Jiho Park, PhD

Risk Analyst, Vice President
Quantitative Risk and Stress Testing, Citigroup
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Summary

Risk Analyst and a member of Quantitative Risk and Stress Testing (QRS) at Citigroup. Quantitative Researcher and Developer with a demonstrated history of work on modeling Fat-Tailed distribution, Time-Series Analysis for forecasting data, Risk Management and Portfolio Optimization. Experienced giving risk management consulting to financial institutions and developing numerical method on FFT, Non-Linear Optimization and Regression for various types of statistical model.

Education

Sogang University
Ph.D. in Mathematics

Seoul, South Korea
2013

- Dissertation: Quanto option pricing formula using series expansion and NTS model.
- Instructor for Calculus and Financial Mathematics for undergraduate course for 2 semesters with 3 courses.
- Gave Academic Advises to help students' curriculum and campus life.

Sogang University
M.S. in Mathematics

Seoul, South Korea
2003

Sogang University
B.S. in Mathematics

Seoul, South Korea
2000

Research Interest

Financial Engineering: Pricing Derivatives, Risk Management, Portfolio Optimization

Financial Statistics: Time Series (ARMA, GARCH) Model, Fat-Tailed (Non-Gaussian, Lévy) Probability Distribution, Stochastic Analysis

Computational Finance: Non-Linear Optimization, Regression, Parameter Estimation, Monte Carlo Simulation, Parallel Computing and C++, MATLAB, R and Python development

Published Papers

Quanto Option Pricing in the Presence of Fat Tails and Asymmetric Dependence. *Journal of Econometrics* with Professors Aaron Kim, Jaesung Lee and Stefan Mittnik (2015)
This paper shows option pricing with Fat-Tailed and Non-Gaussian distribution gives better fitting to real market than the prices from classical Normal distribution. In this paper, market data is governed by Multivariate Normal Tempered Stable (NTS) process a kind of Non-Gaussian Fat-Tailed Distribution, we introduce Quanto option closed form formula with Nikkei 225 index and the exchange rate between US dollar and Japanese Yen. And we show that the NTS model clearly dominates the Black-Scholes model given in Normal distribution.

Pricing of quanto option under the Hull and White stochastic volatility model. *Commun. Korean Math. Soc.* with Professor Jaesung Lee (2013).
In this paper, we derived a Quanto option pricing method with series expansion closed form formula which is driven from the idea out of Taylor series expansion and Feynman-Kac theory. This can provide same result as simulation method previously used to compute that kind of option pricing. This closed form formula gives

advantages in timing problem. Because pricing usually takes long time with simulation method which is used traditionally in the stochastic volatility model.

Professional Experience

Quantitative Risk and Stress Testing, Citigroup   Irving, TX
Risk Analyst, Vice President   Oct 2020 – Current
- **Fundamental Review of Trading Book (FRTB) Project**: Research and python code development on new FRTB regulation.

Mathematics and Statistics, Texas Tech University   Lubbock, TX
Postdoctoral Teaching Scholar   Aug 2018 – Oct 2020
- **Implied Minimum Risk Rate**: Implied Minimum Risk Rate based on Cryptocurrency market with other classical assets such as Stock, Foreign Exchange Rate, ETF for Bond and Money Market, and REIT is a new way to drive interest rate. Deriving Implied Rate includes the processes of the Markowitz Mean Variance Portfolio Optimization, PCA for dimension reduction and multivariate Regression. And applying various distribution models such as Hyperbolic Geometric, Variance Gamma and Normal Inverse Gaussian with ARMA-GARCH time series, we can find the distribution fitting better for reliable backtesting result with VaR (Value at Risk). From this research, we can derive interest rate which has a role as riskless rate, given in no arbitrage condition, for pricing futures and options on Cryptocurrency market, moreover, we can find the best way to choose most benefit portfolio including Cryptocurrency.
- **Bond Portfolio with Lévy Process**: This is a research about Bond Portfolio analysis with computing VaR and Optimal Portfolio under NTS which can capture extreme events in data set more likely than Normal distribution, usually passes the backtesting which Normal distribution fails in general. We can show that NTS model has a better performance for capturing risk and optimal portfolio than classical Normal distribution.
- Instructing Ph.D. students in Quantitative Finance Research Group about Data Science, Time Series and advanced Distribution Models and their MATLAB applications.
- Developing workflow control to gather the market data in MySQL database server for the department.
- Delivering lectures on Interest Rate Theory, Mathematical Statistics, Calculus and Computational method on mathematics and science for 4 semesters with 9 courses.

College of Business, Stony Brook University   Stony Brook, NY
Visiting Scholar   Jun 2014 – Dec 2017
- Drew a research result on measuring Portfolio Risk of Treasury Bond using NTS distribution.
- Completed code development for Bond portfolio risk and optimization.
- Contributed code development of empirical test to the research paper "Quanto option pricing with Lévy models" with modules computing Fat-Tailed Distribution and Option Pricing and showed the Option Pricing on the distribution has better performance than classical normal distribution.

GlimmAnalytics   Stony Brook, NY
Quantitative Researcher and Developer   Jan 2016 – Oct 2017
- Developed C++ libraries on time series models, Fat-Tailed distributions able to be run on high frequency, 1-min the smallest, data to make the risk measurement more accurate.
- Implemented parallel computing skill on developed libraries to make it run faster for the greater number of CPUs.
- Completed Python and Linux Shell script development to run the C++ code on Linux system.

Department of Mathematics, Sogang University   Seoul, South Korea
Postdoctoral Teaching Scholar   Sep 2013 – Jun 2014
- Deliver lectures on Basic and Multivariate Calculus for 3 semesters with 4 courses.

Fist Global Inc.   Seoul, South Korea
Risk Management Consultant   Feb 2007 – Jan 2012

- Gave consulting to clients in financial institutions to use the risk management system correctly and efficiently instructing them about market risk management and pricing financial derivative.
- Contributed algorithm for pricing new financial derivatives to the development of brand-new version of risk management system.
- Completed a consulting on the Certificate given by Federal Supervisory Service in Korea for Internal Model to Market Risk established by Basel Committee, to the clients, NH Bank Korea and Tong-Yang Securities.
- Code and algorithm development for various types of pricing derivative whose underlying includes stock, foreign exchange and interest rate, and Risk Management System.