REVIEW

for **Tsvetelin Stefanov Zaevski, PhD**

in a competition for the academic position of **"Associate Professor"**

by professional field 4.5 Mathematics, scientific specialty "Probability Theory and Mathematical Statistics" (Stochastic models in finance)

Reviewer: akad. Ivan Petkov Popchev

Pursuant to Art. 4, para. 2 of the ADAS in the Republic of Bulgaria, Art. 2, para. 2 of Regulation of application of the ADASRB and Decision of the Scientific Council of IMI-BAS (Protocol No. 1 of 22.01.2021) at the proposal of the ROPS department Director Acad. V. Drenski 28/19.02.2021 in connection with the announced competition for the **academic position "Associate Professor"** in SG no. 108/22.12.2020 in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.5 Mathematics, scientific specialty "Probability theory and mathematical statistics" (Stochastic models in finance) I have been appointed an external member of the Scientific Panel.

I was selected as a reviewer of the announced competition at a meeting of the Scientific Jury, Protocol No. 1/02.03.2021

As a reviewer, I have received all 17 documents included in the application to the Director of IMI-BAS for admission to participate in the competition from 10.02.2021.

According to ADASRB, Regulation of application of the ADASRB and the Regulations for application of ADASRB in IMI-BAS, the candidates for associate professor must meet certain conditions and requirements.

Art. 24 (1) The applicants to occupy the academic position of Associate Professor must meet the following conditions:

1. to have been awarded the educational and scientific degree of Doctor;

2. for minimum two years:

   a) to have occupies the academic position of Assistant, Chief Assistant;

3. to have presented a published monograph or equivalent publications in specialized scientific issued or …, which do not reproduce those presented for awarding the educational and scientific degree of Doctor and for awarding of the scientific degree of Doctor of Science.

4. to meet the minimum national refinements under Art. 2b, Para. 2 and 3, respectively the requirements under Art. 2b, Para. 5.

5. to have no plagiarism proven as per the legally established order in the scientific works.

(2) The academic position of Associate Professor shall be occupied on the basis of a competition and election.

(3) A competition for occupying the academic position of Associate Professor shell be opened, if it is possible the relevant teaching and research load to be provided, according to the relevant rules of procedure of the higher school or scientific organization.

According to the Regulations for application of ADASRB in IMI-BAS in art. 3 (1).2 of the submitted publications for participation in a competition for the academic position of "associate professor" the candidate must have at least 5 publications in publications with IF or SJR.

Tsvetelin Stefanov Zaevski, PhD **meets the requirements of Art. 24 (1).1** because he defended his dissertation on "Combined processes of Ito and Levi”. Holds Diploma No. SU 2013-119, issued on 15.10.2013

Tsvetelin Stefanov Zaevski, PhD **meets the requirements of Art. 24 (1).2a** because with a certificate ex. No. 59/23.01.2010, signed by Director Acad. V. Drenski is certified that he works at the Institute of employment contract No.31 from 14.01.2014 as an assistant in the "Operations Research, probabilities and statistics" Department and to January 25, 2021 has a work experience of 6 years, 3 months and 10 days.

Tsvetelin Stefanov Zaevski, PhD **meets the requirements of Art. 24 (1).3** as it has presented 3 publications in specialized scientific issues, which do not repeat the ones presented for acquiring the educational and scientific degree “doctor”.

In the documents for the competition there is a "List of all works" - 13 pcs. and "List of publications for participation in the competition" - 10 pcs.

The brief analysis of the 10 **publications submitted for participation** in the competition shows the following:

- 9 publications are in **IF journals** (Nos. 1, 3, 4, 5, 6, 7, 8, 9 and 10);
- 1 publication **in the annual** (No. 2);
- 6 publications are **independent** (Nos. 5, 6, 7, 8, 9 and 10);

28 citations of 7 publications are includes in the **"List of citations of publications"** and **15 citations of 3 publications** are entered in the **"List of citations for participation in the competition for associate professor"**.

The reviewer considers that Tsvetelin Zaevski, PhD **fulfills the requirement of Art. 24 (1).4** as it meets the minimum national requirements under Art. 2b, para. 2 and 3 and the requirements under Art. 2 b, para. 5 respectively, as well as requirements of art. 3 (1) of the Regulation for application of ADASRB in IMI-BAS. According to **Art. 24 (1).5 there is no plagiarism in the scientific works proven according to the legally established order**.

In accordance with Art. 26 of the ADASRB, the candidate has submitted a **"List of original scientific contributions"** in four areas.

The contributions of Tsvetelin Zaevski, PhD can be briefly systematized as follows:

1. It is presented a stochastic volatility model for option pricing that exhibits Levi jump behavior and for this model is derive the general formula for a European call option [No. 1].
2. It is initiated the application of methods from spectral graph theory to the analysis of multidimensional genetic data, and in particular to the problem of detection differential expression based on RNA – Seq data [No. 2].
3. There are presented: a method for pricing the defaultable derivatives based on the assumption that the asset price is the solution of a stochastic differential equation (SDE) [No. 3] and two essentially different schemes for deriving the partial differential equation (PDE) for the price of the defaultable derivatives [No. 4].
4. They are received: form of the early exercise premium for the American type derivatives [No. 5] and an approach for deriving the early exercise boundary of American put options [No. 6] as well as approach for pricing discounted perpetual game call options [No. 7].

5. There has been studied the behavior: of perpetual game put options, also known as cancellable puts [No. 8] and a special kind of game option, whose main feature is the presence of an early exercise right for the seller as well as for the buyer [No. 9].
6. There are presented some propositions about the Laplace transform related to the first hitting time to piecewise linear functions of Brownian motion. The results can be used for example barrier of American options [No. 10].

Tsvetelin Zaevski, PhD has participated in **3 research projects** financed by the Scientific Research Fund and in **4 international scientific conferences with a report**.

He presented an official note No. 08/27.01.2021, signed by Assoc. Prof. P. Parvanov, PhD - Dean of the Faculty of Mathematics and Informatics - Sofia University "St. Kliment Ohridski" in the assurance that he was a **part-time lecturer** for students of Bachelor's and Master's degrees in the subjects "Financial Theory 2" - exercises and "Mathematical Theory of the Financial Market"- lectures from 2004 to 2021 with corresponding hours.

A generalized **"scientometric image"** of Tsvetelin Stefanov Zaevski, PhD can be created based on information from world scientific bases:

- Scopus: 9 documents, 31 citations, h-index – 3;
- Web of Science: 18 citing articles, 26 sum of times cited, h-index - 2;
- Scholar.google: 36 citations, h-index 3, i10 -1.
- ResearchGate: RG Score 11.57, h-index 2, h-index 2 excluding self-citations.

The generalized **"scientometric image"** deserves to be the subject of careful and critical **self-analysis** and is a sufficient basis for further **publication activity**.

CONCLUSION

All requirements, conditions and criteria according to ADASRB, Regulation of application of the and the Regulation for application of ADASRB in IMI-BAS are fulfilled and I give a **strongly positive conclusion** for selection of Tsvetelin Stefanov Zaevski, PhD in a competition for the academic position "Associate Professor" in professional field 4.5

Mathematics, scientific specialty "Probability Theory and Mathematical Statistics" (Stochastic models in finance).

I propose to the Scientific Panel to unanimously vote a proposal to the Scientific Council of IMI-BAS to elect Tsvetelin Stefanov Zaevski, PhD for the academic position of "Associate Professor" in the professional field 4.5 Mathematics, scientific specialty "Probability Theory and Mathematical Statistics" (Stochastic models in finance).

18.03.2021 г.

Reviewer: ……………………………….

akad. Ivan P. Popchev