CHAPTER-1

1. INTRODUCTION

1.1. Introduction

Financial crises have a long history. Some of the earliest examples of crisis episodes are the Dutch Tulip mania (1634-37), the Mississippi Bubble (1719-20), and the South Sea bubble (1720). These episodes involved substantial rise in certain asset prices which was then followed by huge declines in their prices. The financial crisis happenings in one country or region also resulted in contagion effect on other economies. From the 18th century onwards, financial crises have accompanied the capitalist development with different intensity in different periods.

During the 19th century, the U.S. suffered a multitude of banking crises such as major banking crisis of 1837 and 1857 before the establishment of the national banking system of the U.S. and banking panics of 1873, 1893, 1907, and 1914 after its establishment. The Great Depression of 1929 is still considered to be the worst crisis faced by the whole world. Similarly, some of the other crises that led to significant impact on different economies include the Latin American sovereign debt crisis of 1982; the Scandinavian crisis of early 1990s; Japan's crisis in 1990s; Dotcom bubble crash in 2000; Global Financial Crisis (GFC) of 2007-09 and more recently the COVID-19 induced stock market financial turmoil.

Some of such episodes which have impacted the world economy in a big way and resulted in heavy toll paid by different economies in multiple ways, be it unemployment, inflation, recession, debt burden, balance of payment crisis etc. are discussed in subsequent sections.

1.2. The Mexican Financial Crisis of 1994-95

The Mexican financial crisis of 1994-1995, refers to the crisis that resulted after Mexico's Peso devaluation in December 1994. This crisis is also known as the "Tequila Crisis". The crisis resulted in the largest currency devaluation within a year i.e. from about 5.3 pesos per dollar to over 10 pesos per dollar between December 1994 and November 1995 and marked the most acute recession in over a decade (Musacchio, 2012).

During the recession of the early 1990s, the interest rates fell in the U.S., and this resulted in foreign investors moving to other markets in search of high yields. The investment community's enthusiasm towards Mexico as an alternate partly drove the Mexico's reform and liberalization as it was a shared belief among investors that Mexico's reforms will allow the country to grow faster. This created a bubble-like dynamic wherein the value of assets kept climbing up. As the value of the assets climbed higher, the risk of the asset price burst also increased. As a result, a change in expectations from positive to negative triggered a massive sale of Mexican assets and resulted in capital flight.

One of the problems with Mexico was its ballooning current account deficit which rose from $6 million to $20 million in 1993. This deficit was indicative of the capital inflows stimulated by the policy reforms. However, the large levels of the deficit became a worry for some observers as they doubted the overvaluation of the Peso thereby, discouraging exports and stimulating the imports (Jr.Whitt A., 1996). At that time, Mexico had a crawling peg exchange rate system and though peso was depreciating nominally, it was actually appreciating in real terms ballooning thecurrent account deficit.

In 1994, a series of events triggered capital flight due to change in investors' expectations. As the capital flowed out of the economy, the central banks were forced to increase the interest rates, consequently, borrowers defaulted on their loans leading to collapse of its banking system. This capital flight also forced the peso devaluation and destabilized the economy.

Furthermore, the infighting among the top-level government officials and assassination of the presidential candidate of the ruling party severely bruised the public confidence. This led to panic propagating through the financial markets leading to floatation of the peso. This finally resulted in the worst recession faced by Mexico in 1995 which spread to other emerging countries.

Mexico requested support from various international financial institutions and the U.S. government, which put together a US$40 billion bailout package by February 1995. The country experienced a GDP decline of 6.2% during 1995. In addition, Mexico suffered from acute Inflation as the prices increased by 35%. The country also was hit by extreme poverty as the unemployment nearly doubled from 3.9% to 7.4% in 1995 (Maloney et al., 2003). The real wages plummeted by 25-35% over the same year, despite sustenance of nominal wages. Over one million people lost their jobs and average real wages decreased by 13.5% throughout 1995 in the formal sector alone (Lustig, 2001). Overall household incomes fell by roughly 30% and the poverty climbed to 37% in 1996 from 21% in 1994. Extreme poverty climbed from 10.1% to 26.5% between 1994 and 1996, which was more than doubled the earlier statistic, while an increase from 43% to 62% was observed in moderate poverty. The impact was so severe that the nation's poverty levels did not begin returning to normal until 2001 (World Bank, 2005).

1.3. East Asian Financial Crisis of 1997-98

In 1997, East Asian countries like Korea, and Indonesia experienced a financial crisis which was triggered by a run on Thailand's currency post the real estate and equity boom. The devaluation of Thailand's currency resulted in reversal of international capital flows for the entire region leading to a crisis spreading to other East Asian economies (Radelet et al., 1998). According to Goldstein, there were three main origins which were interrelated - i) easy global liquidity conditions and financial sector weaknesses in Asian emerging economies; ii) contagion from Thailand to Malaysia, the Philippines, Malaysia and then to Japan, Taiwan, Hong Kong, and South Korea followed by other countries like Russia and Brazil; and iii) concerns related to external sector. The impact of this crisis was so severe that on an average, the currency devaluation in the five East Asian economies namely - Korea, Indonesia, Thailand, Malaysia and the Philippines was 80% between June 1997 and December 1997 (Blaszkiewicz, 2000).

The existing literature presents two schools of thoughts explaining the causes of the Asian crisis: fundamentals vs panic schools of financial crises. The studies by Krugman (1979), Corsetti et al. (1998), Krugman (1998), Goldstein (1998) and Mishkin (1999) supported fundamentals interpretation which focused on the inconsistent domestic policies and economic fundamentals weaknesses. That is, a crisis occurs when the economy is in distress, accompanied by a slowdown in growth or recession, deteriorating current account balance, the bursting of real estate and asset price bubbles and dangerous levels of short-term debt. Corsetti et al. (1998) highlighted a number of country specific and global factors which determined the current account imbalances observed in Asia. It was claimed that the key to interpretation of the events which led to Asian crisis lies in weaknesses pertaining to banking, corporate and financial sectors operating in the region.

On the other hand, other studies like Radelet and Sachs (1998); Stiglitz (1998) argued that financial panic was the main reason which led to Asian financial crisis as negative sentiments became self-fulfilling. According to these self-fulfilling models, countries with pegged exchange rate systems can collapse despite having sound market fundamentals. These models emphasized the instability of the fixed exchange rate regimes as they were subjected to the sudden changes in market sentiments. This meant that if people perceived that the economy will get worse, they would take short positions in that country's currency, hindering the economy. Thus, this panic interpretation pointed out that the herding behavior and self- fulfilling expectations in international capital markets were the root cause of the Asian crisis.

The 1997 Asian crisis affected the economies deeply. For example, in 1998, Thailand witnessed a decline by 10.5% in real terms, the Indonesian economy shrunk by 13%, and South Korea and Malaysia witnessed a comparatively low decline of 7%.

The crisis also led to sharp reductions in currencies values, financial markets, and other asset prices of several Asian countries like Indonesia, Thailand, Malaysia etc. The nominal U.S. dollar GDP of the Association of Southeast Asian Nations (ASEAN) member countries fell by $9.2 billion in 1997 and $218.2 billion in 1998. Whereas, the nominal U.S. dollar GNP per capita fell by 21.2% in Thailand, 42.3% in Indonesia, 19% in Malaysia, 12.5% in Philippines and 18.5% in South Korea according to Asian Development Bank (ADB, 2001).

Indonesia was hit hardest by the crisis as the growth declined from 7.8% in 1996 to -13% in 1998. The rupiah depreciated by over 500% from January 1997 to July 1998, inflation soared to 78%, and unemployment rose to above 6% in 1999 (Miller, 2005). Thailand was next to Indonesia in terms of severity of the crisis impact. The unemployment rose from almost zero to 4.5% in 1998. Nationwide poverty fell from 21.3 to 11.3% (Bhaopichitr et al., 2005). In South Korea, its GDP

declined by 6.5% in 1998 accompanied by inflation rising by 75%. At the same time, the poverty rose to 19.2% which was more than the triple, and the unemployment rose from nearly full employment to 6.8%, which was more than double from the preceding year levels. Malaysia's unemployment rose to 3.2% while its GDP contracted by 9% in 1998. The headcount poverty rose to 10% even though it was in better economic situation than any of its neighbors when the crisis erupted. The currency depreciation was also a major consequence where Thai baht depreciated by 40.2%, Malaysian ringgit declined by 45% and South Korean won depreciated by 34.1% (Cheetham, 1998)

1.4. The Global Financial Crisis -2008-09

The more recent example of a financial crisis is the subprime crisis of 2008 when the global economy was shaken by the Global Financial Crisis (GFC). This crisis emanated in the U.S. mortgage market in 2006, and hit the entire U.S. financial system in 2007. By the second half of 2008, the crisis spread to the rest of the world (Dawood, 2016). Many economists considered this episode as the worst financial crisis since the Great Depression of the 1930s which resulted in the collapse of many large banks like the Merrill Lynch and the Lehman Brothers. In the U.S., bailout measures were taken by the U.S. government which included certain banks taking over or buying the damaged banks. This scene was not confined to the U.S. economy and as such had repeated around the world, particularly in the Europe. As a consequence, it resulted in downturns of stock markets around the world. The housing markets also suffered as numerous people were evicted from their homes. The decline in economic activity, leading to a severe global economic recession in 2008, was fueled by the decline in consumer wealth and confidence. This could be seen in large drops in the value of house prices which contributed to the failure and insolvency of keybusinesses.

The widespread impact of the GFC has vividly shown how substantially and greatly the turmoil can affect the conduct of economic and financial policies. A report by Kelleher et al. (2012) declared that the crisis had a "cost tag of $12.8 trillion on terms of output loss in the U.S. alone". The report estimated a $7.6 trillion of actual GDP loss, calculated as the difference between the potential GDP that would have been there in absence of the financial crisis and the actual GDP as reported by the government for the period 2008-2012. The stock markets fell all around the world with drops of around 10% in most indices. By February 2009, the Dow Jones Industrial Average(DJIA) dropped from 13930 points in October, 2007 to 7063 points in February, 2009 incurring a decline of 49.3% (Puchkova and Kryazhimskiy, 2012).

The recession officially began in December 2007. According to the Financial crisis inquiry report by The Financial Crisis Inquiry Commission (2011), the job market was hit worst as the U.S. economy shed 3.6 million jobs in 2008, which was the largest annual fall since 1940. Another 4.7 million jobs were lost by December 2009. The underemployment rate increased from 8.8% in December 2007 to 13.7% in December 2008 climbing to 17.4% in October 2009. Real GDP fell at an annual rate of 4% in third quarter of 2008 and 6.8% in the fourth quarter. The U.S. experienced the biggest drop in its Gross Domestic Product (GDP) since 1946 as the average GDP for the year 2009 was 2.6% lower than in 2008.

The situation was new; previous crises spread from the developing countries to the developed countries but this time developing countries became the victim of the crisis. "The causes of the global financial crisis are to be found in the financial and economic policies of the developed countries, primarily the United States (U.S.). Developing countries are not responsible for it, but they are now seriously affected," wrote Martin Khor, the new Director of the South Centre in

Geneva[1]. The first round of adverse effects of GFC did not affect the economies like India and China directly. However, increasing level of integration among the economies, led to having a wider implication on these economies and their Asian neighbors through trade flows.

According to the International Monetary Fund (IMF) April 2009 World Economic Outlook, developing and threshold economies experienced higher growth setbacks than the industrialized economies when compared to their growth potential. Hence, threshold economies were hit harder by the GFC than the industrialized economies that caused it.

1.5. Impact of the Global Financial Crisis on Indian Economy

In early 1990s, the policy planners in India implemented a series of reforms related to industry, investment, and trade sectors to tackle balance of payment crisis. India became integrated with the world economy post these reforms which liberalized the economy and opened it to the global markets, technology and financial flows.

India did not remain safe from the impact of GFC owing to increased integration with the world economy. Due to its limited operations outside India, the Indian banking sector remained largely unaffected, however, the GFC influenced India through three paths namely trade flows, exchange rates, and financial markets. The effect for Indian banks was also muted due to Reserve Bank of India's (RBI's) impositions and regulations limiting the commercial bank lending to the real sector by means of higher provisioning requirements. This helped in curbing the growth of a real estate price bubble. As a result, Indian banks announced encouraging results and as a whole, the banking sector experienced a rise of 43% in its profitability during the third quarter of FY2008. This was

[1] This South Centre's "South Bulletin" shows in detail how the developing countries were impacted by the crisis. South Centre. *South Bulletin*, Issue 34, 16 March 2009 http://www.southcentre.org/index.php?option=com_contentandtask=viewandid=978andItemid=1.

in comparison to the non-financial corporate enterprises and financial institutions around the world. Thus, RBI warranted a better banking assets quality by closely monitoring the appropriate lending norms coupled with banning complex structures such as synthetic securitization.

However, the Indian banks were hit by the crisis indirectly. The liquidity squeezes in global markets forced the Indian corporations and banks to shift their credit demand from external to domestic banking sector. This led to shooting up of short-term lending rates due to the increased pressure in the domestic markets. As evident, the inter-bank call money rate spiked to 20% in October 2008. The credit expansion in domestic markets was hurt due to the loss of confidence following the collapse of the Lehman Brothers and increased aversion of Indian banks coupled with credit crunch. The impact of the crisis was so severe that non-food credit expansion declined by more than 68% during the last five months of FY2008-09 as compared to corresponding five months of previous financial year period. The sluggishness of External Commercial Borrowings (ECBs), Foreign Direct Investments (FDIs) inflows, and remittances combined with the massive Foreign Institutional Investors (FIIs) outflows led to significant deterioration of India's capital account turning the capital account of India's BOP negative for the first time after a long period. Indian economy also experienced a sharp fall in exports demand in its major markets. Furthermore, the Indian Rupee came under pressure when the foreign exchange demand by Indian entrepreneurs increased and portfolio investments decreased, hoping to replace the ECBs by domestic financing. As a result, the Indian rupee plummeted by 27% vis-à-vis the U.S. Dollar during the period from April 2008 to March 2009.

The spread of financial crisis to developing countries was primarily via financial flows and trade as evident from above referred context to India. The transmission was rapid and the impact was stronger for the economies which were closely coupled with the global economy. Therefore, the

impact of GFC varied across different countries, regions and population groups. Thereby, rendering each region its own pattern in terms of effect and recovery. Furthermore, for the most important developing economies, the crisis transmission was quick on account of stock market exchanges as well.

The spread of the turmoil was quite fast due to level of integration among the markets internationally. The integration of financial markets and the globalization all around the world had exposed the policy planners to new challenges as a results of shortening of the time period for responding to financial crisis. The 2008-2009 sub-prime crisis emphasized the importance of understanding, measuring and predicting financial crisis. It has become important to understand their dynamics as there are increased interlinkages of the markets and increasing complexity of the new innovative instruments coming to the markets. In addition, financial crises have become increasingly frequent and damaging which has led to a debate on their root causes, management and anticipation. Thus, a thorough analysis and understanding of the costs of and the best responses to crisis has become the need of the hour and are needed to be integrated in current policies in order to prevent the haunting and long lasting effects of these crises that continue.

Therefore, the renewed challenge of crises prediction and management has propounded several questions related to the quality and the efficiency of the Early Warning Systems (EWSs) developed till date in predicting the early episodes as well as any future crises.

Effect of COVID-19 on Indian Economy

The advent of the recent health crisis due to COVID-19 has shaken the world and has disrupted the world economic activity by inflicting both health shock and economic shock across various countries. India is no exception to such economic fallout which has resulted in negative per capita GDP growth. In order to contain the spread of the disease, government mandated countrywide

lockdown from March 2020, which brought an immediate halt to almost all the economic activities. India's growth fell to 3.1 percent in the fourth quarter of the fiscal year 2020 (Ministry of Statistics). The unemployment rate rose from 6.7 % in March 2020 to 26% in April, 2020. Similarly, India took hit in the exports and imports sector, where by exports dropped to 36.65% and imports dropped to 47.36% in April 2020 compared to April 2019 (Ministry of Commerce & Industry). During COVID-19 period, the fiscal deficit of the government breached the target set by FRBM Act (Fiscal Responsibility and Budget Management Act) and was reported to be standing at 4.6% of GDP against the target value of 3.5% of GDP (Sengupta, 2020). The Coronavirus has created a significant turmoil in stock markets around the world. Indian stock markets also loomed under fear due to prevailing uncertainty. Following the global markets, major Indian exchanges such as BSE Sensex and Nifty 50 fell by 38 % and total market capitalization lost a whopping 27.31% from the start of the year (Kumar and Kumara, 2021). Sectors like tourism, entertainment, oil and gas were some of the major hit sectors amid the set back to economic activity due to various lockdowns and mandates imposed by government. Some of the companies belonging to aforementioned sectors had their stock prices fall by more than 40% while some businesses went bankrupt due to loss of operations (Kumar and Kumara, 2021). However, stock markets because of favorable sentiments and future hope of revival in the economy; picked up within few months.

1.6. Macroeconomic Anatomy of the Global Financial Crisis

The crises can be associated with a number of macroeconomic issues. There is no consensus among researchers and policy planners' on what led to the GFC crisis. However, three factors appeared to have contributed to the build-up of financial imbalances: i) inadequate supervision and

regulation, ii) rising global imbalances and capital flows, and iii) loose monetary policy (Merrouche and Nier, 2010).

The U.S. economy influenced the global economy through its high import demand. This imbalance was evident of consumption exceeding production in the country and ultimately led to an increase in external imbalance in trade relations. Apart from the external account deficit, the U.S. economy also faced the problem of internal budget deficit. Due to the dotcom bubble bust and 9/11 terrorist attacks, the economy was going through a temporary economic slowdown. In addition to this, financing in Iraq war led to significant rise in budget expenses. Meanwhile, Asian economies built up large national reserves through export-led economic strategies, while oil producing countries achieved this through rising oil prices (Yeoh, 2010). These high reserves were maintained to deal with financial pressures similar to 1997 Asian crisis. As the U.S. needed capital to support their persistent budget deficits, the surpluses maintained by Asian and oil producing economies found their way to the U.S. capital and financial markets.

The literature has identified a number of channels through which monetary policy led to global imbalances build- up (Merrouche and Nier, 2010). The interest rates in the U.S. were significantly reduced after the dotcom bubble burst of 2001. Loose monetary policy (a low short-term rate) may have i) encouraged more risk taking by banks, including liquidity and credit risks (Borio and Zhu, 2008); ii) "reduced the cost of wholesale funding for intermediaries, leading those intermediaries to build-up leverage" (Adrian and Shin, 2008); and (iii) "have increased the supply of and demand for credit (mortgages), causing asset (house) prices to rise" (Taylor, 2007) (Merrouche and Nier, 2010).

Another factor contributing to the global financial crisis was inadequate regulation and supervision. It was supposed to prevent crisis, by discouraging excessive risk-taking and controlling moral hazard on the part of financial institutions.

The decision by many to default on mortgages was rational as there was an incentive in default if the value of the outstanding debt exceeded the value of the house they owned. Even in the U.S., the penalty to default was slight for subprime mortgagees because the loans were non-recourse in nature (McDonald, 2009). This has posed certain questions that need to be investigated to come out with rational answers to overcome such happenings in future. The question which still needs to be answered here is that why instigators did not consider this while making the mortgages. The second question is why the buyers of the securitized asset failed to contemplate the high risk carried by subprime mortgages.

The fundamental economics fails to answer these questions, and this is where an alternative branch of economics called behavioral economics comes into play.

1.7. Behavioral Economics and the Subprime Crisis

Widespread financial failures appear to be inconsistent with the traditional paradigm theories like Efficient Market Hypothesis (EMH) and indicate more than random errors in decision making. Behavioral economics draws a wide range of evidence including psychology and experiment results, finding significant deviations from the classical belief of rational decision making in the behavior of human beings. Humans are prone to self-serving bias, present bias, herd mentality, and reference standards. And these weaknesses provide insights in explaining the origins of sub-prime crisis which the conventional economics fails to provide. These deviations from the behavior

of conventional economics can be seen in the global financial crisis which accelerated the journey to this catastrophe. According to McDonald, (2009), the following insights could be revealed:

i) **Present Bias**: Subprime mortgages exploited this bias. The bias, also known as hyperbolic discounting, states that individuals have tendency to focus on "now" and undervalue the future. In context of the housing crisis, individuals put off reading the small print in the mortgage contract and might have felt prepared to accept cutbacks in future consumption, when the period with the low teaser rates ended. However, with time it became too difficult.

ii) **Self -Serving Bias**: The behavioral economists have revealed a strong tendency of individuals to bid the price of an asset above its fundamental price. The individuals, instead, having good perception of the price of an asset at the end, are prepared to bid prices above the fundamental price in the interim which eventually leads to price crashes. Thus, even though having a clear perception of potential losses, this behavior leads to occurrences of actual real estate and property market bubbles. The probable reason behind this kind of behavior is the belief that the individual will get out well before the crash. This belief is consistent with the idea of overrating one's abilities, i.e. self-serving bias.

iii) **This time it's different**: According to Akerlof and Shiller (2009), there is a tendency for human beings in a booming market to believe in "new era" stories. With the advances in information technology and an experience of long term sustained economic growth and asset prices increase, the idea of falling house prices did not cross the minds of economists. Even the slight possibility of that happening was also ignored, as such

disagreement with the "new era" stories, would have attracted the pejorative label "dinosaur" (McDonald, 2009).

iv) **Money Illusion**: This weakness corresponds to overestimation of the real value of an increase in asset prices like house prices (Akerlof and Shiller, 2009). Estimation of the increase in the wealth requires comparison of the current value with some initial value and in case of house property, that happens to be the value at the time of purchase. Consequently, for individuals owning houses for a long duration of time the increase in wealth would appear larger. And this effect gets amplified in a booming market which leads to people borrowing and consuming excessively. This phenomenon as argued by Akerlof and Shiller (2009) appeared to explain the decline in household savings in the U.S to some extent.

v) **Loss Aversion**: Individuals do not like losing and are usually risk averse by nature. Generally, a loss is defined as a shortfall of the rate of return received from a benchmark reference rate. And each individual has his/her own reference rate, a zero level, below which any value of rate of return would generate disutility. According to Kahneman and Tversky (1979), the "basic intuition concerning loss aversion is that losses loom larger than corresponding gains" and thus, to avoid net losses, people tend to take extra risk.

vi) **Herd behavior:** As the name itself suggests, this phenomenon is a tendency to go with the crowd. This behavior just amplifies all the above listed effects. To stay in the rising markets, individuals instead of using their rationality, blindly follow the herd in signing up the complex mortgages without completely understanding them and ignoring the inherent risks, like others do.

1.8. Can Crisis be Predicted?

The occurrence and nature of these crises have provoked questions as to whether there is a pattern to financial crises or are they inevitable. Crises prediction will always be limited as financial crises are diverse in nature. They occur due to varied reasons in different regions and in different time as evident by the above described episodes. Crises have several causes embedded in the complex interactions between investor psychology and market fundamentals, and it is this interaction which renders crises prediction challenging (Eichengreen, 2003). However, there are some common underlying causes to most of the financial crises. The understanding of financial crises has become the need as the people hardest hit by a financial crisis are those who actually have nothing much to do with cause and instruments behind it. The studies on predicting financial crises have been limited before 1970s, be it a currency, banking, debt or balance of payment crisis. The prediction of financial crises presents the researchers with a challenge to design and devise a financial system that remains immune to or at least can subdue the impact of irrational thinking thereby, preventing or attenuating the adverse effects it may cause on the real economy. Furthermore, the analysis and examination of crises can improve our understanding on how the economy functions, its structure and how it responses to various domestic and external shocks (Zanalda, 2015).

The vast literature on analyzing financial crises ranges from historical overviews to analyzing the macroeconomic instability constituting the mishandling of fiscal, exchange rate and monetary policies, or mismanagement of banks, credit instruments or financial institutions leading to disruptions in functioning of financial systems. The crisis can be characterized by typical features like disruptions in credit markets; unusual variations in asset prices levels; balance sheet problems of households', firms' and of sovereign's; solvency and liquidity problems of large/systemic financial institutions; exceptional fiscal measures to lessen the impact of economic downturns

caused by a major crisis, and exceptional monetary authority's intervention to tackle solvency and liquidity problems (Claessens and Kose, 2013). As Bretton Woods system collapsed in 1971, the literature on prediction of a financial crises flourished with Krugman (1979) and Flood and Garber (1984) developing the first-generation crisis models in which currency crises were linked to persistent economic balances. As first generation models could not explain the crisis episodes of Mexico in 1994-95, second generation models for currency crisis came into light. The chapter on literature review undertakes a comprehensive overview of all the available theoretical models for currency and banking crisis.

The enormous economic costs in terms of unemployment, financial restructuration and economic contraction have led to an increasing interest on the part of researchers to undertake empirical studies in relation to the theoretical models aimed at predicting crisis. These empirical models are known as Early Warning Systems (EWSs) which are used by policy planners to detect the risks and buildup of a crisis in advance so as to take necessary actions to downgrade the adverse effects of crisis.

As evident from the earlier mentioned episodes of various crises, the economic costs incurred are huge not only in terms of unemployment, inflation etc. but also in terms of the social impact it carries. This emphasizes that models which can predict an approaching financial crisis are the necessity of the time, so as to initiate proactive policy measures to minimize the adverse impact of such happenings or to take preventive measures in advance.

1.9. India as the Suitable Case for Study: Rationale

The present research has undertaken the work in the context of Indian economy. The globalization of the capital flows has led to increasing relevance of emerging capital markets with India increasingly getting integrated with the global markets and attracting funds from foreign countries.

Two major sectors i.e. banking sector and stock market sector have been studied to identify the early warning indicators and their predictive power in estimating the probability of a crisis in these domains.

The Indian banking sector has been one of the significant pillars constituting the Indian financial system in terms of its contribution to socio-economic development of the country. It accounts for around fifty percent of the assets of the financial sector during post-independence period. The Indian banking system encompasses the central bank- Reserve Bank of India (RBI) established in 1935, scheduled banks and non-scheduled banks. Scheduled banks consist of scheduled cooperative banks and scheduled commercial banks (SCBs). The SCBs are further divided into four categories: Public and Private Sector Banks, Regional Rural Banks, and Foreign banks in India. The commercial banks are key players in mobilizing and disbursal of financial resources and thus, contribute to the growth and development of an economy.

Several phases of major paradigm shifts have been undertaken by the Indian banking sector such as nationalization and directed credit with focus on mass banking, promoting socio-economic development. The Indian financial sector underwent a radical change from the relatively regulated environment to an open environment during nineties, amidst economic challenges of balance of payment crisis and fiscal deficit. The structural reforms focused on relaxation of restrictions as they hampered the efficient functioning of the markets and optimal resource allocation. Opening up of the economy has exposed banks to the liberalized global arena in terms of augmented

revenues. However, the adoption of prudential norms as part of banking reforms has also led to the disclosure of latent inefficiencies and inadequacies of Indian public sector banks, therefore heightened the concerns about banking soundness and stability, in particular. Various studies have classified the Indian banking as an episode of banking distress/crisis during the nineties. Some previous identified phases of distress based on event study methods are: i) 1994-95 on account of high level of non-performing assets in the system, classified as a crisis by Caprio and Klingebiel (1996) and ii) banking distress during the period 1991-99 based on profitability, nonperforming assets and capital adequacy of banks in India described by Khan and Bishnoi (2001).

According to a study (Raje, 2000), post-liberalization, India has not experienced any instance of contagion, systemic crises, bank closures or bank runs which usually symbolize banking crises. The study, however, suggests that the Indian banking system is still fragile since problems like growing non-performing assets, poor risk management systems and skills, and fluctuating operating performance from year to year still prevail. Hence, monitoring the fragility in the Indian banking sector becomes important for its economy to grow and develop.

The financial markets constitute another important pillar of the financial sector of any country. They help in fostering the economic development and growth through proper allocation of funds and facilitate liquidity in an economy. There are 9 official stock exchanges in Indian market out of which 2 are the major ones namely: Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). Indian stock market witnessed metamorphic changes post the financial sector reforms in early 1990s. One of the major reform constituted opening the Indian stock markets to international participants. In 1992, FIIs were allowed to trade in Indian stock markets under Portfolio Investment Scheme. By 2008, investments of FIIs soared and were recorded to be Rs.2,55,464.40 crores which makes up almost 9 percent of the total market capitalization. Over

the time, FIIs have emerged as important players in the Indian equity market as more and more FIIs are getting attracted by India's growth potential. However, the opening of markets has its own disadvantages as well. One of those disadvantages constitute increased volatility of markets and destabilization of the economy. As the significance of FIIs is undeniable in Indian stock markets, in case of a small economic problem, large and concerted withdrawals by these investors can destabilize the economy.

1.10. Structure of the Thesis

The remainder of the thesis consists of 4 chapters organized as follows:

Chapter 2 reviews the relevant literature on theories underlying financial crises targeted at understanding the dynamics and causes of financial crises. The literature then focuses on prevention of financial crises through development of Early Warning Systems (EWSs) and the methodologies adopted in constructing of an EWS. It covers the success and failures of such models in predicting the probabilities of rare extreme events. Finally, literature on behavioral approach has been reviewed to explore it as an alternative approach or rather, a supplementary approach in explaining the onset of such events and establishing the behavioral indicators in prediction and prevention of financial crisis. Through review of literature, key gaps have been identified which have helped in formulating the key objectives and developing research design.

Chapter 3 acts as a skeleton for the research undertaken in the thesis. It lays down the details about the research framework and design adopted for the study. It discusses the key objectives and the related hypotheses framed with the details of the data collected, data sources and the methodologies employed in the conducted research.

Chapter 4 presents the models employed for the study, the data analysis, inferences drawn from the analysis and the results derived from each section of the study. This chapter discusses the role of macroeconomic and financial variables in acting as leading indicators of an anticipated financial crisis. It also discusses the role of new tools and techniques like Artificial Neural Networks (ANNs) in improving the predictive power of EWSs. Thirdly, it explores and discusses the role of investor sentiment as a leading indicator in predicting the probability of a financial crisis, particularly in context to India.

Chapter 5 summarizes the overall thesis by presenting the findings, limitations of the study, its contribution to the knowledge, the relevance of research outcome to policy makers and investors. It also suggests the scope for future research in the area.