



Annex No. 10 to the MU Directive on Habilitation Procedures and Professor Appointment Procedures

HABILITATION THESIS REVIEWER'S REPORT

Masaryk University

Applicant

Ing. Tomáš Plíhal, Ph.D.

Habilitation thesis

Essays on Volatility Modeling: The Effect of Expected and Unexpected Events

Reviewer

Prof. dr hab. Piotr Fiszeder

**Reviewer's home unit,
institution**

Faculty of Economic Sciences and Management,
Nicolaus Copernicus University in Torun

The subject of the habilitation thesis is volatility modelling. This is a very popular subject due to the importance of the raised issues. Due to the recurring periods of turbulence and crises occurring on financial markets, it is still a current topic of research. Issues raised in the thesis, such as analyses of the cryptocurrency market, investor attention or the covid-19 crisis, are among the areas in which intensive scientific research is currently being carried out in the world. For the above reasons, I consider the choice of the thesis subject to be successful and important.

The habilitation thesis consists of an introduction and four chapters. Chapter 1 introduces basic GARCH and HAR models. Chapters 2, 3 and 4 contain a description of six previously published papers in highly ranked journals (Finance Research Letters, Journal of International Financial Markets, Institutions and Money, Journal of Economic Dynamics and Control, Research in International Business and Finance, International Review of Economics & Finance). The thesis is well written and structured and is at a high scientific level.

All presented papers have significant contribution in empirical finance research. Two papers from chapter 2 provide new insights into volatility forecasting using the implied volatility from options and low-frequency data. In the first paper it is shown that the implied volatility from short-term options (one day and one week) is relevant for forecasting the realized volatility of the next day. In the second paper it is confirmed that high-frequency data are superior to low-frequency counterparts. However, this advantage is statistically significant only for short forecast horizons (less than five days).

Papers from chapter 3 provide information about the response of realized volatility on macroeconomic news announcements and other events. The third paper focuses on central bank announcements and quantitative easing and the reaction of stock markets in seven developed countries. It provides relevant policy indications. The fourth paper sheds new light

on the volatility of bitcoin related to macroeconomic news announcements, news about regulation, or security breaches of major exchanges.

Chapter 4 is devoted to the analysis of shock phenomena related to two crises caused by the COVID-19 pandemic and the Russian invasion of Ukraine in early 2022. The fifth paper analyses the reaction of stock indices in 23 countries to policy interventions and responses intended to lessen the pandemic's short-term economic impact and offset financial turmoil. In the sixth paper intraday data of Google searches and implied volatility instead of commonly used daily data are applied for Russian ruble. Both approaches help predict the intraday volatility of the USD/RUB and the EUR/RUB exchange rates, although the implied volatility encompasses intraday attention. Both papers were among the first to analyze these turbulent periods in financial markets.

The habilitation thesis proves that Tomáš Plíhal conducts research at a high international level. The presented thesis is well motivated and highly relevant to the financial literature. The obtained results make a significant contribution to world literature.

Reviewer's questions for the habilitation thesis defence:

1. All studies were performed based only on univariate models. That is why my question is about multivariate volatility models. What are their advantages and disadvantages compared to univariate models? Why were they not used in any research?
2. In my research on volatility forecasting, a large impact on the results have outliers. Can you confirm this based on your studies and what solutions do you see for this problem?

Conclusion

The habilitation thesis entitled *Essays on Volatility Modeling: The Effect of Expected and Unexpected Events* by Ing. Tomáš Plíhal, Ph.D. **fulfils** requirements expected of a habilitation thesis in the field of Finance.

Date: December 12, 2022

Signature: 