

Report: PhD submission in order to obtain the academic degree Doctor of Science in Economics

Candidate: Mr. Dean Fantazzini

Title: Modelling and forecasting univariate and multivariate time series using Google data and copulae

Date: May 7, 2020

Dear Sir/Madam

At the request of the National Research University Higher School of Economics in Moscow and as a member of the PhD committee of the above candidate, I hereby submit my report on the thesis, which Mr. Fantazzini hopes to defend on May 29.

I base myself on a pdf file which I received containing 477 pages with an introduction, a statement of the main results, and 18 separate papers ('appendices').

The thesis is truly impressive containing, as mentioned above, no less than 18 papers. It is very exceptional to see so many high-quality papers in one dissertation. The topics also cover a wide range, from copulas, financial crisis, food stamps data, power plants, car sales, oil prices, bitcoins, market risk, and happiness (only in Russian). Most papers are in English, the ones in Russian I could not judge.

The *quality* of the research is very high. Most papers have been published in very respectable journals, and the author clearly has masterful technical knowledge, not only in his specialty (copulas) but in econometrics more broadly as well. The research is always well referenced, and the subjects are treated with respect and dignity.

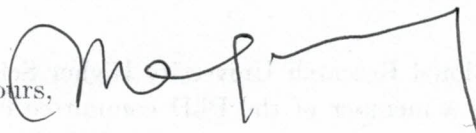
The *relevance* of the selected topics is also high. All subjects mentioned above cover important issues, and it is clear that the author has a fertile and imaginative mind. He obviously does not restrict his attention to one subject, but applies his knowledge and technique wherever the current question leads him. This poses new challenges and he appears to be fully capable of dealing with these.

All papers depend on *concepts* (the a priori structure and assumptions) and these concepts need to be defended and the reader needs to be convinced that they are reasonable in the text of the work. This is always achieved with verve. Also, the *conclusions* and *recommendations* proposed in the dissertation are well-reasoned, and when there is some weakness in the con-

clusions the author fairly admits it. The research, as far as I could judge, is both new and relevant.

In short, the collection of papers meets the criteria for a PhD thesis at any university that I am familiar with, and hence the Thesis corresponds to the criteria established at the National Research University Higher School of Economics. It is my opinion that Mr. Fantazzini deserves to be awarded the academic degree of Doctor of Sciences.

Sincerely yours,



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