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London 15 August, 2011

REPORT ON THE THESIS: *"Wavelet-based realized variation and covariation theory"* by Jozef Barunik.

This is an excellent thesis that contributes to the existing literature with several original results.

In particular, Barunik' s main original contributions are:

- to provide a new theoretical framework generalizing the popular concept of realized variance and covariance and
- to corroborate these findings with a wide and detailed empirical investigation on real stock markets data sets.

Moreover, Barunik' s studies not only have produced more efficient estimates, but also have with no doubts contributed to a better understanding of the dynamics of stock markets.
On the applied side, Barunik's investigations have proved to improve forecasts significantly.

Barunik has certainly put an enormous effort in producing a complete literature review on the subject providing all relevant references.

I have no doubts that this thesis is defendable at my home institution and that these thesis results might be submitted in international journals and in a respected economic journal.

In my opinion this thesis is now complete, all my previous minor comments have been considered and implemented in this final version.

In conclusion, I strongly recommend this thesis for defense without any further changes. Moreover, given the outstanding results obtained in this very challenging research field, I strongly recommend a special commendation.

Yours sincerely

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LONDON

London 13 April, 2011

REPORT ON THE THESIS: "Wavelet-based realized variation and covariation theory" by Jozef Barunik.

This is very good thesis, I enjoyed reading it and these studies are of great interest for all the scientific community working in Economics.

In this thesis, Barunik presents a study along the line of the new research field of *Econophysics* that applies methods from physics to macro/micro-economic modelling and financial market analysis. Indeed, this thesis concerns mainly the study of the wavelet – based realized variation theory and an extension to the multivariate case.

This is a very challenging research line, which requires the use of cutting-edge theoretical and numerical tools. The thesis shows the effectiveness of this study, its advantages and disadvantages and some original results might be also reported and published in international journals.

The main innovation of this thesis is in providing a new theoretical framework for the estimation of the wavelet realized variations. The originality of his thesis lies mainly in the comparison of different estimators and the empirical studies of the market data.

This work has certainly required a large amount of study of the existing literature as well as original thinking. The skills requested for a successful thesis of such type are mainly ability to understand and process a large amount of literature from different fields, good data mining skills, computational skills, ability to handle analytical models, knowledge of statistical techniques. I can say that in this thesis Barunik has proven to have all of them.

Barunik has also demonstrated the ability to digest the literature and this works is based on relevant references.

Barunik has certainly put an enormous effort in producing a coherent presentation. Through the thesis he has adopted methods appropriate to tackle the goals of the thesis and he has shown deep critical thoughts. The subjects are properly presented and discussed.

This thesis gives a good contribution to the development of the knowledge in this research and I have no doubts that this thesis is defendable at my home institution.

I have only noted some minor suggestions and some errors of typing including the following that I propose to perform:

I would slightly improving the abstract presentation by giving some more general details. On line 1 write "Study….has become…..area of research..". Try not to repeat "to noise as well jumps" at both lines 8 and 12.
Page 2, Line 26 "bring".
Page 4, Line 27 "introduce", Line 40 "reveals".
Page 5, Line 8 "this dissertation..", Line 9 "This work..".
Page 7, Line 21 "milestone results…"
Page 8, Line 8 "like a filter" or "like filters".
Page 11, check notation for M^C, C on page 12 looks capital.
Page 20 last paragraph, "generalize".
Page 33 Line 10 I would write names for different estimators and add relevant references.

Page 35 Line 6 , Hurst exponent has not been introduced before but after. It is not clear what the "*" are indicating.
Page 34 first sentence of paragraph 4.2 I would add a reference.
Page 36 Line 8, "summarize".
Page 41 Line 16 "estimator is used for..".
Page 42 Line 15 I would add a reference.
Page 47 Line 6 "provides", Line 10 "types", Line 17 "provide".
Page 50 Line 2 "has ", Line 9 "do not".
Page 53 last Line "provide".
Page 58 Line 10 "for".
Page 60 Line 4 "measure", Line 27 "brings a new ".
Page 62 Line 26 "generalizes".
Page 64 Line 4 "has been".
Page 69 Line 20 "bring", Line 28 "introduce".
Page 95 Line 11 "shows".
Page 102 Line 4 "does not".
Page 103 last paragraph "These results tell us..".
Page 105 Line 11 "compare", Line 19 "shows".
Page 106 Line 19 "have".
Page 108 Line 25 "introduce".
Page 109 Line 9 "reveals".

In conclusion, I recommend the thesis for defense without substantial changes.

Yours sincerely

Tiziana Di Matteo