ECONOMIC GROWTH, FINANCIAL DEVELOPMENT AND STOCK MARKET: SECTORAL EVIDENCE FROM INDIA

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ABSTRACT

The study undertaken aims to investigate the effect of financial development and sector-specific stock market indices on the respective sector's growth for the Indian economy and uses quarterly time-series data ranging from 2005-06: Q1 to 2019-20: Q4. The study applies Autoregressive Distributed Lag (ARDL) bounds test, concluding the existence of a long-run co-integrating relationship between sector-specific GDP with stock market indices and financial development in India. The granger causality tests conclude the existence of a bi-directional causality running between financial development and sector-specific economic growth. The study found that there exists a two-way causality between sectoral stock market development and sector-specific economic growth only in the services sector while only a unidirectional causality runs from stock market growth to GDP growth in the manufacturing sector, and there exists no causality in the utility sector.

Keywords: Financial development, stock market, Autoregressive distributed lag (ARDL) bounds test, Granger causality, economic growth.

INTRODUCTION

Investment is considered to be the major factor that plays an important role in the determination of growth in output and income as per economic theory. A robust financial institution in the economy ensures mobilization of savings to investment through the working of banking, and the capital markets. Both these components are equally important in channelizing the funds from households to business and bringing about growth in investment which ultimately results in the growth of economies across the world.

LITERATURE REVIEW

Earlier studies found a positive long-run causal relationship exists between the financial sector development and growth in the economy [Goldsmith (1969); Levine, (1993, 1997); Beck et al. (2000); Demirguc-Kunt (2006); Khatun, 2016]. However, some studies also showed a negative or no long-term relationship between financial development and growth in the economy. [Patrick, 1966; Lucas, 1988; Singh, 1997; Andersen and Tarp, 2003], while some others provided a less uniform conclusion [Demetriades, 1996; Samargandi et al. 2015].

While investigating the long-run causal relationship between the stock market and economic growth, studies have found that a sound and liquid stock market enables efficient capital allocation, facilitates the exchange of goods and services, mobilizes domestic savings, and reduces the risk through diversification [Pagano, 1993; Korajczyk (1996); Levine and Zervos, 1998]. In India such studies have been conducted by Kamat and Kamat, 2007; Pradhan, 2007; Agrawalla and Tuteja, 2007; Acharya et al.,2009. These studies analyzed the relation between either stock market or financial development and growth of the economy. Therefore, to encompass the impact of both the variables, this study analyzes the impact of growth in the stock market and financial development on economic growth through a sectoral analysis.

DATA AND METHODOLOGY

The study covers quarterly data from 2005-06: Q1 to 2019-20: Q4 to examine the relationship between sector-specific economic growth, sectoral stock market development, and financial development in India. The data have been compiled from Handbook of Statistics on Indian Economy, World Bank database, the official website of National Stock Exchange (NSE, India) and Bombay Stock Exchange (BSE, India).

Three sector-specific models are estimated to investigate the impact of respective sector-specific indices and financial development on sector-specific GDP. The sector-specific GDP is used as a proxy variable for sectoral economic growth taken as a dependent variable in the three models: (i) GDP of the manufacturing sector (GDPM), (ii) GDP of electricity, gas, and water sector (GDPEGW) and (iii) GDP of the service sector (GDPS).

The study uses the stock market indices for these three sectors, namely, NIFTY India manufacturing index (INDXM); BSE Utilities index (INDXEGW); and NIFTY Services Sector index (INDXS), to analyze the impact of sectoral stock market indices on sector-specific economic growth. The broad money supply measure M2 published by the Reserve Bank of India has been taken as the proxy for financial development (FD) in the economy.

The models include the World bank energy prices index (ENRGI), Real exchange rate (REER), T-bill rates (TBR), and wholesale price index (WPI) as control variables in the study. All the variables are taken in their natural logarithm. The models are specified as follows:

Model I: LGDPM= f[LINDXM,LFD,LENRGI,LREER,LTBR,LWPI]

Model II: LGDPEGW= f[LINDXEGW,LFD,LENRGI,LREER,LTBR,LWPI]

Model III: LGDPS= f[LINDXS,LFD,LENRGI,LREER,LTBR,LWPI]

The study adopts the Autoregressive Distributed Lag (ARDL) approach-based bounds test proposed by Pesaran, Shin, and Smith (2001) to examine the long-run cointegration relationship between sectoral economic growth, stock market indices of respective sectors, and financial development in the economy.

EMPIRICAL ANALYSIS

The results from the Augmented Dickey Fuller (ADF) unit root test used to check for the stationarity of the series used in the analysis. The results reveal that all the variables are stationary at their first differences, that is, I (1) except the stock market index for services which is stationary at level.

Long Run Relationship

To examine the cointegration, the ARDL model given by Pesaran et al. (2001) was employed which is applicable even if few of the series under analysis are stationary at the level and few at the first order of integration. The results of the ARDL bounds test used to examine cointegration have been presented in Table 2. The estimated F-value for all the three models I, II, and III was found to be higher than the upper bounds at a 5 per cent significance level ascertaining the existence of long-run relationships among the variables in all three models. The lower panel of Table 2 exhibits the results of diagnostic tests for all three models and all three models pass these tests.

Table 1: ARDL Bounds Test

Indicators	**Model I**	**Model II**	**Model III**
F-statistics	5.7706*	4.5271*	4.6088*
***Significant at 1%**			
Diagnostic Tests	Model I	Model II	Model III
Serial correlation LM test (F)	0.0842	1.1085	0.0686
Heteroscedasticity test (F)	0.7402	0.1249	0.0502
Ramsey reset test (F)	0.9531	0.8106	1.0137

Source: E-views 12, authors' calculation.

Table 2: Estimated Long term coefficients of ARDL Model

Regressors	**Model I: LGDPM**		**Model II: LGDPEGW**		**Model III: LGDPS**	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
LINDXM	0.179**	2.442	–	–	–	–
LINDXEGW	–	–	-0.316***	4.73	–	–
LINDXS	–	–	–	–	0.372***	3.831
LFD	0.205**	2.068	0.492***	5.784	0.229**	2.545
LENRGI	-0.120***	(-2.948)	0.130***	2.859	-0.087**	(-2.358)
LREER	1.092***	2.784	2.351***	5.322	-0.649	(-1.231)

LTBR	0.101*	1.719	-0.01	(-0.198)	-0.155***	(-3.843)
LWPI	0.502***	2.768	0.195	1.223	0.126	0.687
CONS	0.497	0.616	1.173	1.321	0.218	(–0.795)
Robustness Indicators						
R2		0.994		0.993		0.984
Adjusted R2		0.991		0.987		0.98
F-statistics		310.317		178.421		246.019
D.W. statistic		2.35		2.298		1.289

Source: E-views 12, authors' calculation.
Notes: (i) Figures in parentheses (#) are estimated t-values.
(ii)*, ** and *** indicate significance at 10%, 5% and 1% level, respectively

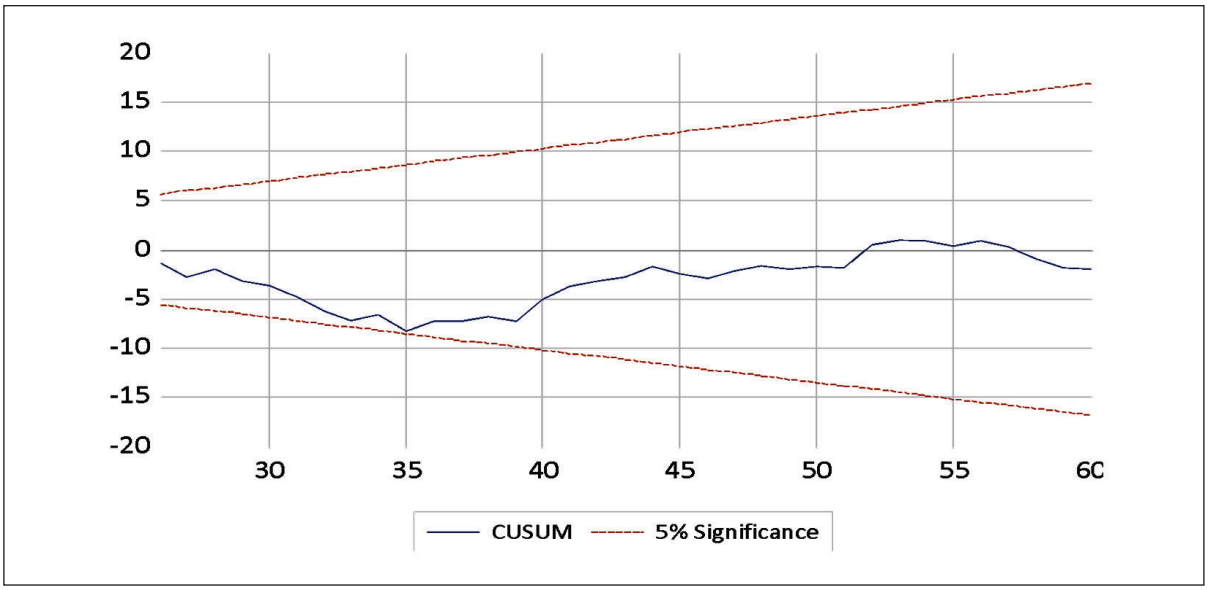
The long-run coefficients estimated from the ARDL models are given in Table 3. The results indicate that the sector-specific stock market development index is positively related to the respective sector's economic growth in all the three sectors namely manufacturing: electricity, gas, and water, and services. Financial development is also found to have a significant long-run relationship with economic growth in all three sectors. This implies that the sector-specific stock market development has a positive influence on that sector's economic growth while financial development in the economy affects all the sectors of the economy positively in terms of leading to the output growth in these sectors. encourages economic growth in that particular sector. All the other control variables are found to have a significant relationship with growth in the manufacturing sector with the energy price index exhibiting a negative relationship. The energy price index and REER are found to have a significant positive relationship with economic growth in the Electricity, Gas, and Water Supply sector while in the case of Services, the interest rates, and energy price index are found to be having a significant effect with energy price index exhibiting a negative relationship.

Stability of Long Run Model

The stability of the long-run model is evaluated by testing the recursive residuals using the cumulative sum and cumulative sum of square tests for all three models. Any systematic changes arising from the coefficients of regression are detected by the Cumulative sum test, while the cumulative sum of square test detects if there are certain sudden changes from the constancy of regression coefficients (Brown, Durbin & Ewans 1975).

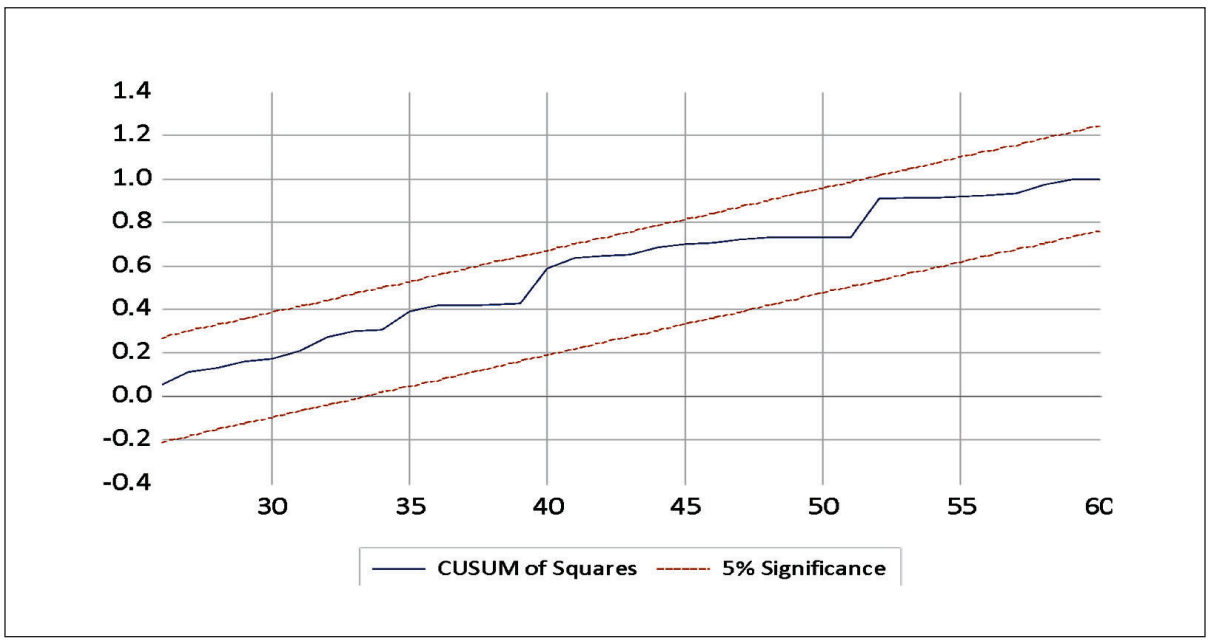
Results of the CUSUM and CUSUMSQ tests indicate that both the statistics lie within the interval bands of 5 per cent confidence interval for all three models. Results suggest that there is no structural instability in the residuals of the equation of the models.

Figure 1a: CUSUM for Manufacturing Sector Model (I)



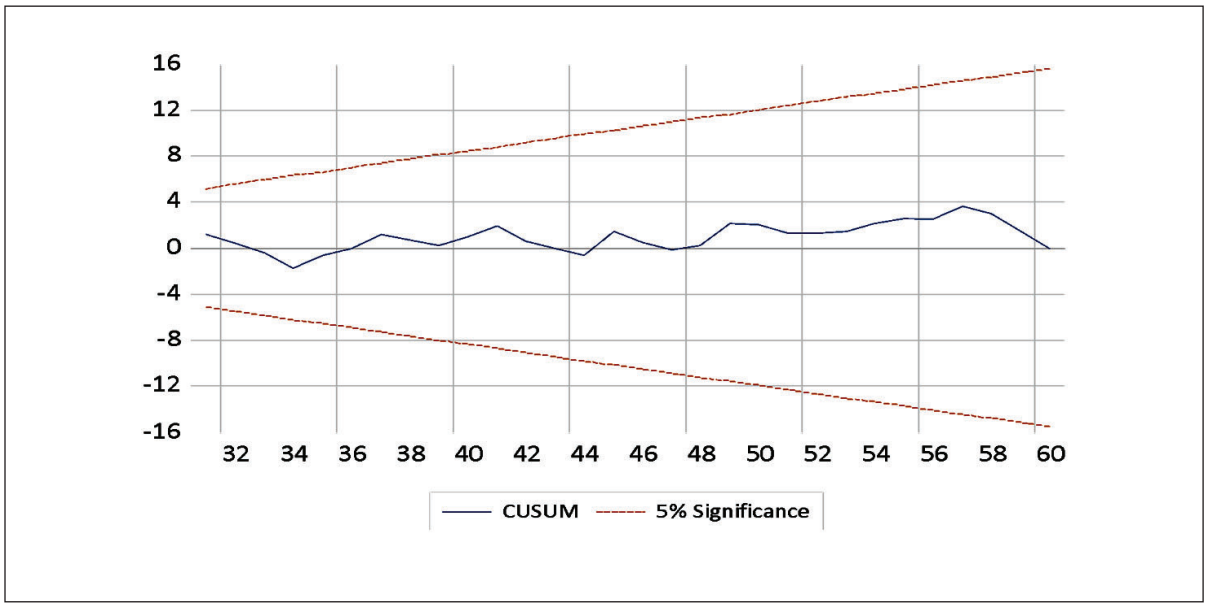
Source: E-views 12, authors' calculation

Figure 1b: CUSUM of Squares for Manufacturing Sector Model (I)



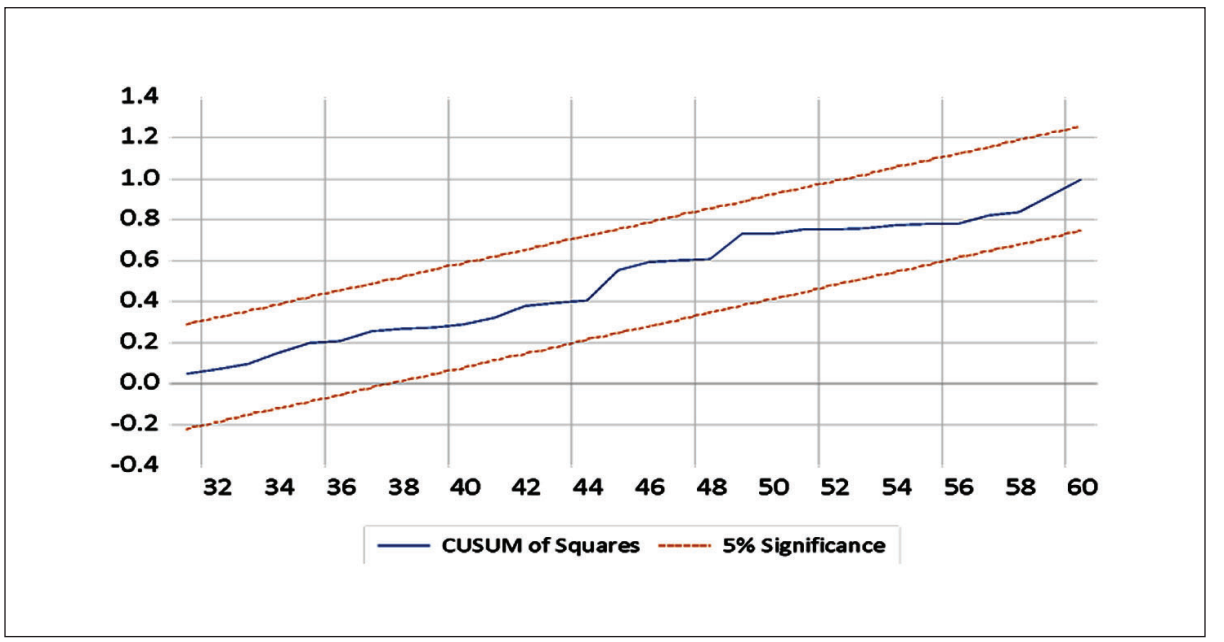
Source: E-views 12, authors' calculation.

Figure 2a: CUSUM for Electricity, Gas & Water Sector Model (II).



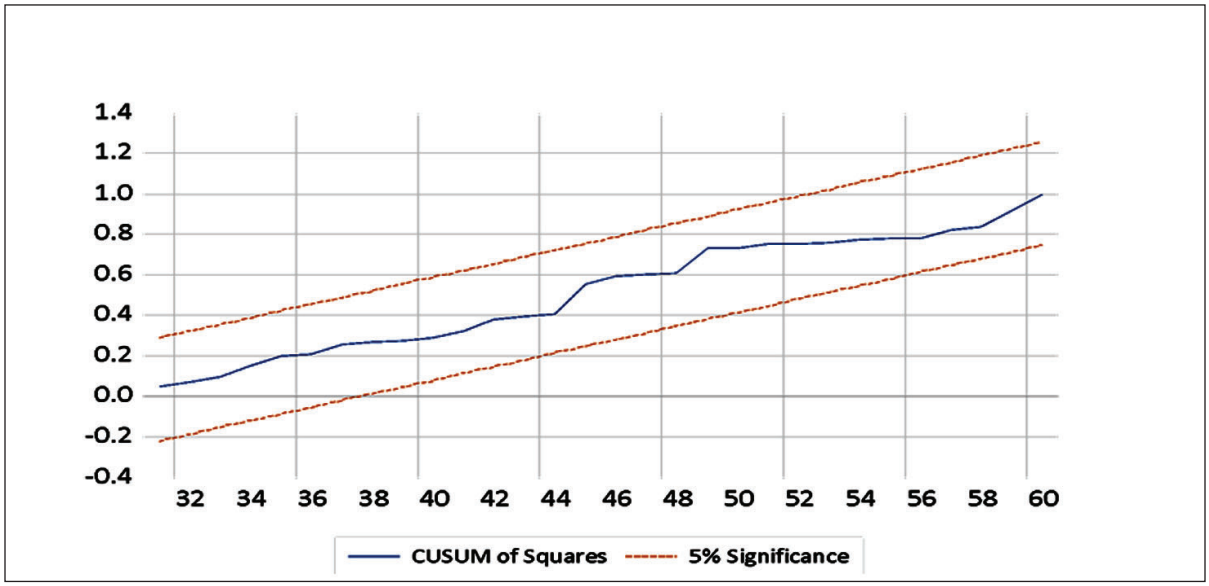
Source: E-views 12, authors' calculation.

Figure 2b: CUSUM of Squares for Electricity, Gas & Water Sector Model (II)



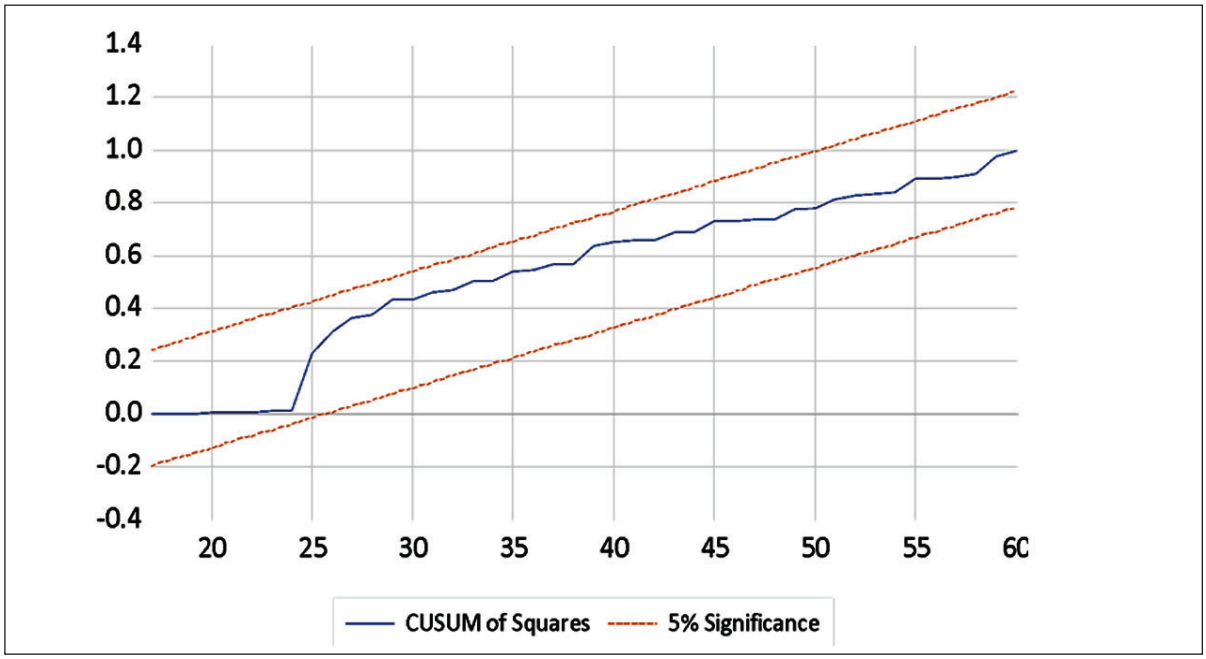
Source: E-views 12, authors' calculation.

Figure 3a: CUSUM for Services Sector Model (III)



Source: E-views 12, authors' calculation.

Figure 3b: CUSUM of Squares for Services Sector Model (III)



Source: E-views 12, authors' calculation

Short Run Relationship

Results of short-run dynamics using the ECM version of ARDL are reported in Table 4. The results show that in the short run, the sector-specific indices of all the three sectors are positively related to the economic growth in the sector but the co-efficient is significant only in the case of the services sector. The ECM of the ARDL approach reveals that the adjustment rate in short-run deviation is high with the ECT (– 1) term being –0.597, –0.751, and –0.499) for models I, II, and III respectively, with all the coefficients being significant at 1 per cent.

Table 3: Estimated Short Run Coefficients

Regressors	Model I: DLGDPM		Model II: DLGDPEGW		Model III: DLGDPS	
	Coefficients	t-value	Coefficient	t-value	Coefficient	t-value
DLINDXM	0.033	-0.931	–	–	–	–
DLINDXEGW	–	–	0.047	-1.092	–	–
DLINDXS	–	–	–	–	0.078*	-1.895
DLFD	0.014	-0.393	-0.025	-0.346	0.039*	-1.955
DLREER	0.406**	-2.132	0.677**	-2.501	0.018	-0.651
DLTBR	0.069**	-2.009	-0.005	-0.125	0.012	-0.537
DLENERGI	-0.061*	-1.759	0.046	-1.025	0.048	-1.017
DLWPI	1.038***	-3.453	–0.446*	-1.905	–0.137	–1.002
CONS	0.477***	-7.761	-5.315***	-5.403	5.034***	-6.118
ECT (-1)	–0.597***	–6.878	–0.751***	–5.443	–0.499***	–6.054

Source: E-views 12, authors' calculation.

Notes: (i) Figures in parentheses (#) are estimated t-values.

(ii) *, ** and *** indicate significance at 10%, 5% and 1% level, respectively.

(iii)D denotes the first difference of the series.

The results of the Granger causality test for the three models are provided in Tables 5(a), 5(b), and 5(c), respectively. The results indicate that there is two-way causality running from the GDP of manufacturing (LGDPM) to Financial Development (LFD) while there is unidirectional causality from sectoral stock market growth to economic growth in the manufacturing sector.

In the case of the electricity, gas, and water sector, again, there is two-way causality running from the GDP of this sector (LGDPEGW) to Financial Development (LFD) while there is no significant causal relationship between sectoral stock market growth to economic growth in electricity, gas, and water sector.

The results of the Services Sector indicate that there is two-way causality running from both sectoral stock market development and financial development in the economy to the economic growth in the services sector (LGDPS) in India.

Table 4(a): Granger Causality Results (Model I)

Sources of Causation							
Dependent Variable	**Independent Variable**						
	LGDPM	LFD	LINDXM	LENRGI	LREER	LTBR	LWPI
LGDPM	–	5.78**	4.49**	1.175	1.26	0.094	3.64*
LFD	4.74**	–	3.38*	0.04	2.05	0.93	2.33
LINDXM	1.51	0.68	–	8.96***	2.13	2.82*	1.46
LENRGI	1.89	2.25	0.88	–	0.01	0.69	3.10*
LREER	3.31**	2.91*	9.56***	5.97**	–	3.34*	2.09
LTBR	0.51	0.65	0.12	1.94	0.64	–	0.28
LWPI	1.007	0.86	0.4	1.56	0.35	0.002	–

Source: E-views 12, authors' calculation.
Notes: *, ** and *** indicate significance at 10%, 5% and 1% level, respectively.

Table 4(b): Granger Causality Results (Model II)

Sources of Causation							
Dependent Variable	**Independent Variable**						
	LGDPEGW	LFD	LINDXEGW	LENRGI	LREER	LTBR	LWPI
LGDPEGW	–	15.46***	0.41	0.16	1.71	0.16	2.78
LFD	8.32***	–	1.02	0.04	2.05	0.93	2.33
LINDXEGW	0. 01	0.06	–	3.01*	0.12	1.81	0.08
LENRGI	2.61	2.25	1.12	–	0.01	0.69	3.10*
LREER	2.44	2.91*	0.46	5.97**	–	3.34*	2.09
LTBR	0.79	0.65	1.81	1.94	0.64	–	0.28
LWPI	0.02	0.86	2.86*	1.56	0.35	0.002	–

Source: E-views 12, authors' calculation.
Notes: *, ** and *** indicate significance at 10%, 5% and 1% level, respectively.

Table 4(c): Granger Causality Results (Model III)

Sources of Causation							
Dependent Variable	**Independent Variable**						
	LGDPS	LFD	LINDXS	LENRGI	LREER	LTBR	LWPI
LGDPS	–	15.67***	11.01***	0.64	0.3	0.16	3.50*

LFD	0.39	–	8.16***	0.04	2.05	0.93	2.33
LINDXS	4.56**	2.98*	–	4.58**	1.63	0.53	2.49
LENRGI	2.17	2.25	1.79	–	0.01	0.69	3.10*
LREER	4.68**	2.91*	7.83***	5.97**	–	3.34*	2.09
LTBR	0.79	0.65	0.11	1.94	0.64	–	0.28
LWPI	0.48	0.86	0.0005	1.56	0.35	0.002	–

Source: E-views 12, authors' calculation.
Notes: *, ** and *** indicate significance at 10%, 5% and 1% level, respectively.

CONCLUSION

With growing diversification in a fast-developing economy like India, it is important to analyze the effects of financial development and sectoral stock market investments on different sectors as the different sectors may respond differently to the investment coming from the different channels. Also, the effect of sectoral growth on the stock prices in that sector can be different for different sectors as the nature of products and business structure vary. This paper aims to investigate the relationship between sector-specific economic growth, sectoral stock market development, and financial development in the country. The ARDL bounds test confirms the existence of a long-run cointegrating relationship between sector-specific GDP with stock market indices and financial development in India in the presence of different macroeconomic control variables related to inflation, interest rates, energy prices, and exchange rate. The long-run ARDL estimates for all the three sectoral models show a positive and significant relationship between sector-specific GDP with respective stock market indices. Further, there is clear evidence that financial development has a positive impact on sector-specific GDP in the long run irrespective of the type of sector. However, the rise in energy prices acts as a hindrance to economic growth in the major sectors of the economy. The estimated long-run results are consistent with the theoretical foundation of the relationships. The short-run estimates support the empirical results of long-run estimates The Granger-causality test results confirm bidirectional Granger causality running from financial development to sector-specific economic growth during the study period for all the models but two-way causality between sectoral stock market development and sector-specific economic growth exists only in the services sector. For the manufacturing sector, the sector-specific stock market growth causes economic growth in the sector, but manufacturing GDP growth does not lead to growth in manufacturing stock market indices. The sectoral stock market development and economic growth do not show any causality with each other for the electricity, gas, and water sector, indicating that growth in this sector is more sensitive to the financial development and international energy prices and exchange rates rather than the domestic stock market in the short run.

The above findings suggest that the long-run economic growth of the different sectors in the

economy is influenced positively by the growth in the respective sector of the stock market. The causality between the two is different for different sectors in the short run which explains the reasons for different sectors of the stock market performing differently in response to growth in incomes of different sectors. The impact of other macroeconomic variables also turns out to be different for separate sectors which implies that policies for specific sectors should be made keeping into consideration the specific characteristics of that sector and then an integrated approach should be adopted to align with the overall economic goals of the country.

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