Bucharest University of Economic Studies (UES)

ANNOUNCEMENT

The Bucharest University of Economic Studies is organizing a selection for the following vacancy:

Postdoctoral researcher - 1 - 1 position – within the *„Non-Gaussian self-similar processes: Enhancing mathematical tools and fincial models for capturing complex market dynamics",* **project code 194/31.07.2023**

Part-time work of maximum 88 hours/month, distributed unequally, gross hourly salary 96.60 lei, fixed period of 12 months with evaluation and possibility of extension until June 30, 2026.

A. To participate in the competition, candidates must meet the following general and specific conditions:

1. General conditions:

a) has Romanian nationality, citizenship of other Member States of the European Union, of States belonging to the European Economic Area and/or foreigners as they are defined by Art. 2 lit. a) of OUG 194/12.12.2002 with subsequent amendments and additions, respectively persons who do not have Romanian citizency, citizeness of another Member State of the EU or the citizenry of the Swiss Confederation;

b) has the minimum statutory age;

c) has full capacity to work;

d) meets the study conditions and, where appropriate, seniority or other specific conditions according to the requirements of the position put up for competition;

e) has not been definitively convicted for committing a crime against humanity, against the State or against authority, or for an offence committed in the course of or in connection with the performance of his or her duties, which obstructs the course of justice, or for forgery or acts of corruption or a crime committed with intent, which would make him or her incompatible with the exercise of the function, except for the situation in which rehabilitation intervened.

2. Specific conditions:

a) level of studies: higher completed with doctor's degree

b) the candidate on the date of appeal (26/06/2023), held a doctorate and had research experience of not more than 8 years equivalent full-time, from the day of the first doctorate degree, but not exceeding 10 years corresponding full time under the conditions provided by the European Research Executive Agency (REA)

c) field of study: branch of science
-    economic sciences, field of finance

d) Other specific conditions:

A solid practical experience in statistics and stochastic modeling with applicability in microeconomics, macroeconomie and sustainability. Experience in previous similar projects will be considered a major advantage.

Abilities:

1. **Technical skills** :
   - Advanced use of Python modelling tools and software.
   - The ability to develop and implement complex financial models.
   - Solid understanding of financial theories and financial instruments.

2. *Analytical skills:*
   - Ability to analyze and interpret complex data, identify trends and formulate recommendations based on analysis.

3. *Communication skills:*
   - Excellent written and verbal communication skills, to present research results clearly and concisely.

4. *Teamwork:*
   - The ability to work effectively in an interdisciplinary team, collaborating with other researchers to the objectives of the project.

Certifications/Qualifications/Specializationsi

1. **Chartered Financial Analyst (CFA) level 3**
2. **Relevant authorizations to the capital market (Financial Supervisory Authority)**

Specific requirements

1. **Foreign Languages:**
   - Advanced knowledge of English (written as well as spoken) to be able to access and disseminate knowledge from international literature.

2. **Scientific publications and contributions**:
   - Candidates must demonstrate that they have contributions and publications in the field of statistics and stochastic modeling in finance, risk management, sustainability, demonstrating expertise and independent research capacity. It is considered an advantage if candidates demonstrate that they have publications in non-Gaussian stochastic modeling in mathematical finance, in journals relevant to the scientific community,

3. **Innovation Capacity:**
   - An innovative attitude and creative thinking to develop new methods and tools.

4. **Research Ethics:**
   - Deep understanding of ethical principles in research and commitment to academic integrity.

5. **Readiness for Professional Development:**
   - Readiness to participate in conferences, workshops and other forms of continuous professional development.

6. **Flexibility and Adaptability**:

• Ability to adapt to project direction changes and to respond to unexpected challenges.

Candidates will present a portfolio of previous projects and relevant scientific publications to assess the quality and relevance of their experience, taking into account the required skills and requirements

B. The selection will consist of:
1. **Step 1 - Evaluation of selection files**;
2. **Step 2 - Structured interview** (in the situation where at least 2 candidates do not register, the competition committee can decide to simplify the procedure and carry out the selection without conducting the interview);

- *the date and time of the interview*: to be announced at the same time as the results of the selection files evaluation are published;

- *the place of the interview*: to be announced at the same time as the results of the selection files evaluation are published,

The tests are eliminatory, the minimum score for each test is 50 points.

C. Topics and bibliography:
1. **Topics:**

1.1. Fundamentals of Stochastic Modeling in Sustainable Finance:

The fundamental principles and techniques of stochastic modeling (Gaussian and non-Gaussian models), exploring their applicability in the analysis and prediction of sustainable financial markets.

1.2. Advanced techniques in stochastic modeling for valuing sustainable financial assets:

The study of advanced stochastic modeling techniques (Gaussian and non-Gaussian model) in mathematical finance with an emphasis on the price dynamics of sustainable financial assets.

1.3. Risk and uncertainty in stochastic models:

Analysis of how Gaussian and non-Gaussian stochastic models can quantify and manage risk and uncertainty in sustainable financial markets

1.4. Modeling volatility and correlations in markets using stochAStic processes:

Explore the use of Gaussian and non-Gaussian stochastic processes in modeling volatility and correlations between sustainable financial instruments.

1.5. Fundamentals in programming for data analysis with Python:

Familiarize yourself with Python libraries essential for data analysis and statistical modelling, such as NumPy, pandas, SciPy and Matplotlib. Focus on their applicability in the processing of financial data and implementation of stochastic modeling algorithms.

1.6. Automation of analysis and predictive modelling using Python:

Advanced techniques to automate analysis and build predictive models for financial markets using machine learning and signal processing. Python libraries for machine learning, such as Scikit-learn.

1.7. Viewing financial data with Python:

Advanced data visualization techniques using Python libraries such as Seaborn and Plotly, to create complex interactive and graphical dashboards that facilitate the understanding of market trends.

1.8. Monte Carlo simulations in Python for risk assessment:

Implement Monte Carlo simulations using Python to assess probability distributions of market returns and to quantify risk in financial portfolios.

2. Bibliography:
2.1. Books:

Fractals and scaling in finance
Mandelbrot, Benoit B.
Sel. Works B. B. Mandelbrot
Springer-Verlag, New York, 1997, x+551 pp.
ISBN: 0-387-98363-5

MR2502480 - Option pricing in fractional Brownian markets
Rostek, Stefan
Lecture Notes in Econom. and Math. Systems, 622
Springer-Verlag, Berlin, 2009, xiv+137 pp.
ISBN: 978-3-642-00330-1

MR4485442 - Continuous time processes for finance—switching, self-exciting, fractional and other recent dynamics
Hainaut, Donatien
Bocconi Springer Ser., 12
Springer, Cham; Bocconi University Press, [place of publication not identified], 2022, xviii+345 pp.
ISBN: 978-3-031-06360-2; 978-3-031-06361-9

MR1422250 - Introduction to stochastic calculus applied to finance
Lamberton, Damien; Lapeyre, Bernard
Chapman & Hall, London, 1996, xii+185 pp.
ISBN: 978-1-58488-626-6

Python for Data Analysis
Wes McKinney..
(O'Reilly). 2022 Wes McKinney,
ISBN: 978-1-098-10403-0

Python for Finance: Mastering Data-Driven Finance
Yves Hilpisch.
O'Reilly Media, Edition. 2nd, 2019.
ISBN: 978-1492024330.

Mastering Python for Finance: Implement advanced state-of-the-art financial statistical applications using Python, 2nd Edition
James Ma Weiming.
Packt Publishing, 2019.
ISBN: 978-1789346466.

2.2. Articles:

MR4028644 - <u>Pricing derivatives in Hermite markets</u>
<u>Stoyanov, Stoyan V.</u>; <u>Rachev, Svetlozar T.</u>; <u>Mittnik, Stefan</u>; <u>Fabozzi, Frank J.</u>
<u>Int. J. Theor. Appl. Finance</u> **22** (<u>2019</u>), no. <u>6</u>, 1950031, 27 pp.

MR4577885 - <u>Volatility is rough</u>
<u>Gatheral, J.</u>; <u>Jaisson, T.</u>; <u>Rosenbaum, M.</u>
<u>World Sci. Lect. Notes Finance</u>, <u>6</u>
World Scientific Publishing Co. Pte. Ltd., Hackensack, NJ, 2023, 127–172.

<u>Fractional Brownian motion with zero Hurst parameter: a rough volatility viewpoint</u>
<u>Neuman, Eyal</u>; <u>Rosenbaum, Mathieu</u>
<u>Electron. Commun. Probab.</u> **23** (<u>2018</u>), Paper No. 61, 12 pp.

MR4698114 - <u>Short-Time Asymptotics for Non-Self-Similar Stochastic Volatility Models</u>
Giorgio, Giacomo; Pacchiarotti, Barbara; Pigato, Paolo
<u>Appl. Math. Finance</u> **30** (<u>2023</u>), no. <u>3</u>, 123–152.

<u>Local volatility under rough volatility</u>
<u>Bourgey, Florian</u>; <u>De Marco, Stefano</u>; <u>Friz, Peter K.</u>; <u>Pigato, Paolo</u>
<u>Math. Finance</u> **33** (<u>2023</u>), no. <u>4</u>, 1119–1145.

<u>Markovian approximations of stochastic Volterra equations with the fractional kernel</u>
<u>Bayer, Christian</u>; <u>Breneis, Simon</u>
<u>Quant. Finance</u> **23** (<u>2023</u>), no. <u>1</u>, 53–70.

<u>Stationary Heston model: calibration and pricing of exotics using product recursive quantization</u>
<u>Lemaire, Vincent</u>; <u>Montes, Thibaut</u>; <u>Pagès, Gilles</u>
<u>Quant. Finance</u> **22** (<u>2022</u>), no. <u>4</u>, 611–629.

<u>Fractional stochastic volatility correction to CEV implied volatility</u>
<u>Kim, Hyun-Gyoon</u>; <u>Kwon, Se-Jin</u>; <u>Kim, Jeong-Hoon</u> <u>Quant. Finance</u> **21** (<u>2021</u>), no. <u>4</u>, 565–574.

<u>The overdamped generalized Langevin equation with Hermite noise</u>
<u>Tudor, Ciprian A.</u>
<u>Fract. Calc. Appl. Anal.</u> **26** (<u>2023</u>), no. <u>3</u>, 1082–1103.

D. Contents of the competition file:

1. List of all attached documents;
2. Application form addressed to the Rector of UES;
3. Declaration regarding the existence/non-existence of situations of incompatibility;
4. Declaration on own responsibility if the applicant has / does not have a spouse or relatives and relatives, up to the third degree inclusive, who are employees of the Academy of Economic Studies in Bucharest in a position of management, control, authority with the post selected and neither the post to which he applies, is not in a leadership, control position with the spouse / wife or relative and related, until the third grade inclusive, university employees;
5. Statement for the processing of personal data;
6. Copy of the identity document or any other document certifying the identity, according to the law, if applicable;
7. Copy of marriage certificate or proof of the change of name, if the candidate has changed his/her name (proof of change of name);
8. The criminal record or a statement on his own responsibility that he has no criminal record that makes him incompatible with the position for which he is applying;
9. Medical certificate attesting the appropriate state of health issued no later than 6 months before the selection by the family doctor of the candidate or by the qualified health units, or the declaration on his own responsibility, with the obligation to complete the selection file with the medical certificate not later than the date of the first test of the recruitment and selection process, if applicable;
10. Curriculum Vitae in European format, RO/ENG– signed and dated on each page;
11. Copies of documents certifying the level of studies and other documents certifying the completion of specializations, as well as copies of documents proving that the specific conditions proving that the specific conditions for the position have been met;
12. Other documents relevant to the competition.

E. Contact information:

The selection files will be submitted in a literal format until 18.03.2024 at 16:00, at the ASE Registry, in the "Ion Angelescu" Building, Bastille Fall, ground floor, room 0016, or online at the address provided by the contact person.

Contact person: Maria Cristina Pădure - e-mail: cristina.padure@ase.ro

The requested forms can be found on the website of the Project Management Service with Non-Restructible Financing, Resources section, by accessing the link https://fondurieuropene.ase.ro/resurse/

F. **The calendar of the selection process:**

No	Activities	Date
1.	Submitting the candidates' competition files at the ASE Registrar's Office and verification of the documents in the file	08/03/2024 – 18/03/2024
2.	Selection of application files by the members of the competition committee	19/03/2024
3.	Publication of the results of the selection of the application files	19/03/2024
4.	Submission of appeals regarding the results of the selection of application files	20/03/2024
5.	Publication of the results of the appeals	21/03/2024
6.	Interview	22/03/2024
7.	Communication of the results after the interview	22/03/2024
8.	Submission of appeals regarding the interview results	25/03/2024
9.	Publication of the results of the appeal	25/03/2024
10.	Publication of the final results	25/03/2024
11.	Appointment to the position	After approval from the Board of Trustees