Framing a financial development index and conducting a comparative analysis- between India and USA

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***Abstract*: Financial market plays important role in economic development of a country. Stock market has become an important indicator to look into the prospects of a country. In the paper the author try to create a broader index which will include variables to measure the depth and efficiency of the capital and banking sector to give a complete overview about the financial development of the economy. In this paper an index is made to measure financial development of the economy by making use of different proxy variables of financial development. GDP at constant US($) 2010 is used to measure economic growth, Broad money as a percentage of GDP, domestic credit provided by financial institution as a percentage of GDP and ratio of stock market capitalization as a percentage of GDP for measuring the extent of financial efficiency and deepening. Financial time series yearly data from the period 1979-80 to 2013-14 is used. This paper tries to develop an index for two sample countries: India and USA and then try to compare the trend, pattern and degree of development in the respective economy. The paper tries to explain the trend between different business cycle with special reference to financial crises of 2007-08. The study attempts to analyse the presence of any long run relationship and granger causality between the financial development of Indian and USA market.**

I.   Introduction

There has been notable empirical work to find the relationship between financial deepening and economic growth (McKinnon, 1974; Rachdi & Mcbarek, 2011; Schumpeter, 1911; Shaw, 1973; Stolbov, 2015, Demetriades & Hussein, 1996) and many others. Findings between financial deepening indicators and their effect on the economic growth are contrary. Strong financial markets may affect the economy positively, first with the help of the wealth effects created for the consumers and second through the general confidence created in the economy for the both businesses and consumers.

One can look at the stock index as a tool to get a brief overview about the health of the financial market of a country. According to a financial dictionary a financial index is a time dependent indicator used to measure and report value changes in a selected group of studies.

An index is an easy and reliable measure to study the trend, pattern and any changes in the behavior of a stocks which somewhat help in determining the sentiments of the market. However just by observing the movements in the stocks index, little information can be inherited about financial health of an economy. Hence need to create robust financial index is a necessity.

To create an index to measure financial development would require aggregate of different factors that measure both the capital and banking sector, as they are crucial for smooth functioning of the economy. In this paper after creating an index, a comparative analysis of financial development index between Indian and USA is conducted. To create an index, stock market capitalization as a percentage of GDP has been used as a proxy to measure the equity market development, domestic credit by financial institution as a percentage of GDP as proxy to measure the depth of the financial institution in a country and broad money as a percentage of GDP to measure the size of the banking sector.

Broad Money as Percentage of GDP (BM) -Broad money is the sum of currency outside banks, demand deposits, fixed deposits and foreign currency deposits by NRIs, and other securities such as certificates of deposit and Treasury bill etc. Bhattacharya and Sivasubramanian (2003), Joshi(2016) used BM as a proxy for measuring the depth of financial sector

Market Capitalization as Percentage of GDP (MC)- the value of a company that is traded on the stock market, calculated by multiplying the total number of shares by the present share price as a percentage of GDP. Demirguc-Kunt and Levine (1996), Levine and Zervos (1998) used market capitalization ratio to represent the magnitude of stock market in India.

Domestic credit provided by financial sector as Percentage of GDP (DC)- Total domestic bank credit provided by financial sector is taken to represent the money circulated in economy. Chakraborty (2007) and World Bank used bank credit as variable to measure the banking sector in their study.

To construct the index Principal component analysis (PCA) is used for finding out the weights of each variable for constructing the index. The components are ordered so that the first principal component explains the largest amount of variation in the data. Each

principal component is the sum of each variable multiplied by its weight. Each variable is multiplied by weights found by PCA to construct an index.

In the recent years, finance-growth nexus debate has received lots of attention; that is the growth of the financial sector that leads to economic development or vice- versa. Hence in this paper we attempt to create a robust measurement of financial development then try to find relationship with the GDP. After creating the financial development index, a comparative analysis is conducted between India and US financial development index.

II. Literature Review

Different studies have been undertaken for a long time to understand relationship between capital market and economic development. Schumpeter (1912) emphasized on the importance of the financial system in economic growth; he believed credit is needed in order for innovators to create new things or rebuilt the old ones to expand the economy. Further in this regard, King and Levine (1993) stated that the level of financial intermediation is a good predictor for economic growth rate, capital accumulation and productivity. Bose(2005) explains the presence of positive correlation between stock market development and economic growth. Rajan and Zingales (1998) believed that the capital market reflects the present value of the future growth opportunities.

Different test have been conducted in different countries to detect the presence of relationship between capital market development and economic growth. Bagehot (1873) empirically found the important role played by financial development in the industrialization process in England. Obreja Brasoveanu, Dragota, Catarama and Semenescu(2008) found positive correlation between capital market development and economic growth for Romania. Bernard and Austin A.(2012) conducted a time series analysis for Nigeria and found out that market capitalization and value traded ratios have a very weak negative correlation with economic growth while turnover ratio has a very strong positive correlation with economic growth. A report by Price Water Cooper (2013) showed that changes in the UK stock market prices have not provided reliable predictions of near term future GDP growth or changes in the unemployment rate in the UK.

Sinha, Viswanathan and Narayanan (2014) in their study found that stock market development has larger and more significant long-run mutual effects on economic growth than credit market development, but the sample size included only 15 observations. A study by Singh (2008), observed the long run relationship between economic growth and financial development, also emphasized on 1991 globalization reforms which helped the financial sector to achieve high economic growth in India, whereas study by Chakraborty (2010) showed that stock market turnover had no significant effect on growth.

Main mechanism through which the stock market affects the economy is the so-called wealth effect, Barlett (2000), increase in stock prices, increases the wealth hold by public and hence of the nation by increasing the expenditure made by public. Thus to theory pumping of money in the economy will lead to increase in output and national income and this help in building a strong future for the economy. Thus one would like to check the relevance of theory with reality. A study by Tandon(2014) show smooth functioning financial system is the important for achieving an efficient economy. It pushes the domestic demand and savings helps in attracting foreign investments boosting up the capital formation and further development of financial markets.

Levine (1996) showed that GDP tend to grow faster in economies that have a liquid stock market. The study some developing countries to have more liquid stock exchanges than countries with higher per capita GDP. Generally both banking and stock market development positively affect the growth of the economy; he suggested that there might be presence of inter-relationship between banking sector and stock market. Shaw (1973) and McKinnon (1973) observed that the increase in productivity and growth have positive effects of financial sector development.

III. India's Financial Development Index
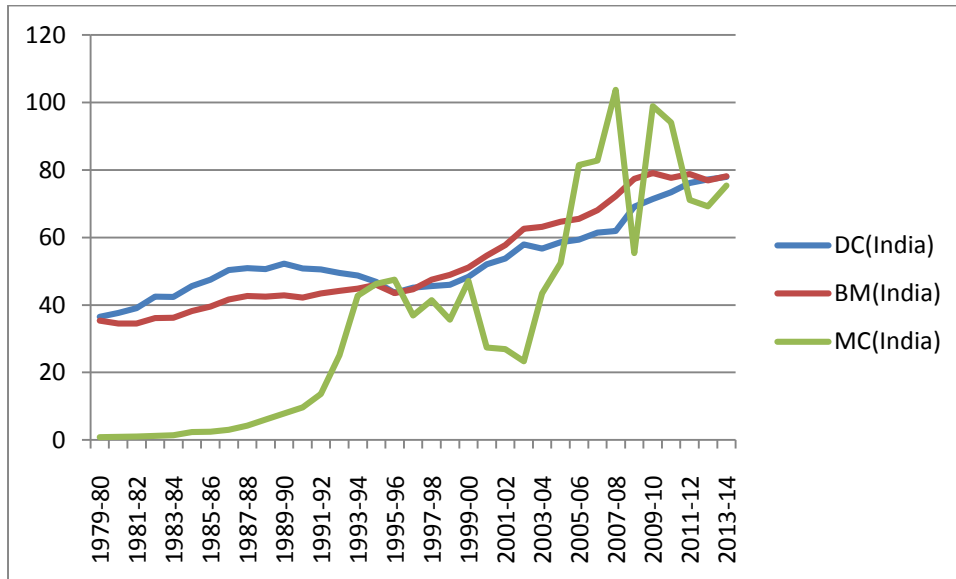
The above graph is a line graph of the factors used to create index for India, the graph shows how the three variables have moved from the year 1979-1980 till the year 2013-2014. Ups and down can be seen during the period of the study; however the domestic credit and broad money as % of GDP has seen has upward and stable trend after 1991.

Correlation Matrix

		DC(India)	BM(India)	MC(India)
Correlation	DC(India)	1.000	.944	.763
	BM(India)	.944	1.000	.876
	MC(India)	.763	.876	1.000

The correlation matrix show high correlation among the three variables. It was only after 1991, India gradually opened up the economy and positive effect of this can be seen on MC immediately; indicating strong confidence of world on the Indian stock market.

One can easily see a dip in all the three variables during the period of Asian crises (1997-98). However during the financial crises of 2007-08 large downward swing can be noticed in MC; but fall in BM and BC is small due to expansionary polices implemented by government to deal with the crises. The financial crises of 2007-08 had its epicenter in US; it hurt almost all the economies of the world and slowed the process of financial and economic development. The impact on Indian market could be seen from the above graph. India's GDP fell from 9% to 6%in 2008-09, despite a great fall India managed to be second largest growing economy after China during the period of financial crises. Effective fiscal and monetary policies were introduced to easing up the liquidity crises.

IV. USA's Financial Development Index

Similar line graph using the same factors of financial development has been constructed for USA as well.
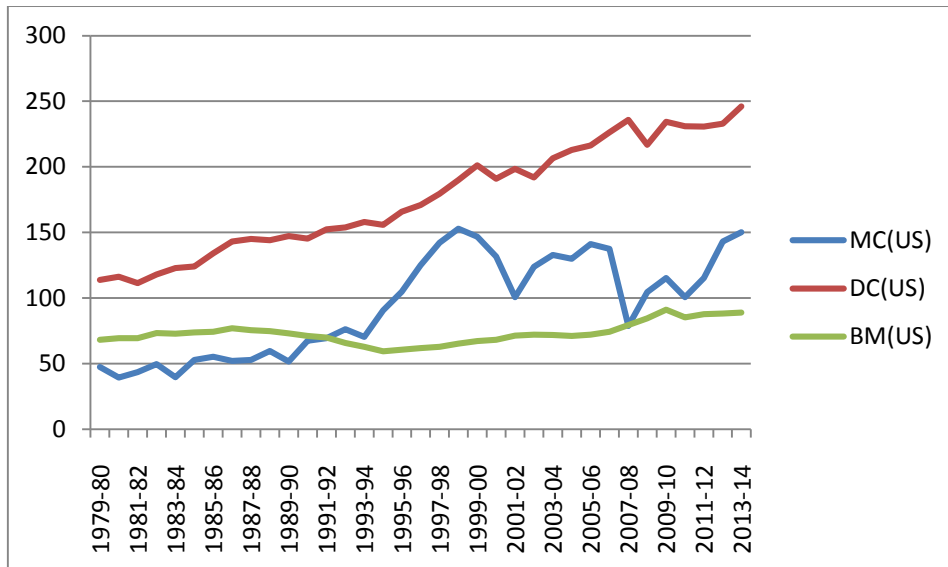
From the graph one can see the adverse effect of financial crises of 2007-08 can easily be seen. There has been a fall in both MC and DC: though the dip in MC is much greater, bringing down the market capitalization to the level it was in year 1995. From this one can understand the detrimental effect of the financial crises on the USA stock market. The BM has remained quite stable throughout the period of study. DC has seen an upward trend, it didn't fall much even during the crises period showing efforts put in by the government to prevent liquidity crunch in the form of bail-out packages like TARP.

Correlation Matrix

		MC(US)	DC(US)	BM(US)
Correlation	MC(US)	1.000	.814	.106
	DC(US)	.814	1.000	.529
	BM(US)	.106	.529	1.000

The correlation matrix indicates weak relation among three variables except DC and MC. Many studies have shown weakening relation between Broad money as an indicator of financial development for USA.

V. Comparing the Financial Development Index of India with USA
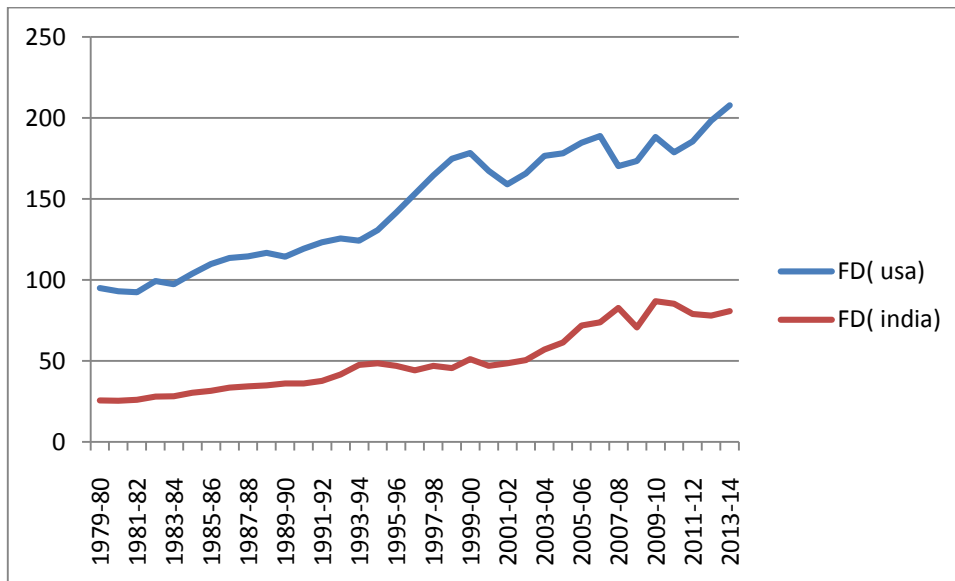
India is still evolving into a more integrated financial market. About 50% of workforce is in agricultural sector but service sector contributes for around two-third of output. Indian economy had experienced major policy changes in early 1990s. The new economic reform, the popularly known as, Liberalization, Privatization and Globalization (LPG) and its effect can easily be seen on the FDI(India).There is continued improvement in the financial sector of both the countries. The index clearly show the detrimental effects of both Asian crises 1997-98 and housing crises of 2007-08 on Indian market however USA financial market survived the Asian crises but could not withstand the housing crises. The subprime crises led to huge decline in the houses prices, creating a liquidity crunch and pushed USA into a recession till the financial year 2009; making it the longest downturn since Great Depression. However both of the market rebounded from the crises around the year 2010. However by looking at the FDI(India) trend a slowdown in the financial market began in 2011 slowing the growth rate of India's GDP. Decline arises because of fall in government spending on productive policies though spending on pension, subsidies, aids increased. High international crude oil prices exacerbated the government's expenditure leading to higher fiscal deficit and worsening of CA deficits. The overall performance of index shows increasing trend for both USA and India with influence to external forces like crises.

VI. Empirical Findings

To apply co-integration test we need to check stationarity of time series The Augmented Dickey Fuller test for testing the presence of unit root in the time series yielded the following results:
Null Hypothesis: FD__USA_ has a unit root

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.164484	0.9338
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

Null Hypothesis: FD_INDIA_ has a unit root

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.393878	0.8992
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Financial development Index for both USA and India show presence of unit root at level. The optimum lag length is usually selected based on SIC test statistic. However, after differencing the series once, the series were stationary. The next step is to examine the existence of a long run association between financial developments of two countries using co-integration analysis.

Sample (adjusted): 4 35
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: DFDINDIA DFDUSA
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.467887	26.73257	15.49471	0.0007
At most 1 *	0.184940	6.543809	3.841466	0.0105

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.467887	20.18876	14.26460	0.0052
At most 1 *	0.184940	6.543809	3.841466	0.0105

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The result of the trace and maximum Eigen value indicates the possibility of rejecting the null hypothesis of no co-integrating vectors at 5 percent level of significance. At 5 percent, the critical value is greater than trace statistic value indicating rejection of null hypothesis thus implying the existence of two co-integrating vector. The maximum Eigen value test gives similar result that is existence of two co-integrating vector among the variables. This validates the existence of long run relationship between India and USA financial development.

VII.   The Granger causality Test

In this paper we try to explore casual relation between the FDI (India) and FDI (USA). After applying the test we get following result.

Pairwise Granger Causality Tests
Sample: 1 35
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DFDUSA does not Granger Cause DFDINDIA	32	6.17675	0.0062
DFDINDIA does not Granger Cause DFDUSA		2.53927	0.0976

The test indicate FDI(USA) granger cause FDI(India), while it is not true for other way around. In the short run any financial development of USA granger cause financial development of India, indicating USA holds a larger strong position in the world financial market which can also been bee seen when comparing the graph of FDI(USA) with FDI(India).

VIII.   Conclusions

This study examined the relationship between the financial development index of India and USA for the period 1979-80 to 2013-14. The study attempts to analyze the presence of any long run relationship between FDI(India) and FDI(USA), where financial development is captured by three proxies namely broad money to GDP, stock market capitalization to GDP and domestic credit by financial institution. The Johnson cointegration test rejects the null hypothesis of zero co-integrating vectors and reveals that there exists a long run relationship between the FDI(India) and FDI(USA). The reforms of 1991 have helped India to achieve a better, more active, advanced and sound financial market. The government should try to further develop the financial sector. Need to work and focus on the financial inclusion policies that expand the scope and the base of the financial sector. This call for more financial integrating policies and increasing the status and regulation criteria of financial institutions and most important creating more awareness among individuals regarding financial market. There has been tremendous increase in the financial institutions which has promoted both savings and investment into productive assets. Though there has been increase in the growth and development of financial assets, India is still very much behind USA. Need to take rigorous approach in opening and deepening of bank and capital market. There is also a need to promote financial education at all levels, so to understand and participate in this market.

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