Bong-Gyu Jang

Curriculum Vitae

Department of Industrial and Management Engineering, POSTECH
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Current Positions

- **Professor**, Department of Industrial and Management Engineering, POSTECH, Sep. 2018 ~ present.
- **Head**, Research Institute of Finance and Risk Management (ReFiRM), POSTECH
- **Director**, Financial Investment and Risk Management (FIRM) Laboratory, POSTECH

Research Interests

- Portfolio Theory, Asset Pricing, Derivatives, Credit Risk, Interest Rates, Life-Cycle Asset Management, Pension Fund Management.
- Financial Engineering/Mathematical Finance, Fintech/Insurtech.

Education

- **Ph.D., Mathematics**, Aug. 2004, KAIST
- **M.S., Mathematics**, Feb. 2000, Seoul National University
- **B.S., Mathematics Education**, Feb. 1997, Seoul National University

Professional Experience (selected)

- **Member of the Risk Management Board**, Korea Housing-Finance Corporation (한국주택금융공사), Nov. 2018 – Present.
- **Member of the Risk Management Board** of National Housing and Urban Fund, Korean Ministry of Land, Infrastructure and Transport (국토교통부 주택도시기금), June 2017 – Present.
- **Member of the Fund Management Evaluation Board**, National Health Insurance Service of Korea (국민건강보험공단), Nov. 2017 – Present.
- **Adjunct Professor**, UTS Business School (Finance Discipline Group), University of Technology Sydney, July 2015 – June. 2016.
- **Associate Professor**, Department of Industrial and Management Engineering, POSTECH, Sep. 2012 ~ Aug. 2018.

- **Assistant Professor**, Department of Industrial and Management Engineering, POSTECH, May 2008 – Aug. 2012.
- **Specialist**, Derivatives Supervision Team, Financial Supervisory Service of Korea (금융감독원), Sep. 2006 – May 2008.
- **Researcher**, Financial Engineering Research Center, KAIST, Apr. 2006 – Sep. 2006.
- **Researcher**, Information Center of Mathematical Science, KAIST, Sep. 2004 –Mar. 2006.

Ph. D Thesis

- "Optimal Consumption and Investment Decisions in the Presence of Transaction Costs"

Published Papers

A. International Journals

1. "Optimal Consumption and Investment with Insurer Default Risk" (with Hyeng Keun Koo and Seyoung Park), *Insurance: Mathematics and Economics*, Vol 88, 2019, 44-56.

2. "Option Pricing with Regime Switching: Integrations over Simplexes Method" (with Hyeon-Wuk Tae), *Finance Research Letters*, Vol 24, 2018, 301-312.

3. "Net Contribution, Liquidity, and Optimal Pension Management" (with Changhui Choi, Changki Kim, and Sang-youn Roh), *Journal of Risk and Insurance*, Vol 83, Issue 4, Dec. 2016, 913-948.

4. "Business Cycle and Credit Risk Modeling with Jump Risks" (with Yuna Rhee and Ji Hee Yoon), *Journal of Empirical Finance*, Vol 39 (Part A), Dec. 2016, 15-36**.**

5. "Robust Consumption and Portfolio Rules with Time-Varying Model Confidence" (with Seungkyu Lee and Byung Hwa Lim), *Finance Research Letters*, Vol 18, Aug. 2016, 342-352.

6. "Ambiguity and Optimal Portfolio Choice with Value-at-Risk Constraint" (with Seyoung Park), *Finance Research Letters*, Vol 18, Aug. 2016, 158-176.

7. "Asset Demands and Consumption with Longevity Risk" (with Hyeng Keun Koo and Yuna Rhee), *Economic Theory*, Vol 62, Issue 3, 2016, 587-633.

8. "Unemployment Risks and Optimal Retirement in an Incomplete Market" (with Alain Bensoussan and Seyoung Park), *Operations Research*, Vol 64, Issue 4, 2016, 1015-1032.

9. "Retirement with Risk Aversion Change and Borrowing Constraints" (with Ho-Seok Lee), *Finance Research Letters*, Vol 16, 2016, 112-124.

10. "Optimal Reinsurance and Asset Allocation under Regime Switching" (with Kyeong Tae Kim), *Journal of Banking & Finance*, Vol 56, 2015, 37-47.

11. "Psychological Barriers and Option Pricing" (with Changki Kim, Kyeong Tae Kim, Seungkyu Lee and Dong-Hoon Shin), *Journal of Futures Markets*, Vol 35, Issue 1, 2015, 52-74.

12. "Optimal Retirement Strategy with a Negative Wealth Constraint" (with Seyoung Park), *Operations Research Letters*, Vol 42, Issue 3, 2014, 208-212.

13. "When Do the Unemployed Jump in the Workforce?" (with Hyun Tak Lee and Seyoung Park), *Management Science & Financial Engineering*, Vol 19, No 2, 2013,43-47.
14. "Optimal Retirement with Unemployment Risks" (with Seyoung Park and Yuna Rhee), *Journal of Banking & Finance*, Vol 37, Issue 9, 2013, 3585-3604.
15. "A Simple Iterative Method for the Valuation of American Options" (with In Joon Kim and Kyeong Tae Kim), *Quantitative Finance*, Vol 13, Issue 6, 2013, 885-895.
16. "Stock Returns and Market Making with Inventory" (with Seyoung Park), *Management Science & Financial Engineering*, Vol 18, No 2, 2012,1-4.
17. "An Analytic Valuation Method for Multivariate Contingent Claims with Regime-Switching Volatilities" (with Kum-Whan Roh and Ji Hee Yoon), *Operations Research Letters*, Vol 39, Issue 3, 2011, 180-187.
18. "Analytic Valuation Formulas for Range Notes and an Affine Term Structure Model with Jump Risks" (with Ji Hee Yoon), *Journal of Banking & Finance*, Vol 34, Issue 9, 2010, 2132-2145.
19. "Valuing Qualitative Options with Stochastic Volatility" (with Kum-Whan Roh), *Quantitative Finance*, Vol 9, Issue 7, 2009, 819-825.
20. "A First-Passage-Time Model under Regime-Switching Market Environment" (with Mi Ae Kim and Ho-Seok Lee), *Journal of Banking & Finance*, Vol 32, Issue 12, 2008, 2617-2627.
21. "A Reflected Diffusion Process in a Regime-Switching Environment" (with Gyoocheol Shim), *Operations Research Letters*, Vol 36, Issue 2, 2008, 177-183.
22. "Liquidity Premia and Transaction Costs" (with Hyeng Keun Koo, Hong Liu and Mark Loewenstein), *Journal of Finance*, Vol 62, No 5, 2007, 2329-2366.
23. "An Algorithm for Optimal Portfolio Selection Problem with Transaction Costs and Random Lifetimes" (with U Jin Choi and Hyeng Keun Koo), *Applied Mathematics and Computation*, Vol 191, No 1, 2007, 239-252.
24. "Optimal Portfolio Selection with Transaction Costs When an Illiquid Asset Pays Cash Dividends", *Journal of Korean Mathematical Society*, Vol 44, No 1, 2007, 139-150.
25. "Transaction Costs and Asset Valuation" (with Hyeng Keun Koo and U Jin Choi), *Review of Accounting and Finance*, Vol 3, No 4, 2004, 99-111.

B. Domestic Journals

1. "Study on Barriers to Use Medical Blockchain Business"(with Woong-gi Seo, Junseong Park, Taeyoon Kim, Jiyoung Kwahk, Sung H. Han, Hyeji Jang, Jiwon Chae, Youngin Koh, and Jingi Kim), *Journal of the Korean Institute of Industrial Engineers*), Vol 45, No 6, Dec. 2019.
2. "The Generation and Analysis of the Interest Rate Shock Scenarios Using DNS model"(with Hyeon-Wuk Tae, Geonyoup Noh, Byung-June Kim, and Kyoung Gook Park), *Journal of Insurance and Finance*), Vol 30, No 2, June 2019.
3. "Life-cycle Asset Allocation with Korean Reverse Mortgages"(with Jin Gi Kim, Snag-Goo Lee, and Seryoong Ahn), *Korean Insurance Academic Society*, Vol 118, Apr 2019, 1-29.
4. "The Price Impact of NPS in Korean Stock Market and optimal Asset Allocation to Domestic and Foreign

Stocks"(with Minjeong Kang and Byung-June Kim), *Korean Journal of Financial Studies*, Vol 46, No 5, Dec 2017, 1033-1060.

5. "The Valuation of Pass-Through Mortgage-Backed Securities in Korean Market"(with Hyeon-Wuk Tae, Ung-Gi Seo, Jun Kim, Jong-Hyuk Roh, and Seroong Ahn), *Korean Journal of Futures and Options*, Vol 25, No 3, Aug 2017, 305-337.
6. "Permanent and Transitory Components of Seoul Apartment Prices"(with Jin Gi Kim and Hyun-Tak Lee), *Journal of Korean Real Estate Analysis Association*, Vol 23, Mar 2017, 19-37.
7. "A Study on discount Rates for Fair Valuation of Insurance Liabilities"(with Geonyoup Noh and Hyeon-Wuk Tae), *Korean Insurance Academic Society*, Vol 107, July 2016, 75-108.
8. "Time Variation of the Permanent and Temporary Shocks in Seoul Apartment Markets"(with Eunyoung Kim and Hyun-Tak Lee), *Korean Association of Financial Engineering*, Vol 15, No 2, 2016, 1-28.
9. "Generating an Optimal Auto-Insurance Rate with the Consideration of Population Change"(with Changhui Choi), *Journal of Insurance and Finance*, Vol 27, No 2, 2016, 81-109.
10. "Changes in Interest Rate Term Structures and Derivatives-Linked Securities"(with Hyeon-Wuk Tae and Sang-Gyu Lim), *Korean Journal of Financial Studies*, Vol 44, No 5, 2015, 947-995.
11. "Portfolio Management with the Business Cycle and Bayesian Learning"(with Seyoung Park, Hyun Tak Lee, and Yuna Rhee), *Journal of the Korean Operations Research and Management Science Society*, Vol 39, No 2, 2014, 49-66.
12. "An Iterative Method for American Put Option Pricing under a CEV model" (with Seungkyu Lee, and In Joon Kim), *Journal of the Korean Institute of Industrial Engineers*, Vol 38, No 4, 2012, 244-248.
13. "The Behavior of the Term Structure of Interest Rates with the Markov Regime Switching Models" (with Yuna Rhee, Seyoung Park, and Jong Oh Choi), *Journal of the Korean Institute of Industrial Engineers*, Vol 36, No 3, 2010, 203-211.
14. "Stochastic Behavior of Commodity Prices: The Valuation of Derivative-Linked Securities" (with Sang-Gyu Lim and Ho-Seok Lee), *Korea Derivatives Association*, Vol 17, Issue 1, 2009, 51-75.
15. "Identifying the Factors That Affect Interest Rate Swap Spreads: Evidence from Korea" (with Sang-Gyu Lim), *Korean Industrial Economic Association*, Vol 20, Issue 3, 2007, 1105-1129.

Working Papers

1. "Liquidation Shocks and Transaction Costs" (with Hyeng Keun Koo and Seungkyu Lee), *Accepted by the 2015 China International Conference in Finance (CICF)*, ***under revision (Mathematics and Financial Economics)*.**
2. "Stock Prices, Changes in Liquidity, and Liquidity Premia" (with Hyun-Tak Lee and Bong-Soo Lee)**.**
3. "Liquidity Premia, Transaction Costs, and Model Misspecification" (with Seungkyu Lee and Seyoung Park)**.**
4. "Does It Pay to Go Outside Your Comfort Zone?" (with Phillip H. Dybvig and Hyeng Keun Koo).

5. "Market Capitalization, Corporate Payouts, and Expected Returns" (with Bong-Soo Lee and Hyun-Tak Lee)
6. "Optimal Reinsurance and Asset Allocation with Correlation Risks" (with Alain Bensoussan, Jin-Gi Kim, and Suengkyu Lee).
7. "How Should Individuals Make a Retirement Plan in the Presence of Mortality Risks and Consumption Constraints?" (with Taeyong Kim, Seungkyu Lee and Hyeon-Wuk Tae).
8. "Mark-to-Market Reinsurance and Portfolio Selection: Implication for Information Quality" (with Kyeong Tae Kim and Hyun-Tak Lee).
9. "Optimal Retirement with Borrowing Constraints and Forced Unemployment Risk" (with Seyoung Park and Huainan Zhao), ***under 2nd round review (Insurance: Mathematics & Economics).***
10. "Entrepreneurial Business Plan under Undiversifiable Idiosyncratic Risk" (with Hyun-Tak Lee and Seyoung Park).
11. "Annuitization and Asset Allocation with Borrowing Constraint" (with Jin-Gi Kim and Seyoung Park), ***under revision (Operations Research Letters).***
12. "American Put Options with Regime-Switching Volatility" (with Hyeng Keun Koo).
13. "A Lattice Method for Lookback Options with Regime-Switching Volatility" (with Ji Hee Yoon, U Jin Choi and Byung Hwa Lim).

Teaching Experience (@POSTECH only, selected)

- **Introduction to Financial Engineering** (fall 2012, fall 2014, fall 2017, fall 2019, undergraduate)
- **Advanced Investment Theory** (spring 2011, spring 2012, spring 2014, spring 2017, graduate)
- **Advanced Topics in Financial Management** (spring 2009, graduate)
- **Advanced Topics in Financial Engineering** (spring 2010, spring 2013, graduate)
- **Financial Accounting** (spring 2009, spring 2010, spring 2011, spring 2012, spring 2013, spring 2014, spring 2015, spring 2017, spring 2018, spring 2019, undergraduate)
- **Investments**, (fall 2008, fall 2009, fall 2010, fall 2011, fall 2013, fall 2016, fall 2018, undergraduate)
- **Financial Engineering** (spring 2015, Spring 2017, Spring 2019, graduate)
- **Introduction to Blockchain Technology** (spring 2018, undergraduate, team teaching)
- **Blockchain Business Model** (fall 2019, graduate, team teaching)

Talks and Presentations (selected)

<< Paper Presentation at International Conferences>>

- **International Conference on Mathematical Finance and Symposium on the Role of Mathematical Finance on Fintech Business,** August 2018.
- **2017 Quantitative Method in Finance Conference (QMF),** December 2017
- **2016 Quantitative Method in Finance Conference (QMF),** December 2016 (as a plenary speaker)

- **2014 Asia-Pacific Association of Derivatives (APAD),** August 2014.
- **2013 China International Conference in Finance,** July 2013.
- **International Workshop on Quantitative Finance**, March 2013.
- **7th World Congress of Bachelier Finance Society**, June 2012.
- **4th POSTECH-Ajou-KAIST Conference in Finance and Mathematics**, July 2011.
- **2011 7th East Asia SIAM conference**, June 2011.
- **2010 International Workshop on Recent Trends in Learning, Computation, and Finance,** August 2010.
- **6th Conference of Asia-Pacific Association of Derivatives,** August 2010.
- **6th Congress of the Bachelier Finance Society (BFS 2010),** June 2010.
- **2009 Joint Meeting of the KMS and the AMS,** December 2009
- **The 41st ISCIE International Symposium on Stochastic Systems Theory and Its Applications (SSS'09),** November 2009.
- **2009 China International Conference in Finance,** July 2009.
- **15th International Conference on Computing in Economics and Finance,** July 2009.
- **2008 4th East Asia SIAM conference**, October 2008. *The paper was awarded the 2nd prize on student paper competition.*
- **AFA 2006 Boston Meetings (American Finance Association),** January 2006.

<< Invited Talks >>

- **UTS Business School (Australia), South Western University of Finance and Economics (China), MorningStar, Financial Supervisory Service of Korea, Korea Life Insurance Association, Korea Insurance Research Institute, Korea Housing-Finance Corporation, Mirae Asset Global Investment, SNU, KAIST, UNIST, Korea University, Yonsei University, KNU, SMWU, KIAS, NIMS, NH Investment & Securities Co., etc.**

Research Projects (selected)

- **Shinhan Life Insurance**: Educational Program for Data Translators (신한생명-포항공대 산학협력을 통한 디지털 인재양성), 2019.
- **Shinhan Financial Group**: Development of Goal-Based Long-Term Asset Management Service (목적기반 장기자산관리 서비스 개발), 2019.
- **Korea Asset Management Corporation**: Business Forecasting by Applying Machine Learning on On-Bid Data (기계학습을 이용한 온비드 공매지수의 경기예측가능성 분석), 2019.
- **Korea Securities Depository**: An Early-Warning System for ELS Products Using Limit Order Distributions (대체지표금리 개발 관련 정부정책 지원을 위한 연구 용역), 2019.
- **National Research Foundation of Korea**: Studies on Investment Strategies for Individuals, Financial Institutions, and Pension Funds (개인, 금융회사, 연기금의 자산관리방안 연구), 2019-2021.

- **Hanwha Investment and Security Company**: Development of a Retirement Asset Management Model (은퇴자산관리 운용 모델 개발), 2018-2019.
- **Financial Supervisory Service of Korea**: Development of New Forecasting Models of Capital Inadequacy (조기경보모형 2 차 개편), 2018.
- **Ministry of Science and ICT (IITP)**: Blockchain Platform with Business Models towards Cross-Domain Interoperability (과기정통부 정보통신기술진흥센터 대학 ICT 연구센터육성사업 공동연구원: 크로스도메인 호환성을 위한 블록체인 플랫폼 및 비즈모델 개발), 2018-2021.
- **Financial Supervisory Service of Korea**: (1) Development of Interest Rates Scenarios under IFRS17 (IFRS17 시행 등 보험감독환경 변화에 따른 금리시나리오 산출·운영방법론에 관한 연구), (2) Development of New Forecasting Models of Capital Inadequacy (新 부실 확률 예측모형), 2017.
- **Korea Housing-Finance Corporation**: Long-Term Development Plan of the Government Guaranteed Reverse Mortgage Program (공동연구원: 주택연금 중장기 발전방안), 2017.
- **National Research Foundation of Korea**: Asset Management Using Stochastic Models during Low Economic Growth Periods (중견연구 연구책임자: 확률모형을 이용한 저성장 시대의 자산관리 방법 연구), 2017-2020.
- **Korea Securities Depository**: An Early-Warning System for ELS Products Using Limit Order Distributions (주문량 분포 추정을 이용한 ELS 조기경보시스템의 설계 방안), 2016-2017.
- **National Research Foundation of Korea**: Asset Management Using Stochastic Control (일반연구 연구책임자: 확률제어이론을 활용한 개인의 자산관리모형 개발), 2016-2017.
- **National Health Insurance Service of Korea**: Mid- and Long-Term Fund Management Consulting for Health Insurance (건강보험·장기요양 자금 중장기 운용전략 컨설팅), 2015.
- **Korea Life Insurance Association**: Discount Rates under IFRS 4 (보험 국제회계기준 하의 할인율 산출방법), 2015.
- **National Research Foundation of Korea**: Development of Integrated Risk Management Financial System for Welfare Society (한국사회과학연구지원사업 SSK 중형연구단 연구책임자: 복지사회를 위한 통합적 위험관리 금융시스템 구축), 2014-2017.
- **National Research Foundation of Korea**: Optimal Asset Management Utilizing Stochastic Differential Equations for an Aging Society (중견연구 연구책임자: 고령화 사회에 대비하여 확률미분방정식을 활용한 개인의 자산관리 방법 연구), 2013-2016.
- **POSTECH** (student research program): Valuation of DLS through modelling gold price (금 가격 모형화를 통한 DLS 상품의 가치평가), 2013.
- **National Research Foundation of Korea**: Development of Enterprise Risk Management Model for Insurance Company (일반연구 연구책임자: 보험사의 전사위험관리 모형 개발), 2012-2015.

- **POSTECH** (student research program): (1) LIBOR and CD Rates during the Recent Economic Crisis (금융위기와 국내외 은행의 금리조작 의혹), (2) The Valuation of Foreign Exchange Derivatives and Model Risks (외환파생상품의 가치와 금융모형 위험), 2012.
- **FIST Global**: Inspection of the Suitability of the Credit Risk System (신용리스크 시스템 정합성 검증), 2011.
- **Financial Supervisory Service of Korea**: Toward an Advanced Equity-Linked Securities Market (주가연계증권 시장의 선진화 방안 제언), 2010.
- **Mirae Asset Security Company**: Development of a Private Annuity Product (개인연금 상품 개발), 2010.
- **POSTECH** (student research program): Valuation of KIKO Products and Analysis of Their Recent Issues (키코 상품 가치평가를 통한 키코 사태의 쟁점 분석), 2010.
- **FIST Global**: Inspection of the Suitability of the Operational Risk System (운영리스크 시스템 정합성 검증), 2010.
- **National Research Foundation of Korea**: Financial Risk Management Using a Markov Regime-Switching Model (신진연구 연구책임자: 국면전환모형을 활용한 금융위험관리 방법 연구), 2010-2012.
- **FIST Global**: Inspection of the Suitability of the Market Risk System (시장리스크 시스템 정합성 검증), 2019-2010.
- **POSTECH** (student research program): The Effect of Equity Linked Securities on the Korean Stock Market (주가연계증권이 현물 시장에 미치는 영향), 2009-2010.

Professional Activities (selected)

- **Organizing Committee** Member of 2018 International Conference on Mathematical Finance and Symposium on the Role of Mathematical Finance on Fintech Business.
- **Local Committee** Member of 2017 Asian Quantitative Finance Conference.
- **Director** of Korean Association of Financial Engineering (2014), Korean Operations Research and Management Science Society (2016-present), Korean Financial Management Association (2016-present).
- **Associate Editor**: Korean Derivative Association (선물연구), 2011-2016.
- **Associate Editor**: Korean Journal of Financial Studies(한국증권학회지), 2015-2018.
- **Associate Editor**: Management Science & Financial Engineering, 2012-2016.

Honors and Awards (selected)

- Best Management Scientist Award(현우 곽수일경영과학학술상), 2018 Korean Operations Research and Management Science Society (KORMS 2014) Conference
- Best Paper Award, 2017 Korea Real Estate Analysis Association (with Jin-Gi Kim and Hyun-Tak Lee)

- Best Paper Award, 2017 Korean Insurance Academic Society (with Geonyoup Noh and Hyeon-Wuk Tae)
- Best Paper Award (2nd Place), 2015 Korean Finance Association Conference (with Seyoung-Park)
- Young Management Scientist Award (차동완젊은경영과학자상), 2014 Korean Operations Research and Management Science Society (KORMS 2014) Conference
- Best Student Paper Award, 2014 Asia Pacific Industrial Engineering and Management Systems (APIEMS 2014) Conference: "Liquidity Crashes and Robust Portfolio Management" (with Seyoung Park and Seungkyu Lee)
- Best Paper Award, 2013 Korean Operations Research and Management Science Society (KORMS 2013) Conference (with Seyoung Park and Hyun-Tak Lee, and Yuna Rhee)
- Best Dissertation Award, 2012 International Conference on Asia-Pacific Financial Markets (CAFM 2012): "Business Cycle and Credit Risk Modeling with Jump Risks" (with Yuna Rhee and Ji Hee Yoon)
- 2011 KRX Best Derivatives Paper Award (2nd Place): "Analytic Valuation Formulas for Range Notes and an Affine Term Structure Model with Jump Risks" (with Ji-Hee Yoon)
- Student Paper Competition (2nd Place), 2008 EASIAM: "A First-Passage-Time Model under Regime-Switching Market Environment" (with Mi Ae Kim and Ho-Seok Lee)

Ad-hoc Referee (selected)

Management Science, Journal of Banking & Finance, Journal of Risk and Insurance, Journal of Economic Dynamics and Control, Scandinavian Actuarial Journal, Review of Derivatives Research, Insurance: Mathematics and Economics, Journal of Futures Markets, Journal of Financial Stability, Quantitative Finance, Asia-Pacific Journal of Financial Studies, Risks, Applicable Analysis, Journal of Industrial and Management Optimization, Applied Stochastic Models in Business and Industry, Journal of Optimization Theory and Applications, Computers and Mathematics with Applications, Applied Mathematics and Computation, etc.

updated: Dec. 2019.