Leverhulme Magna-Carta Doctoral Scholarship in Econometrics

Royal Holloway, University of London - Department of Economics and Department of Computer Science

This is a unique opportunity for a high-achieving graduate student to be **fully funded** to carry out research on Market Manipulation and High Frequency Trading in Cryptocurrencies and other Electronic Markets. The successful candidate will work with staff from the Economics Department and Computer Science Department at Royal Holloway University of London. This studentship will enable the recipient to develop academic-standard research skills and a deep understanding of electronic markets in practice with potential collaboration with external firms.

**Project Title: Market Manipulation and High Frequency trading in Cryptocurrencies and other Electronic Markets**

**First Supervisor: Prof. Alessio Sancetta (Economics), Second Supervisor: Prof. Volodya Vovk (Computer Science)**

The goal of the project is to formally define market manipulation and abuse in high frequency trading from a statistical point of view, and to test whether some electronic markets are prone to market manipulation. In the specific context, market manipulation means that some economic agent sends orders to the market in order to create a fictitious snapshot of the market conditions. The intention is to induce other agents to place orders that will result in a profit for the market manipulator. Such “manipulating” orders are fictitious because they are unlikely to be filled, but create a false view of the demand and supply schedule in the market. This practice is often referred to as spoofing. Such practice is unlawful in regulated electronic markets, and discouraged in unregulated markets such as foreign exchange. However, trading in cryptocurrency such as bitcoins happens in completely unregulated markets where such practice can freely be used. Data availability in these markets provides a unique comparative framework on which to devise theories, statistics and tests for market manipulation.

The project will attempt to define the framework for the study of market manipulation using modern inferential procedures under weak assumptions. In this respect, the techniques will have to be robust to dependence and heterogeneity in high frequency data. To avoid functional misspecification, but retain clear interpretability of results, heavy use of semiparametric methods will be needed. It is expected that the topic will require to advance economic understanding of market manipulation. Using Karl Popper view that theories need to be falsifiable in order to be scientific, the project will rely on use of large data sets and related statistical testing procedures.

**Academic Requirements**

The ideal candidate has a strong interest in financial markets, is very mathematically oriented, and willing to work with large datasets. An Msc (expected by Sept. 2016) in either Econometrics, Statistics, or Machine learning together with knowledge of either Matlab, R or Python is required.
**Funding Level**

The successful applicant will have their full PhD fees paid at the appropriate rate for 3 years. Note that the Leverhulme Magna Carta awards are for an annual stipend of £16,296 and an HEU fee waiver. Students will become part of the Magna Carta Doctoral Centre and are expected to contribute to its activities.

**Contact Information and How to Apply**

For further information or informal enquiries please contact Prof Alessio Sancetta

Alessio.sancetta@rhul.ac.uk

Application procedure

You should apply via Royal Holloway’s online application system, which can be accessed at: www.rhul.ac.uk/studyhere/postgraduate/applying/howtoapply.aspx. In addition to completing the postgraduate application form, your application should include:

- A copy of your first degree and postgraduate transcripts.
- A current CV
- An optional 1 page statement outlining your interest in the research and highlighting any experience that might be relevant.

Closing Date for formal applications: Tuesday 15 April 2016

The expected start date for this project is September 2016