

# Report on Bachelor / Master Thesis

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

<b>Student:</b>	<b>Samuel Mayr</b>
<b>Advisor:</b>	<b>PhDr. Ladislav Křišťoufek Ph.D.</b>
<b>Title of the thesis:</b>	<b>Do crypto-currencies form a new asset class?</b>

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

This bachelor thesis deals with the topic of alternative currencies or crypto-currencies, such as Bitcoin, ripple, and Litecoin, particularly with their statistical properties. It compares the characteristics of these currencies to various financial instruments, S&P500 and Euro and tries to find similarities based on a group of stylized facts. From this comparison, the author derives an answer to the central question of the thesis, which is whether crypto-currencies form a new class of assets.

Generally, the text has a good structure with an introduction and four chapters, however, the combination of two sections into one in case of Chapter 3, Methodology & Analysis of Results, is unusual, although it comes from the nature of the article the author decided to follow in his text.

While I am not overly familiar with the literature concerning crypto-currencies, I think that the author provides a good synthesis of several articles related to crypto-currencies and financial markets. However, in certain places the linkage between the reviews could be improved in order to give a more comprehensive picture to a general reader and to provide better support for the aim of the thesis.

The literature review is followed by Chapter 2: Data. It refers to all sources of data the author used and adjustments that have been made to the data. A part of the three page long description of data could be substituted by a summarizing table. In addition, a plot of these time series would be helpful to the reader to see the shape of the data. For example, the time series of Bitcoin may have some specific aspects such as jumps. In this section, I noted a few points of concern:

- On the page 10, the definition of return should be  $R(t) = x(t) - x(t - 1)$ , instead of  $R(t) = x(t + 1) - x(t)$ .
- On the page 11, the author says: *“And even though, the data for trading volume has been collected irregularly — for one out of two or three days, it should not change much in the analysis, as the focus is more on the great scale of things.”* On the contrary, when studying lagged correlations, the irregularity may indeed have an adverse effect.

The main part of the thesis is Chapter 3: Methodology & Analysis of Results. This part extensively studies eight empirical stylized facts that are *“taken as a status quo and expectation for the way in which financial assets generally behave.”* These were defined by Cont (2001) in his paper in Quantitative Finance, which is more technical than this thesis. This chapter follows part of its methodology and applies it to the crypto-currencies. The author uses methodological concepts that are not taught at the bachelor level and this wide range methodology of tools such autocorrelation, statistical property tests, and VAR, for example, are properly used. Some of the tools could be defined and described in more detail, such as the VAR and Granger causality. Further, while following Cont (2001), the analysis is extensive, even though it is a description of the data rather than a gradual story-telling analysis. As the amount of results is large, these become confusing sometimes; it is hard to consider and connect all of the results when reading the comparison or conclusion of the section. This could be improved by a presentation of results different from only referring to a value of autocorrelation of the first lag, for instance.

The last chapter summarizes the results of the thesis. The thesis may contribute to the literature since it covers many statistical properties of the three crypto-currencies, which can be valuable not only for researcher in this field. Since it is a descriptive work, which is completely fine for a bachelor thesis, it concludes that three of the eight analysed stylized facts are not in accordance with the stylized facts corresponding to the financial assets.

# Report on Bachelor / Master Thesis

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

<b>Student:</b>	<b>Samuel Mayr</b>
<b>Advisor:</b>	<b>PhDr. Ladislav Křišťoufek Ph.D.</b>
<b>Title of the thesis:</b>	<b>Do crypto-currencies form a new asset class?</b>

Concerning the manuscript, the thesis is well written; all tables and figures are good quality. The text effectively refers to citations, graphs, and tables. Nonetheless, several things should be corrected, e.g.:

- The quotation marks should be used when citing exact words from a given source, e.g., pg. 12.
- When putting a footnote at the end of a sentence it should be behind the full stop not in front of it, e.g., at the end of the first sentence on page 1.
- Minor typos, pg. 23, *favor* and *favour* appear on that page, pg. 45, there is a typo such as "...*fiat currencies? data.*".

Suggested **questions** for the defence are:

- Could you explain the difference between the two concepts: differencing and de-trending of a time series? (Motivation comes from pg. 11: "...*volume data has been transformed by de-trending the time series using natural logarithm and differences.*").
- Could you explain how you chose the number  $k(n)$  for the Hill's tail index? (On the page 31, the author says: "*Unfortunately the right choice of  $k(n)$  is very complicated and incorrect values might reproduce faulty tail indices.*", but then the author picks a number, arguing that it "...*has been chosen, based on graphical representation of the distribution,*" which is a concern.)


Given the fact that the thesis fulfils the standard requirement of a bachelor thesis, **pending a successful thesis defence, I recommend the grade "velmi dobře" ("good", 2).**

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

<b>CATEGORY</b>	<b>POINTS</b>
<i>Literature</i> (max. 20 points)	15
<i>Methods</i> (max. 30 points)	25
<i>Contribution</i> (max. 30 points)	18
<i>Manuscript Form</i> (max. 20 points)	14
<b>TOTAL POINTS</b> (max. 100 points)	<b>72</b>
<b>GRADE</b> (1 – 2 – 3 – 4)	<b>2</b>

**NAME OF THE REFEREE: Luboš Hanus**

**DATE OF EVALUATION: 27. 8. 2015**

  
\_\_\_\_\_  
**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	<b>1</b>	= excellent	= výborně
61 – 80	<b>2</b>	= good	= velmi dobře
41 – 60	<b>3</b>	= satisfactory	= dobře
0 – 40	<b>4</b>	= fail	= nedoporučuji k obhajobě