

Report on Bachelor / Master Thesis

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

Student:	Bc. Jakub Cieslar
Advisor:	Mgr. Lukáš Vácha, Ph.D.
Title of the thesis:	Measuring high-frequency phase shifts between stock markets

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

The thesis examines phase differences of European stock markets returns in time-frequency domain during the period 2008 - 2015. The analysis is focused on high-frequency data that allows for the measuring of possible lead and lag relationships between developed and less developed stock markets. Using continuous and discrete wavelet transform and the high-frequency data, trading horizons from 10 minutes are considered. For testing the phase differences, Jakub prepared a convenient testing procedure that gives reliable results. He thoroughly tested all possible cases and fine-tuned the procedure.

Contribution

The thesis contributes to the literature in two ways. An important benefit is the study of phase shifts testing. This aspect is usually overlooked in many studies which may result in spurious results. The second part of the contribution is a detailed description of the convergence process of the Central European stock markets (PX, WIG, BUX) to the developed ones (DAX, FTSE100). Results show significant lagging of developing (CE) markets behind developed ones, especially on horizons between 20 and 80 minutes. Furthermore, the significance of the phase shifts is fading throughout the examined period. Thus, the results suggest that the less developed Central European markets are recently becoming more effective.

Methods

Application of wavelet methods is appropriate for the studied task. It gives unambiguous answers to the tested hypotheses. All methods are used correctly.

Literature

Jakub used relevant and recent literature. Considering the work with literature, it is clear that Jakub understands the literature and he quotes properly.

Manuscript form

The manuscript is appropriately structured and well written. The research hypotheses are clear and well-defined.

Summary and suggested questions for the discussion during the defense

To conclude, Jakub shows his understanding of the topic and ability to use advanced wavelet methods. The thesis answers of research questions and the overall contribution is strong. I recommend the thesis for defense with the grade "A".

Question for defense:

Are there other possibilities for testing the phase differences in the time-frequency domain?

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

CATEGORY	POINTS
<i>Contribution</i> (max. 30 points)	30
<i>Methods</i> (max. 30 points)	30
<i>Literature</i> (max. 20 points)	20
<i>Manuscript Form</i> (max. 20 points)	15
TOTAL POINTS (max. 100 points)	95
GRADE (A – B – C – D – E – F)	A

NAME OF THE REFEREE: Lukáš Vácha

DATE OF EVALUATION: 13.1.2019



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.*

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
30	15	0

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.*

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
30	15	0

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

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
20	10	0

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.*

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
20	10	0

Overall grading:

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