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Contribution of Stock Market Development on Economic Growth of Nepal

Yogesh Ranjit[1]

Abstract

The objective of this paper is to analyze the contribution of stock market development on economic growth of Nepal. A well-developed stock market could promote the volume of domestic savings, saving mobilization, capital formation, and efficient allocation of capital in productive sectors of the economy that ultimately helps for increasing income, output, and employment and thereby enhance the economic growth of the nation. The study followed quantitative analysis and deductive method by using secondary data of 27 years from 1994 to 2021. It used ARDL model, co-integration test, bound test, CUSUM, and CUSUMQ test for data analysis. It employs the real gross domestic product as a proxy variable for economic growth while broad money supply, market capitalization, stock market turnover, NEPSE index, and listed companies are taken as the indicator of stock market development. The study found that there is a significant contribution of broad money supply, market capitalization and NEPSE index to real GDP. But, there is a weak contribution of stock market turnover to real GDP that indicates a liquidity problem in Nepalese stock market. It concludes that stock market development has a significant contribution for economic growth in Nepal. Hence, it is suggested that policymakers should think about the stock market development while formulating sectoral policies.

Keywords: *Stock market development, Economic growth, ARDL model, Autoregressive distributive lag, Co-integration.*

JEL Classification: *E44, D53, E51, C13, C22.*

Introduction

The stock market is a collective name of formal, legal, and institutional mechanism of trading stocks (shares) of various public companies under the given financial system of the nation. The stock market can be divided into primary and secondary markets. The primary market is the firsthand trading system of stocks under the facilitation of issue management institutions. Fund user companies

[1]**Dr. Ranjit** is an Associate Professor at the central Department of Economics, Tribhuvan University, Kirtipur, Nepal. Email: Yogesh.ranjit@cdec.tu.edu.np; yogeshr777@yahoo.com; ORCID: https://orcid.org/ 0009-0001-9271- 4566

(institutions) raise funds through this market from public investors through initial public offerings (IPOs) or / and further public offering (FPO). The secondary market is the system of trading second-hand stocks among investors through security brokers in the stock market for which the floated shares must be listed in the stock exchange exchange of the nation like Nepal Stock Exchange Limited (NEPSE) of Nepal. It provides platforms and facilities to investors for trading stocks on regular basis in 'Bulk of Exchange Trading'. However, the liquidity of securities is a crucial aspect in the secondary market that can easily be sold at any time whenever it is required by the investors. So, stock market is a significant component of capital market that helps to collect scattered savings of people and channelizes these savings into productive activities of goods and services. The stock market provides a return to the investors in the form of 'Dividends' and 'Capital Appreciation' of the stocks through the secondary market. The stock market is one of the prime, integral part, and significant components of the capital market that plays a crucial and important role in the economic growth of the nation through channeling the funds from ultimate savers to the ultimate investors. It becomes the primary source for many companies to raise capital by issuing stock in the market which is less risky and least cost compared to another source of capital generation.

A well-developed stock market could promote the volume of domestic savings, saving mobilization, capital formation, and efficient allocation of capital in productive sectors of the economy that ultimately helps for increasing income, output, and employment and thereby enhance the economic growth of the nation (Dhungana, 2013). Stock market development is necessary to manage the fund for the development activities of the nation. Therefore, the stock market could play a crucial role as an engine and contribute to the economic growth of the country (Gupta & Kathy, 2009). However, the effect of stock market development on economic growth has been an interesting subject matter of discussion among researchers. Therefore, many countries have developed policies for boosting share market development (SMD) to promote economic growth (Pradhan et al., 2014; Nguyen & Bui, 2019). The development of the stock market is an important part of any economic reform as well. The stock market is one of the mechanisms for transferring savings into investment. Specifically, the securities market enables the minimization of transaction costs and the costs of collecting, processing, and distributing information about enterprises and possible investment projects (Levine, 1997). Through the issuance of stocks, companies acquire perpetual capital for development. Through the provision of equity capital, the market also enables companies to avoid over-reliance on debt financing thus improving the corporate debt-to-equity ratio (Sylvester & Enabulu, 2011).

The Nepalese stock market has been widespread in recent times (Appendix – I & II). Its continued existence and development could have major implications for economic activities. It is evident that even in less developed countries, the

capital market has been contributing to allocating funds efficiently. In this line, the stock market can play a pivotal role in inducing economic growth in a country like Nepal by channelizing resources from the public. Evaluating the impact of stock market development on economic growth is relevant.

Statement of the Problem

The pace of Nepalese stock market development has been very slow in comparison to neighboring countries. Because of the small size of market and its liquid nature, the Nepalese stock market has a low turnover ratio, low value-traded ratio to volatility but high concentration ratio. For a long time, financing from banking sector has been dominating and still the industrial and service sectors have been hesitating to be benefited from the stock market. But, in recent times financial markets are playing a prominent role in financing long term projects. However, the Nepalese private sector business is predominantly family ownership type and they are not more professional enough to mobilize resources from the stock market as well. So, the stock market in Nepal has not been able to produce the expected results for a long time. There are controversies among the researchers regarding contribution of stock market development on economic growth of Nepal. Some argued that stock market development supports economic growth and some are of the view that stock market development does not impact economic growth at least in the short run. Hence, the study will help to prioritize policy-making for financial development that will support making the stock market better functioning towards economic growth. However, the research questions of the study are the following.

- Does the stock market development contribute to economic growth in Nepal?
- Is there a long run association between stock market development and economic growth in Nepal?

Objectives and Hypothesis

The objective of the study is to analyze the contribution of stock market development to economic growth in Nepal. The hypothesis of the study is that there is a long run association between the stock market developments to economic growth in Nepal.

Review of Literature

There are a number of studies related to the contribution of the stock market development on economic growth in both international and Nepalese contexts as well.

Theoretical Review

Q – Theory:- The theory is developed by Tobin (1969) in explaining how stock prices can have a direct impact on economic growth. The theory highlighted the impact of stock price on the cost of capital by a coefficient of 'Q'. The coefficient

of 'Q' i.e. 'q' is the ratio of market price of equity / cost of capital. If the 'q' ratio is high, prices are directly impacted and firms will invest more and vice-versa. The theory is further explained in the way that, 'q' is the ratio of the market value of current capital and the replacement capital by an individual firm. So, when business firms need more funds, it can raise funds by issuing stocks in the market. When the market value of the stocks increases, new investors can earn capital gain. In general, when the market price of stock is high, firms tried to raise money by issuing shares in the market. The measurement of stock valuation is the driving force for investment decision that promotes economic activities and ultimately contribute for economic growth.

Endogenous Growth Theory:- The theory is developed by Lucas (1988) in order to establish a finance-growth nexus. The model focused on contributing to economic growth by raising the productivity of capital through lowering financial intermediation costs and enhancing saving rates. The theory assumes that when financial systems are expanded, they support innovative projects by financing and ultimately contribute to fostering economic growth. It claims that there is a strong link between financial development and economic growth. Improving the proportion of savings, saving rate, investment, raising marginal productivity would result in a higher level of financial development which would generate a high growth rate. Hence, the endogenous growth theory implies a positive link between stock market development and economic growth.

Empirical Review

Joshi (2010) evaluated the relationship between stock market development and economic growth in Nepal for the 15 years from the mid-July, 1994 to mid-July 2008. The study has used the market capitalization ratio, total value traded ratio, and turnover ratio as indicators of stock market development by using Karl Pearson correlation to examine the relationship between two variables. The study concluded that there is a positive relationship between stock market development and economic growth so that the stock market development has a positive effect on the economic growth of Nepal.

Regmi (2012) examined the causal relationship between stock market development and economic growth for 18 years from 1994-2011. The study used stock market indicators namely market capitalization ratio, total value traded ratio, turnover ratio, number of listed companies in NEPSE, and the market concentration ratio. The study employed unit root test, co-integration, and vector error correction models to examine the relationship. The study found that stock market development has significantly contributed to the economic growth in Nepal. Since the stock market is a vehicle for economic growth in our context, it should be integrated into the whole economic system of the country while designing economic plans and policies.

Bayar et al. (2014) analyzed the effects of stock market development on economic growth in Turkey. The study used a few variables for the analysis like real GDP growth rate, market capitalization as a percentage of GDP, total value of stocks traded as a percent of GDP, and turnover ratio of stock traded. The stock market capitalization represents the size of the stock market, and liquidity of the stock market is represented by the total value of stocks traded and turnover ratio of stocks traded. The study found that there was a long-run relationship between stock market development and economic growth in Turkey. It further stated that stock market development affects economic growth positively.

Aigbovo and Izekor (2015) explored that stock market development has a significant impact on economic growth in Nigeria by using panel data set for the period of 2003-2013. The study used real gross domestic product, market capitalization, turnover ratio, total value of stock traded, and all shares indices. They have applied the Augmented Dickey-Fuller, unit root test, Johansen co-integration test, and error correction mechanism. They asserted that turnover ratio and market capitalization have a strong proxy of stock market development that is highly linked to economic growth in the short- run in Nigeria. Similarly, the total value of the stock traded, all shares indices, and turnover ratio significantly influenced to economic growth in the long-run.

Azam et al. (2016) examined the roles of stock market on the economic growth of four countries namely Bangladesh, India, China and Singapore. The study used annual time series cross country data from 1991 to 2012 obtained from World Bank database. The variables used in the study used and the result shows that there is long-term co-integration among stock market development and economic growth, FDI, and inflation.

Bista (2017) examined the empirical relationship between stock market development and economic growth in Nepal using time series data for 22 years from 1993 to 2014. A simple linear regression model was used to determine the long-run co-integrating relationship between the development of the stock market and economic growth in Nepal. The results showed that inflation has a negative and significant impact on GDP per capita in the short and long run. The study concludes that long-run policies should be formulated in such a way that they facilitate the development of the stock market so as to increase economic growth.

Pan and Mishra (2018) investigated both the long-run and short- run relationship between the stock market and the real economy in China by considering the issue of structural breaks and causality. The study collected monthly data on the market capitalization of stock 'A' and stock 'B' in both Shanghai Stock Exchange and Shenzhen Stock Exchange. But, the study didn't find any relationship between the stock market and the real economy in the short run due to the fact that China is a large country but the stock market constitutes a small fraction of the entire economy which is not enough to have an effect on the economy.

Baral (2019) has analyzed the relationship between the stock market development and economic growth in Nepal. The study used time series data set for 11 years from 2007/08 to 2017/18 using size and liquidity of the secondary market as the proxy for stock market development and GDP as the proxy for economic development. Furthermore, the study argued that there is a significant positive relationship between stock market development and economic growth in Nepal. The study claimed that the size of NEPSE has a satisfactory ability to mobilize capital and diversity risk in the economy.

Pokharel (2020) examined the causal relationship between capital market development and economic growth in Nepal using time series data for 26 year from 1994 to 2019. The study employed market capitalization as the proxy for stock market development and GDP per capita as the proxy for economic growth. The study claimed a unidirectional relationship between economic growth and stock market development and concluded that capital market development is supported for economic growth in Nepal.

The review shows that there is a vital role of stock market development on economic growth and that has become a well-pronounced issues among researchers worldwide. But, there are controversies among the researchers. Some argued that stock market development highly supported economic growth whereas some are of the views of no impact on economic growth at least in the short-run. Besides, there is only a few studies that has been done in developing countries like Nepal. So, the study is very relevant and that helps to fill up the vacuum of studies related to the contribution of stock market development on economic growth of Nepal.

Methodology and Data

Research Design, Study Period Covered, and Data Sources

The study used deductive method and quantitative analysis using time series data of selected variables of 27 years from 1994 to 2020 (Appendix - III). The required data and information were collected from published by the Ministry of Finance, Nepal Rastra Bank, Central Bureau of Statistics, Securities Board of Nepal, and NEPSE.

Tools and Method of Data Analysis

The study used a unit root test, auto-regressive distributed lag (ARDL) model, error correction model, bound test co-integration test, and stability test using CUSUM and CUSUMQ.

Model Specification

The study used the log linear multiple regression model as following,
The functional form of the equation is following,

$$RGDP = f(M_{2,} MCN, TOV, NPX, NLC,)$$

The model converting into a linear form is -

$$RGDP_t = \alpha + \beta_1 M_{2t} + \beta_2 MCN_t + \beta_3 TOV_t + \beta_4 NPX_t + \beta_5 NLC_t + \mu_t$$

Taking natural logarithm on both sides, the linear equation becomes as given -

$$\ln RGDP_t = \alpha + \beta_1 \ln M_{2t} + \beta_2 \ln MCNt + \beta_3 \ln TOV_t + \beta_4 \ln NPX + \beta_5 \ln NLC_t + \mu_t$$

Where,

RGDP = Real gross domestic product,
M_2 = Broad money supply,
MCN = Market capitalization,
TOV = Total turnover value of stock market,
NPX = NEPSE Index
NLC = Number of Listed Companies in NEPSE.
α = Constant,
$\beta_{I\text{-}5}$ = Coefficients of parameters
μ_t = Error Term.

The ARDL model process is a statistically more significant approach to determining the co-integration relationship in a small sample rather than those of the Johansen and Juselius co-integration technique (Pesaran & Shin, 1995). The logic for using ARDL is the mixed stationary result. It can be applied irrespective of whether the underlying variables are I (0), I (1) or a combination of both (Pesaran & Shin, 1995). ARDL model considers a sufficient number of lags to capture the data-generating process in a general specific modeling framework, removes dilemmas connected with omitted variables, and provides unbiased and efficient results. (Narayan, 2004). The basic ARDL model can be written as:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{t-3} + \ldots + \beta_n y_{t-n\,1} + \lambda_0 X_t + \lambda_1 X_{t-1} + \lambda_2 X_{t-2} + \lambda_p X_{t-p\ldots} + \mu_t$$

The study followed the ARDL co-integration technique proposed. It is also benefited in investigating the long-run relationship between stock market development and economic growth (Pesaran et al., 1997). An ARDL model representation is as follows:

$$\Delta ln\ RGDP_t = \beta_0 \sum_{i=1}^{q} \beta_{1i}\, \Delta ln\ RGDP_{t-i} + \sum_{i=0}^{q} \beta_{2i}\, \Delta ln\ M_{2t\text{-}i} + \sum_{i=0}^{q} \beta_{3i}\, \Delta ln\ MCN_{t\text{-}i} + \sum_{i=0}^{q} \beta_{4i}\, \Delta ln\ TOV_{t\text{-}i} + \sum_{i=0}^{q} \beta_{5i}\, \Delta ln\ NPX_{t\text{-}i} + \sum_{i=1}^{q} \beta_{1i}\, \Delta ln\ NLC_{t\text{-}i} + \beta_7\, ln\ RGDP_{t-1} + \beta_8\, ln\ M_{2t\text{-}1} + \beta_9\, ln\ MCN_{t-1} + \beta_{10}\, ln\ TOV_{t-1} + \beta_{11}\, ln\ NPX_{t-1} + \beta_{12}\, ln\ NLC_{t-1} + \mu_t$$

Where, Δ is the first difference operator, q is the optimum lag length, β_1 to β_6 are the short-run dynamics of the model, β_7 are β_{12} are long-run elasticity, and μ_t is the error term.

The use of the bound testing technique is based on three validations like - ARDL model is used for the estimation of level relationships as once the order of the ARDL has been recognized; the bounds test allows a mixture of I (1) and I (0) variables as repressors i.e. the order of integration of appropriate variables may not necessarily be the same; ARDL model is more robust and performs better for small sizes than other co-integration techniques (Pesaran et al., 2001).

The general hypothesis for co-integration can be stated as:
H_0 = There is no co-integrating relationship
H_1= There is a co-integration relationship.

The ARDL-bound test is further processed as:

$$\Delta ln\ RGDP_t = \beta_0 \sum_{i=1}^{q} \beta_{1i}\, \Delta ln\ RGDP_{t-i} + \sum_{i=0}^{q} \beta_{2i}\, \Delta ln\ M2_{t-i} + \sum_{i=0}^{q} \beta_{3i}\, \Delta ln\ MCN_{t-I} + \sum_{i=0}^{q} \beta_{4i}\, \Delta ln\ TOV_{t-i} + \sum_{i=0}^{q} \beta_{5i}\, \Delta ln\ NPX_{t-i} + \sum_{i=0}^{q} \beta_{6i}\, \Delta ln\ NLC_{t-i} + \beta_7\, ln\ RGDP_{t-1} + \beta_8\, ln\ M2_{t-1} + \beta_9\, ln\ MCN_{t-1} + \beta_{10}\, ln\ TOV_{t-1} + \beta_{11}\, ln\ NPX_{t-1} + \beta_{12}\, ln\ NLC_{t-1} + \mu_t$$

Where, Δ is the first difference operator, q is the optimum lag length, $_1$ to β_6 are the short-run dynamics of the model, β_7 to β_{12} are the long-run elasticities, and μ_t is the error term. As per the results of the bound test, if the value of calculated F - statistics is greater than the upper bound I (1), the null-hypothesis is to be rejected. If the calculated value of F-statistics is greater than the upper bound, there exists co-integration, and the study further proceeds for the error correction version of the above equation.

$$\Delta ln\ RGDP_t = {}_0 \sum_{i=1}^{q_1} \beta_{1i}\, \Delta ln\ RDGP_{t-i} + \sum_{i=0}^{q_2} \beta_{2i}\, \Delta ln\ M2_{t-i} + \sum_{i=0}^{q_3} \beta_{3i}\, \Delta ln\ MCNr_{t-i} + \sum_{i=0}^{q_4} \beta_{4i}\, \Delta ln\ TOV_{t-i} + \sum_{i=0}^{q_5} \beta_{5i}\, \Delta ln\ NPX_{t-i} + \sum_{i=0}^{q_6} \beta_{6i}\, \Delta ln\ NLC_{t-i} + \lambda Ec_{t-i} + \mu_t$$

Where, q_1 to q_6 are the optimal lag length, and λ is the speed of adjustment parameter. Ec represents the error correction term derived from the long-run relationship from the above equation.

Variables Description

a) Real Gross Domestic Product (RGDP): GDP is the total market value of all final goods and services produced in an economy during a given fiscal year. Real GDP is the inflation-adjusted measures of total GDP of the economy in

a given year. The real GDP is used as the proxy variable for economic growth which is the dependent variable of the model.

b) **Broad Money Supply (M_2 = C + DD + TD):** Broad money supply is the sum of currency (C) held by people, demand deposits (DD) and time deposits (TD) of public with the banking institutions in an economy at a point of time. Hence, M_2 is taken as the indirect indicator of stock market development since this inversely affects interest rate. Therefore, it is taken as the first independent variable in the study.

c) **Market capitalization (MCN):** Market capitalization (market cap) is the aggregate monetary value of all the outstanding stocks of all listed companies. It is calculated by multiplying the total number of outstanding stock by the present stock price of each listed companies. It measures the size of the stock market. The size of stock market positively contributes to the economic growth in the economy. It is the second independent variable of the study.

d) **Stock Turnover Value (TOV):** Share turnover is a measure of liquidity that signifies the relatively easily find a buyer or seller to convert a stock into cash by investors. Share turnover is calculated by dividing the total number of shares traded over a particular period by the number of shares outstanding during that period. A high stock turnover value implies low transaction costs in the stock market that is easier for investors to buy or sell the stocks. It is the third independent variable of the study.

e) **NEPSE Index (NPX):** Stock index is termed as the barometer which is used to measure the stock market performance in the economy. NEPSE index shows the overall performance of the Nepalese stock market. NEPSE index is calculated by dividing the current market capitalization by base year market capitalization and then multiplying by 100. It is the fourth independent variable of the study.

f) **No. of Listed Companies in NEPSE (NLC):** The number of listed companies denotes the total number of companies of different sectors listed in the Nepal Stock Exchange Ltd for the secondary trading of the stock. The increasing trend of listed company shows the development trend of stock market and more participants of the investors in the market. It is the list independent variable of the study.

Results and Discussion

Descriptive Statistics

Descriptive statistics describes and helps to understand the nature and characteristics of variables, distributions, interpretation, and behavior of data series used in the study through the measurement of 'Central Tendency' and 'Dispersion' etc. in a given set of data. The given descriptive statistics are based

on the 27 observations of given variables as shown in the given table 2.

Table 2: Descriptive Statistics

Variables	RGDP	M_2	MCN	TOV	NPX	NLC
Mean	1301.63	66964.28	50679.33	3764.30	610.29	152.96
Median	1209.51	35821.37	18360.13	666.53	386.83	135.00
Maximum	2109.26	259170.2	189013.00	20502.00	1718.15	233.00
Minimum	742.67	6977.70	1229.50	2026.00	163.35	66.00
Standard Dev.	410.39	68935.40	65084.57	5953.34	476.43	55.80
Skewness	0.5699	1.4753	1.1487	1.5707	0.9561	0.1703
Kurtosis	2.1159	4.1700	2.7918	4.1460	2.6170	1.4953
Jarque-Bera	1.8731	11.3389	5.9862	12.5793	4.2785	2.6777
Probability	0.3920	0.0035	0.0501	0.0019	0.1177	0.2622
Sum	35144.02	1808036	1368342	101636.0	16477.75	4130.00
Sum Sq. Dev.	4378880.00	1.24E+11	1.10E+11	9.21E+08	5901587.00	80960.96
Observations	**27**	**27**	**27**	**27**	**27**	**27**

Sources: Authors' calculation using E-views 12 version.

The table 2 shows that the highest value of mean, median, and standard deviation is of M_2 whereas the lowest value of them is of NLC in NEPSE. Similarly, the range of variation between maximum and minimum is also reasonable for all variables. The variables of RGDP and NPX are positive skewed as there value lies in between 0.5 to 1. As the value is gather than one, the variables of M_2, MCN, and TOV are extremely skewed. But, the variable NLC is having nearly symmetrical as the value lies in between - 0.5 & 0.5. Similarly, the distribution of all variables used in the study is 'Leptokurtik' as the kurtosis value of all given variables is greater than unit. Again, The Jarque - Bera's value for all variables is significant at a 5 percent level of confidence that shows normal distribution in the given set of time series data. Hence, the descriptive statistics of the variables confirms the normality of the distribution in the given set of time series data.

Unit Root Test

The given time series data might be non-stationary or stationary. It is generally believed that non-stationary time series data leads to spurious regression which will distort the results. It does not tend to revert to its long-run average value (Dimitrios, 2006). If a time series is non-stationary, it is said to have a unit root. Its mean, variance, and covariance also change over time. So, in econometric estimations, the given time series data for all variables used in the study must be stationary and integrated in the same order. Thus, stationary time series data is examined by conducting a unit root test (Shrestha & Bhatta, 2017). The following ADF test is considered to confirm the stationary of the series.

$$\Delta y_t = \alpha + \delta t + p\, y_{t-1} + \sum_{i=1}^{m} \lambda y_{t=i} + \varepsilon_t$$

Where, ε_t is the error term and $\Delta y_{t-1} = (y_{t-1} - y_{t-2})$ and so on.

Table 3: Results of Unit Root Test

Variables	At levels		At first difference		Remarks
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	I (1)
ln RGDP	0.99	0.09	0.004	0.0023	I (1)
ln M_2	0.33	0.88	0.0006	0.0014	I (1)
ln MCN	0.90	0.04	0.0151	0.0066	I (1)
ln TOV	0.79	0.02	0.0000	0.0001	I (1)
ln NPX	0.82	0.00	0.0149	0.0241	I (1)
ln NLC	0.21	0.81	0.0030	0.0107	I (1)

Source: Authors' calculation

Table 3 shows that the data set are stationary at first difference. When the data are of the first order of integration, the study can proceed for the co-integrate ratio test, co-integration bound test, and, after that Auto Regressive Distributive Lag (ARDL) model for further processing.

Co-integration Test

The co-integration test shows the correlation and test of long-run association between the variables. When the data are of I (0) and I (1), the study can apply the ARDL bound testing model in that situation. The existence of co-integration among the variables under study can be confirmed from the bound testing.

Table 4: Results of Bound Test

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistics	**Value**	**Significant**	**I (0)**	**I (1)**
			Asymptotic: n = 1000	
F - Statistics	45.0518	10 %	2.08	3
k	5	5 %	2.39	3.38
-	-	2.5 %	2.7	3.73
-	-	1 %	3.06	4.15

Source: Authors' calculation.

The data used in the study are of order one (I) i.e., they became stationary after at first differentiation. When the data are of I(0) and I(1), in that situation, the study can apply ARDL bound testing model. The existence of co-integration among the variables under study can be confirmed from the bound testing. The decision criteria is given as - If the calculated value of F - statistics is greater than the upper bound of the critical values, it can be confirmed that there exists a co-integration; if the calculated value of F - statistics is less than the lower bound of the critical values, then the study concludes that there is no co-integration among the variables; finally, if the calculated value of the F - statistics lies between the upper and lower bound of the critical values, then it can be concluded that it is inconclusive in determining co-integration (Pesaran et al., 2001).

After confirming a long-run co-integration relationship between the stock market development and economic growth, the long-run estimations have been carried out. The following table 5 shows the test results.

Table 5: Long-run Estimation

Dependent Variable: ln RGDP				
Repressors	**Coefficients**	**Standard Error**	**t-ratio**	**p-value**
C	1.7643	1.1511	1.1387	0.0014
ln M_2	0.1012	0.0512	1.9779	0.0714
ln MCN	0.1299	0.1063	1.2220	0.0245
ln TOV	- 0.0378	0.0755	- 0.5007	0.6256
ln NPX	0.0729	0.1422	0.5122	0.0612
ln NLC	0.6612	0.2832	2.6643	0.0378

Source: Author's calculation.

The results of the long run and short co-integrating relationship among the variables in the ARDL model are reported below respectively. The table 5 indicates that variables of broad money supply (M_2), market capitalization (MCN), and no. of listed companies (NLC) have positive coefficients value within the acceptable level of significance whereas turnover ratio (TOV) has a negative coefficient value with an insignificant p-value. Similarly, NEPSE index (NPX) has a coefficient value of 0.072 at a significant level of 10 percent. The positive coefficient values with an acceptable level of significance indicate that proxies of the stock market development will support accelerating economic growth in Nepal, i. e, major stock market indicators have positively supported economic growth. The results are also similar with Ake (2010); Regmi (2012); Bista (2017).

Table 6: Short-run Estimation of the Model (2, 2, 1, 0, 2, 0)

Dependent Variable: ln RGDP				
Variables	**Coefficients**	**Standard Error**	**t-statistics**	**p-value**
D (ln RGDP (-1)	0.0394	0.1334	-7.7897	0.0000
D (ln M_2)	0.0642	0.0063	-10.1835	0.0000
D (ln M_{2-1})	- 0.0424	0.0052	-8.0147	0.0000
D (ln TOV)	0.0010	0.0029	0.3672	0.7199
D (NPX)	0.0375	0.0087	-4.3149	0.0010
D (NPX(-1)	0.0501	0.0071	6.9956	0.0000
Co-int Eq (-1)	- 0.1954	0.0137	-14.18605	0.0000
R - squared = 0.8672		Adj. R - squared = 0.8229		N = 27

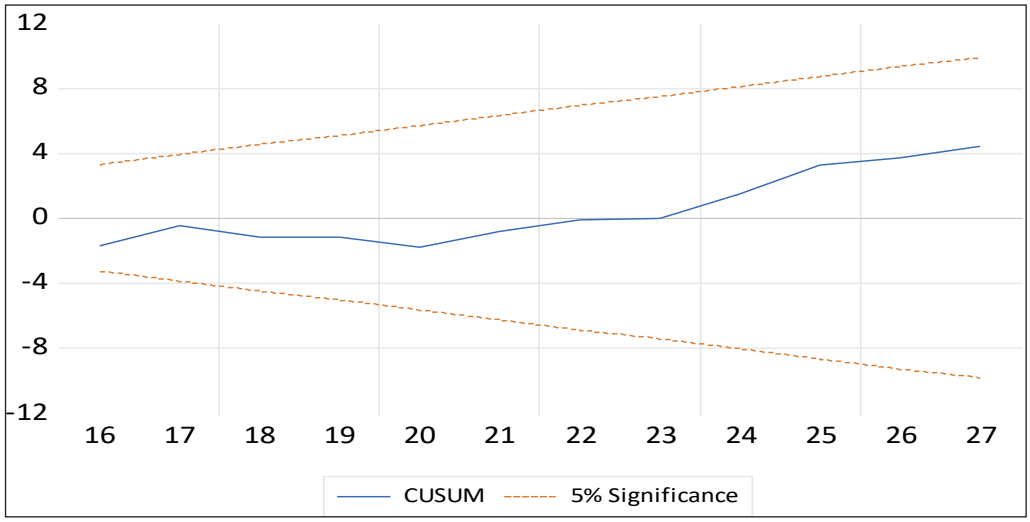
Source: Author's calculation.

The short-run ARDL estimation is significant at 6 indicates and the co-integration at 1 percent level of significance with the correct negative sign. It is observed from Table 6 that all stock market indicators have a positive impact on economic growth except the one year lag of M_2 which is found negative. The short-term long-run adjustment is by 19.54 percent back from the short-term disequilibrium. It can be concluded from the results that there exists a positive relationship between stock market development and economic growth in the long run.

Stability Test

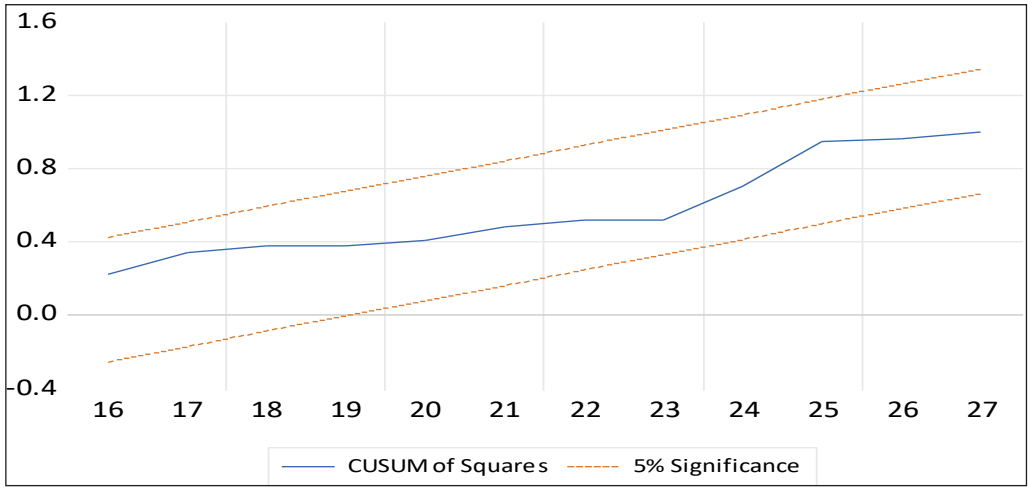
In time series data analysis, the coefficient of independent variables will vary in course of time. So, as developed by E. S. Page of the University of Cambridge, CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMQ (Cumulative Sum of Recursive Residuals of Square) are typically used for monitoring change detection in a multiple linear regression model. CUSUM and CUSUMSQ are based on accumulated residuals and aggregate residual squares respectively. CUSUM test is used the stability of coefficients (β_n) whereas the CUSUMQ) test is used to check the stability of the model itself. The CUSUM test detects systematic modifications in regression coefficients, whereas the CUSUMS test detects drastic changes in the permanence of the regression coefficients. The results of the CUSUM and CUSUMQ is presented in Figures 1 and Figure 2 respectively.

Figure 1: Cumulative Sum of Recursive Residuals (CUSUM) Test



Source: Author's Calculation.

Figure 2: Cumulative Sum of Square of Recursive Residuals (CUSUMQ) Test



Source: Author's Calculation.

It is found that in Figures 1 and 2, both of the plots are within the 5 percent of significance line, thus, the coefficients of the Error Correction Models are stable and the null hypothesis cannot be rejected. It implies that the model of the study is robust and stable as both lines of the short-run and long-run coefficients are acceptable over the study period of 27 years from 1993 to 2020. The diagnostic tests confirm that the models have the desired econometric properties.

Conclusion

It can be claimed that stock market development contributes to channelize resources efficiently and have a positive impact on economic growth in the long run. It argues that the pivotal role of stock market development on economic growth cannot be underestimated. Most of the review of literature exhibit a positive and strong relationship between stock market development and economic growth. Market capitalization, stock market turnover, and the NEPSE index are the major stock market development indicators that have a significant and positive relationship with RGDP. There is a positive and strong relationship between the market capitalization ratio and real GDP growth rate, NEPSE index, and RGDP and suggesting a supportive role on economic growth in the long-term as well as in the short run. From the empirical investigation, the result revealed that stock market development has a positive role in economic growth in Nepal in the short run as well as in long run. The study confirmed that stock market development can support economic growth in Nepal. The study suggest that some other influencing variables in stock market development can be used for further research as the study used only few indicators of stock market development.

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Appendix I: Glimpse of the Nepalese Stock Market for Last Five - year

S. N.	Participants in Nepalese Stock Market	15th July, 2017	15th July, 2018	15th July, 2019	15th July, 2020	15th July, 2021
1	SEBoN as a Regulatory Body	1				
2	Nepal Stock Exchange Ltd.	1				
3	Central Depository Service and Clearing Limited (CDSC)	1				
4	Stock Brokers	50	50	50	50	50
5	Merchant Banker	25	30	32	30	30
6	Stock Dealer	-	-	-	1	1
7	Credit Rating Agency	2	2	2	2	3
8	Mutual Funds	9	11	14	14	14
9	Depository Participants	70	72	76	79	81
10	ASBA Members	65	53	59	52	49
11	Qualified Institutional Investors (QII)	N/A	N/A	N/A-	88	111
12	No. Listed Companies in NEPSE	196	215	212	219	234
13	No. of Dematerialized Accounts	875047	1296569	1571600	1754034	3791457
14	No. of MERO Share Accounts	N/A	N/A	564100	742049	2853837

Source: www.nrb.org; www.sebon.gov.np

Appendix II: Group-wise Listed Companies in NEPSE

S. N.	Sectors Composition of Listed Companies	Group-wise Listed Companies in NEPSE	Percent
1	Commercial Bank	26	11.11
2	Development Bank	16	6.55
3	Finance Company	20	8.55
4	Micro-Finance Company	54	23.08
5	Life-Insurance Company	12	5.13
6	Non-life insurance company	18	7.69
7	Production and Processing	19	8.12
8	Hotel and Tourism	5	2.14
9	Trading company	4	1.71
10	Hydropower Company	51	21.79
11	Investment	6	2.59
12	Ohers	3	1.28
	Total	234	100

Source: www.sebon.gov.np

Appendix III: Data Related to the Variables Used in the Study

Years	Real Gross Domestic Product	Broad Money Supply	Market Capitalization (Rs. in million)	Stock Turnover Value	NEPSE Index	No. of Listed Companies
1994	742.7	6977.70	1387.20	44.16	226.00	66
1995	**762.4**	**8098.50**	**1296.30**	**105.43**	**195.50**	**79**
1996	804.8	9265.20	1229.50	21.56	185.60	89
1997	845.8	12646.3	1269.80	41.62	176.31	95
1998	872.9	15280.00	1428.90	20.26	163.35	101
1999	912.0	18612.10	2350.80	150.00	216.92	107
2000	**966.8**	**21445.40**	**4312.33**	**115.70**	**360.70**	**110**
2001	1013.0	22398.80	4634.94	234.42	348.43	115
2002	1014.6	24591.10	3470.40	154.06	227.54	96
2003	1052.8	27730.60	3524.04	57.60	204.86	108
2004	1099.3	30044.00	4142.50	214.43	222.04	114
2005	**1134.8**	**34682.40**	**6136.59**	**450.77**	**286.70**	**125**
2006	1177.1	39551.80	9676.37	345.14	386.83	135
2007	1209.5	49537.70	18360.13	836.01	683.95	135
2008	1279.6	63052.10	36624.76	2282.08	963.40	142
2009	1329.6	71959.90	51293.91	2168.11	749.10	159
2010	**1386.2**	**78381.40**	**37687.14**	**1185.11**	**477.73**	**176**
2011	1439.5	92132.10	32348.43	666.53	362.85	207
2012	1507.2	113030.20	36826.21	1027.28	389.74	216
2013	1553.5	131537.60	51449.21	2204.89	518.33	230
2014	1642.7	156596.70	105716.58	7729.86	1036.11	232
2015	**1700.4**	**187780.10**	**98940.04**	**6533.16**	**961.23**	**233**
2016	1700.4	224457.90	189013.00	16395.77	1718.15	229
2017	1846.5	259170.20	185683.00	20502.00	1582.67	196
2018	1982.7	30944.66	143513.77	12139.10	1212.36	215
2019	2109.3	35821.37	156749.39	11007.49	1259.01	212
2020	**2058.1**	**42309.69**	**179276.67**	**15003.45**	**1362.35**	**219**

Source: www.nrb.org ; www.sebon.gov.np