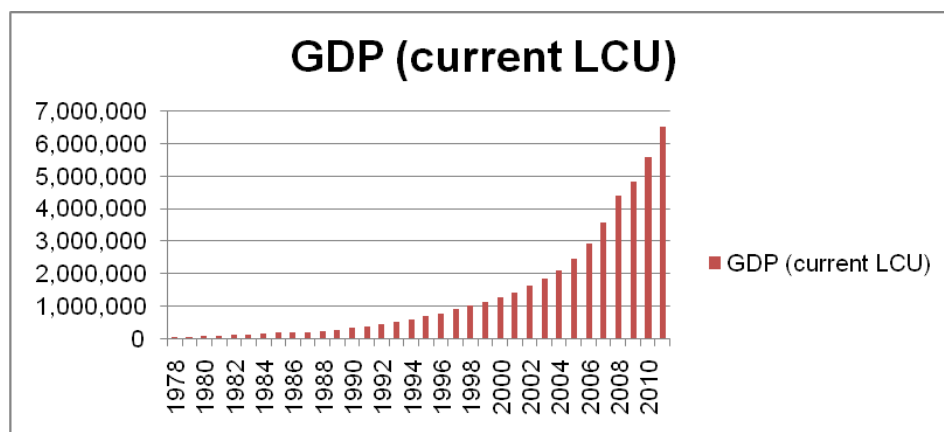
Figure 1 Market capitalisation in Sri Lanka (see online version for colours)



Source: IFS (2012) published by the International Monetary Fund and Colombo Stock Exchange publications

2.2 Economic growth in Sri Lanka

In spite of years of civil war, the country has recorded strong growth rates in recent years. Sri Lanka is poised for economic growth. Despite the 1983–2009 civil war, GDP growth averaged around 5% from 1996–2008. Due to the civil war and global recession and escalation of fighting during the final stages of the war, GDP growth was negative 1.55% in 2001 and slowed to 3.5% in 2009. Economic activity rebounded strongly with the end of the war and an IMF agreement resulting in two straight years of 8% growth in 2010 and 2011. The gross domestic product (GDP) in Sri Lanka was worth 6,542,663 million (local currency) in 2011, it was 42,665 million in 1978. According to a report published by the World Bank, the GDP value of Sri Lanka is roughly equivalent to 0.10% of the world economy. Sri Lanka is now a lower-middle income developing nation with a GDP of about \$59 billion. This translates into a per capita income of about \$2,800, among the highest in the region. The main sectors of the Sri Lanka's economy are tourism, tea export, apparel, textile and rice production. Remittances also constitute an important part of country's revenue. Figure 2 shows the trends of GDP in million rupees during the period 1978–2011.

Figure 2 Trend of GDP in Sri Lanka (see online version for colours)

Source: IFS (2012) published by the International Monetary Fund

3 Literature review

There are number of empirical studies examining the relationship between financial development and economic growth and most of studies found that financial sector development contributes positively to economic growth (e.g., Beck et al., 2000; Christopoulos and Tsionas, 2004; King and Levine, 1993; Levine et al., 2000). There is also number of studies on the relationship between SMD and economic growth in different countries (Levine and Zervos, 1998; Mauro, 2000; Atje and Jovanic, 1993; Harris, 1997). Minier (2003) analysed the influence of the stock market dimension on economic development by regression tree techniques; he found evidence that the positive influence of SMD on economic growth held only for developed stock markets in terms of turnover, in the case of underdeveloped stock markets the influence is negative. Nieuwerburgh et al. (2006) analysed the long-run relationship between SMD and economic growth in Belgium. They performed Granger causality tests and emphasised that SMD determined economic growth in Belgium especially in the period 1873–1935, but also on the entire analysed period (1800–2000) with variations in time dues to institutional changes affecting the stock exchange. Liu and Hsu (2006) reported positive effect of SMD on economic growth in Taiwan, Korea and Japan. Tharavanij (2007) observed that countries with deeper capital market face less severe business cycle output contraction and lower chances of an economic downturn compared to those with less developed capital market. Further, Luintel and Khan (1999) reported a bi-directional between SMD and economic growth in ten cross country study. Rousseau and Wachtel (2000) studied the relationship between equity market and growth for 47 countries between 1980 and 1995 and emphasised the importance of the liquidity of stock markets for economic growth.

Bolbol et al. (2005) analysed the effect of financial markets on total factor productivity and growth in Egypt and they showed that capital market development had a positive influence on factor productivity and growth. Beckaert et al. (2005) demonstrated that capital market development increases economic growth. Hondroyiannis et al. (2005)

found out that the relationship between economic growth and capital market development is bi-directional in Greece. Ted et al. (2005) examined the empirical association between SMD and economic growth in India and found no evidence on the association between the Indian SMD and economic growth during pre-liberalisation, they discovered a negative relationship between SMD and economic development for the post liberalisation period.

There are few empirical studies on the relationship between financial development and economic growth where Sri Lanka has been included among other selected countries. Demetriades and Hussein (1996) show that economic growth of Sri Lanka causes financial development and to lesser extent, financial development leads to economic growth. Abma and Fase (2003) investigated how the financial intermediation matters for growth for 9 selected countries and found non-significant relationship for Sri Lanka.

It is clear from the previous studies in Sri Lanka as well as in other countries that there are conflict views on the relationship between economic growth and financial development focusing the SMD. Hence, there is the need to investigate the relationship further.

4 Data and methodology

4.1 Data source

Quarterly time series data are employed for the Sri Lanka economy for the period 1996 to 2011 for economic growth and SMD are collected from International Financial Statistics (IFS) published by the International Monetary Fund, CSE data library 2011 and Annual Reports of Central Bank of Sri Lanka. Quarterly Data on GDP are collected from the annual reports of Central Bank of Sri Lanka. Data on market capitalisation and turnover were collected from IFS published by International Monetary Fund and CSE.

Two measures are used for the SMD in order to quantify the relationship between financial depth and economic growth and, further, to examine the sensitivity of the results. First one is the market capitalisation ratio which is measured by market capitalisation to nominal GDP (MCAPGDPN). Second is liquidity ratio which is measured by value traded to nominal GDP (TURNNGDPN). Levine and Zervos (1998) have used these measures as stock market variables. Following common practice in the literature, economic growth is measured by the change in real GDP (Constant 2005). All the data were transferred to natural logarithms for conventional statistical reasons.

4.2 Empirical model specification

In order to investigate the relationship between SMD and economic growth, co-integration test and vector error correction model (VECM) are applied. Variables used in the study are tested for stationary before running causality tests. For this purpose, unit roots are tested using Augmented Dickey-Fuller (1979) test.

After confirming that the variables are integrated of order one, then it is tested the existence of co-integration relationship between the variables. The co-integration tests were done among the variables using the Johansen (1998) co-integration tests. Since Johansen co-integration is sensitive to the lag length, we used Schwarz Information Criterion to determine the appropriate number of lag.

If co-integration detected between variables, then it is known that there exists a long term equilibrium relationship between them. So, we can estimate VECM with variables. The equation forms for VECM are as follows.

$$\Delta GDP_t = \lambda_{10} + \sum_{i=1}^n \lambda_{11i} \Delta GDP_{t-i} + \sum_{i=1}^n \lambda_{12i} \Delta SMD_{t-i} + \lambda_{13i} ECT_{t-1} + \mu_t \quad (1)$$

$$\Delta SMD_t = \lambda_{20} + \sum_{i=1}^n \lambda_{21i} \Delta SMD_{t-i} + \sum_{i=1}^n \lambda_{22i} \Delta GDP_{t-i} + \lambda_{23i} ECT_{t-1} + \mu_t \quad (2)$$

We also estimate a trivariate VECM with SMD measures, bank-based financial development measure and GDP. Credit to private sector is used as a proxy for bank-based variable for financial market development. The equation forms for trivariate VECM are as follows.

$$\begin{aligned} \Delta GDP_t = \lambda_{10} + \sum_{i=1}^n \lambda_{11i} \Delta GDP_{t-i} + \sum_{i=1}^n \lambda_{12i} \Delta SMD_{t-i} \\ + \sum_{i=1}^n \lambda_{13i} \Delta CPS_{t-i} + \lambda_{14} ECT_{t-1} + \mu_t \end{aligned} \quad (3)$$

$$\begin{aligned} \Delta SMD_t = \lambda_{20} + \sum_{i=1}^n \lambda_{21i} \Delta SMD_{t-i} + \sum_{i=1}^n \lambda_{22i} \Delta GDP_{t-i} \\ + \sum_{i=1}^n \lambda_{23i} \Delta CPS_{t-i} + \lambda_{24} ECT_{t-1} + \mu_t \end{aligned} \quad (4)$$

where ECT_{t-1} is the lagged value of the error correction term (ECT), μ_t is white noise error terms, Δ is the first-difference of the variable, GDP is the change in real GDP, SMD is the SMD, and CPS is the credit to private sector.

5 Empirical results

5.1 Unit root test

To check the stationarity of the variables, the Augmented Dickey-Fuller (ADF) test was employed. The test is conducted with intercept only and intercept and trend respectively on the level and first differences of the variables. It finds all variables are stationary on first differencing. The results of ADF test are shown in Table 1. All variables are stationary on first differencing. Thus variables are stationary and integrated of same order I(1). The GDPR is also weakly significant at its level under intercept and trend and intercept respectively.

Table 1 ADF unit root test results

<i>Variables</i>	<i>Level</i>			<i>First Difference</i>			<i>Number of observations (after adjustments)</i>
	<i>Test with intercept</i>	<i>Test with trend and intercept</i>	<i>Lag length</i>	<i>Test with intercept</i>	<i>Test with trend and intercept</i>	<i>Lag length</i>	
GDPR	-2.826*	-2.974	3	-20.434***	-20.237***	2	59
MCAPGDP	-1.005	-2.257	1	-5.561***	-5.663***	0	61
TURNingDP	-1.929	-2.970	0	-8.949***	-8.902***	0	61
CPS/GDP	-1.849	-2.444	4	-8.649***	-8.575***	2	61

Notes: ***, **, * indicates significance at the 1%, 5% and 10% level respectively. Critical values with intercept and trend and intercept are for all tests are -3.546, -2.912, -2.594 and -4.121, -3.488, -3.172 at the 1%, 5% and 10% levels of significance in that order. Number of lags was selected automatic-based SIC.

Table 2 Johansen co-integration test results: economic growth (RGDP) and stock market development

<i>Hypothesised no. of CE(s)</i>	<i>Trace test</i>			<i>Maximum eigenvalue test</i>		
	<i>Test statistic</i>	<i>Critical value 5%</i>	<i>Prob. **</i>	<i>Test statistic</i>	<i>Critical value 5%</i>	<i>Prob. **</i>
<i>1 GDPR and MCAPGDPN</i>						
None*	16.86715	15.49471	0.0309	14.81638	14.26460	0.0409
At most 1	2.050772	3.841466	0.1521	2.050772	3.841466	0.1521
<i>2 GDPR and TURNingDPN</i>						
None*	65.32747	15.49471	0.0000	62.14814	14.26460	0.0000
At most 1	3.179337	3.841466	0.0746	3.179337	3.841466	0.0746
<i>3 GDPR, MCAP and CPS</i>						
None*	56.49183	29.79707	0.0000	42.98277	21.13162	0.0000
At most 1	13.50905	15.49471	0.0974	10.68994	14.26460	0.1704
At most 2	2.819113	3.841466	0.0931	2.819113	3.841466	0.0931
<i>4 GDPR, TURN and CPS</i>						
None*	56.49183	29.79707	0.0000	42.98277	21.13162	0.0000
At most 1	13.50905	15.49471	0.0974	10.68994	14.26460	0.1704
At most 2	2.819113	3.841466	0.0931	2.819113	3.841466	0.0931

Notes: *Denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

5.2 Co-integration tests

Having confirmed that all variable are integrated of order (1), the co-integration tests were done among the variables using the Johansen's co-integration tests to investigate long-term equilibrium relationship among the variables. Number of lags is selected using an optimal lag structure in the unrestricted VAR. Johansen's approach derives two likelihood estimators for the co-integration rank: a trace test and a maximum Eigen value test. Table 2 presents summarised co-integration results between the variables.

Co-integration results indicate the existence of long-run association between the indicator of SMD, indicator of bank-based financial development and economic growth in Sri Lanka. Therefore, VECM can be used to investigate the relationships among the selected variables.

5.3 Vector error correction model

Since the variables are co-integrated, there are long term relationships among the variables under consideration. Table 3 presents the results of bivariate VECMs with respect to GDP and indicators of SMD. When we use the GDP as a dependent variable, the estimated ECTs are negative and highly significant in model 1 and 2. But when the indicators of SMD are dependent variable in the models, the ECTs are negative and insignificant. These results are supporting the co-integration among the variables represented by model.¹

Table 3 VECM: bivariate analysis between SMD and economic growth

<i>Model 1</i>				
<i>GDP and MCAP</i>	<i>GDP(-1)</i>	<i>MCAP(-1)</i>	<i>C</i>	<i>ECT</i>
GDP	1.000	-0.099** (-2.045)	0.098	-1.523*** (-3.728)
MCAP	-10.147*** (-4.4456)	1.000	-0.993	-0.020 (-0.821)
<i>Model 2</i>				
<i>GDP and TURN</i>	<i>GDP(-1)</i>	<i>TURN(-1)</i>	<i>C</i>	<i>ECT</i>
GDP	1.000	-0.056*** (-3.618)	0.034	-2.528*** (-9.925)
TURN	-2.656*** [-9.137]	1.000	0.001	-0.028 (-0.901)

Notes: **, ***Indicate significance at 1% and 5% levels respectively. The t-values are in parenthesis.

Table 4 VECM: trivariate analysis between SMD, financial development and economic growth

<i>Model 1</i>					
<i>GDP, MCAP and CPS</i>	<i>GDP(-1)</i>	<i>MCAP(-1)</i>	<i>CPS(-1)</i>	<i>C</i>	<i>ECT</i>
GDP	1.000	-0.122*** [-3.847]	-0.203 [-1.503]	0.327	-2.341*** (-7.168)
MCAP	-8.2518*** [-8.433]	1.000	1.6746 [1.529]	-2.698	-0.0534*** (-2.573)
<i>Model 2</i>					
<i>GDP, TURN and CPS</i>	<i>GDP(-1)</i>	<i>Turn(-1)</i>	<i>CPS(-1)</i>	<i>C</i>	<i>ECT</i>
GDP	1.000	-0.076*** [-3.599]	-0.1947 (-1.058)	0.245	-1.186*** (-4.144)
TURN	-13.301*** (-8.499)	1.000	2.590 (1.183)	-3.256	0.0176 (0.413)

Notes: **, ***Indicate significance at 1% and 5% levels respectively. The t-values are in parenthesis.

Hence, the VECM results show unidirectional causality from SMD to economic growth despite different variables used to measure the SMD. Coefficients of SMD proxies are major interest. That is in model 1 coefficient of market capitalisation is -0.099 and significant at the 1% level. This magnitude implies that 1% increase in market capitalisation will increase GDP by 9.9% in the long run. In Model 2, coefficient of market turnover is -0.056 , which is also significant at the 1% level. This magnitude implies that 1% increase in turnover will increase GDP by 5.6% in the long run.

Table 4 presents summary of the result of trivariate VECM with respect to GDP, measures of SMD and proxy of bank-based financial market development. The estimated ECT is negative and highly significant in model 1 and 2. However, in this model also, when the indicators of SMD are dependent variable in the models, ECT is significantly negative and it is negative and insignificant for TURN.

VECM results with trivariate equation also support that SMD leads the economic growth despite different variables used to measure the SMD. In model 1 coefficient of market capitalisation is -0.122 and significant at the 1% level. This magnitude implies that 1% increase in market capitalisation will increase GDP by 122% in the long run. But the proxy for bank-based CPS is insignificantly negative. In Model 2, coefficient of market turnover is -0.076 , which is also significant at the 1% level. This magnitude implies that 1% increase in turnover will increase GDP by 7.6% in the long run.

The results indicate that SMD leads economic growth of Sri Lanka than bank-based development. In this trivariate model, bi-directional causality between market capitalisation and GDP is observed but could not find bi-directional causality between market turnover and GDP. In sum, SMD leads the economic growth of Sri Lanka. So the SMD in particular is urgent need of the country for attaining the sustainable economic growth in Sri Lanka.

6 Concluding remarks and policy implications

This study investigates the relationships between economic growth and SMD in Sri Lanka using quarterly data over the period 1996 to 2011. The stationarity of the data are tested using ADF test. Johansen co-integration technique and VECM are used to estimate the causal relationship between economic growth and SMD. Two different measures of SMD namely; market capitalisation and turnover, are used in this study. It finds that indicators of SMD and economic growth are co-integrated. VECM results show unidirectional causality from SMD to economic growth despite different variables used to measure the SMD. The findings support to the theoretical prediction that development of stock market would play key role in economic growth. The study, therefore, concludes that SMD leads the economic growth in Sri Lanka and efforts should be devoted to develop the stock market.

The policy implication of our study is that SMD is critical for the growth of the economy than the bank-based financial development. Therefore, Sri Lankan government has to take essential measures to strengthen the long-term relationship between SMD and economic growth in the country. Government may use its fiscal policy to promote the stock market. Policy makers shall focus on the long term policies by way of tax concession and expanding the stock market activities island wide.

Moreover, our results show an unidirectional causality from SMD to economic growth despite different variables used to measure the SMD. However, this study also

finds some positive results from the trivariate analysis bidirectional causality. So, in order to get a clear picture of the direction of causality, further comprehensive studies need to be carried out using alternative economic growth measures and stock market and bank-based financial development indicators.

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Notes

- 1 Due to space, detailed results are not presented here. Upon request, it will be provided.