CHAPTER 5

Role of Financial Development in the Performance of Manufacturing Exports and Trade Balance of India

5.1 Introduction

In this chapter the focus will be on attaining the results of second objective which is to assess the role of financial development in the performance of manufacturing exports and trade balance. Before assessing the role of financial development with manufacturing exports and trade balance it is important to construct financial development index by taking appropriate proxies which can measure the depth of financial development in India. These proxy of financial development are discussed later on in this chapter. After construction of financial development index FDI (Financial development index) relationship of it will be checked with manufacturing exports and trade balance with the help of some important tools and techniques with are mentioned below. Various researchers have utilized the Augmented Dickey Fuller (ADF) test for examination of stationarity in their studies. This study has also applied Augmented Dickey Fuller (ADF) test to check unit root. Johansen Co-integration Test has been used to find out the long-run relationship between the variables. To check the causality and its direction the Granger Causality Test, and at last Vector error correction Model (VECM) have been applied in this study to check the short run association between variables

5.2 Financial Development Index

An index is a statistical aggregate that measures change in the magnitude of a group of related variable to measures the stock market performance or economic performance. Each index has its own calculation methodology and is usually expressed in terms of a change from base value. To understand and measure the degree of financial

development one must consider different factors that together contribute to the degree of depth and efficiency of the provision of financial services.

There is no single argument as to which proxies are most appropriate for measuring financial development of a nation. This justifies the need to construct an index as a single measure that represents the overall development in the financial sector by taking the relevant financial proxies in to account. The study used Broad money as percent of GDP (M3), Bank Credit as percentage of GDP (BC), Market Capitalization as percent of GDP(MC) and Financial Innovation(FIN) ratio as the proxies for financial depth. Using these variables the researcher developed a summary measure for financial depth by applying Principal Component Analysis (PCA). That sufficiently deals with the problems of multi-colinearity and over parameterization as an overall indicator of the level of financial development.

To construct FDI for India below given four indicators have been used as an indicator of financial development which have been widely used in literature (Rousseau and Wachtel, (1998) Xu (2000), Fase and Abma (2003), Rioja and Valve (2004), Rahman (2004), Tahir (2008).

5.2.1 Broad Money (M3) (as % of GDP)

Broad money is the total sum of currency outside banks, demand deposits other than those of the central Government, the time savings and foreign currency deposits of resident sectors other than the central Government, bank and traveler's cheques and other securities such as certificates of deposit and commercial paper.

5.2.2 Market Capitalization (as % of GDP)

Market capitalization is the total value of the tradable shares of a publicly traded company, it is equal to the share price times the number of shares outstanding.

5.2.3 Private Credit by banks and other financial institutions (as % of GDP)

Total bank credit provided by the scheduled commercial bank is taken to represent the credit money circulated in economy during each period.

5.2.4 Financial Innovation Ratio

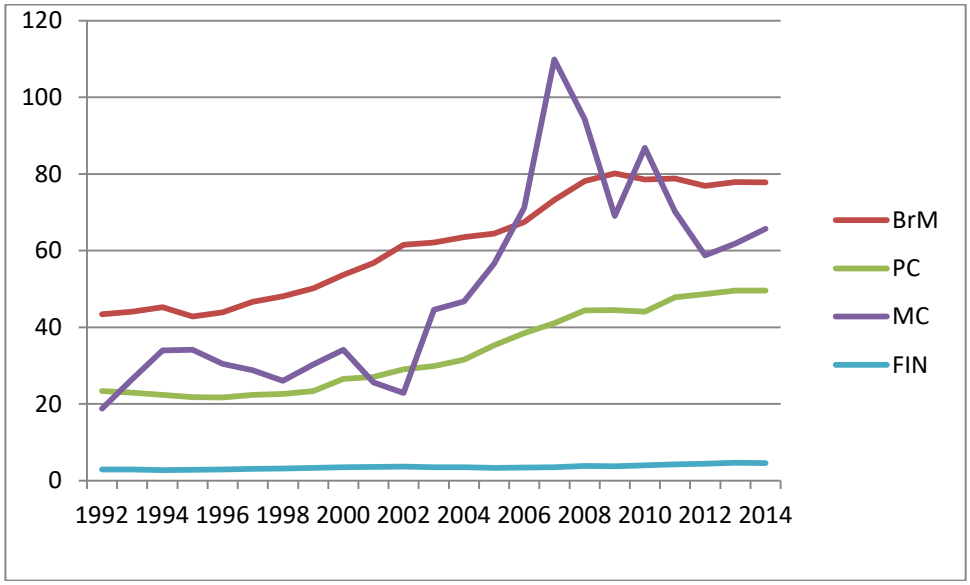
Financial innovation means that the new instruments in the financial services industry like ATM, Debit card, Credit card, Smart cards and Wire transaction. These innovations play significant role in the improvement of an economic efficiency and productivity. Generally broad money (M3) to narrow money (M1) ratio is taken to represent financial innovation ratio. The motivation for using this measure is that as financial innovations grow, individuals tend to move away from more liquid assets, which are reflected in M1, to less liquid assets, which are reflected in M3. The ATMs concentration, bank concentration and private sector credit as a percent of GDP can also be used as alternative proxies for measuring financial innovation.

Table No. 5.1: Indicators of Financial Development of Index

Year	Broad Money(%GDP)	Private credit by money banks and other financial institutions (% GDP)	Market capitalization(% GDP)	Financial innovation ratio
1992	43.38361	23.36136	18.78431	2.93405
1993	44.10991	22.95706	26.4775	2.85906
1994	45.2283	22.38643	33.95459	2.74422
1995	42.79482	21.808	34.12785	2.78908
1996	43.91923	21.65723	30.41661	2.89264
1997	46.64202	22.38486	28.74497	3.06646
1998	48.05851	22.63066	25.99536	3.17393
1999	50.18484	23.36055	30.25666	3.28902
2000	53.70334	26.56207	34.15482	3.46096

2001	56.74395	26.99236	25.61342	3.54364
2002	61.5403	29.01546	22.89353	3.62772
2003	62.09038	29.88384	44.55021	3.46583
2004	63.52173	31.50079	46.78001	3.45609
2005	64.46119	35.26139	56.57688	3.29081
2006	67.42788	38.44168	71.24072	3.41973
2007	73.22305	41.02541	109.8937	3.47622
2008	78.15405	44.37484	94.24033	3.80637
2009	80.14973	44.52106	69.02351	3.76205
2010	78.5734	44.05978	86.85786	3.96993
2011	78.83992	47.79597	70.23557	4.25052
2012	76.85653	48.70382	58.73553	4.42145
2013	77.91	49.61748	61.89569	4.62062
2014	77.77307	49.61802	65.70387	4.60223
Source- World Bank				

Figure No. 5.1: Trend of variables used for FDI.



Source- Author's Computation with MS- Excel 2007.

The above Table and figure shows the trend of all four variables (Broad money M3, Private credit by banks and other financial institutions, Market capitalization and financial innovation) which we have selected for the purpose of financial development index. When we look at the chart it is clearly visible that all the variables have increasing trend with some fluctuations in between.

Firstly, **Broad money** is denoted as BrM and here it is taken as the percentage share of Broad money in GDP. The percentage of broad money has increased since 1992 to 2014. It was around 43.4% in 1992 and in 2014 it touched 77.8%. Some of the major reasons for this increase has been identified are Increased government expenditure over a period of time, Conversion of foreign currency inflows through FDI and ECBs, Increased deposits with banking system as these constitute around 85% of M3, Improved performance of many sectors .

Secondly, **private credit by banks and other financial institutions** is denoted by PC. Private credit too has taken in the form of percent of GDP. It too has increased from 23.36% in 1992 to 49.61% in a smooth way. Reforms of 1992 have played a

very key role in addition of private credit by banks and other financial institutions as these reforms has helped in increased money supply due to many factors which have been mentioned above. Financial inclusion policy with simplified banking procedure has increased the banking and other investment deposits which has ultimately resulted in diversification of these deposits towards the private credit to industries and other entities. Basically private credit by banks and other financial institutions shows the lending ability of financial institutions of a nation. Higher lending ability of financial institutions and banks represents the better condition of financial institutions and banks and vice- versa.

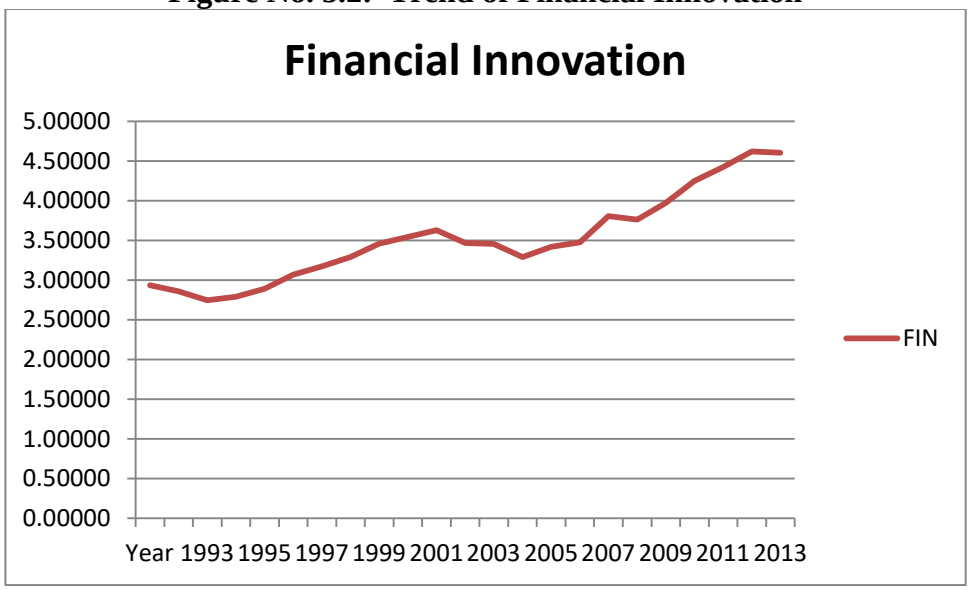
Thirdly, **market capitalization** is denoted by MC in chart and it is too taken in the form of percent of GDP. It has increased from 18.78% to around 65% basically these sector has tremendous growth and has gained most out of 1992 reforms but if we look chart closely then it is also visible that growth of market capitalization was not a smooth one during this period in 1998 it came down to 25% from 30% in 1996 and again in 2002 it touched low of 22.89%. After this low it soared to 109.9 in 2007 but after this it again came down which was 65.70% in 2014. Some of the major positive reasons for this market capitalization increase are increased resource mobilization by firms which was supported by FIIs and mutual funds from supply side, Surge in crude oil prices, Mergers and acquisition, Increased financial literacy among investors, simplification of trading and settlement procedure in stock market which has helped market capitalization to grow but there are many other reasons which have impacted the growth of market negatively. Some of them are U.S sub-prime mortgage, Inflation, high oil prices, slowdown of world economy and depression of U.S dollar.

Fourthly, **financial innovation** is denoted as FIN in chart and it is calculated as M3/M1. Financial innovation too has increased in a smooth way and reforms have

played a very key role in development of financial innovation. Few of the reasons for this increased innovation from 2.93 in 1992 to 4.6 in 2014 are globalization of economy, more sophisticated technology, due to changes in procedure of taxes and policy, market imperfections, search of transaction reduction method.

Below given graph is the graph explaining financial innovation individually which is same included in above graph where its performance was not visible clearly as the size of financial innovation was too low as compared to other variables included in above graph. Values of financial innovation lies between 3 to 4.5 which means that it does not have any high changes over the study period and the reasons for the same have been already discussed.

Figure No. 5.2: Trend of Financial Innovation



Source: Author's Computation with MS-Excel 2007.

5.3 Methodology Adopted to construct Financial Development Index (FDI)

- For the purpose of FDI yearly data is taken for a period of 23 years from 1992-2014.
- bank credit as percentage of GDP, market capitalization of listed companies as percentage of GDP Broad money as percentage of GDP, bank credit as

percentage of GDP, Financial Innovation ratio (Broad money to narrow money) are considered for constructing the Financial Development Index for India(FDII).

- To calculate the weights of each variable for construction of FDI Principal Component analysis (PCA) is used.
- Variable is multiplied with corresponding weights which are calculated through principal Component analysis Sum up the results of the multiplied variable and divided by the total weight of principal components.
- The obtained figure is the financial development index (FDI) to represent financial Development.

Component Score Coefficient Matrix

	Component
	1
VAR00002	.283
VAR00003	.285
VAR00004	.242
VAR00005	.267

Extraction Method: Principal Component Analysis.

Component Scores.

Source: Authors computation with SPSS software

Above table shows the weights of different – different variables used for construction of financial development index. In the above table weight first variable has 28.3 weight, second has 28.5% which is also highest among all other variables, third variable has 24.2% and the third one has 26.7%. Aggregate of these weights is approx. 107 and this will be converted to 100 and on the scale of 100 the above

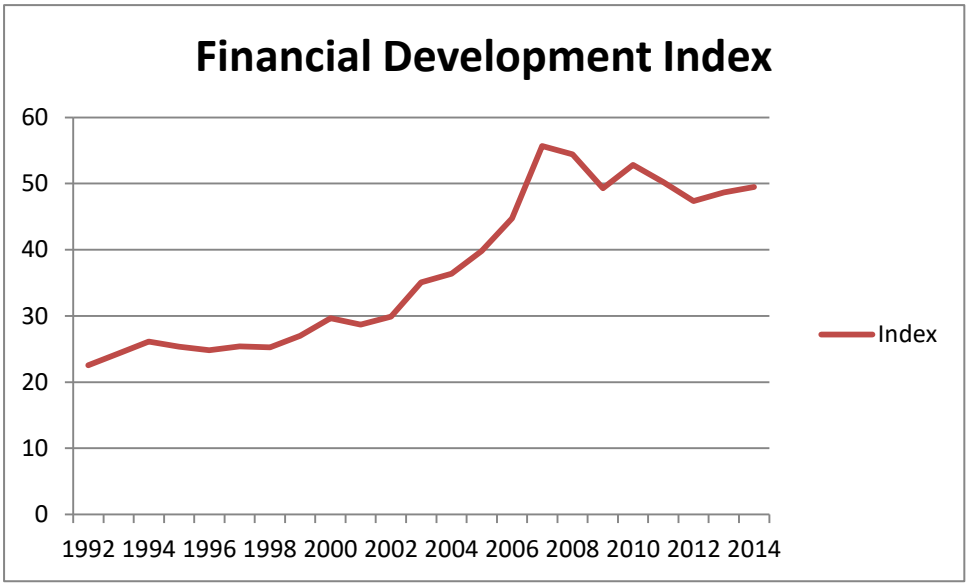
weights will be converted on the scale of 100 which will be final weights considered for the construction of index.

Table -5.2: Financial Development Index

Year	Index
1992	22.52836
1993	24.32301
1994	26.11821
1995	25.37595
1996	24.82282
1997	25.39794
1998	25.24362
1999	26.9818
2000	29.67217
2001	28.68518
2002	29.8899
2003	35.09247
2004	36.39518
2005	39.79839
2006	44.74764
2007	55.65688
2008	54.40148
2009	49.2847
2010	52.80924
2011	50.20072
2012	47.37707

2013	48.65535
2014	49.47103

Figure No. 5.3: Financial Development Index



Source: Authors computation with MS-Excel 2007.

Above given figure 4.5 is Financial Development Index figure which is calculated with the help of four variables used for financial development. Financial development has an increasing trend from 1992 to 2014 whose values lies between 22.52 to 49.47.Values going towards 100 shows that financial development is improving over time. In case of India financial development was increasing smoothly but due to fall in market capitalization decline 2007 onwards financial development too has shown fluctuating trend of decreasing first then increasing again followed by falling again.

5.4 Relationship between Financial Development and Manufacturing Exports

As financial development index has been constructed with the help of proxies of financial development next step is to check the relationship of financial development index with manufacturing exports and trade balance with the help of below mentioned procedure.

5.4.1 Unit root

It deals with the stationarity of time series variables taken in a study. To make the study free from spurious relationship, it is essential to testify whether taken variables are stationary or not. Stationarity condition is prime assumption for the analysis of time series, which is necessary to fulfill a time series analysis. If the data taken in the study has a unit root at level zero it is necessary to be stationary at level one. It means that data should be stationary after first difference or second difference. In this study I have applied Augmented Dickey Fuller (ADF) Test which has three models suhch as Intercept, Trend and Intercept and no trend and no intercept. Null hypothesis is there is unit root or non-stationary and alternative hypothesis is there is no unit root or stationary. The rejection of null hypothesis is based on the criteria of test statistics and probability value. If test statistics is more than critical value at 5 percent level of significant the null hypothesis will be rejected. On the other hand probability value (p-value) plays a crucial role to check significance of the model. The p-value is less than 0.05 leads to rejection of the null hypothesis at level of significance. The following table reveals the results of unit root test at level zero.

Table No. 5.4: ADF Test at Level

Variables	ADF Model	t-statistics	Critical value at 5%	p-value
LNFD	Intercept	-1	-3.03	0.73
	Trend & Intercept	-1.46	-3.66	0.8
	None	1.42	-1.96	0.95

LNME	Intercept	-1.36	-3.02	0.58
	Trend & Intercept	1.34	-3.66	0.99
	None	-0.46	-1.96	0.5
LNTB	Intercept	-2.97	-3.02	0.05
	Trend & Intercept	-2.88	-3.66	0.18
	None	-1.45	-1.96	0.13
Source: Calculated by Researcher in e-views 9.5				

The above table depicts the results for unit root test. Here financial development, manufacturing exports and trade balance of India are the three variables which are being checked unit root. The above table states that in the model of intercept for financial development the t-statistics is -1 and critical value at 5 percent level of significance is -3.03. It states that t-statistics is lesser than the critical value at 5 percent. Meanwhile the p- value is 0.73 which is not significant. In this model null hypothesis cannot be rejected. It means financial development has unit root or not stationary for intercept at level zero.

In the model of trend and intercept for financial development the t-statistics is -1.46 which is less than 5 percent critical value -3.66. On the other hand p-value is 0.8, which indicates that the model is not significant. These results shows that the null hypothesis cannot be rejected which means in this model financial development has unit root.

Further the model which has no trend and no intercept, the t-statistics -0.42 which is less than 5 percent critical value -1.96. On the other hand p-value is 0.95 which is

greater than 0.05. It shows that the null hypothesis cannot be rejected. It means financial development has unit root in this model also.

Apart from financial development the other variable is manufacturing trade which is also required to be examined the presence of unit root. For this indicator three models have been adopted which are intercept, trend and intercept and no trend and no intercept. For intercept the t-test of manufacturing is -1.36 and critical value at 5 percent level of significance is -3.02. Here the t-statistic is greater than critical value at 5 percent level of significance. In the model of trend and intercept the t-statistics is -1.34 and the critical value is -3.66 which is greater than the t-statistics. The p- value is 0.99. In this situation null hypothesis cannot be rejected. The other model is no trend and no intercept the t-statistics is -0.46 and critical value is -1.96. Here the value of t-statistics is less than critical value at 5 percent level of significance. More over the p- value is 0.5 which is more than 5 percent. The result indicates that the null hypothesis cannot be rejected. It means manufacturing trade has unit root or not stationary at level zero.

In the model of third variable which is trade balance for intercept t-statistics is -2.97 and critical value is -3.02 which is greater than t-statistics, p-value is 0.05. For trend and intercept t-statistics is -2.88, critical value is -3.66 and p-value is 0.18 which indicates that the model is not significant. In the model of no trend and no intercept the t-statistics is -1.45, critical value is -1.96 and p-value is 0.13. It means this model also has a unit root.

In nut shell it is found that the indicators, taken in this study have unit root at level zero which is not full filling the assumption of time series analysis.

Since the variable are unit root at level zero which is not meeting the assumption of time series analysis this study needs to go for the examination of unit root at level one i.e. after first difference or second difference.

Table No. 5.5: ADF Test at 2nd Difference

Variables	ADF Model	t-statistics	Critical value at 5%	p-value
LNFD	Intercept	-6.21	-3.04	0
	Trend & Intercept	-6.2	-3.69	0
	None	-6.43	-1.96	0
LNME	Intercept	-5.94	-3.02	0
	Trend & Intercept	-3.37	-3.73	0.09
	None	-5.85	-1.96	0
LNTB	Intercept	-4.84	-3.04	0
	Trend & Intercept	-4.66	-3.69	0
	None	-5.01	-1.96	0

Source : Calculated by Researcher in e-views 9.5

The present table indicates the results of unit root for the indicators financial development, manufacturing exports and trade balance at level two. In this test there are three models taken which are intercept, trend and intercept and no trend and no intercept. This table states that in the model of intercept for financial development the t-statistics is -6.21 and critical value at 5% level of significance is -3.04. It states that

the critical value at 5 percent is lesser than the t-statistics. The p- value is 0.00 which is significant. In this model null hypothesis will be rejected, because the critical value is less than t-statistics and p- value is less than 0.05%. It means financial development is stationary for intercept at level one. So, null hypothesis can be rejected. In the model of trend and intercept for FD the t-statistics is -6.2 which is greater than 5 percent critical value -3.69. The p- value is 0.00, which indicates that the model is significant. Thus the null hypothesis can be rejected.

In the ADF model of no trend and no intercept, the t-statistics is -6.43 which is greater than 5 percent critical value -1.96. On the other hand p- value is 0.00. The result shows that the null hypothesis can be rejected. It means the model is significant.

Apart from FD, for intercept the t-statistics of manufacturing exports is -5.94 and critical value at 5 percent level of significance -3.02. Here the t-statistics is greater than critical value at 5 percent level of significance. So the null hypothesis can be rejected. In the ADF model which have trend and intercept the t-statistics of manufacturing exports is -3.37 and critical value at 5 percent level of significance is -3.73. The p- value is 0.09, which means that null hypothesis cannot be rejected. Further, the model which has no trend and no intercepts t-statistics is -5.85 which is greater than 5 percent critical value -1.96. The p- value is 0.00. So the null hypothesis can be rejected.

Apart from FD and ME, in the model of trade balance for intercept the t-statistics is -4.84 and critical value at 5% is -3.04. The p-value is 0.00. For the model trend and intercept t-statistics is -4.66 and critical value is -3.69. The p-value is 0.00. It means we can reject the null hypothesis. In the model of no trend and no intercept the t-statistics is -5.01 and critical value at 5 percent is -1.96. The p-value is 0.00.With the above results we can say that the model is stationary and we can proceed. Because

only after the stationarity of the model, we can check any relationship between variables. To see the long-run relationship between FD and ME, between FD and TB Johansen co-integration test has been used.

5.4.2 Co-integration Test

Through Co-integration Test we will check long-run relationship between variables. This test has adopted trace statistics and max statistics for the examination of relationship between variables. Results of the co-integration test have been depicted in the table.

Table No.5.6: Co-integration Test of FD & ME

Trace Statistics					Max Statistics			
No. of CE	Eigen Value	trace stat	5% critical value	P-value	Eigen Value	Max-Eigen stat	5% critical value	P-value
None	0.52	17.34	15.49	0.03	0.52	15.27	14.26	0.03
At most 1	0.94	2.06	3.84	0.15	0.94	2.06	3.84	0.15

Source : Calculated by Researcher in e-views 9.5

The above table reveals co-integration between financial development (FD) and growth of manufacturing exports (ME) of India. Here trace statistics and max Eigen value have been utilized for determination of relationship. In this test, trace statistics (17.34) for none is greater than 5 percent critical value (15.49) and max Eigen statistics (15.27) is more than 5 percent critical value (14.26). In both statistics probability value (0.03) is significant at 5 percent level of significance. These values

lead to reject the null hypothesis which is that there is no co-integration between the variables. It means that the variables are co-integrated in the long run.

Table No 5.7: Co-integration Test of FD & TB

Trace Statistics					Max Statistics			
No. of CE	Eigen Value	trace state	5% critical value	P-value	Eigen Value	Max-Eigen state	5% critical value	P-value
None	0.42	12.03	15.49	0.15	0.42	11.58	14.26	0.13
At most 1	0.02	0.45	3.84	0.5	0.02	0.45	3.84	0.5

Source: Calculated by Researcher in e-views 9.5

The above table reveals co-integration between financial development (FD) and trade balance (TB) of India. Here also trace statistics and max Eigen value have been utilized for determination of relationship. In this test, trace statistics (12.03) for none is less than 5 percent critical value (15.49) and max Eigen statistics (11.58) is less than 5 percent critical value (14.26). In both statistics probability values (0.15, 0.13) are not significant at 5 percent level of significance. These values lead to accept the null hypothesis which is that there is no co-integration between variables. It means that the variables are not co-integrated in the long run.

5.4.3 Granger Causality Test

It is statistical hypothesis test to determine the causality between the variables. It shows the causality between the indicators. It does not only examine the causality

between the variables but also show the direction of causality between the variables. This test is based on f-statistics. To test the hypothesis the probability value (p-value) plays a significant role. If the p-value is less than 0.05 the null hypothesis will be rejected. Results of the Granger causality test have been depicted in the above table.

Table No. 5.7: Granger Causality Test

Null Hypothesis	F-Statistics	P-Value
LNFD does not Granger cause LNME	7.01	0
LNME does not Granger cause LNFD	0.19	0.82

Source: Calculated by Researcher in E-Views 9.5

The above table presents the results of Granger Causality Test on financial development and manufacturing trade of India. The table reveals that the p-value is 0.00 for null hypothesis LNFD does not granger cause LNME which is less than 0.05, so the null hypothesis can be rejected at this level of significance. On the other for the null hypothesis LNME does not granger cause LNFD, the p-value is 0.82 which is greater than 0.05. This value prompts to accept the null hypothesis. The results are showing that the growth of financial development causing the growth of manufacturing exports of India. The above results indicate that there is unidirectional relationship between financial development and manufacturing exports in India.

5.4.4 Vector Error Correction Model (VECM)

If the variables included in the empirical model are co-integrated, it will be useful to use a Vector Error Correction Model (VECM) to understand the relationship between the variables in the short run, which will be useful to have comprehensive information concerning the dynamic relationship between the variables and how the adjustment

towards the equilibrium position occurs after the initial divergence. The table below shows the results of VECM which shows the relationship between the variables in short run.

Table No. 5.8: VECM Dependent Variable D(ME)			
Test Statistic	Value	df	Probability
F-statistic	0.247667	(3, 17)	0.8619
Chi-square	0.743002	3	0.863
Source: Calculated by Researcher in E-views 9.5			

Normalized Restriction (=0)	**Value**	**Std. Err.**
c(5)	0.583198	0.813279
c(6)	-0.015119	0.704931
c(7)	0.030324	1.256299
Source: Calculated by Researcher in E-views 9.5		

Null Hypothesis: C (5)l=C(6)=C(7)=0

Note: *when probability value is more than 0.5% we accept null hypothesis.*

The results of the f-statistics, chi-square and probability value summarized in table indicate the acceptance of null hypothesis that says there is no short run causality between the variables. The table shows that there is no causality running from

financial development to manufacturing exports, which is indicated from the probability value which is more than 5% significance level.

5.5 Conclusion

While summarizing this chapter it can be clearly observed that financial development index follows the same trend of variables which are used to construct the financial development index. Market capitalization is the only variable which is a high fluctuating in nature and reasons for the same has been already discussed other than market capitalization all variables have smooth increasing trend from 1992 to 2014. There is no doubt that financial development in India has increased post reforms period but it is also fact that India need to go at much higher stage of financial development which is only possible when Indian government focuses on increasing awareness for stock market among investors and promoting financial innovation all over India not only to few regions of nation. After construction of financial development index the results of relationship between financial development index and manufacturing exports have been obtained by applying ADF test to test the stationarity of the time series. After checking stationarity co- integration test was applied on two times. Firstly on financial development and manufacturing exports and secondly on financial development and trade balance where co-integration was found between financial development and manufacturing trade whereas there was no co-integration between financial development and trade balance. After conducting co-integration test Granger causality test was applied on financial development and manufacturing exports and outcome of this test was that financial development have causality on manufacturing exports but manufacturing exports does not have any causality on financial development which is a unidirectional relationship. At last vector error correction model (VECM) was applied on financial development and

manufacturing exports to check their short- run relation where the outcome of the test it that there is no short run causality between financial development and manufacturing exports.