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STOCK MARKET - ECONOMIC GROWTH NEXUSES: EVIDENCE FROM ASIAN STOCK MARKETS

N. T. Wickramasinghe[1], N. P. Ravindra Deyshappriya[2] and Y. M. C. Gunaratne[3]

[1]Faculty of Management, Uva Wellassa University of Sri Lanka
[2]Senior Lecturer, Faculty of Management, Uva Wellassa University of Sri Lanka. E-mail: ravindra@uwu.ac.lk
[3]Senior Lecturer, Faculty of Management, Uva Wellassa University of Sri Lanka

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Abstract: The study focuses on the causal relationship between stock market development and economic growth in Asian countries. Generalized Method of Moment (GMM) Dynamic Panel analysis along with panel unit root and cointegration tests were employed to accomplish the objectives of the study. One of the key significances of the study is the study have constructed a composite index to measure stock market development rather than rely on conventional measures. The cointegration test emphasizes the existence of long-term relationship between stock market development and economic growth while the GMM dynamic panel analysis confirms the positive relationship between stock market development and economic growth of top 10 stock exchanges in Asian Region. Moreover, reverse causality which runs from economic growth to stock market development has also been confirmed by the GMM dynamic panel analysis. Consequently, bi-directional causality between stock market development and economic growth exists in top 10 Asian stock exchanges confirming both Finance-Led Growth Hypothesis and Growth-Led Finance Hypothesis. Hence, stock market and growth oriented policies are recommended to be implemented to optimize the mutual benefits.

Keywords: Stock Market Development, Economic Growth, Generalized Method of Moment, Causality, Asian Stock Markets

JEL Classification: C220, C230, E010

1. INTRODUCTION

Stock market-growth nexuses have been well-documented, despite there is no consensus on the said relationship. Historical studies such as Bagehot (1873) and Schumpeter (1911) also examined the aforementioned relationship and however ended up with inconclusive findings. It is recognized that there are mainly four streams of conflicting

views on stock market-growth nexuses. Firstly, finance-led growth hypothesis which stresses that economic growth can be increased through savings and efficient resource allocation supported by financial system which includes stock markets as well. This notion is supported by Hicks (1969), Bencivenga and Bruce (1991) and Beck and Levine (2004). Secondly, growth-led finance hypothesis which is confirmed by Robinson (1952), Ireland (1994) and Capasso (2006) highlighted that higher economic growth is essential for the development of the financial system. The third view emphasizes that there is a bi-directional causality between stock market development and economic growth (Demetriades and Khaled (1996) and Arestis and Kul (2001)) and highlighted the importance of both sectors for mutual benefits. In contrast, the fourth view ignore all three notion and mentioned that no proper causal relationship between financial system and economic growth and especially Lucas (1988) indicated that finance-growth nexuses have been unnecessarily over stressed in the literature. In addition to aforementioned empirical contradictory views, there are several methodological issues in the literature also highlight the necessity of novel methodological approach to address the link between stock market development and economic growth.

Majority of the studies have based on cross-country analyses which hinder possible causality direction between variables and also such cross-country analyses treat the countries with heterogenous characteristics as homogenous groups Demetriades &Khaled (1996) and Beck & Levine (2004). Moreover, time series analysis just provides findings on specific countries which cannot be generalized. Apart from that, issue of simultaneity is always attached with time series analysis. Under this scenario, the present study attempts to examine the relationship between stock market development and economic growth along with causality direction. The study overcomes the highlighted methodological issues by employing panel data analysis under dynamic setting based on Generalized Method of Moment (GMM). Apart from that, panel unit root tests and cointegration tests were also applied to check the time series properties of the longitudinal data. Specifically the present study attempts to accomplish two main objectives such as (1) to observe the link between stock market development and economic growth in Asian countries (2) to recognize the nature of causal relationship between stock market development and economic growth in Asian countries. The next sections of the paper focus on literature review followed by the methodology adopted. After that, the results of the analysis are elaborated while the final section has been allocated for conclusions and recommendations.

2. LITERATURE REVIEW

A study Levine (1993) which covered 77 countries over the period of 1960-1989, observed that there is a positive relationship between financial sector development and

growth. Similarly, Levine and Zervos (1998) examined the impact of Stock market and Bank on long run economic growth considering 47 countries over the period of 1976-1993. They confirmed that both stock market liquidity and banking development positively and strongly link with both current and future rates of economic growth, capital accumulation, and productivity growth. Fang-Chin Cheng (2011) extended the economic growth model tested by (Levine and Zervos, 1998) by including a measure for capital allocation efficiency proxied by stock price informativeness based on 59 countries. It is observed that stock price informativeness is positively and strongly correlated with the economic growth of both emerging and developed economies. In addition to that, the study stressed that stock price informativeness works as a substitute for banking development and stock market liquidity in predicting emerging economies' economic growth after gaining control for capital flows and economic factors. A study by Adjasi & Biekpe (2006) studied the effect of stock market development on economic growth in 14 African countries and by using dynamic panel data modelling setting. Similar to Levine and Zervos (1998) and Levine (1993), this study found that positive relationship between stock market development and economic growth. Furthermore, Adjasi & Biekpe (2006) highlighted that low-income African countries with less developed stock markets must grow and improve their markets in order to reap economic benefits from stock markets.

A panel data analysis based on 10 Asian Islamic countries were carried out by Muhamad (2014) and confirmed that both the development of banks and the development of stock markets have a substantial impact on economic growth. Furthermore, Muhamad (2014) mentioned that variables such as bank credit, turnover ratio, and government consumption favourably contribute economic growth in the long run. Similar to Muhamad (2014), Atje & Jovanovic, (1993) also observed the same relationship between economic growth and stock market development in the context of 40 countries over the period of 1980-1988. More specifically, Atje & Jovanovic, (1993) stressed that stock markets may have a greater impact on economic growth than the banking sector. Conversely, a study by Harris (1997) which examined the empirical relationship between stock markets and economic growth for developed and less developed countries unable to confirm the positive link between expanded stock market activities and economic growth. However, Harris (1997) mentioned that impact of stock market development on economic growth might be substantial in relation to developed countries compared to less-developed countries.

Apart from that, Beck and levie (2004) investigated the impact of stock markets and banks on economic growth for the period of 1976–1998 using dynamic panel data analysis based on the GMM (Generalized-Method-of Moments) technique. They observed that stock markets and banks positively influence on economic growth. Similar

to Beck and levie (2004), Mohtadi and Sumit (2002) also employed GMM panel data analysis to examine the relationship between stock market development and economic growth for 21 emerging markets over 21 years and confirmed that stock market development contributes to economic growth both directly and indirectly. Particularly, Mohtadi and Sumit (2002) emphasized that market liquidity (Turnover Ratio) has a direct impact on economic growth and while market size (Capitalization Ratio) has an indirect impact which promotes economic growth through investments. A recent study by (Kajurová & Rozmahel, 2016) examined the causal relationship between stock market development and economic growth by using evidence from the European Union. Unlike the results of Harris (1997), Levine and Zervos (1998), Adjasi & Biekpe (2006), Beck and levie (2004) and Mohtadi and Sumit (2002), (Kajurová & Rozmahel, 2016) argued that there is no long-term causality relationship between stock market development and economic growth in considered countries except marginal link in short term. Conversely, Azam (2016) stressed the long term relationship between stock market development and economic growth in the context of countries such as India, Bangladesh, Singapore and China over the period of 1991-2012.

It is apparent from the existing body of knowledge that most of the studies have applied time series or cross sectional analyses while only few studies have applied longitudinal analysis. In fact, time series analyses highly country specific and therefore results cannot be generalized and also the simultaneity issue is involved (Beck and Levine, 2004). Similarly, cross sectional analyses treat heterogeneous countries as homogenous and in turn end up with misleading conclusions while hindering the causality direction (Rousseau & Wachtel, 1998). Apart from that, a great deal of studies have used single stock market indicators such as market capitalization, turnover ratio, total value traded and stock market price indices to measure the stock market development, despite the stock market development is a function of number of all key stock indices. Therefore, utilization of single indicator to measure the stock market development essentially ignores the impact of other variables on stock market development. Consequently, a usage of single indicator may underestimate stock market development occurring a measurement error related to the dependent variable. Hence, the present study introduces a composite index to proxy the stock market development while employing dynamic panel data modelling to overcome the methodological issues in the literature.

3. METHODOLOGY

3.1. Data

The study mainly applies a quantitative research desing based on regiorus econometric framework. The current study is entirely based on secondary data collected from the

considered stock markets in the Asia region. The study mainly focuses on 8 countries with top 10 stock exchanges in Asian region in 2019 according to the data from World Federation of Exchanges. Mainly 8 countries have been selected for data collection as India and China account for two stock exchanges each within top 10 stock exchange in Asian region.

Table 1: List of Sample Countries

Country	*Stock Exchange*
Japan	Tokyo Stock Exchange
China	Shanghai Stock Exchange
	Shenzhen Stock Exchange
Hong Kong	Hong Kong Stock Exchange
India	Bombay Stock Exchange
	National Stock Exchange
South Korea	Korea Exchange
Taiwan	Taiwan Stock Exchange
Singapore	Singapore Exchange
Thailand	The Stock Exchange of Thailand

Source: Created by authors

The annual data for each variable were collected for the period of 1990 - 2020. Similarly, the relevant data were collected only for 7 countries out of 8 as Taiwan and China have not been listed as separate countries in the World Development Indicators.

3.2. Data Analysis and Empirical ModelEstimation

The present study employs dynamic panel data analysis along with series of econometrics techniques.

The following two empirical models were econometrically estimated to observe the link between stock market development and economic growth of sample countries. As indicated in equation (1) and (2), both Economic Growth (EG) and Stock Market Development (SMD) were interchangeably assigned as dependent variables to capture the availability of bi-directional causality between EG and SMD.

$$lnRGDP_{i,t} = \beta_1\, lnSMD_{i,t} + \beta_2\, lnCF_{i,t} + \beta_3\, lnLF_{i,t} + \beta_4\, lnINF_{i,t} + \beta_5\, lnPERCAP_{i,t} + \beta_6\, lnOPEN_{i,t} + \beta_{i,t} + U_{1i,t} \quad (1)$$

$$lnSMD_{i,t} = \beta_1\, lnRGDP_{i,t} + \beta_2\, lnCF_{i,t} + \beta_3\, lnLF_{i,t} + \beta_4\, lnINF_{i,t} + \beta_5\, lnPERCAP_{i,t} + \beta_6\, lnOPEN_{i,t} + \beta_{i,t} + U_{1i,t} \quad (2)$$

The table 2 indicates the operationalization of the research, which explains the details of the dependent and independent variables.

Table 2: Operationalization of Variables

Variable Name	*Description*	*Source*
lnRGDP	Log of Real GDP	World Bank Data
lnSMD	Log of Stock Market Development	International Financial Cooperation
lnCF	Log of the Ratio of Gross Capital Formation to GDP	World Bank Data
lnLF	Log of Economically Active Population over 15 Years	World Bank Data
lnINF	Log of Inflation	World Bank Data
lnPERCAP	Log of Per Capita Income	World Bank Data
lnOPEN	Log of Economic Openness[1]	World Bank Data

Mainly, the variable Stock Market Development (SMD) was constructed based on the method introduced by Levine and Zervos (1998), where the SMD was created by getting the average of mean removed values of Stock Market Capitalization Ratio, Total Value Traded Ratio and Turnover Ratio. The study uses real GDP (lnRGDP), align with Beck and Levine (2004), Levine and Zervos (1998) and Levine (1993) and in fact usage of real GDP ignores price fluctuations in the GDP. Apart from that, the ratio of gross capital formation to GDP (ln CF) and labour force (lnLF) are also used as explanatory variables. More specifically, over 15 years economically active population are considered as the labour force. Moreover, inflation (lnINF) which measured using the dymaics of local consumer price indices of respective countries is also included alone with percapita income (lnPERCAP) (Adjasi & Biekpe, 2006) and economic openness (lnOpen). The economic openness has not been included in many studies and however the present study recognize that the economic openness as one of the key variables of considered countries and therefore included as an independent variable. The economic openness was created by getting the summation of import and exports. The log values of all the independent variables are considered as the log values reduces the variations of each variable and also as the estimated coefficients of log variables can be interpreted as elasticities.

The estimation procedure includes number of steps along with several econometrics techniques. The empirical models expressed in equation (1) and (2) were estimated using Generalized Method of Moment (GMM). Moreover, panel unit root test and panel cointegration test were employed to test the time series econometric properties

and long run relationship between stock market development and economic growth respectively.

Panel Unit Root Test

When dealing with time series data, it is required to test the stationarity of the data series in order to avoid spurouse estimation. Unlike time series data, panel data has both time and cross sectional dimensions and therefore it is required to employ a panel unit root test to check whether the data series have unit root. This study employs both Im, Pesaran and Shin (IPS) unit root test and Fisher Chi-square Augmented Dickey-Fuller (ADF) Test introduced by Im, Pesaran and Shin (2003) and Dicky & Fuller (1981) respectively.

Panel Cointegration Test

One of the main objective of this study is to observe whether there is a long run relationship between stock market development and economic growth of Asian countries. Thus, three panel cointegration testes were employed to check the existence of long run relationship between stock market development and economic growth. In particular, Pedroni Panel Cointegration Test developed by Pedroni (2004), Kao Panel Cointegration Test developed by Kao (1999) and Fisher-Johansen Panel Cointegration Test developed by Maddala and Wu (1999) were applied to observe the long run relationship between stock market development and economic growth.

GMM Dynamic Estimation

The study employs GMM dynamic panel data analysis introduced by Arellano and Bond (1991) as the GMM dynamic panel data analysis can be used to control econometric issues such as unobserved country specific issues and endogeneity problem. GMM dynamic panel data analysis has been widely used in financial literature by Beck and Levine (2004) and Yuncu (2007). However, they haven't use a composite index for stock market development and instead used one stock market variables such as market capitalization or stock market turnover ratio. Hence, the current study applies the GMM technique in a novel way and along with new set of variables and time periods.

The empirical models expressed in equations (1) and (2) can be re-written as below after introducing the dynamic nature to the models.

$$\ln GDP_{i,t} - \ln GDP_{i,t-1} = (\propto_1 -1)\ln GDP_{i,t-1} + \beta_1 \Delta \ln SMD_{i,t} + \beta_2 \Delta \ln CF_{i,t} + \beta_3 \Delta \ln LF_{i,t} + \beta_4 \Delta \ln INF_{i,t} + \beta_5 \Delta \ln PERCAP_{i,t} + \beta_6 \Delta \ln OPEN_{i,t} + \delta_{i,t} + U_{1i,t} \quad (3)$$

$$\ln SMD_{i,t} - \ln SMD_{i,t-1} = (\propto_2 -1)\ln SMD_{i,t-1} + \beta_1 \Delta \ln RGDP_{i,t} + \beta_2 \Delta \ln CF_{i,t} + \beta_3 \Delta \ln LF_{i,t} + \beta_4 \Delta \ln INF_{i,t} + \beta_5 \Delta \ln PERCAP_{i,t} + \beta_6 \Delta \ln OPEN_{i,t} + \delta_{i,t} + U_{1i,t} \quad (4)$$

Moreover, instruments were used when the estimating the GMM dynamic panel data models in order to avoid the endogeneity problem. The lag values of respective independent variables were used as the instruments of the model. Apart from that, Sargan Test and Serial Correlation Test were used to overall validity of the moment condition and the existence of serial correlation respectively.

4. RESULTS AND DISCUSSION

4.1. Results of the Panel Unit Root Test

The study employs Im, Pesaran and Shin (IPS) unit root test and Fisher Chi-square Augmented Dickey-Fuller (ADF) test and the results of the panel unit roots tests are indicated in table 3 below.

Table 3: Unit Root Test Results for the Countries

Series	*Level*		*First Difference*	
	IPS	*ADF*	*IPS*	*ADF*
Ln CF	0.2452	0.4521	0.0020***	0.0011***
Ln OPEN	0.8753	0.8921	0.0002***	0.0000***
Ln INFLATION	0.0198**	0.0220**	0.0012***	0.0000***
Ln LF	0.7530	0.7362	0.0297**	0.0212**
Ln PERCAP	0.8720	0.8277	0.0072***	0.0203**
Ln RGDP	0.7240	0.9828	0.0000***	0.0021***
Ln STOCK	0.0012***	0.0020***	0.0000***	0.0001***

Source: Author's calculation based on the World Bank data
*** - Significant at 1% ** - Significant at 5%

As table 3 indicates, most of the considered variables non-stationary at level form. However, variables such as Ln INFLATION and Ln STOCK are stationary at the level form under both IPS and ADF tests. Nevertheless, all the variables are stationary at the first difference and therefore the variables are considered as *I*(1) variables. The variables integrated in order one - *I*(1) emphasizes possible long run relationship between such variables.

4.3. Results of the Panel Cointegration Test

The main objective of employing the cointegration test is to capture whether there is a long run relationship between stock market development and economic growth with

reference to top 10 Asian markets. Therefore, three panel conintegration tests (Pedroni, Kao and Johansen -Fisher) were used to examine possible long run relationship between stock market development and economic growth.

Table 4: Panel Cointegration Tests Results for the Countries

Variables	*Cointegration Test*	*Statistics*	*Probability*
STOCK- Ln RGDP	Pedroni	ADF Statistics 0.3548	0.5757
STOCK- Ln RGDP	Kao	ADF Statistics -3.4667	0.0003***
STOCK- Ln RGDP	Johansen -Fisher	Fisher Stat (Trace Test) 45.26 (None)	0.0021***
		44.38 (At Most 1)	0.0014***
		Fisher Stat (Max Eigen Test) 36.25 (None)	0.0031***
		46.23 (At Most 1)	0.0021***

*** - Significant at 1%

Source: Author's calculation based on the World Bank data

According to the results of the cointegration tests, except Pedroni test, both Kao and Johansen-Fisher cointegration tests confirm that there is a long relationship between stock market development and economic growth of top 10 Asian markets. More specifically, Johansen-Fisher cointegration test confirms the availability of one cointegration vector between said variables. Similar log run relationship between stock market development and economic growth has also been observed by Christopoulous and Tsionas (2004) and Yuncu (2007) as well. In fact, well-functioning stock markets ensure the capital requirement for higher economic growth. Apart from that, stable economic growth is also essential for stock markets to flourish. Despite the study confirms there is a long run relationship between stock market development and economic growth, the causality direction of this relationship has been still inconclusive and highly debated. Hence, the next section of this paper focuses on checking the causality direction of the aforementioned relationship.

4.4. Results of the GMM Dynamic Panel Data Analysis

The main objective of this analysis is to quantify the impact of stock market development on economic growth while recognizing the causality direction between the said variables. Therefore, two models were empirically estimated by assigning Ln RGDP (Model 01) and Ln SMD (Model 02) as the dependent variable in order to capture the causality direction between Ln RGDP and Ln SMD. Based on the statistically significance of the

estimated coefficient of Ln SMD is the Model 01 and estimated coefficient of Ln RGDP in Model 02, the causality direction can be determined as follows.

1. If the coefficient of Ln SMD in Model 01 is statistically significant (While the coefficient of Ln RGDP in the Model 02 is insignificant) there is a uni-directional causality which runs from stock market development to economic growth.
2. If the coefficient of Ln RGDP in Model 02 is statistically significant (While the coefficient of Ln SMD in the Model 01 is insignificant) there is a uni-directional causality which runs from economic growth to stock market development.
3. If both coefficients of Ln SMD and Ln RGDP in Model 01 and Model 02 are respectively statistically significant, there is a bi-directional causality between stock market development and economic growth.

Table 5 indicates the results of the GMM dynamic panel data model which has assigned Ln RGDP as the dependent variable.

Table 5: GMM Dynamic Panel Analysis - Impact of Stock Market Development on Economic Growth (Dependent Variable - Ln RGDP)

Dependent Variable	: Ln RGDP			
Estimation Technique	: Panel GMM - 2SLS Method			
(First Difference) Observations	120			
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
ΔLn RGDP(-1)	0.3684	0.0567	6.4973	0.0000***
ΔLn SMD	0.0109	0.0027	4.0370	0.0000***
ΔLn CF	0.0323	0.0866	0.3729	0.6256
ΔLn LF	0.2683	0.1025	2.6175	0.0116**
ΔLn OPEN	0.2391	0.1054	2.2685	0.0235**
ΔLn PERCAP	0.3462	0.0532	6.5075	0.0000***
ΔLn INFLATION	0.0121	0.0231	0.5238	0.6944
Instrument rank	31.8978			
J-statistic	26.2132			
Sargan Test (P - Value)[1]	0.4121			
Serial Correlation (P - Value)[2]	0.6231			

Source: Calculated by author based on World Bank data

1. Sargan Test has the null hypothesis that the over-identifying restrictions are valid.

2. Serial Correlation Test has the null hypothesis of error terms are not serially correlated.

*** - Significant at 1% ** - Significant at 5%

According to table 5, it is apparent that there is a positive relationship between stock market development and economic growth in top 10 Asian markets. Moreover, this relationship is statistically significant at 1% level and therefore it can be confirmed that stock market development essentially stimulates the economic growth of considered countries. Hence, according to the above criteria, it is observed that the causality direction runs from stock market development to economic growth. Studies by Levine and Zervos (1998) and Yuncu (2007) also confirmed that stock market development increases economic growth. Apart from that, coefficients estimated for the variables such as lag of RGDP, labour force, openness and per capita income are positively affect economic growth and also these estimated coefficients are statistically significant. In fact, labour force is one of the key determinant of economic growth especially in Asian region as most of the Asian countries account for young and energetic workforce. Therefore, labour productivity in Asian region plays a crucial role on economic growth as the countries have been adopting labour productivity enhancement mechanisms. Similarly, international trade flows in the considered countries are well-functioning along with number of bilateral and multilateral trade agreements with many developed countries. Therefore, trade openness of the countries essentially increases the real GDP growth rate. Moreover, Banda (2005) argued that trade agreements between countries increase the economic growth by stimulating the allocation efficiency while Krueger (1997) and Helpman and Krugman (1985) highlighted that economic growth can be increased by allocating resource from outdated import-substitution policies to efficient bi and multilateral trade policies.

However, the estimated coefficient for capital formation and inflation are not statistically significant. In fact, inflation mostly link with the nominal GDP and also the impact of inflation might die out in the long run (Ireland, 1994). The validity of the model is checked by using Sargen Test and Serial Correlation Test. The Sargen Test is used to check the validity of the instruments used in the model. The null hypothesis of the Sargen Test is 'over-identifying restrictions are valid'. The P-value on Sargen Test (0.4121) confirms accepting the null hypothesis and therefore the instruments used in the model are valid. Apart from that, the null hypothesis of the Serial Correlation Test suggests that error term of the model is not serially correlated. The P-Value on the Serial Correlation Test is 0.6231 and therefore the null hypothesis can be accepted, confirming the model is free from serial correlation.

In addition to the Model 01, the Model 02 was also estimated by assigning Stock Market Development (Ln SMD) as the dependent variable. The main purpose of estimating this model is to capture the existence of reverse causality - to check whether the causality runs from economic growth to stock market development. As table 6 indicates, economic growth (Ln RGDP) positively related with stock market development

(Ln SMD) and also the estimated coefficient is statistically significant at 1% level. Hence, it is confirmed that higher economic growth and expanded economic activities enhance stock market development though higher demand for financial assets. This finding has also been verified by scholars such as Robinson (1952), Ireland (1994) and Capasso (2006).

Table 6: GMM Dynamic Panel Analysis - Impact of Economic Growth on Stock Market Development (Dependent Variable - Ln SMD)

Dependent Variable	: Ln SMD
Estimation Technique	: Panel GMM - 2SLS Method (First Difference) Observations 120

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
ΔLn SMD(-1)	0.4532	0.5632	0.0804	0.5423
ΔLn RGDP	7.5648	2.2110	3.4214	0.0001***
ΔLn CF	1.2446	0.6025	2.0657	0.0232**
ΔLn LF	-5.2331	4.3231	-1.2104	0.4324
ΔLn OPEN	0.8908	0.8951	0.9951	0.4712
ΔLn PERCAP	1.2299	0.5595	2.1982	0.0303**
ΔLn INFLATION	-0.1831	0.0952	-1.9233	0.0574*
Instrument rank	25.0000			
J-statistic	12.0821			
Sargan Test (P - Value)1	0.8865			
Serial Correlation (P - Value)2	0.8123			

Source: Calculated by author based on World Bank data

1. Sargan Test has the null hypothesis that the over-identifying restrictions are valid.

2. Serial Correlation Test has the null hypothesis of error terms are not serially correlated.

*** - Significant at 1% ** - Significant at 5% * - Significant at 10%

Apart from that, variables such as capital formation, per capita income and inflation are also significantly affect stock market development of considered countries. Capital formation is also positively related with stock market development and the estimated coefficient is statistically significant at 5% level. Moreover, higher per capita income enhance the stock market activities as the public with higher per capita income increase the demand for financial assets rather than saving their money. As table 6 indicates, inflation is negatively related with stock market development. In fact, inflation may adversely affect stock market development different ways. Mainly, higher inflation essentially reduces the real income and in turn people postpone their investment decisions. Similarly, inflation widens the risk of investing and also fluctuates the stock

prices and therefor people reluctant to invest in stock markets. Moreover, validity of the Model 02 is also verified using Sargen Test and Serial Correlation Test. P-values of both tests are 0.8865 and 0.8123 respectively emphasize that null hypothesis cannot be rejected and hence the instrument used for the model are valid and also the error terms are not serially correlated.

Considering the Model 01 and 02 indicated in the table 5 and table 6 respectively, it can be concluded that there is a bi-directional causality between stock market development and economic growth. Thus, stock market development stimulates the economic growth while economic growth enhances stock market development. It implies that both finance-led growth hypothesis and growth-led finance hypothesis are valid for top 10 stock markets in Asian region.

5. CONCLUSIONS AND RECOMMENDATIONS

Despite stock market-growth nexuses have been well-documented, there is no consensus yet on this relationship and conflicting findings have generated few contradictory thoughts on the said relationship. Thus, the present study attempts to examine the link between stock market development and economic growth along with their causality direction in the context of top 10 stock exchanges in Asian region. The analysis based on economies with top 10 stock exchanges in Asian region and data were collected over the period of 1990-2020. The econometrics analysis employs techniques such as panel unit root test, panel cointegration tests along with GMM dynamic panel data analysis which included the lag of independent variables as instrumental variables in order to overcome the methodological weakness in the literature while introducing a composite index to measure stock market development. The cointegration tests confirm the availability of long run relationship between stock market development and economic growth of considered countries.

The GMM panel data analysis indicates that there is a statistically significant positive relationship between stock market development and economic growth in top 10 stock exchange in Asian region. The analysis also confirms the existence of reverse causality which runs from economic growth to stock market development. Hence, it can be confirmed that there is a bi-directional causality between stock market development and economic growth in the context of top 10 stock exchange in Asian region. Therefore, the current study supports both finance-led growth and growth-led finance hypotheses. Apart from the main findings, the results revealed that capital formation and per capita income also positively affect to the stock market development while labor force and inflation negatively affect the stock market development. Based on the findings, the study strongly recommends to stimulate stock market activities under appropriate regulation while shifting unproductively allocated funds towards stock markets, to meet

long-term capital requirement which is essential for long-term economic growth. Moreover, it is crucial to promote favourable economic and political climate to obtain the optimal contribution from stock markets. Apart from that, the study suggests for future researchers to incorporate non-economic factors of stock market development such as political stability and quality of the institution in order to enrich the model further to have more precious estimates.

Note

1. The variable Openness was created by getting the summation of import and export.

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