Report on **Bachelor / Master Thesis**

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

Student:	Vlastimil Bureš
Advisor:	PhDr. Ladislav Krištoufek, Ph.D.
Title of the thesis:	Financial earthquakes: Are volatility correlations related to Omori's law?

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

The thesis investigates whether a power law, Omori's law in particular, can be characteristic of the cumulative number of time series returns in the periods following financial market crashes; the death announcement of Steve Jobs for Apple, the 2010 DJIA Flash Crash and IBM's low earnings announcement in 2013. The Omori's law itself characterizes the decay rate of aftershocks following a main shock to a time series.

The thesis opens with a quite thorough literature review section that presents a gradual evolution and application of the chosen power law to diverse stock market crashes. Next, the selected stock market events are introduced and well described. The methodology section of the thesis offers a proper descriptions of the methods applied, in line with the empirical nature of the work. The data descriptive part and the empirical results chapter are of the proper form and present information and results clearly.

However, there are a few points that could be raised:

- The work overall is a nice academic exercise that investigates if the power law can be successfully applied to cumulative returns of the chosen time series following certain negative financial market events, by means of defining different thresholds and non-linear least squares estimation of the decay rate parameter p. By the definition of the power law at play, the entire analysis is focused ex-post. Thus, does the investigation have any real-life uses or implications? The author mentions at some point in the thesis that in general investigating volatility correlations is of interest in finance in regards to risk. It would be therefore welcome to explain if and how risk managers/professionals could benefit from this analysis.
- Chapter 5, dealing with data description, could be improved by giving more background information on the data, e.g. not only presenting the statistics but perhaps commenting on why skewness and kurtosis are almost always much larger for 1 minute time series than for 5 minute series.
- Results appear to be sample choice dependent, i.e. larger decay rate p estimates were shown to be linked with higher threshold values in the literature, investigating aftershock periods of other market shocks, but not in this thesis. Moreover, there does not seem to be concensus on the length of the aftershock period when investigating for Omori's law. Would a sensitivity analysis, period length of 20 or 40 days, lead to different decay rate estimates and thresholds?
- Last but not least, empirical analysis is a bit repetitive as the author applies the same approach to 3 different series. A reader might find it more interesting if two different power laws, e.g. Productivity law and Omori's law, were applied on fewer series, e.g. 1-2 series, and compared. Given that productivity law also investigates preshock periods of stock market events, this analysis would be even more thorough.

Overall, the thesis is well structured, clearly written with only minor language issues (p. 19 "restrain", p. 42 "flow from" and word order at several points in the work), describes and applies well the chosen econometric technique. Therefore, I recommend this thesis for defense with the ssuggested grade "excellent".

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

CATEGORY		POINTS
Literature	(max. 20 points)	20
Methods	(max. 30 points)	30
Contribution	(max. 30 points)	23
Manuscript Form	(max. 20 points)	17
TOTAL POINTS	(max. 100 points)	**90**
GRADE	(1 – 2 – 3 – 4)	**1**

NAME OF THE REFEREE: Mgr. Diana Žigraiová

DATE OF EVALUATION: 9.6.2014

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Referee Signature