CHULWOO HAN

Mill Hill Lane
Durham Business School
Durham DH1 3LB, UK
chulwoo.han@durham.ac.uk
+44 191 334 5892 (office)
+44 747 260 7838 (mobile)

RESEARCH INTERESTS

Machine learning, portfolio management, asset pricing, quantitative methods in finance.

PROFESSIONAL APPOINTMENTS

2022 – *present* **SUNGKYUNKWAN UNIVERSITY** Seoul, Korea
Associate Professor.

2013 – 2022 **UNIVERSITY OF DURHAM** Durham, UK
Associate Professor in Finance.

2022 **LONDON BUSINESS SCHOOL** London, UK
Visiting Professor.

2018 **UNIVERSITY OF TORONTO** Toronto, Canada
Visiting Professor.

2017 **KAIST** Seoul, Korea
Visiting Professor.

2003 – 2013 **CAPITAL MARKETS & PORTFOLIO RESEARCH, INC.** Seoul, Korea
CEO and co-founder.

2001 – 2003 **SAMSUNG LIFE INSURANCE** Seoul, Korea
Software Engineer

EDUCATION

2008 **KAIST** Seoul, Korea
Ph.D., Financial Engineering.

2001 **SEOUL NATIONAL UNIVERSITY** Seoul, Korea
M.S., Mechanical Engineering.

1999 **SEOUL NATIONAL UNIVERSITY** Seoul, Korea
B.S., Applied Chemistry.

PUBLICATIONS

Publications

Han, C., Park, F.C., 2022. A Geometric framework for covariance dynamics. Journal of Banking & Finance, 134.

Han, C., Kang, J., Kim, S., 2021. Betting against analyst target price. Journal of Financial Markets, 100677.

Han, C., 2021. Bimodal characteristic returns and predictability enhancement via machine learning. Management Science.

Tan, Z., Li, Y., Han, C., 2021. A machine learning approach for the short-term reversal strategy. International Journal of Data Science and Analysis. 7(6).

Han, C., 2020. A nonparametric approach to portfolio shrinkage. Journal of Banking & Finance, 120.

Han, C., 2020. How Much should portfolios be shrunk? Financial Management, 49(3).

Chou, F., Han, C., Shi, S., 2018. Dynamics and determinants of credit risk discovery: Evidence from CDS and stock markets. International Review of Financial Analysis, 55.

Chong, E., Han, C., Park, C., 2017. Deep learning networks for stock market analysis and prediction: methodology, data representations, and case studies. Expert Systems with Applications, 83.

Han, C., Park, F. C., and Kang, J., 2017. Geometric treatment of time-varying volatilities. Review of Quantitative Finance and Accounting, 49 (4).

Han, C., and Taamouti, A., 2017. Partial structural break identification. Oxford Bulletin of Economics and Statistics, 79 (2).

Han, C., 2016. Modeling severity risk under PD-LGD correlation. The European Journal of Finance, 23 (15).

Han, C., Hwang, S., Ryu, D., 2015. Market overreaction and investment strategies. Applied Economics, 47 (54).

Fong, L., Han, C., 2015. Impacts of derivative markets on spot market volatility and their persistence. Applied Economics, 47 (22).

Han, C., 2014. Comparison of credit risk models for loan portfolios. Journal of Risk Model Validation, 8 (2).

Han, C., Lee, I., Nam, C., 2013. Characteristic factors and fund evaluation in Korea. Emerging Markets Finance and Trade, 49 (S4).

Han, C., Jang, Y., 2013. Effects of debt collection practices on loss given default. Journal of Banking and Finance, 73 (1).

Han, C., Kang, H., Kim, K., Yi, J., 2013. Logit regression-based bankruptcy prediction of Korean firms. Asia-Pacific Journal of Risk and Insurance, 7(1).

Park, F. C., Chun, C., Han, C., Webber, N., 2011. Interest rate models on Lie groups. Quantitative Finance, 11(4).

Han, C., Kang, J., 2008. An extended CreditRisk+ framework for portfolio credit risk management. Journal of Credit Risk, 4(4).

Han, C., Park, F. C., Kang, J., 2007. Efficient Value-at-Risk estimation for mortgage-backed securities. Journal of Risk, 9(3).

Kang, J., Kim, S., Han, C., 2005. Estimating the term structure of interest rates and default risk embedded in Korean corporate bonds. Korean Journal of Options and Futures, 13(2).

Books, Chapters

Han, C., He, Z., 2019. Machine learning and stock recommendation. In Big data recommender systems: Recent trends and advances, IET.

Working Papers

Han, C., He, Z., Toh, A., 2021. Pairs trading via unsupervised learning.

Han, C., Kan, R., 2020. Out-of-sample Sharpe ratio maximization.

Han, C., Kan, R., 2020. Asset Clustering.

Chou, F., Han, C., Shi, S., 2017. `Too-Interconnected-To-Fail' Financial Institutions: Evidence from the Transmission of Credit Risk across the G-SIFIs.

Kim, B., Han, C., Park, C., 2016. Optimizing credit portfolio using a quadratic nonlinear projection method.

Work in Progress

Han, C., Kang, J., Guofu, Z., 2022. Stock return anomalies: Update from PyAnomaly.

DeMiguel, V., Han, 2021. Real world performance of factor portfolios.

Han, C., Noh, S., 2020. Optimal portfolio choice with constraints via reinforcement learning.

Andreou, P., Han, C., Li, N., 2020. A semi-parametric approach to option pricing.

Software

PyAnomaly: Comprehensive python library for firm characteristics and factors creation and portfolio analysis. https://pyanomaly.readthedocs.io/en/latest/

REFEREE SERVICE

Management Science, Operations Research, Journal of Machine Learning Research, Quantitative Finance, International Journal of Forecasting, Journal of Risk, Expert Systems with Applications, Information Sciences, Autosoft, Evolving Systems.

PROFESSIONAL SKILLS / CERTIFICATIONS

Programming

Extensive programming experience using Python, C/C++, Pro C, SQL (Oracle/MsSql), and Matlab under Unix or Windows. Experience in Java, SAS, EViews, and R. Specialization in software design for efficient big data analysis and parallelization.

Academic Software:

PyAnomaly: Python library for firm characteristics and factor portfolio generation

Python library for deep learning for asset pricing (optimized for asset pricing research)

Python library for empirical asset pricing

Matlab library for portfolio optimization

Commercial Software Packages (major contribution):

CRPP (credit risk management)

CVPO (credit portfolio optimization)

Opus 1 (general portfolio optimization)

Many in-house system developments for clients

Qualifications

Fellow, The Higher Education Academy, 2015.
CFA (Chartered Financial Analyst), CFA Institute, 2005.
FRM (Financial Risk Manager), GARP, 2003.

Research Grants/Advisory Works

Durham University

InvestEngine. Consultation on ETF-based portfolio strategy. Role: PI. 2020.

ExChain. Machine learning-based cryptocurrency trading strategy. Role: PI. 2020.

Ostrica BV. Machine learning-based stock portfolio strategy. Role: PI. 2020.

Mirae Asset Management. Machine learning-based bond portfolio strategy. Role: PI. 2020.

Shinhan Investment. Machine learning-based US market stock portfolio strategy. Role: PI. 2020.

International Research Grant, Durham University. 2019,

Quantbot Technologies. Machine learning-based global futures strategy. Role: PI. 2019.

Mirae Asset Management. Machine learning-based portfolio strategy development. Role: PI, 2019

Durham Business School. Seedcorn fund. 2018.

Research grant from SNU Institute for Research in Finance and Economics. Role: Co-PI. 2017.

Successful nomination of a PhD student to NEDTC grant. Full financial support during the program. Role: 1st Supervisor. 2016.

Durham Business School. Seedcorn fund. 2018.

TheCitySecret. Portfolio optimization engine development. Role: PI. 2015.

CMPR

Many advisory works for public and private financial institutions. Some selected works are:

Mirae Asset Securities. Strategic asset allocation. Size: £60,000. Role: PI. 2011.

Samsung Fire & Marine. Asset management system. Size: £100,000. Role: PI., 2010

Hyundai Fire & Marine. Portfolio investment strategy. Size: £150,000. Role: Portfolio optimization part leader. 2010.

Korea National Pension Service. Active risk management. Size: £180,000. Role: Asset allocation part leader. 2009.

Samsung Life Insurance. Portfolio management system. Size: £460,000. Role: PI. 2003.

SELECTED INVITED TALKS

2020

Global AI Finance Research Conference

2019

Peking HSBC Business School, KAIST, Ajou University, Sungkyunkwan University, FnGuide

2018

Korea Capital Market Institute, Xiamen University, Busan National University, UNIST, Seoul National University, Concordia University

2017

Hanyang University, Seoul National University, KAIST, Kyungbuk National University, University of Stavanger

2016

HKUST, Sungkyunkwan University

~2015

Neuchatel University, Neuchatel, 2015.
Opening remarks, Chairman, Risk & Return Korea, Asia Risk, Seoul, 2013.
Systemic risk reduction for the OTC derivative market, Korea Banking Risk Dialogue, The Asian Banker, Seoul, 2012.
Upcoming regulatory changes and the role of portfolio compression in Korea, Risk & Return Korea, Asia Risk, Seoul, 2012.
Risk management techniques and challenges in Korea: The use of derivatives, Moderator, Risk & Return Korea, Asia Risk, Seoul, 2012.
Risk management for financial institutions, Korea University, Seoul, 2010 - 2012.
Risk management for financial institutions, Hanyang University, Seoul, 2010 - 2012.
Optimization in finance, CRO Forum, Korea Association of Risk Professionals, Seoul, 2011.
Financial engineering and risk management, Seoul National University, Seoul, 2009.
Some recent developments in portfolio credit risk management, Hong Kong Institute for Monetary Research, Hong Kong, 2006.
Asset Allocation, Korea Bond Pricing, Seoul, 2004.

SELECTED CONFERENCE PRESENTATIONS

Pairs trading via unsupervised learning, APAD conference, 2021.

Bimodal Characteristic Returns and Predictability Enhancement via Machine Learning , FMA Annual Meeting, Online, 2020.

A Nonlinear approach to portfolio shrinkage, FMA Annual Meeting, San Diego, US, 2018.

Machine-learning based stock recommendation, EKC Conference, Glasgow, UK, 2018.

A Nonlinear approach to portfolio shrinkage, FMA Europe Meeting, Kristiansand, Norway, 2018.

Improving the naïve portfolio strategy, Australasian Finance & Banking Conference, Sydney, 2016.

A Geometric GARCH Framework for Covariance Dynamics, 10th Risk Management Conference, Singapore, 2016.

Challenging 1/N strategy, Multinational Finance Association Annual Meeting, Stockholm, 2016.

Challenging 1/N strategy, 2015 Paris Financial Management Conference, 2015.

Geometric treatment of time-varying volatilities, CFE-CMStatistics Conference, London, 2015.

Modeling Severity Risk under PD-LGD Correlation, World Finance Conference, Buenos Aires, 2015.

Geometric treatment of time-varying volatilities, EEA-ESEM 2015, Toulouse, 2014.

Geometric treatment of time-varying volatilities, FMA Annual Meeting, Chicago, IL, 2013.

Logit regression-based bankruptcy prediction of Korean firms, Finance Association Joint Conference, Daejeon, 2011.
Optimization in finance, KORMS Conference, Seoul, 2008.
Conditional Value-at-Risk optimization within an extended CreditRisk+ framework, 10th Conference of the Swiss Society for Financial Market Research, Zurich, 2007.

Efficient Value-at-Risk estimation for mortgage-backed securities, 2nd APAD Conference, Bangalore, 2005.
Simulation methods for analysis of mortgage-backed securities, KSIAM Conference, Seoul, 2005.

TEACHING EXPERIENCE

2013 – present **UNIVERSITY OF DURHAM** Durham, UK
Portfolio Management (Master, 2014-present), Computational Quantitative Finance (UG, 2019-present), Security Analysis (Master, 2018), Security Investment Analysis (UG, 2016), Financial Markets and Risk Management (UG, 2013).

2021 **KAIST** Seoul, Korea
Advisory professor of KAIST Student Investment Fund

2017 **KAIST** Seoul, Korea
Credit Risk Analysis Using Big Data (Master), Algorithmic and Quantitative Trading (Master)

2008 – 2013 **EDUCATION CENTER OF CFA KOREA SOCIETY** Seoul, Korea
Risk Management and Derivatives (CFA Level II and III).

2011 **SEOUL NATIONAL UNIVERSITY** Seoul, Korea
Mechanics of Finance (Master).

2008 – 2011 **SOGANG UNIVERSITY** Seoul, Korea
Financial Risk Management (UG), and Financial Engineering (Master).

2005 – 2010 **HANKUK UNIVERSITY OF FOREIGN STUDIES** Seoul, Korea
Advanced Operations Research (Master), Operation Research (UG), Statistics (UG), Advanced Statistics (UG), Financial Management (UG).

2009 **SEOUL WOMEN'S UNIVERSITY** Seoul, Korea
Risk Management (Master).

2009 **KOREA BANKING INSTITUTE** Seoul, Korea
Credit Risk Management, Certified Derivatives Investment Advisor.

2009 **KOREA FINANCIAL INVESTMENT ASSOCIATION** Seoul, Korea
Certified Investment Manager, Certified Derivatives Investment Advisor (lecturer and examiner).

2008 **KYUNGHEE UNIVERSITY** Seoul, Korea
Financial Engineering (UG).

2008 **SUNGKYUNKWAN UNIVERSITY** Seoul, Korea
Derivatives Theory (EMBA).

MISCELLANEOUS

Ustinov college mentor, Durham University, *2016-present*. President and founder of Team Storm Riders, the largest international amateur cycling team in Korea, *2012 ~ 2013*. Cycling director of Seoul Synergy, the oldest international triathlon club in Korea, *2011 ~ 2012*. Competitive cyclist and runner: First Korean completing Paris-Brest-Paris 1200km, the biggest long-distance cycling event in the world, *2011*; Invited for Medoc Marathon by Chateau La Laguine, *2012-2013*; Attended many cycling and duathlon races including 9 stage Tour de Korea (2007, 2012); Completed full course marathon 7 times (PB: 3:09:46). Second degree in Kendo.