

OPINION
about the competition for acquiring
the academic position of "Associate Professor"
announced by the Institute of Mathematics and Informatics
in the Bulgarian Academy of Sciences
in Newspaper of State, No. 108 of 22.12.2020
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)

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The only applicant: Assistant Professor **Tsvetelin Stefanov Zaevski**, PhD from IMI-BAS

I. General description of the presented materials.

I do not know Tsvetelin Zaevski, I have not worked with him. My opinion is based entirely on the materials submitted for the competition.

I find that they are well formed, the content is presented clearly and precisely. The most important of the attached materials and part of the information contained in them are:

1. Professional CV in the common European format, according to which Tsvetelin Zaevski graduated from high school in 1993 at MG "Geo Milev", Pleve; from 1993 to 1999 he is a student at FMI-Sofia University "St. Kliment Ohridski ", specialty Applied Mathematics and graduated with a Master's degree. In 2013 he defended a dissertation on "Combined processes of Ito and Levi" with supervisor Prof. Dr. Racho Denchev. Copies of master's and doctor's diplomas are presented.

From 2014 until now he has been working as an assistant at IMI-BAS, and since 2019 he has been lecturing on the course "Mathematical Theory of the Financial Market" as a part-time lecturer at FMI-Sofia University "St. Kliment Ohridski ". He has worked there as a part-time lecturer in the period 2004-2009, when he taught exercises in the course "Theory of Finance 2". A certificate from IMI-BAS and an official note from Sofia University are presented.

The autobiography also mentions participation in 4 conferences..

2. General list of publications, 13 in number, as well as a list of publications for participation in this competition, 10 in number.

3. Signed author's reference for the scientific contributions of the publications for participation in the competition, summaries of the same publications in Bulgarian and English, as well as copies of the publications themselves.

I find the reference to be very well prepared and accurately reflect the contributions of the articles in question.

4. Complete list of citations, containing 28 citations, as well as a list of citations for participation in the competition, containing 15 citations.

5. List of research projects with the participation of Tsvetelin Zaevski. Three projects are listed, all three to the Research Fund: one for the period 2015-2018, the other from 2016 to 2019 and the third for the period 2019-2022.

6. Information for the fulfillment of the minimum national requirements according to ZRASRB, as well as of the minimum requirements of IMI-BAS. The reference shows that Tsvetelin Zaevski satisfies these requirements with much more than the necessary points.

II. General characteristics of the scientific activity of the candidate according to the materials submitted for participation in the competition.

Tsvetomir Zaeovski participated in the competition with 10 articles published in the period 2014-2020. They have not been used in the procedure for obtaining the educational and scientific degree "PhD", for which the candidate has applied a declaration.

One of the presented articles is in the Annual of Sofia University "St. Kliment Ohridski" and 9 are in journals with impact factor and high values of Q - indicators: 5 are with Q1, 1 with Q3 and 3 are with Q4. All are written in English. Although the publications are not too many, the level of the journals that published them is high and they are quite sufficient to cover and exceed the requirements necessary to acquire the academic position of "associate professor".

Five of the papers are written by the author alone, one is with one co-author, two are with two co-authors and one is with three co-authors. This shows the candidate's very good skills, both for individual performance and for teamwork and exchange of scientific ideas.

We considered the teaching activity and participation in projects, as well as the citations of the candidate in the previous point. Here I will note that for participation in the competition Tsvetelin Zaeovski presented a reference for 15 citations from 22 authors.

III. Analysis of the scientific and scientific achievements according to the materials submitted for participation in the competition.

The research and teaching activities of Assistant Professor Dr. Tsvetelin Zaeovski are entirely related to financial mathematics. With few exceptions, the problems considered arise from the financial market, which puts at a very high level the practical applications of the obtained theoretical results.

Thematically, the presented papers can be divided into several groups.

The first topic can be characterized as an application of Levy's process for modeling the evaluation of options (paper [1] from the list of publications for participation in the competition). In this paper, based on real data, a comparison is made between the classical Bates and Black-Scholes models, in which jumps are presented as a complex Poisson process, with the innovations of the authors model with constant-active jumps, presented by a moderately stable process. It turns out that moderately stable jumps describe market prices more accurately.

The second topic is related to the application of methods from the spectral theory of graphs for analysis of multidimensional genetic data and more precisely for finding gene expression in two separate control groups. (article [2] from the list of publications for participation in the competition). Although this topic seems far from financial mathematics, if we replace the concept of genes with assets in the financial market, we come to the task of distributing marketable assets between a number of groups.

Papers [3] and [4] of the list of publications for participation in the competition are devoted to methods for assessing credit risk derivatives. Two essentially different schemes for deriving the partial differential equations for the price of such derivatives are presented. The first paper discusses a method in which the price of an asset is solution of a stochastic differential equation that stops at a random moment. In the second paper, this method is further developed and another method is presented, based on the idea of adding a jumping process so that the moment of stopping is at its first jump.

The remaining articles in the list of publications for participation in the competition ([5] - [9]) continue the study of derivatives, and in particular derivatives with the right of early exercise, and the work [10] considers properties of the Laplace transformation of reaching partially linear functions of Brownian motion. [5] and [6] deal with American-type

derivatives, characterized by giving the owner the right to choose the time of early exercise. In [5] a new form of the so-called early exercise premium for the American derivative is presented. The technique of stopping times is used, not the classical infinitesimal operator. This allows the premium to be obtained in the case where the payment structure of the derivative is not a differentiable function and does not even need to be continuous. In [6], a new approach to finding the limit for early exercise of American options is presented and a comparison is made with other numerical methods for evaluating these options.

The other main type of derivatives with the right of early exercise are the so-called game derivatives. In them, the right to early exercise has not only the owner of the derivative, but also the issuer of the derivative. However, he is obliged to pay a certain amount more than usual when he decides to terminate the contract. Papers [7] - [9] are devoted to this type of derivatives. They examine game options based on generalized assumptions and use a new approach based on a special type of auxiliary derivatives.

I think that all the articles presented by Assistant Professor Dr. Tsvetelin Zaevski for participation in the competition for "Associate Professor" are interesting, containing significant theoretical results, with specific applications in practice.

CONCLUSION

The above gives me a reason to strongly recommend to the Honorable Scientific Jury to suggest to the Scientific Council of IMI – BAS to select Tsvetelin Stefanov Zaevski for the academic position "Associate Professor" 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)

April 19, 2021

Signature:

/Assoc. Prof. Velika Dragieva/