PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
School	International Business School Suzhou
Supervisors	Principal supervisor: Dr Edwin Ruan (XJTLU) Co-supervisor: Professor Chardin Wese Simen (UoL)
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Inferring Market Return Predictability from the Cross Section of Options: A Machine Learning Approach
Contact	Please email Edwin.Ruan@xjtlu.edu.cn (XJTLU principal supervisor's email address) with a subject line of the PhD project title. The principal supervisor's profile is linked here: http://www.xjtlu.edu.cn/en/persons/EdwinRuan

Requirements:

A Master's degree with MeritMerit, plus dissertation module 65%+, and a Bachelor's degree with first-class or upper second-class honors are required for PhD admissions. Exceptional candidates holding only a Bachelor's degree may be considered on an individual basis in certain disciplines.

Evidence of good spoken and written English is essential. The candidate should have an IELTS (or equivalent) score of 7.0 or above, with each component 6.5, if the first language is not English. This position is open to all qualified candidates irrespective of nationality.

Degree:

The student will be awarded a PhD degree from the University of Liverpool (UK) upon successful completion of the program.

Funding:

The PhD studentship is available for three years subject to satisfactory progress by the student. The award covers tuition fees for three years (currently equivalent to RMB 99,000 per annum). It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. The scholarship holders are expected to conduct the majority of their research at XJTLU in Suzhou, China. However, they may apply for a short-term research visit to the University of Liverpool if the project requires it.

Project Description:

Understanding the predictive content of options markets for aggregate stock returns has been a longstanding focus in asset pricing. Existing research typically relies on simple aggregation of option-implied information, such as average implied volatility, skewness, or spreads, when constructing predictors for market returns (e.g., Han and Li, 2021; Cao et al., 2022; Jondeau et al., 2019). While these approaches have yielded important insights, they may fail to capture the rich and high-dimensional information embedded in the full cross section of options. This project proposes a novel framework that leverages modern machine learning techniques to uncover and exploit latent structures in option data for market return prediction. Specifically, we consider deep learning architectures, unsupervised learning, and reinforcement learning methods to extract signals from diverse option-based measures, including the implied volatility surface, option Greeks, higher-order risk-neutral moments, trading activity patterns and others. By moving beyond simple averages, our approach aims to identify nonlinear interactions and hidden features that traditional econometric models overlook. The project contributes to the literature in three key ways: (i) it introduces a machine learning–driven methodology for inferring market expectations from the option cross section, (ii) it provides a comprehensive evaluation of the predictive performance of alternative models across different market conditions, and (iii) it sheds light on the economic mechanisms through which option investors' beliefs and trading behaviors translate into aggregate return predictability.

For more information about doctoral scholarship and PhD programme at Xi'an Jiaotong-Liverpool University (XJTLU), please visit

https://www.xjtlu.edu.cn/en/admissions/global/entry-requirements/

https://www.xjtlu.edu.cn/en/admissions/global/fees-and-scholarship

How to Apply:

Interested applicants are advised to email Edwin.Ruan@xjtlu.edu.cn (XJTLU principal supervisor's email address) the following documents for initial review and assessment (please put the project title in the subject line).

- CV
- Two formal reference letters
- Personal statement outlining your interest in the position
- Certificates of English language qualifications (IELTS or equivalent)
- Full academic transcripts in both Chinese and English (for international students, only the English version is required)
- Verified certificates of education qualifications in both Chinese and English (for international students, only the English version is required)
- PDF copy of Master Degree dissertation (or an equivalent writing sample) and examiners reports available