CHAPTER 2
REVIEW OF LITERATURE

Literature Review pertaining to the analysis of Net Interest Spreads is categorized into the following:

I. Determinants and Trends of Net Interest Spreads

II. Risk Management and Net Interest Spreads

Net Interest Spread is an indicator of the performance and efficiency of banks. The identification of factors impacting Net Interest Spreads has implications for both, bank managers as well as policy makers.

I. Determinants and Trends of Net Interest Spreads

This section pertains to the Determinants and Trends of Net Interest Spreads of the Scheduled Commercial Banks (Public, Old Private, New Private and Foreign Banks). Both Indian and International Evidence is cited for Determinants and Trends in the Net Interest Spreads.

Leite and Sundararajan (1990) concluded in their study on “Issues in Interest Rate Management and Liberalization” about World-Wide Trends towards Financial Liberalisation for the period 1970 to 1990, that lower interest rates would lead to more investment only if more savings were forthcoming. Extremely low interest rates will not just add to more investment. The aim was to keep real interest rates positive in order to prevent non-productive hoarding of goods. Emphasizing interest rate differentials between countries, it was observed that interest rates should be set in consideration to interest rate differentials in comparison to world financial markets, taking into account the economy's degree of openness to capital movements. If two economies were totally open to capital movements, their interest rate differential would tend to be almost equal to the expected movements in the exchange rates between their currencies. In certain cases, where there was some but not perfect capital mobility, the interest rate differential, after allowance is made for exchange rate rate expectations, should not be too large so as to prevent destabilizing capital movements. The strategies for financial liberalization as adopted by various countries
tantamount to: (a) The savings deposit rate was used as the minimum basic rate and a benchmark for all other rates. The government could then intervene in the financial markets by adjusting the savings deposit rate in line with the various monetary policy criterion, whilst also monitoring its effects on the interest rate structure; (b) Some governments have set a minimum deposit rate and a maximum lending rate, and over a certain period of time adjusted the floor and ceiling rates to bring about a gradual but subsequent liberalization of the system; (c) An alternative suggested was that in some countries interest rate range was set for the deposit rates and lending rates separately, and commercial banks were to set the aforesaid rates within these ranges. The authorities then could widen the range over time for effective liberalization of the rates and (d) Another alternative that was majorly dependent on market forces was that the government fixes the maximum spread between the average cost of funds to the financial institutions and their lending rates, and also allows them to determine the interest rate levels. If the spread as permissable by the authorities took into account risks, normal intermediation costs, and profits (but not monopolistic or oligopolistic profits), the result, would be an interest rate mechanism similar to the equilibrium rates as under competitive conditions. It was concluded that actual financial liberalization of interest rates was possible only through the above mentioned strategies.

Kaminsky and Reinhart (1996) studied the macro economic factors and variables that act as early warning signals for recessionary conditions. Analysing major global banking crises in the period 1970 to 1995, it was found that the macro economic variables detrimental to the growth of a sound banking system pertained to a decline in economic activity, falling stock markets, weakening of the export sector and extremely high real interest rates in the banking system. These factors usually precede both, banking, as well as currency crises. Besides these, credit expansion, abnormally high money growth rates and a decline in terms of trade are also some of the other factors that precede banking crises. Moreover, very high and positive real interest rates were also cited as a macro economic variable preceding a financial crises.

Angbazo, L. (1997) using Generalised Least Squares(GLS) studied the link between Net Interest Margins, Interest Rate Risk and Default Risk of different classes of banks for the time period 1989 to 1993 in U.S.A. It was observed that money-centered banks were not sensitive to interest rate risks but to default risk due to higher
exposure to off-balance sheet activities. The super-regional banks were more sensitive to interest rate risks due to less exposure to off-balance sheet activities of banks, but less prone to default risk. The local banks were exposed to both default risk and interest rate risk. Thus banks, by their categorization, were more or less exposed to Interest Rate Risk and Default Risk.

**Kunt and Huizinga (1998)** pointed out the differences in the impact of foreign ownership between developed and developing countries using a cross-country study of variations in Bank Performance using Regression Analysis. The data set was at bank level for 80 countries over the period 1988 to 1995. In the developing countries, foreign banks have greater Net Interest Margins and profits than the domestic banks. In the developed countries’, the opposite case holds true. The first finding points out to the lower Non Performing Assets’ (NPAs) of foreign banks by their country of origin in India. The foreign banks because of their higher per capita GDP have much better banking opportunities and operating environment than domestic banks.

**Shaffer’s (1998)** study of the Non Performing Assets of the Spanish Banks during the period 1985 to 1997, based on Panel Data concluded that the Non Performing Assets of banks differed by type of loan. Firms and Households both contribute to Non Performing Assets. But on an average, the households’ NPA’s or bad loans were lower than those of the firms’. Among households, mortgages had lower delinquency levels compared to credit loans, consumer loans, or overdrafts. The various categories depicted that an adverse selection of the aforesaid categories had a persistent worsening effect on the banks which were comparatively new entrants in the market. An adverse selection further impacted many banks’ profitability.

**Ajit and Bangar (1998)** used a number of indicators: Profitability Ratio, Net Interest Spread, Capital Adequacy Ratio, and the Net NPA Ratio for the period 1991 to 1997 for analyzing the performance of the Indian Public Sector and Private Sector Banks. The conclusion drawn was that the Private Sector Banks out-performed the Public Sector Banks. Despite having lower Net Interest Spreads, the Private Sector Banks had higher Return to Assets. Private Sector Banks thus demonstrated greater efficiency with profitability.

**Saunders and Schumacher (2000)** using the GLS model, while studying the determinants of Net Interest Margins (NIMs), for 1998 to 1995, for six selected
European Countries and U.S.A, contended that the regulatory aspects in the form of reserve requirements, interest-rate restrictions on deposits, and capital-to-asset ratios have a significant impact on banks’ NIMs. For the seven countries studied (UK, USA, Germany, Italy, Spain, France and Switzerland), a 1% increase in the volatility, increased the bank’s NIMs by 0.2%. This suggested that macro-policies consistent with reduced interest-rate volatility (e.g., low inflation policies) could have a positive effect in reducing NIMs. Also, it was highlighted that greater the monopoly power exerted by the banks, greater are the Net Interest Margins.

Eichengreen and Arteta (2000) analysed a sample of 75 emerging markets and traced the causes of financial distress and the reasons for interest rate liberalization in the period 1975 to 1997. A boom in domestic credit was a major cause of financial distress; macro-economic policies leading to excessive loaning out, and financial overheating generally did set the stage for future economic problems. Domestic interest-rate liberalization often accompanied the excessive lending activities of banks.

Joseph, Sinkey, and Carter (2000) studied the financial characteristics of USA’s Commercial Banks that use derivatives and analyzed its impact on bank spreads. The empirical approach utilized the differences in means and regression (Tobit) analysis to investigate the relationship between the extent of derivatives usage by commercial banks and certain other financial characteristics as of year-end 1996. It was analyzed that banks with low Net Interest Spreads attempt to increase fee income by speculating and selling derivative products, while banks with high Net Interest Spreads attempt to lock in their spreads by using derivatives to hedge. Larger banks which have smaller Net Interest Spreads use derivatives to increase fee income from Off-Balance Sheet (OBS) activities. Smaller banks use derivatives to protect their Net Interest Spreads.

Arpa (2001) studied the effects of business cycles on Austrian Banks’ Risk Provision and Earnings in 1990s. During a period of falling real GDP growth, risk provisions increased. Also, rising real estate prices lead to higher provision allocation, while falling inflation depressed the provisions. Macro economic variables such as consumer prices and real estate interest rates were significant in explaining the profitability of the Austrian Banks.
Chaudhuri, S. (2002) assessed that Indian Public Sector Banks during 1991 to 2001 faced reduced profitability due to their nature of ownership and also due to their goals and priorities as was also authenticated using various profitability ratios. It was further contended that the PSBs are sometimes faced by compressed profitability due to the high burden of NPAs. Moral suasion and more direct methods are imperative to reduce their lending spreads, which further threaten to compound the difficulties of the PSBs. Upon linking the profitability aspect of PSBs and their bank spreads, it was concluded that if banks enjoyed higher Net Interest Spreads, and if all other things remained constant, then they would be able to withstand the risk associated with higher NPA generation. By squeezing the Net Interest Spreads of banks, their ability to per-se absorb the risk associated with lending to sub-prime categories was threatened.

Das, A. (2002) using Data Envelopment Analysis of Risk and Productivity changes of Indian Public Sector Banks, contended that insufficiently capitalised banks have lower productivity and were subject to a higher degree of regulatory pressure than adequately capitalised banks for the period 1995 to 2001. It was observed that productivity changes and capital risk are to a great extent intertwined, and to a degree, reinforcing and complementing each other.

Mohan, T. (2002) while assessing the performance of the Indian Public Sector Banks since bank deregulation set in motion in 1992-93, based on Ratio Analysis, concluded that the banking system neither collapsed nor was there a banking crisis after the Post-Reform Period. The Public Sector Banks due to the stringent regulatory framework stayed away from risky assets like real estate and stock market. Also, the harmful impact of full capital account convertibility as faced by a few developing countries’ banks was skipped in the case of Public Sector Banks. Moreover, there had been a tendency towards Net Interest Spreads’ convergence across all bank groups except foreign banks.

Reddy, A. (2002) summarizing the international experience about Net Interest Spreads and profitability from late 1990s to 2002, using Ratio Analysis, found that the financial systems in the developing countries demonstrated comparatively high and persistent Net Interest Spreads than the developed countries due to the fact that cost of poor quality loans was shifted to bank customers through higher Net Interest Spreads.
Zoli (2001) stated that an increase in Net Interest Spreads signaled that banks are facing riskier borrowers and hence charging them higher rates of interest, or that banks needed to cover larger expenses due to loan losses. Hence, a decline in spreads is interpreted as an improvement in efficiency. Also, for the undercapitalized banks it was concluded that they faced distorted incentives in extending new loans and were prone to excessive risk-taking and high Net Interest Spreads. Implicit taxes such as Cash Reserve Ratio (CRR), Statutory Liquidity Ratio (SLR) and Priority Sector Lending are relatively greater in the developing countries, which is also a cause for higher Net Interest Spreads. It was further stated that in the long-run, the banking system should be stable and efficient to enhance the overall development of the country. Stability clearly requires sufficient banking profitability, while economic efficiency requires Net Interest Spreads that are not too large. An essential condition to formulate effective banking policies is to understand the determinants of bank profitability and Net Interest Spreads (Asli and Harry 1999).

**Bhide, Prasad, and Ghosh (2002)** assessed the interest rate deregulation structure of India during the years 1981 to 2001, and concluded that interest rates deregulation allowed banks the freedom to determine deposit and lending rates. On the deposit side, the interest rate on saving deposits was administered (fixed at 4 percent) whereas, on the lending side, the sub-prime lending rate (PLR) had been permitted. The maximum spread was restricted to 4 per cent over the PLR of each bank, and there was a ceiling of PLR on small loans upto Rs 2 lakh (till the year 2002). Citing some of the weaknesses of interest rate deregulation, it was concluded that there did not appear any systematic mechanism for the interest rates structure. Also, when different authorities used different interest rates in the financial system, it could impinge upon the signaling attribute of the bank rate.

**Souza, E. (2002)** opined that it was the Narasimham Committee (1998) which highlighted the weak loan recovery, poor capital position, high cost and low profitability of the Indian Public Sector Banks. The Committee signaled these causes, specifically to the managerial and policy environment within which banks had operated, and sought to improvise the overall efficiency of the banking system by the introduction of transparency in operations, thus enabling the banking sector to operate in a sound financial framework. Hence, controls on interest rates were removed, pre-emption of bank assets were significantly reduced, and supervisory and regulatory
standards were strengthened with the introduction of new norms of asset classification. Also, Capital Adequacy Requirements were formulated based on Narasimham Committee’s initial recommendations. The Ratio Analysis Methodology was used for analyzing Profitability and Efficiency of the PSBs in the 1990’s.

**Barth, Caprio, and Levine (2002)** using Correlation and Regression for 107 countries from 1998 to 2001 opined that regulations that encourage private monitoring of banks are associated with better banking sector outcomes like overall banking development, lower Net Interest Spreads and smaller Non Performing Assets. However, it was concluded that regulations that foster private monitoring do not necessarily imply a reduction in the likelihood of suffering a major banking crisis. Also, it was highlighted that there is no robust link between the regulations and restrictions on bank activities and Net Interest Spreads.

**Impavido, Musalem, and Tressel (World Bank Study) (2002)** studied contractual savings organizations (pension funds and life insurance companies) for Argentina, Brazil, Mexico, and India, and concluded that they do not increase the rate of savings but shift the composition of total savings towards long-term financial assets on the basis of balance sheet and income statement of unbalanced sample of commercial banks over the period 1991 to 2000, as aggregated by a country each year. The significance of the relationship between the development of contractual savings institutions and banks’ profitability and loan maturity choices was emphasized. The potential ways through which the development of contractual savings institutions may affect the banking sector was further discussed. The development of contractual savings institutions had a major impact on Net Interest Spreads and loan maturity. If these institutions were competitors to banks, then banks may respond to the competitive pressures by concentrating on their basic comparative advantage (as associated to narrow banking), by increasing the short-term loans provision. But, since price competition existed, it is likely expected that a decrease in Bank Net Interest Margins would henceforth follow as contractual savings institutions further developed as competitors. On the other hand, if contractual savings institutions provided resources to the banking system as a whole, either in the form of deposits, loans, or by buying securities issued by banks, the latter will be comparatively less subject to liquidity risks at a given level of long-term assets. The banks, then, may increase the supply of long-term loans.
Kunt, Laeven, and Levine (2003) examined the impact of banking regulations, concentration, and institutions on Net Interest Spreads by taking bank level data across 72 countries and using Generalized Least Squares with Random Effects, and country-specific variables for the time period 1995 to 1999. It was observed that individual bank characteristics explain a substantial part of within-the-country variations in Bank Interest Spreads, whereby high margins usually tend to be associated with small banks; banks that hold a low fraction of liquid assets; banks that hold a relatively low amount of capital; banks without substantial income from fee-based activities, and banks with a large market share. This finding is consistent with the view that banks that are relatively large compared to the market can exert market power to increase rents and income.

Levine, R. (2003) used Generalized Least Squares Estimator with Random Effects for 1200 banks for 47 countries during 1997 to 1998 and found that restrictions on foreign banks entry – as proxied by ‘fraction foreign denied’ – is positively correlated to Net Interest Margins. The restrictions on foreign banks’ entry, boosts the gap between interest received and interest paid as a fraction of interest earning assets. Further, the findings are confirmed when using instrumental variables to proxy for the differences in national institutions that use different policies towards foreign banks. These instrumental variables results imply that restricting foreign banks entry increases Net Interest Margins, and with a caution that this relationship may reflect even deeper institutional characteristics.

Kamath, Kohli, Shenoy, and Kumar (2003) in a colloquium of distinguished panel of managing directors and chief executive officers of well known banks, recognized the numerous challenges faced by the Indian Banks in the Post-Reform Period (1991 to 2003), by way of increased competition, pressure on Net Interest Spreads and systematic changes of alignment of banks in accordance with international standards. These necessitated a re-evaluation of strategies and processes in order to remain competitive in the future’s dynamic environment. They also recognized that banks would be henceforth under pressure to diversify their income streams further for future. Also, it was cited that the importance of bank lending could be expected to decline as capital markets competed with the banking system more closely. This effect was termed as “disintermediation”.
Jadhav, N. (2003) observed that during the Pre-Reform Period (1969 to 1991), a complex structure of interest rates existed in the Indian Banks, and due to the provision of direct and concessional credit to certain sectors, cross-subsidization among borrowers was encouraged. Moreover, due to the complex interest rate structure, the maintenance of Net Interest Spreads adversely impacted the regulation of both, deposits and lending rates. This resulted in distorting interest rates mechanism which adversely affected the viability and profitability of banks. The lack of due recognition to the importance of accountability, transparency, and prudential norms in the smooth operations of the banking sector led to a rising burden of Non Performing Assets. Also, the joint balance sheets of the Government, RBI and Commercial Banks, together with the transactions between the three segments, were governed by plan priorities than sound principles of financing. The Camel Model (Capital Adequacy, Assets Quality, Efficiency of Management, Quality of Earnings and Liquidity of Financial Institutions) for the period 1981 to 2003 for calculating Financial Parameters for the SCB’s was used, and it was found that reforms have brought efficiency into the banking system by way of a reduction in Net Interest Spreads.

Sensarma and Ghosh (2004) summarized Net Interest Spread as the difference between interest earned and interest expended by a bank divided by its total assets and is considered an indicator of bank performance and efficiency. An empirical approach was followed whereby results were obtained for the determinants of Net Interest Spreads of the Indian Commercial Banks during the period 1997 to 2001 using Panel Data Model. A competitive banking system catered to greater efficiency through a lower Bank Interest Spread. Due to the banking sector reforms in 1991, Interest Spreads in the Indian Banking Sector did come down, but the decline was slow. A comparative analysis of Bank Spreads of the developing and developed countries revealed that NIM in the developing countries was higher than in the developed countries. The reasons were lack of sufficient competition, higher intermediation costs, and lagged responses to changing regulations. It was concluded that: (a) Proportion of investment in government securities adversely affected Net Interest Spreads. If less investment was done in government securities, then banks could have invested in other options which give higher returns and generate more interest income; (b) Proportion of advances to the Priority Sector positively affected NIM. Due to the removal of interest rate subsidy on priority sector loans, it was considered
a viable business option for banks to lend to the Priority Sector and to park the shortfall in the Rural Infrastructure Development Fund (RIDF) of National Bank of Agricultural and Rural Development (NABARD) to meet priority sector lending targets; (c) Higher Capital Adequacy Ratio was associated with higher Net Interest Spreads. This was because banks with higher Capital to Risk Weighted Assets Ratio (CRAR) seek more interest income in order to maintain high levels of capital which get reflected in higher Net Interest Spreads; (d) Higher Non Performing Assets (NPAs) were associated with lower Net Interest Spreads. Banks with high Non Performing Assets shifted their loan portfolio away from risky activities to prevent negative effect on their bank spreads; (e) Nature of Ownership was also a significant determinant of Net Interest Spreads; (f) Foreign banks had the highest Net Interest Spreads, followed by Public, Old Private, and New Private Banks, and (g) the proportion of non-interest income to total assets signifies fee-based activities of banks. Higher Income from fee-based activities allowed the banks to tolerate lower levels of Net Interest Spreads.

Nachane and Ghosh (2004) summarized Net Interest Spreads as a measure of intermediation profitability before credit losses. They connected the Credit Ratings and Net Interest Spreads value’s impact on the Credit Ratings of Indian state-owned Banks using quarterly data for the period 1997 Q1 to 2002 Q4, besides considering the impact of several other variables on the Credit Ratings of banks using Multinominal Logit Model. Net Interest Spreads i.e., the difference between total interest income and total interest expenses, can be taken to be a proxy for earnings. The banks with low Net Interest Spreads would attempt to increase fee income by selling derivative products and thus, due to the diversification, besides the traditional banking activities, could get a better Credit Rating. Banks with high Net Interest Spreads might be inclined to lock-in their spreads by not using hedging instruments. A high Net Interest Spread in the long-run would translate into a lower Credit Rating for the bank as it would be interpreted as an evidence of the absence of diversification of banking operations.

Mohan, R. (2006) emphasized that the basic objective of banking supervision was to ensure that banks are financially sound, well managed, and that they do not pose a threat to the interest of their depositors. The emphasis of supervision, after the initiation of reforms (1991) had shifted from the traditional CAMELS (Capital,
Assets, Management, Earnings, Liquidity and Interest Rate Sensitivity Model) to a more Risk-Based Approach as per Basel II (2004) norms to ensure financial stability which encompass risk analysis, using a ‘three-pillar’ concept, that is, Minimum Capital Requirements, Supervisory Review, and Market Discipline.

Nachane and Ghosh (2007) contended that off-balance sheet activities (OBS) of Scheduled Commercial Banks comprised of four categories; (a) swap and hedging transactions; (b) bank guarantees; (c) loan commitments, and (d) investment banking activities. These OBS activities generate fee for banks but also increase bank risk. The banks use them as a means of augmenting earnings to offset reduced spreads on traditional On-Balance Sheet corporate lending business. An empirical analysis of the Off Balance Sheet Activity of the Indian Banks for the period 1996-2004 was conducted to identify the determinants of the off-balance sheet activities of the banks, using the Logistic Diffusion Model.

Souza and Sobrinho (2007) highlighted cross-subsidization of interest rates between borrowers on loans in Brazil using the Ratio Analysis Methodology for 2001 to 2006. It was concluded that Net Interest Spreads were extremely high in Brazil, being ten times larger than the typical spreads in the developed countries, and three times larger than the Latin American average. This regulation took the form of credit and interest rate controls. Specifically, Brazilian commercial banks were required by law to allocate a large fraction of their funds to selected borrowers at below-market interest rates. The banks then compensated the losses they made in such selected loans by charging a disproportionately higher spread to the non-selected borrowers which increased the overall Net Interest Spreads.

Ketkar, S. and Ketkar, W.(2008), using the Fixed and Random Effects Multiple Regression Model (Panel Data), contended that since 1997, Net Interest Margins had declined in every segment of the Indian banking system. The Nationalized Banks and their profit margins, with and without taxes, had improved, but the private banks’ Net Interest Margins and profits started improving since 2005 and outstripped the overall industry margins. It was concluded that the industry-wide net profit margins peaked in 2004, and had not recovered from their downward spiral since then. However, the banks had gained in efficiency in terms of producing the specified outputs, and also on an individual basis, the banks performed better in the Post-Reform Period (1991 onwards).
Saxena and Villar (2008) highlighted the spread of Derivatives in the emerging markets namely Brazil, India, Korea, Mexico, Russia, and South Africa from 1990s to 2008. The demand for hedging in the Forex Market was driven by investors’ desire to invest in the emerging markets for bonds and equities. The Forex Derivatives Markets are however, most developed in countries with deep and efficient Spot Markets (e.g., Hong Kong and Singapore). However, they have also developed in some of the Emerging Market Economies (EMEs), namely Brazil, India, Korea, Mexico, Russia, and South Africa. The banking sector was the biggest user of Over the Counter (OTC) Derivatives in EMEs. Among Forex Derivatives, Forex Swaps dominated the OTC Derivatives Market in EMEs as they enabled the foreign investors to access the local money market. Forex Forwards were dominant in Korea and Taiwan and were fairly liquid in Chile, Hong Kong, India, Russia, Singapore and South Africa. Currency Swaps consisted of a very small share of Forex Derivatives and were traded mainly in Brazil and Korea. Forex Options had relatively larger trading volumes in Hong Kong, India, and Singapore.

Blas, B. (2008) using Ratio Analysis upon bank-level data for 80 countries between 2000 and 2006, concluded that by allowing Foreign Direct Investment (FDI) in the developing countries’ banking sector, their Net Interest Margins used as a proxy of lending-to-deposit rate spreads, increased as opening the financial sector to mergers and acquisitions by foreign acquirers accelerated average Net Interest Margins (markups). Moreover, interest rates on borrowings/loans declined due to improved efficiency and increased competitiveness between the banks. As a result, increased FDI flows were witnessed during 2000 and 2006 in developing countries and NIMs were finally determined by the banks. The phenomenon is also relevant for the less developed countries where it is harder to implement the technology adopted by foreign banks, and for countries where there are more limitations on entry by the domestic banks.

Subbarao, D. (2009) assessed the impact of the Global Financial Crisis (2007-08) on India. It was observed that over the last five years (2003 to 2008), the unprecedented 9 percent growth was driven by domestic consumption and investment. The Indian Banking System has had no direct exposure to the sub-prime mortgage assets or to the collapse of institutions. It had very limited off-balance sheet activities or securitized assets. But the Global Financial Crisis had an indirect impact on the Indian economy;
as prior to it, easy liquidity and low world interest rates were available. Thus, its aftermath impacted India’s growth trajectory in terms of less investments and exports.

**Maudos and Solis (2009),** using both Static and Dynamic Panel Data Model for the period 1993 to 2005 in Mexico, observed that if banks had higher Operating Costs but also adequate Market Power then they passed that on to the customers in the form of higher Net Interest Margins, and thus enjoyed higher Intermediation Margin. The banks even protected themselves from a high volatility of market interest rates by charging higher Net Interest Margins. In addition, it was observed that banks that are managerially inefficient selected less profitable assets and high-cost liabilities, leading to lower margins. Also, banks with high levels of implicit interest payment tend to set a higher margin because it represented an additional expense.

**Altunbas, Gambacorta, and Ibanez (2009)**, using the Panel Regression Model for the period 1999 to 2005, contended that the dramatic increase in securitisation activity experienced in Europe in the years following the introduction of the euro had altered the liquidity, credit, and maturity transformation role traditionally performed by banks. They claimed that the changing role of credit intermediaries due to securitisation had also modified the effectiveness of the bank lending channel and banks’ ability to grant loans in a constructive way. The use of securitisation shelters banks’ loan supply from the effects of monetary policy. Securitisation activity had also strengthened banks’ capacity to supply new loans. The capacity to supply new loans also depended on business cycle conditions and, also on banks’ risk positions. The study validated the importance of securitization as a risk hedging tool in the European Banks.

**Thorsten, Kunt, and Levine (2009)** studied the recent trends in the structure and development of financial institutions and markets across countries based on their bifurcation into high-income, middle-income and low-income countries from 1995 to 2007. Lending and debt issues were more concentrated in the high income countries, while the low and lower-middle income countries experienced an increase in remittance flows. Lower Net Interest Margins, rising profitability through off-balance sheet activities, and declining stability in the high-income countries’ banking sectors led to the financial sector boom in the high income countries, and finally culminating into the Global Financial Crisis of 2007. Moreover, while analyzing the profitability
of banks, different patterns of different income groups across countries were observed. Poorer countries have high Net Interest Margins and overhead costs. Net Interest Margins exhibited a decreasing trend between 1995 to 2007 in the median-income countries. While Net Interest Margins have been low and relatively stable in the high-income countries in the same period, there has been a significant declining trend in the Net Interest Margins in the upper-middle income countries. Net Interest Margins in the median-low and lower-middle income countries, categorized on the basis of the level of income, witnessed a decreasing trend between 1995 to 2007. Overhead Costs displayed a decreasing trend across all income groups.

**Fadzlan and Muzafar (2010)**, using the Data Envelopment Analysis Method, highlighted the impact of the Post-Asian Financial Crises (1997) on Net Interest Spreads in Thailand, and the efficiency of the Thai Banking Sector during the period 1999 to 2008. The sharp decline in its domestic currency had damaging effects on its leading banks’ balance sheets and their capital adequacy. In response to the depreciating exchange rate, the Bank of Thailand (the Central Bank of Thailand) raised interest rates on deposits. This resulted in a decline in bank revenues, as banks could not pass on the higher interest rates to the distressed corporate borrowers, thus ending negative Net Interest Spreads, and subsequently a reduction in the net income of banks. Major structural changes have occurred in the Thailand Banking Sector now. Prior to the Asian Financial Crisis in 1997, the Banking Sector had been sheltered from foreign competition. In the aftermath of the crisis, the government launched two major strategies to revive the financial sector. First, several ailing financial institutions were nationalised or merged with the other Thai commercial banks. Second, the banking sector was re-capitalised by relaxing regulations on foreign shareholding limits in the Thai Commercial Banks.

**Delis and Kouretas (2011)**, using Panel Random Effects upon 18000 annual observations on European Banks for the period 2001 to 2008, contended that strong empirical evidence existed about the fact that low interest rates increased banks’ risk-taking substantially. Also, the distributional effects of interest rates on bank risk-taking due to individual bank characteristics revealed that the impact of interest rates on risk-prone assets diminished in the case of banks with higher equity capital, and was greater for banks with higher off-balance sheet items.
Sidabalok and Vivrita (2011), using a Dynamic Panel Data Methodology, analyzed the Indonesian Banks’ Net Interest Margins and their determinants during the period 2003 to 2009. It was found that there was a high and persistent Net Interest Margin of the Indonesian Banks. The evidence also revealed that high Net Interest Margin was caused by a wide pure spread as well as banks’ market power. Furthermore, it was also found that the previous NIM is the main and continual determinant of Net Interest Margin. This indicates that the more a bank is reluctant to take risks, it will set a higher Net Interest Margin (Ho and Saunders, 1981). Theoretically, the larger the size of a bank’s operations, the higher is the risk of failure (default loan). Therefore, banks tend to set high Net Interest Margins.

Tarun, Chekol, and Mutwol (2012) analyzed the bank-specific, industry-specific and macroeconomic determinants of Net Interest Margins of 44 Kenyan Banks using pooled OLS and Fixed Effects (Panel Data) Banks for the period 2000 to 2009. They found that that operating expenses had a positive and significant impact on Net Interest Margin of the commercial banks in Kenya. Also, Credit Risk tended to be positively associated with Net Interest Margin, and market concentration influenced Net Interest Margins adversely. A negative concentration effect found in the Kenyan market may be attributed to the high concentration of foreign banks which exhibited lower Net Interest Margins. Therefore, a market mainly characterized and dominated by foreign banks, had lower Margins because of superior management or better production technologies in Kenya.

Ewijk and Arnold (2013) analyzed the determinants of Net Interest Margins in the U.S. Commercial Banking Sector using factor analysis with bank-level data during the years 1992 to 2007. Many banks in the U.S. moved from a Relationships-Oriented (ROM) to a Transactions-Oriented Model (TOM) of financial intermediation, because of their ability to invest in customer-specific information which was ‘soft’ in nature. These locally focused banks had the potential to earn higher Net Interest Margins by paying a lower interest rate to a loyal base of core depositors in the case of Relationship-Oriented Model. Also, they can charge high interest rates to an information-problematic category of borrowers, which otherwise would have problem in obtaining funding from the capital markets, and over which they have substantial market power due to information-based switching costs. In contrast, Transaction Banks focus mainly on the effective use of ‘hard’ information and the
commoditization of financial services’ provision. Transaction Banks take advantage of the economies of scale concept in the marketing, production, securitization and servicing of ‘transaction loans’. These banks operate with lower unit costs, but are likely to earn lower Net Interest Margins as they are primarily selling financial commodity products in highly competitive markets. As a result, the margins for transaction banks are likely to be smaller. This transition from Relationship-Oriented Banks to Transactions-Oriented Banks was significantly visible in the U.S. banks.

Summary

The main Determinants of Net Interest Spreads, after the review of the aforesaid studies, can be summarized as follows:

(a) Larger banks can operate with lower margins by way of scale efficiencies achieved. Larger the Bank Size, lower the Net Interest Spread and vice- versa.

(b) High Non Performing Assets put pressure on the banks to increase the Net Interest Spreads.

(c) Greater the diversification banks achieve through fee-based activities, the more the banks can tolerate lower Net Interest Spreads.

(d) The shortfall of lending to the Priority Sector is parked in the Rural Infrastructure Fund of NABARD, such that Priority Sector Advances now positively impact Net Interest Spreads. The Subsidy or Caps for the provision of Priority Sector Advances at soft rates have been majorly reduced in Indian Banks.

(e) Higher Growth Rates increase Loan Demand and subsequently lead to higher Lending Rates or increased Net Interest Spreads.

(f) Increased Level of Capital Stability attracts low cost deposits of the banks due to the positive impact of depositor’s confidence in the banks.

(g) With increased inflation, banks face a difficulty in deposit accumulation and thus raise their deposit rate which eventually leads to lower Net Interest Spreads.
II. Risk Management and Net Interest Spreads

This section of the Review of Literature deals with the Risk Management Practices as followed by banks to effectively maintain their Net Interest Spreads. The studies pertaining to the same are listed below.

A Survey on the ‘Implementation of the Capital Adequacy Directive’ by the Banking Federation of the European Union, April 1998 (covering 17 countries), highlighted that very few banks are using sophisticated and complicated models for managing their risks. Most banks which use it, do so for the purpose of internal risk management only.

Vaidyanathan, R. (1999) summarized various strategies of Assets and Liability Management in cases where a bank was Asset-Sensitive or Liability-Sensitive. He asserted that earlier (in 1980s) Indian Banks focused on Primary Asset-Sensitive Strategies as low costs deposits were available. Later (1990 onwards), due to the paucity of low cost deposits, Liability-Sensitive strategies were also adopted. He analysed different categories of risks and dealt with strategies like Duration Gap, Traditional Gap, Value at Risk Method, and suggested Simulation tests for Interest Rate Risks primarily.

Nachane, Ghosh, Narain, and Sahoo (2001) examined the Indian Public Sector Banks over the period 1997 Q1 to 1999 Q4 and used the Dynamic Multivariate Panel Regression Model to study the relationship between the risk appetite of banks and their level of capital. It was observed that in the context of directed credit, risk-taking activities and, market risks were not accurately reflected in interest spreads, and the changes in risk appetites of banks and their level of Capital to Risk Weighted Assets Ratio (CRAR) was pivotal and needed to be captured effectively before further policy actions.

D.M. Nachane and Saibal Ghosh (2002), using Pooled Data Analysis pertaining to the Indian Public Sector Banks for the period 1995 to 2000, identified the factors influencing their Off-Balance Sheet (OBS) activities. The analysis revealed that: (i) ‘size’ plays an important role in influencing OBS activities, and, (ii) higher the levels of capital and liquid assets, lower the incentive of the banks to engage in OBS activities. This is in context of the Hedging Theory, which contends that the aversion
to risk might be an important determinant of the OBS activities of the banks. As the PSBs had higher Capital and Liquid Assets, they engaged in lesser Risk Hedging activities than their counterparts.

Patnaik and Shah (2003), using the Net Present Value (NPV) Approach from September 2000 to December 2002 for 42 Scheduled Commercial Banks in India, asserted that if interest rates go up in the future, it would hurt banks funding long-maturity assets using short-maturity liabilities. Generally, banks have government bonds which make up 30 percent of their assets. Therefore, in this case, an increase in interest rates would often erode its net worth as the Present Value of their long-maturity assets would fall. If interest rates increased, then the value of deposits would not change, but the investment portfolio would henceforth depreciate. In India, while the RBI Guidelines advise banks to use Forward Rate Agreements and Interest Rate Swaps to hedge interest rate risks, these markets are quite small. Exchange-traded futures and options on interest rates have yet to come a long way hence. Thus, this avenue for risk-containment is essentially unavailable to the banks.

Raghavan, R. (2003) analyzed Risk Management in Indian Banks from 1988 to 2003 and categorized the broad risks into Market Risk, Credit Risk, Operational Risk, Environment Risk, Country Risk, Liquidity Risk, and Interest Rate Risk. These varied type of ‘risks’ were studied in purview of the BASEL Accord II (2001). Risk-based Supervision and Risk-Aggregation and Capital Allocation for the same were cited as important parameters.

Gup, Kolari and Fraser (2003) reviewed Asset Liability Management in USA’s Commercial Banking in the context of Risk Management from 1990 to 2003 and found it to be short-run in nature. Aggressive Asset/Liability Management focuses on increasing the Net Interest Margin by altering the portfolio of the institution and Defensive Asset/Liability Management focuses on insulating the Net Interest Margin by preventing an increase or a decrease in it due to changes in the interest rates. It was concluded that the changes in the Net Interest Margins can be categorized into: (a) changes caused due to interest rates; (b) changes caused due to volume of funds, and (c) changes caused due to the variation in the mix of assets and liabilities. Asset/Liability Management focuses on interest rate changes of the net interest income. A common measure of Asset/Liability Management is the Gap Analysis i.e., the
difference between the volume of interest-sensitive assets and interest-sensitive liabilities. The emphasis of the Gap Analysis is on the profitability and costs of assets and liabilities rather than on the value of assets and liabilities. If a bank had a greater volume of interest-sensitive assets than interest-sensitive liabilities, then it was termed as Asset-Sensitive. Also, if a bank had more interest-sensitive liabilities than interest-sensitive assets, then it was termed as Liability-Sensitive. An Asset-Sensitive Bank experienced a decline in Net Interest Margins when interest rates declined and a Liability-Sensitive Bank, a decline in Net Interest Margins when interest rates increased. The gap is calculated for a variety of time periods and sub-periods resulting in a cumulative and an incremental gap.

**Das and Ghosh (2004)**, using Two Stage Least Squares Regression in Simultaneous Equation, observed that Risk, Capital, and Operational Efficiency were interlinked in the case of the Indian Public Sector Banks during 1993 to 2000. Poor performers are more prone to risk-taking than better performing banking organizations, supporting the ‘gamble for resurrection’ argument (Dewartipont and Tirole, 1993). The positive effect of productivity and efficiency on capital is associated with regulatory pressure, more specifically for banks which fall short of the prescribed minimum capital adequacy standards.

**Hanweck and Ryu (2005)**, using the Dynamic Panel Data Model on 12 Banking Groups of USA during the period 1986 to 2003 examined the sensitivity of Bank Net Interest Margins and Profitability to credit interest rate and term structure shocks across banks’ product specializations. Mostly, the different Banking Groups were sensitive, in varying degrees to interest rate, credit and term-structure shocks. Large and more diversified banks seemed to be less sensitive to interest rate and term-structure shocks, but were more sensitive to credit shocks. It was also found that the composition of liabilities and assets, in lieu of their repricing frequencies, helped to amplify or moderate the effects of changes and volatility in the short-term interest rates on the Net Interest Margins of the banks.

**Reddy, Y. (2005)** upon analyzing the interest rate structure in India during the period 1992 to 2004 concluded that the interest rates in the Indian Banking System have been largely deregulated except for a few specific cases like Savings Deposit Accounts, NRI Accounts, Small Loans upto Rs.2 lakhs, and Export Credit.
Administered Interest Rates also prevailed in the small schemes of the government. Further, as an interest-risk management strategy in the case of deregulated interest rates structure, banks were required to maintain a separate Investment Fluctuation Reserve (IFR) out of profits towards interest rate risk. It was 5 percent of their Investment Portfolio under the category “held for Trading” and “available for Sale”. As the IFR was announced when banks were making gains on their treasuries in the falling interest rates scenario, those unrealized gains coupled with the IFR fund created, were anticipated to help in cushioning the losses when interest rates in the long-run would move up.

Sarkar, A. (2006) asserted after analyzing the Indian Derivatives Market during the period 1990 to 2005 that there remained major areas of concern for the Indian derivatives users. In the category of equity derivatives, National Stock Exchange (NSE) figures showed that almost 90% of the activity was due to stock futures or index futures. Besides, trading in options was limited to a selected few stocks, as they were settled in cash and not the underlying stocks. Also, Exchange-Traded Derivatives based on interest rates and currencies were virtually absent.

Subramanian, V. (2006) highlighted the scope and objectives of Risk Management System in the Indian Banks from 1990 to 2005, and further emphasized the steps involved in transforming risk management from the traditional control-orientated process into a value-adding function. Various risks were identified and categorized as Credit Risk, Liquidity Risk, Interest Risk and Operational Risk, and a Risk Matrix Approach was followed whereby the mentioned categories of Risks were identified in the various Banking Sector Products. Also, steps of Risk Management were identified and categorized as (a) Risk Identification; (b) Risk Measurement; (c) Risk Control and Monitoring; (d) Capital Allocation, and (e) Risk Adjusted Performance Measurement and Value Management. It was also stressed that the significance of Integrated Risk Management was critical for effective value addition and also the role of capital as a cushion for risk taking was pronounced as pivotal by the Basel Capital Accord II (2004-05). In the Basel Accord II (2004-05), sweeping changes have been suggested for the computation of Capital Adequacy as Basel Accord I (1988) failed to achieve its objective of promoting safety and soundness of the financial system.
DM Nachane and Saibal Ghosh (2007) using data for 1996 to 2004 and applying Logistic Diffusion Model analyzed that the Indian Banks had increasingly made forays into newer domains of operation in order to augment their fee income and as a consequence, the Off-Balance Sheet (OBS) business then had gained prominence. The article elaborates the determinants of Off-Balance Sheet activities in the Indian Banking Sector. It was observed that besides the regulatory factors, the macro-economic conditions and market forces captured by banks’ specific characteristics also contributed in the diffusion pattern of Off-Balance Sheet (OBS) activities. From the regulatory consideration, while Capital Adequacy was a dominant concern in the case of Public Sector Banks, Non-Performing Assets seemed to be a prime concern for Foreign Banks, in addition to Private Sector Banks. Among other factors, at the bank specific level, ‘size’ was an important consideration for the Public Sector and Foreign Banks, while profits were a prime concern mainly for the New Private Sector Banks. Finally, the macro-economic environment seemed to have played an important role in affecting OBS diffusion, more specifically for Public Sector and New Private Sector Banks.

Mohan, R. (2007) asserted that the price discovery of exchange rates and interest rates, and the integration of these prices across markets helped in the efficient allocation of resources in the real sectors of the economy. Uncollateralised overnight transactions were then limited to banks and primary dealers for the overall financial stability during 1990 to 2007 for India. The reduction in bid-ask spread in the overnight rates illuminated the fact that the Indian Money Market had become deep, liquid and vibrant. Financial Market Reforms in India ensured a greater and deeper integration of various segments of the Financial Markets, a reduction in arbitrage opportunities, and also achieved higher level of efficiency in the market operations of the intermediaries and banks. These factors also improved the efficacy of monetary policy of the economy. Growing integration of the financial markets, beginning 2000, could be ascertained from cross-correlation among various market interest rates. The increased integration among various financial market segments was accompanied by lower volatility in interest rates. To match the evolution of the foreign exchange markets and the increased depth and volumes in the markets, various hedging instruments viz. foreign exchange forwards, swaps and options were permitted to the market participants particularly against foreign currency exposures.
Charumathi, B. (2009), using Ratio Analysis, emphasized that the ‘size’ of the banks did not matter in the case of interest rates swaps in the banking operation after analysis of 24 Indian Commercial Banks’ annual data for the year 2007-08. This study led to the conclusion that the larger banks (as explained by the total assets) and profitable banks (as explained by the profit before tax to total asset ratio) did not seem to have any comparative advantage in using interest rate swaps for hedging purposes. But banks with more exposure to interest rate risk, and high net worth, and higher loans to asset ratio, tend to be the larger users of interest rate swaps. In view of the rapid growth of interest rate swap market in India and narrowing of bid-offer spreads, the participation of banks in the swap market was going to be more substantial in the future.

Agarwal, R. and Arora, D. (2009) asserted that according to the RBI Guidelines on Risk Management in Banks (1999), the broad parameters of the Risk Management Function should encompass: (a) Organisational Structure of the financial institution; (b) its comprehensive Risk Measurement Approach; (c) Risk Management Policies should be approved by the Board and should be consistent with the capital strength, broader business strategies, management expertise, and overall willingness to assume risk; (d) Guidelines and other parameters used to govern risk-taking to include a detailed structure of prudential limits; (e) strong MIS (Management Information System) in place for reporting, monitoring and controlling risks; (f) well-laid out procedures for effective control through comprehensive risk reporting mechanisms; (g) separate Risk Management Framework, independent of operational departments and a clear segregation of levels of responsibility for the management of risk; and (h) its periodical review and evaluation.

Sensarma, R. and Jayadev (2009) examined interest rates risks as the risk of a decline in net interest income of a bank due to a change in interest rates. The paper interprets selected accounting ratios as risk management variables and attempts to gauge the overall risk management capability of banks by summarizing the accounting ratios as scores through the application of multivariate statistical techniques and studies the impact of these risk management scores on stock returns through regression analysis of Indian Commercial Banks for the period 1999 to 2006. It was concluded that the movements in interest rates affect the Bank Spreads and the
Return On Assets (ROA), and finally shareholders’ returns. Categorizing banks as Asset-Sensitive Banks and Liability-Sensitive Banks, it was concluded that the Net Interest Spreads of Asset-Sensitive Banks were impacted by falling interest rates, and those of the Liability-Sensitive Banks were impacted by rising interest rates. In order to manage interest rate risk, Indian banks have installed Asset-Liability Management Systems, adopted Duration Gap Analysis, and introduced risk control measures based on value at risk techniques, a measure of the risk of loss on a specific portfolio of financial assets. Net Interest Spreads reflect the resilience of banks to interest rates risks. The ratio of net interest income to total assets is an indicator of interest rate risk management capabilities of banks.

Srivastava, S. and Srivastava, D. (2010), using Analysis of Variance (ANOVA) Test, put forth that Interest Rate Risk, that is, the exposure of a bank’s financial condition to adverse movements in interest rate, is the most prevalent risk. Interest rate risk arises from holding assets and liabilities with different principal and maturity dates or reprising dates. Banks could reduce their interest rate risk by hedging with derivatives securities and by using the Asset/Liability Management Techniques. Their analysis was confined to two Indian Banks, SBI and ICICI for the period 2006 to 2009, and it was found that in the case of SBI, a negative correlation existed between the volume of assets, loans, deposits, demand deposits, Return on Assets (ROA), Return on Equity (ROE), Interest margins, NPAs, and Tier I capital on one side and investment in Interest Rate Derivatives (IRD) on the other. On the other hand, the ICICI Bank showed a positive correlation amongst all the variables but for demand deposits and ROA in accordance with the Interest Rate Derivatives.

Memmel and Schertler (2011), using the Ordinary Least Squares (OLS) technique, on the dataset of German Banks for the period 1999 to 2010, asserted that the price and weight changes explain more than 40% of the changes in the Net Interest Margin of the banks, where price changes are far more relevant than weight changes. Price changes incorporate all changes in premiums for banks' transformation functions, i.e., market-wide changes in the premiums for term, liquidity and risk transformations that give compensation to financial institutions for credit risk, interest rate and liquidity. Besides, weight change captured changes in the banks' balance-sheet structure, i.e., the changes in the on-balance risk exposure which contribute to the overall change in
the Net Interest Margin. The third component was the idiosyncratic change in a bank's Net Interest Margin capturing bank-specific deviations from the market-wide bank rates. Next, they attempted to link the price and weight changes to the use of Derivatives. Changes in the Net Interest Margin of banks using derivatives depend less on the weight and price changes than the ones of non-users. This finding is in line with the argument that Interest Rate Derivatives are majorly used to reduce the risk of on-balance exposure of banks. Finally, banks behave procyclically, i.e., weight and price changes are strongly and positively correlated; the correlation between weight and price changes is greater for banks using derivatives than for banks not using derivatives.

Saremi, H. (2011) highlighted the fact that due to competitive aggravation and contortion of work and business environment, the risk factor has increased and there will be ever increasing dangers in the Financial Sector as analysed for the period 1990 to 2011 globally. Financial managers at present are members of the Risk Committee and sometimes they undertake the main responsibility of the Risk Management Department of the Scheduled Commercial Banks. The financial management thus has to undertake the larger duty of evaluating future risks, determine the effect of different kinds of risks and devise an appropriate strategy, determine profits, and analyze and report risk to the interested parties. The strategy used for evaluating and tackling recession by the concerned department in financial institutes encompasses reduction of interest rates, new liquidity infusion to financial institutions, and purchasing of problem financial assets.

Singh and Tandon (2012) analyzed Asset/Liability Management (ALM) in the Indian Banking System from 1990 to 2012 and suggested strategies to meet various types of risks, viz. market risk, financial risk, interest rate risk etc. Asset-Liability Management (ALM) is one of the important tools of risk management. The net income of the banks is risk-sensitive and the objective of the study was to describe the concept and application of the ALM technique which is a dynamic and comprehensive mechanism for managing, measuring and monitoring the market risk associated with a bank. It consists in the management of the structure of the bank’s balance sheet (both assets and liabilities) in such a way that the net interest earnings are maximized within the overall risk-preference (present and future) of the financial
institutions. The ALM functions extend to and incorporate management of market risk, liquidity risk, trading risk, funding, profit planning, capital planning and growth projections.

**Summary**

The Risk Management Framework, after the review of the aforesaid studies, can be summarized as follows:

(a) Very few banks till 1998, even in developed countries, used sophisticated and complicated model for managing their risks. Most banks which did use it then, did so for the purpose of internal risk management only.

(b) The broad Risks were categorized into Market Risk, Credit Risk, Operational Risk, Environment Risk, Country Risk, Liquidity Risk, and Interest Rate Risk.

(c) As Indian Public Sector Banks had higher Capital and Liquid Assets, they engaged in lesser Risk Hedging Mechanisms and Off-Balance Sheet Activities than their counterparts.

(d) Different strategies like Duration Gap, Traditional Gap, Value at Risk Method and Simulation Tests exist for managing Interest Rate Risks of Banks.

(e) The Asset Liability Management (ALM) technique is a dynamic and comprehensive mechanism for managing, measuring and monitoring the market risk associated with a bank. It consists of the management of the structure of the bank’s balance sheet (both assets and liabilities) in such a way that the net interest earnings are maximized within the overall risk-preference (present and future) of the financial institutions.

(f) If a bank is Asset- Sensitive and interest rates are predicted to fall, banks can increase the maturity structure of its Assets and lower the maturity structure of its liabilities. Similarly, if a Bank is Liability- Sensitive and interest rates are about to rise, banks can lengthen the maturity structure of its Liabilities and shorten the maturity structure of its Assets.
Matrix of Review of Literature

<table>
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<tr>
<th>Concepts</th>
<th>Authors</th>
<th>Major Findings</th>
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| Trends and other Determinants of Net Interest Spreads | Leite, S., Sundararajan. (1990); Angbazo, L. (1997); Sinkey and Carter (2000); Saunders and Schumacher (2000); Das, A. (2002); Kamath, Kohli, Shenoy, Kumar Nayak and Kuppuswamy (2003); Levine, R. (2003); Jad -hav, N. (2003); Barth, Caprio and Levine (2004); Mohan, R. (2006 ); Nachane and Ghosh (2007); Saxena and Villar (2008); Thorsten, Kunt, Levine (2009); Maudos and Solis (2009); Altunbas, Gambacorta and Ibanez (2009); Delis and Kouretas (2011); Sidabalok and Vivrita (2011); Tarus, Chekol and Mutwol (2012); Ewijk and Arnold (2013). | 1. Net Interest Spread is expressed as interest yield on earning assets (any asset, such as loan, that generates interest income) minus interest rates paid on borrowed funds (Bittner, Johnand Goddard, 1992). Net Interest Spread is analogous to Net Interest Margin earned by a bank on its total earning assets. To quantify Net Interest Spreads as a percentage of total earning assets, Net Interest Margins is used by the SCBs. It is an important indicator of the efficiency of banks. Both terms can be used alternatively.  
2. High Net Interest Spreads tend to be associated with small banks; banks that hold a low fraction of liquid assets; banks that hold a relatively low amount of capital, and banks without substantial income from fee- based activities.  
4. With an increase in Deposits (Saving Deposits and Fixed Deposits), the interest cost of Banks has increased. The increase in the expenses of banks has meant a rise in bank charges, especially in the interest charged on loans.  
5. Low Net Interest Spreads, rising profitability via high non interest income, and declining stability in high-income countries’ banking sectors characterize the recent financial sector boom in high-income countries leading to the Global Financial Crisis of 2007. |
### Trends and other Determinants of Net Interest Spreads

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6. For effective financial sector reforms, in case of less than perfect capital mobility between nations, the gap between the lending and deposits rates should not be too high.

7. Banks are under pressure to diversify their revenue streams.

8. Net Interest Spreads for high-income countries were low. The upper-middle income countries, and low-income countries witnessed a gradually declining Net Interest Spread trend over the years.

### Risk Management and Net Interest Spreads

<table>
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<td>Vaidyanathan, R.(1999); Narain and Sahoo (2001); Nachane and Ghosh (2002); Patnaik and Shah (2003); Gup, Kolari and Fraser (2003); Raghavan, R. (2003); Das and Ghosh (2004); Nachane and Ghosh (2004); Reddy, Y. (2005); Hanweck and Ryu (2005); Subramanian (2006); Sarkar, A. (2006).</td>
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</table>

1. Capital, Assets, Management, Earnings, Liquidity and Interest Rate Sensitivity (CAMELS) has to be augmented with a Risk-Based Approach and effective Asset-Liability Management.


3. Various risks were identified and categorized into Credit Risk, Liquidity Risk, Interest Risk and Operational Risk. The steps of Risk Management involve (1) Risk Identification; (2) Risk Measurement; (3) Risk Control and Monitoring; (4) Capital Allocation; (5) Risk Adjusted Performance Measurement and Value Management.

4. Interest rate risk arises from holding Assets and Liabilities with different principal and maturity dates or reprising dates. Banks could reduce their interest rate risk by hedging with derivative securities and by using the Asset or Liability Management Techniques.
5. It was observed that Net Interest Spreads of the Assets-Sensitive Banks were impacted by falling interest rates, and those of the Liability-Sensitive Banks were impacted by rising interest rates.

6. Banks are required to maintain a separate Investment Fluctuation Reserve (IFR) out of profits towards interest rate risk. It was mostly 5 percent of their Investment Portfolio under the category “held for Trading” and “available for Sale” during the Post-Reform Period. In case of a falling interest rate scenario, the unrealized gains coupled with the IFR fund created, help in cushioning the losses when interest rates in the long-run move up for a Liability-Sensitive Bank. The opposite case holds true for an Asset-Sensitive Bank.

Research Gaps

A survey of literature reveals the existence of research gaps in evaluating the Indian Scheduled Commercial Banks’ Net Interest Spreads for the Post-Reform Period (1991 to 2011) as a dependant variable. An analysis of the Determinants of Net Interest Spreads of the SCBs during the Post-Reform Period is pivotal in understanding the main causes impacting the profitability and efficiency of the Indian Banks. Also, studies pertaining to the Post-Reform Period do not focus on the Risk Hedging Tools and Mechanisms to combat the volatility in the Net Interest Spreads of Indian Scheduled Commercial Banks. The Risk Hedging Strategies, together with the Determinants of the Net Interest Spreads of the Scheduled Commercial Banks of India can effectively contribute to the effective Risk Management objective of Basel Accord II.

The inter-linkage between Net Interest Spreads and Risk Hedging Techniques for the abatement of volatility in Net Interest Spreads following a detailed analysis of the Determinants of Net Interest Spreads is what is aimed to be focused upon in the present study.

| Risk Management and Net Interest Spreads | D.M. Nachane and Saibal Ghosh (2007); Mohan.R. (2007); Sensarma and Jayadev (2009); Shrivastava and Shrivastava (2010); Memmel and Schertler (2011); Singh and Tandon (2012). | 5. It was observed that Net Interest Spreads of the Assets-Sensitive Banks were impacted by falling interest rates, and those of the Liability-Sensitive Banks were impacted by rising interest rates. 6. Banks are required to maintain a separate Investment Fluctuation Reserve (IFR) out of profits towards interest rate risk. It was mostly 5 percent of their Investment Portfolio under the category “held for Trading” and “available for Sale” during the Post-Reform Period. In case of a falling interest rate scenario, the unrealized gains coupled with the IFR fund created, help in cushioning the losses when interest rates in the long-run move up for a Liability-Sensitive Bank. The opposite case holds true for an Asset-Sensitive Bank. |