

Report on Bachelor / Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student:	Ing. Lukáš Frýd
Advisor:	Mgr. Lukáš Vácha, Ph.D.
Title of the thesis:	Volatility and Skewness Spillover Effects: Multiresolution Analysis

OVERALL ASSESSMENT (provided in English, Czech, or Slovak):

As a first thing, I have to describe nonstandard cooperation with Lukáš on this thesis. Due to the time limitation on Lukáš's side, we consulted the thesis only via telephone (two times), and as I write this report, it is the first time I see the thesis.

The thesis is focused on volatility and skewness spillover effects among seven world stock indices and WTI oil. Lukáš uses time-frequency decomposition utilizing the maximal overlap discrete wavelet transform (MODWT). The MODWT coefficients are further used to construct the multiresolution analysis (MRA). This procedure disentangles the original series into a variety of several series of the same length, but each of the series represents different time (or trading) horizon. Next, the moments are estimated by the GAS model. Following standard metrology of Diebold and Yilmaz 2012 (with the FEVD) the total and the (net) directional spillovers effects are estimated. The standard setting of 200-day rolling windows, VAR(2) model and forecast horizons of 10 days is applied.

Contribution

The thesis is partly contributive. Adoption of the skewness to the spillover volatility modelling is attractive as well as the time-frequency approach.

Methods

The methods are mostly used in the correct way. However, there are several key questions that need to be addressed. Below and in the question part, I describe some of the major issues:

This part is from the conclusion (p. 68-69): "*The interesting results were obtained from the analysis of two European stock markets DAX and CAC and also Japanese Nikkei index. All of them are almost inert to the volatility transmission from U.S. markets. On the other hand, DAX and CAC are closely linked and volatility from one market spill to another market and vice versa.*"

There is an apparent problem with time synchronization across the time zones. This might be one of the reasons why we observe weak overseas spillover effects for the highest frequency band. In the recent literature that study the spillover phenomena, the continuous high-frequency data partly eliminate this problem. This problem is, of course, much smaller for low frequencies bands (D2, D3). Unfortunately, the highest amount of information is carried on the highest frequency band (D1). This is evident from the Table 4.2., where we can compare variances of the D1-D3 time series.

The net directional spillovers are relatively small. Unfortunately, there are no confidence intervals, or any level of significance, of the spillover effects in the thesis, so we do not know whether and where are the spillovers significant. Simulated confidence band are discussed, for example, in Barunik et al. (2016, JFM).

Literature

Lukáš uses relevant literature for the topic. It is clear from the manuscript that Lukáš understands the literature and uses it correctly.

Manuscript form

The manuscript has a standard form. There are several minor problems with English.

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Summary and suggested questions for the discussion during the defense

To conclude, the thesis has some contribution. If the cooperation were standard, the thesis would benefit substantially. On the other hand, Lukáš presents a good piece of work that he did only by his own. I suggest the grade D, but in case (at least some) the questions are fully addressed the grade could be better.

As I did not have a chance to ask or comment on before submitting the thesis, the number of question is rather larger than usual:

Q: The MRA introduce dependence to the time series (due to the filtering process). May this fact potentially influence the estimated results?

Q: Can the time-zone heterogeneity significantly influence the results?

Q: Why there are no confidence intervals for the net directional spillovers?

Q: Describe the importance of individual scales (frequency bands) in terms of their volatility contribution.

Q: Why lower frequencies are not used in the analysis (D4, D5, etc. or S3)? In the current setting, the thesis deals only with a maximum time horizon of 16 days which is strange for a dataset that includes 26 years. Such long dataset gives interesting opportunities for analysis of cycles with a long period.

SUMMARY OF POINTS AWARDED (for details, see below):

CATEGORY	POINTS
<i>Contribution</i> (max. 30 points)	15
<i>Methods</i> (max. 30 points)	20
<i>Literature</i> (max. 20 points)	15
<i>Manuscript Form</i> (max. 20 points)	15
TOTAL POINTS (max. 100 points)	65
GRADE (A – B – C – D – E – F)	D

NAME OF THE REFEREE: Mgr. Lukáš Vácha, Ph.D.

DATE OF EVALUATION: 27.1.2020



Referee Signature

EXPLANATION OF CATEGORIES AND SCALE:

CONTRIBUTION: *The author presents original ideas on the topic demonstrating critical thinking and ability to draw conclusions based on the knowledge of relevant theory and empirics. There is a distinct value added of the thesis.*

METHODS: *The tools used are relevant to the research question being investigated, and adequate to the author's level of studies. The thesis topic is comprehensively analyzed.*

LITERATURE REVIEW: *The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way.*

MANUSCRIPT FORM: *The thesis is well structured. The student uses appropriate language and style, including academic format for graphs and tables. The text effectively refers to graphs and tables and disposes with a complete bibliography.*

Overall grading:

TOTAL	GRADE
91 – 100	A
81 - 90	B
71 - 80	C
61 – 70	D
51 – 60	E
0 – 50	F