Report on **Master Thesis**

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

Student:	**Bc. Veronika Mertová**
Advisor:	**PhDr. František Čech, Ph.D.**
Title of the thesis:	**The Impact of News on Videogame Stock Market Prices and Volatility**

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

Short summary
This thesis explores the impact of social media and news headline sentiment on stock prices, with a focus on comparing gaming firms to companies in other industries. The study collected tweets and news headlines related to selected gaming and non-gaming companies and analyzed their influence on daily stock price data. The research found no significant differences between the gaming and non-gaming sectors regarding overall sentiment polarity effects on stock prices. However, some significance was observed when emotions were divided into different categories, although it varied among individual firms regardless of their sectors. The conclusion emphasizes the importance of considering specific sentiment channels or direct investor sentiment when using similar analysis for market predictions. It also suggests further research with longer sample periods for more conclusive results.

Contribution
The contribution mostly lies in creating a rich sentiment dataset considering various sources (Twitter, news headlines, different methodologies, and different technical processing of the collected data). On the other hand, as the author herself admits, the contribution may have been limited by a relatively short analysis period. What I find problematic is the selection of analyzed companies: there are four companies selected from the gaming industry (which seems reasonable), but then there are only almost completely arbitrarily chosen four other companies from all other remaining industries (Toyota, Tesla, Amazon, Apple, i.e., only the automotive and big tech industries), which by no means represent the rest of the market. On the other hand, I would like to appreciate the author for not being afraid to transparently publish the mostly "negative" results, which are often just as important as the "positive" ones, as well as for a fair discussion of the limitations of the research and the reliability of individual results.

In Section 6.3, I perceive that the Twitter emotions results may appear somewhat like a random data-mining endeavor. The author mentions that "some significance was observed, although the findings varied across individual firms regardless of their sectors" but without delving into a deeper interpretation, providing insights into potential economic implications, or the practical applications of these results. Could these findings, e.g., potentially contribute to enhancing some forecasting models or serve any other valuable purpose?

Methods
The selected modeling/estimation methodology follows the standard GARCH and VAR analysis. Where important, stationarity is verified via the ADF test. Methodologically interesting is the sentiment dataset creation using Twitter API, R package "rtweet," lexicon sentiment analysis tool VADER, the NRC word-emotion classification lexicon in the R package "Syuzhet", and the Europe Media Monitor's NewsBrief feature. The author properly and contributively describes the data processing and various related challenges.

Regarding Twitter sentiment analysis, it seems suspicious to me that there is almost no dynamics on sentiment for Nintendo, Blizzard, Apple, Tesla, and Toyota (Plots 4.1 and 4.2 on pg. 25-26) and similarly for news headlines sentiment for Amazon and Apple (Plots 4.7 and 4.8 on pg. 31). Can author elaborate on the potential causes of this uninteresting behavior during the defense?

Regarding financial data, aside from standard daily log returns, the author also defines "over-the-weekend" and "Monday" returns on pg. 35, but those are not used in the subsequent analysis. Why?

It also seems that sentiment variables are only used for the "second-step" VAR analysis after volatility is standardly estimated via GARCH. Why not include the sentiment variable into the GARCH structure directly? Can the author defend this modeling choice?

Literature
There is a large Chapter 2 "Background," which must have taken a significant effort to elaborate. I especially appreciate the wide range of topics discussed and the overall general overview of the field the author demonstrates. At the same time, it seems largely disconnected from (or even irrelevant to) the overall

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research topic of the thesis. Most of the information there only describes or frames the general topic of the gaming industry without having any clear or at least potential methodological connection to the presented analysis. Chapter 3 "Literature review" first rather insufficiently presents the main philosophical background of the work, the Efficient Market Hypothesis, and then mostly presents related papers in a one-by-one descriptive fashion. While the Introduction presents some important motivation for the given research based on a supposedly "unique behaviour of gamers" and contains several strong statements, these are unsupported by academic citations (there is only one single citation in the Intro).

Manuscript form
The thesis is written in decent English, standardly structured, and employs Microsoft Word for typesetting; however, it may thus not be realistic to anticipate exceptional design qualities. Regrettably, there are notable and consistent imperfections in citation formatting and avoidable grammatical errors. Referencing tables and figures within the main text adheres to conventional practices. These tables are adequately labeled (except for Chapter 5, where all tables are labeled as 6.X) and described, and the figures are self-contained. However, it is worth noting that tables in the Appendix should also be sequentially numbered and referenced within the text. The graphics are standard and easy to look through and understand. Pages solely comprising tables, such as pg. 43, may benefit from reconsideration.

Overall evaluation and suggested questions for the discussion during the defense
The assessed thesis fulfills the IES, Faculty of Social Sciences, Charles University master-level standards. Thus I can recommend it for the defense and suggest a grade C.

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

Potential topics for the discussion:
- Plots 4.13 and 4.14 on pg. 36 depict the estimated volatility of the given eight companies. How was this volatility estimated (because the methodology Chapter 5 is yet to follow)?
- Why only GARCH (1,1) is estimated (pg. 38)? What are the econometric methods/tools to find the most appropriate specification of the GARCH model to fit?
- In the ADF tests, how was the appropriate number of lags (k) set, and what did you do when, e.g., a log-returns series was not stationary (pg. 70)?
- Can the results in Section 6.3 (see Contribution) be simply random due to the multiple hypothesis testing problem, since there are for sure many more than 100 individual tests being conducted?

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

CATEGORY		POINTS
Contribution	*(max. 30 points)*	20
Methods	*(max. 30 points)*	22
Literature	*(max. 20 points)*	17
Manuscript Form	*(max. 20 points)*	14
TOTAL POINTS	*(max. 100 points)*	**73**
GRADE	**(A – B – C – D – E – F)**	**C**

NAME OF THE REFEREE: Jiří Kukačka
DATE OF EVALUATION: 10. 9. 2023

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Referee Signature

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