Report on **Bachelor Thesis**

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

Student:	**Radim Kašpárek**
Advisor:	**Doc. PhDr. Ladislav Krištoufek, Ph.D.**
Title of the thesis:	**Scale of Market Movements for US stock market**

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

Contribution
The thesis aims to propose a new Scale of Market Movements (SMM) that would be based on the principles valid for energy in physics. Upon two measures previously described in the literature, the author builds his own measure in order to assign real values to market movements. Given the literature review of the thesis, this use of physical principles in economics is not fully exploited when studying movements on the stock markets yet and it can give new perspectives in understanding of crises, for instance. Unfortunately, the link to physics is not clearly described and it is not actually clear how the author derived the formula of his propre measurement, the justification is missing. It creates an impression that the formula is basically invented by the author without the direct influence of formulas found in the literature as the similarities between two formulas are not seen (equation 3 & 8).
Next, the SMM proposed by the author assigns a real value to every market movement on the weekly basis that is the main goal of the thesis. On the other hand, the obtained numbers do not have the exact meaning behind yet. The author affirms that his results are rather relative and in order to assign the real meaning to them it would be necessary to calculate these values for long period of time and create matching on the basis of past relevant events. For now, the author's SMM points out the similar information that can be mostly read from the time series data (significant changes in the indeces' values in given periods of time).

Methods
Throughtout the whole experimental part of the thesis the author mostly uses statisical and econometrical methods that are not included in the bachelor curriculum (different tests for normality, bootstrap method, principal component analysis). The only insufficiency arises from the SMM formula proposed since the theory behind is rather weak.

Literature
The abstract and the introduction of the thesis point out the possible use of the concepts from physics in economics in order to measure the severity of market movements. This link between the shocks in the natural systems (such as earthquakes) and the financial markets is summarized in three sentences (page 6). In my opinion, this interesting connection is not well explained or described that seems to me unsatisfactory as the thesis is presented as one to be assigned to the econophysics. The only content of the literature review is basically giving three examples of SMM built on the principles from natural sciences. The more extended and complete point of view of the whole problematic is missing. I would expect better explication of the shock similarities in physics and economics, a comparison of such built measures with the other measures describing shocks or crisis if they exist, or a discussion of use of the existing measures or hypothethical use of new measures in real life.

Manuscript form
The overall manuscript form is rather average. To cite few problems:
- mainly, the flow of the text is confusing;
- missing references to provided figures in the text (e.g. Figure 20);
- incorrect references of online sources (moreover some of the links do not work, this would be ovecome if the author cites these references correctly – describing the name of the article /section cited);
- some variables in the equations are not described or they are described in the other part of the text that worsen the ability of a reader to follow (equation 8 – α);
- unexplained abbreviations (*IMS*);
- interchange of *SMM* and *SMS,* the author should assign an unique name to his measure;

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- use of *I* and *we*, the author should stick to one of them;
- scale of *y* axis in the Figure 4 inappropriately chosen;
- unexplained English terms in the abstract in Czech.

Moreover, some parts of the text should be definitely rewritten such as the following one: "*Nevertheless, these people in the end always left physics and started to publish in economical journals. On the contrary, the new approach, which econophysics brings, is that the researchers have their articles published by both economical as well as physics journals. This interdisciplinary approach is rather unique in social sciences and once could become an example of successful combination of natural sciences and social sciences.*" The literature review could be also extended by the discussion of combination of natural and social sciences. Then, it could be realized that this interdisciplinary approach is not rather unique, since we can find examples in neural networks, chemometrics, biological economics, etc.

Question fot he defense:
„*Nevertheless, the scale is not useless, as it can still uncover interesting information such as the 'Leave' vote influenced the US stock market more than US presidential.*" The author comments on the usage of his SMM that it can actually reveal which changes on the market are more important. On the other hand, in the description of data he says that these two events resulted in the same change of the Index by 5.5 percentage points. How should we understand more significant effect than the change of prices, how would the author describe "bigger influence" in this context?

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

CATEGORY		POINTS
Contribution	*(max. 30 points)*	25
Methods	*(max. 30 points)*	25
Literature	*(max. 20 points)*	10
Manuscript Form	*(max. 20 points)*	10
TOTAL POINTS	*(max. 100 points)*	**70**
GRADE	**(1 – 2 – 3 – 4)**	**2**

NAME OF THE REFEREE: Šarlota Smutná

DATE OF EVALUATION: 5.6.2017

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Referee Signature

EXPLANATION OF CATEGORIES AND SCALE:

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

Strong	Average	Weak
20	10	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.*

Strong	Average	Weak
30	15	0

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.*

Strong	Average	Weak
30	15	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.*

Strong	Average	Weak
20	10	0

Overall grading:

TOTAL POINTS	GRADE		
81 – 100	**1**	= excellent	= výborně
61 – 80	**2**	= good	= velmi dobře
41 – 60	**3**	= satisfactory	= dobře
0 – 40	**4**	= fail	= nedoporučuji k obhajobě