

Report on Bachelor Thesis

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

Student:	Jan Tůma
Advisor:	Petr Polák
Title of the thesis:	Sustainable Finance in the Digital Age“ An analysis of Cryptocurrencies and CBDCs

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

Short summary

The thesis aims to explore the relationship between cryptocurrencies and the environment, which is an interesting and potentially important place for research. At the same time, this is only my assumption, as the text does not correspond to this aim. Instead, the text is full of claims such as "This study approaches digital currencies from almost every angle imaginable" or "It aims to be a comprehensive guide to digital currencies", but lacks a clear, concise description of what it does. But I could not find any of these goals achieved, the text is far from studying cryptocurrencies from every angle and far from being a guide. It also motivates to look at Central Bank Digital Currencies (CBDCs), but later on page 17 we learn that these are not studied: "Since CBDCs are mostly still being researched and developed, few are being tested and even fewer have been launched, there is not much data available on their energy consumption and carbon footprint. That's why our research revolves around cryptocurrencies."

Aside from the misleading motivation, it is not entirely clear what the paper does, even after reading the methods and results sections. The methods section asks three questions that have little to do with the claims quoted above, and the results section does not answer these questions. See details below.

Contribution

The key question of interest is hard to find, and therefore it is hard to identify any contribution. For example, how does the first question of increased bitcoin price volatility associated with higher energy consumption relate to motivation? And why is it economically relevant? We can have trillions of trades with similar prices and therefore low volatility that consume a lot of energy, and we can have a single but very large price jump that creates very high volatility with very low energy consumption. But how does bitcoin's energy consumption depend on trading activity? Why should it rise with volatility? I believe that these questions are not properly asked because there is no reason for such behaviour.

Moreover, as discussed below in the Methods section, the questions are neither tested nor answered appropriately, and the paper lacks elementary scientific attributes.

Methods

The one-paragraph methodology claims to use a "quantitative research approach" and lists three questions. There is essentially no methodology described.

Later in the results section, simple regressions or visual inspection are used as methods. Unfortunately, the regressions are incorrectly used to test the hypotheses. For example, the first question of increased bitcoin volatility associated with higher energy consumption is tested with the null hypothesis that there is a significant relationship between these two quantities. However, the author talks about ARIMA, which is suitable for univariate time series analysis, and later uses simple regression without a constant, which significantly biases the estimation. Also, volatility is incorrectly measured as high minus low, which is a measure of spread, not dispersion.

The unnumbered graph on page 19 is misinterpreted, there is no "high HmL - high consumption" relationship.

Report on Bachelor Thesis

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

Student:	Jan Tůma
Advisor:	Petr Polák
Title of the thesis:	Sustainable Finance in the Digital Age“ An analysis of Cryptocurrencies and CBDCs

Similarly, Hypothesis 2, that a higher network hash rate is associated with a lower share of renewable energy, is not tested, only presented and described, but no analysis is performed.

Literature

The thesis uses appropriate literature.

Manuscript form

Section numbering starts from the literature review section and the introduction is unnumbered, figures are not numbered, sections are not connected and chaotic, e.g. section 1.2. in the literature review on "Principles of sustainable finance and ESG" introduces CBDCs but I can't find any principles, etc. Etc. The manuscript lacks the proper form of a scientific paper.

Overall evaluation and suggested questions for the discussion during the defense

In conclusion, the thesis falls short of being a proper academic work in most aspects, it lacks motivation, it lacks clear question, it lacks methodology, it incorrectly tests its hypotheses, it lacks correct manuscript form and therefore I cannot recommend the thesis to be defended and I propose to award the thesis a mark of 'F'.

The results of the documentary analysis do not indicate any significant similarity of the text with other available sources.

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

CATEGORY	POINTS
<i>Contribution</i> (max. 30 points)	13
<i>Methods</i> (max. 30 points)	0
<i>Literature</i> (max. 20 points)	14
<i>Manuscript Form</i> (max. 20 points)	10
TOTAL POINTS (max. 100 points)	37
GRADE (A – B – C – D – E – F)	F

NAME OF THE REFEREE: Jozef Barunik

DATE OF EVALUATION: 16.8.2024

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.*

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.*

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

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.*

Overall grading:

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