



## Department of Mathematical Sciences

### Seminar in Stochastic Systems

Dr. Ronnie Sircar

Operations Research & Financial Engineering  
Princeton University

*Optimal Investment with Derivatives*

Monday, November 24, 2003

3:30 pm

Pierce 218

*Abstract:* We study the problem of portfolio optimization in an incomplete market using derivatives as well as basic assets such as stocks. In such markets, an investor may want to use derivatives, as a proxy for trading volatility, for instance, but they should be traded statically, or relatively infrequently, compared with assumed continuous trading of stocks, because of the much larger transaction costs. We discuss the computational tractability obtained by assuming exponential utility, and the relation of the optimal strategy to the method of utility-indifference pricing. In particular, we show that the optimal number of derivatives to invest in is given by the Legendre transform of the indifference price as a function of quantity, evaluated at the market price. The procedure is illustrated numerically within diffusion stochastic volatility models.

Joint work with Mattias Jonsson.

Dr. Sircar is affiliated with the Department of Operations Research & Financial Engineering and with the Bendheim Center for Finance at Princeton University. His research interests are in the area of stochastic models of finance, numerical methods and approximations of solutions, modeling and statistics of volatility, as well as stochastic differential equations. He is the author of many scientific publications on these topics, as well as the recent monograph "Derivatives in financial markets with stochastic volatility", Cambridge University Press, 2000

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Refreshments will be served at 3:20 pm.

For more information contact Prof. Darinka Dentcheva at [ddentche@stevens-tech.edu](mailto:ddentche@stevens-tech.edu) or call 201-216-5449.