

**COMPARATIVE ANALYSIS OF THE RISK MEASUREMENT  
MODELS AND IMPACT OF DERIVATIVES ON RISK,  
LIQUIDITY AND PRICE DISCOVERY: AN EMPIRICAL  
STUDY IN THE CONTEXT OF INDIAN STOCK MARKET**

by

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Submitted  
in fulfillment of the requirement for the award of degree of

**Doctor of Philosophy**

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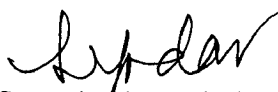


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**March 2006**

## CERTIFICATE

This is to certify that the thesis entitled **Comparative Analysis of the Risk Measurement Models and Impact of Derivatives on Risk, Liquidity and Price Discovery: An Empirical Study in the Context of Indian Stock Market**, being submitted by Mr. Sandeep Srivastava to the Indian Institute of Technology, Delhi, India, for the award of the degree of Doctor of Philosophy (Ph.D.) is a record of bonafide research work carried out by him under our guidance and supervision. He has fulfilled the requirements for the submission of this thesis, which has attained the standard required for a Ph.D. degree of this institute. The results presented in this thesis have not been submitted in part or full to any other university or institution for the award of any degree or diploma.



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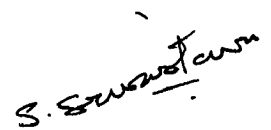
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## **ABSTRACT**

Risk management in stock market deals with the three core issues namely, identification of the type of risk, its measurement and use of certain tools and techniques, generally derivative securities, to manage such risk. The market risk has been identified as the major source of risk in literature for the market participants. Indian stock market has also grown exponentially both in terms of trading volumes and reach all across the country. Keeping this in view, the study aims to evolve a framework for the measurement of risk and it also seeks to record the evidence of impact of derivative securities in Indian stock market. The broad objectives of this study include measurement of risk; identification of the most appropriate model for capturing risk in context of Indian stock market; analysis of the impact of derivative securities on risk, liquidity and price discovery; and understanding the perception of the market participants relating to the efficiency and usage of derivative securities.

A comprehensive survey of literature was done and is presented separately for risk measurement and impact of derivative securities. This review of literature has helped in identifying the relevant issues and developing the framework. For studying the risk measurement framework, the literature survey reveals that it is not sufficient to focus on risk measurement models only rather the emphasis should be laid on length of sample period and forecast horizon as well as return interval too. Similarly, the impact of derivative securities is analyzed on risk, liquidity and price discovery in the underlying securities market.

Therefore, the methodology used comprises an extensive application of econometric and mathematical modeling. It includes the use of simple statistical techniques, like standard deviation, on one hand. While on the other, the implied volatility is used that includes the advanced mathematical applications.

The findings of the study are presented in three parts namely, results for selection of appropriate risk measurement model; findings with regard to the impact of derivative securities and survey results. It can be concluded that implied volatility turns out to be the better predictor of realized volatility for short term. While for the medium and long term, the conditional volatility model and standard deviation capture the volatility appropriately. The implied volatility estimates could not be studied for the medium and long-term because of the unavailability of option contracts for such time period.

With regard to the impact of derivative securities on risk, liquidity and price discovery, the evidence is, by and large, in line with the international experiences. The risk level in the market has declined after the introduction of derivative securities. The informational efficiency of market has also improved that has resulted in better price discovery consequent upon the introduction of derivative securities. The findings with regard to the liquidity effect of derivative securities could not be properly ascertained because the introduction of rolling settlement in the post-introduction period. Lastly, the survey findings have provided the useful inputs in relation to the perception of market participants about the derivative securities, their usage and pricing practices. It has linked the previous findings with the real world applications.

- Finally, the conclusion is drawn with the discussion of significant research contributions at conceptual, empirical and methodological level, limitations of the work and scope for future study.

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