

# Report on Rigorous Thesis

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

<b>Student:</b>	<b>Mgr. Marek Vavřina</b>
<b>Advisor:</b>	<b>Mgr. Lukáš Vácha, Ph.D.</b>
<b>Title of the thesis:</b>	<b>Comovement of Stock Markets and Commodities: A Wavelet Analysis</b>

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

The rigorous thesis applies wavelet methods to stocks and commodity markets. Subsequently, the results from the wavelet analysis are accompanied with more popular Granger causality test. Author tests hypothesis whether there is significant increase of comovement between commodities and stock indices during the period of the financial crisis. Furthermore, author examines contagion of the crisis measured by correlation change before and after some points defining the crisis, such as after the Lehman bank bankruptcy in September 2008. Using the wavelet analysis these differences in dependence structures can be tested on various frequency bands representing different investment horizons.

The first part of the thesis introduces theoretical background of both continuous and discrete wavelet decompositions and motivates following analysis. Following parts are devoted to data description, wavelet correlation and contagion and comovement study. The final part is focused on causal relations between stock and commodity markets, where author compares results from wavelets and Granger causality approach.

The contribution of the thesis is strong and the topic is very actual since interrelations and dependencies between financial markets are important for portfolio analysis and various risk measures. These risk measures are generally very volatile in periods of financial crisis and even the long term structures of these markets can change. Furthermore, wavelets allow for examination on scale-by-scale basis and analyzing the time series for different horizons. This advantage is demonstrated in the wavelet correlation part.

The results of the wavelet correlation analysis show that the correlation decomposition to various investment horizons is important, especially for portfolio diversification task. The analysis indicates that a short term investor can quite well diversify his portfolio, however a long term investor has a limited diversification possibilities as the wavelet correlation is much higher at longer investment horizons.

Another important feature of the wavelet methodology is its ability to work also with locally stationary time series which is of great importance in turbulent periods during, such as the financial crisis. This ability is demonstrated in the comovement part, where wavelet coherence is used for a localized analysis.

Interesting results are in the Chapter five, where the contagion is tested. The analysis is performed on two time windows - before and after the bankruptcy of Lehman

# Report on Rigorous Thesis

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

Student:	Mgr. Marek Vavřina
Advisor:	Mgr. Lukáš Vácha, Ph.D.
Title of the thesis:	Comovement of Stock Markets and Commodities: A Wavelet Analysis

Brothers bank. Results indicate that there was no contagion spreading from the US stock market to other examined stock markets except the German stock market.

To conclude, author shows his understanding and ability to use advanced wavelet methods, the thesis is well structured and every chapter contains relevant literature review. I recommend the rigorous thesis for defense with the grade “**výborně**” (excellent, 1).

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

CATEGORY	POINTS
Literature (max. 20 points)	20
Methods (max. 30 points)	25
Contribution (max. 30 points)	25
Manuscript Form (max. 20 points)	18
<b>TOTAL POINTS</b> (max. 100 points)	<b>88</b>
(doporučuji, nedoporučuji )	doporučuji

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



**DATE OF EVALUATION:** 11.10.2013

---

**Referee Signature**

