

# Opponent's Report on Dissertation Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague  
Opletalova 26, 110 00 Praha 1, Czech Republic  
Phone: +420 222 112 330, Fax: +420 222 112 304

Author:	<b>Mgr. Krenar Avdulaj</b>
Advisor:	PhDr. Jozef Baruník, Ph.D.
Title of the Thesis:	Essays in Financial Econometrics
Type of Defense:	<b>DEFENSE</b>
Opponent:	<b>Doc. RNDr. Jiří Witzany Ph.D.</b>

Address the following questions in your report, please:

- a) Can you recognize an original contribution of the author?
- b) Is the thesis based on relevant references?
- c) Do the results of the thesis allow their publication in a respected economic journal?
- d) Are there any additional major comments on what should be improved?
- e) Were the comments raised at the pre-defense, addressed in the dissertation submitted to the regular defense?
- f) What is your overall assessment of the thesis? (a) I recommend the thesis to be defended without major changes; (b) The thesis is not defensible.

(Note: The report should be at least 2 pages long.)

---

## Content of the Report:

The Dissertation Thesis is based on three papers that can be all characterized by a few common keywords as: copula dependence modeling, realized volatility, quantile regression, value-at-risk, or portfolio diversification. The author is focusing on nonlinear dependence in financial time series that is captured better by appropriately chosen copulas compared to standard linear or rank correlation measures. The copula modeling approach is coupled with utilization of realized volatility obtained from high-frequency data in order to model precisely the marginal distributions applying, in particular, the realized GARCH model. The advanced econometric modeling framework is used to study the stock-oil dependence dynamics and the diversification benefits, further to estimate conditional quantiles of returns of selected US stocks, and finally Conditional Value at Risk of selected institutions depending on other institution being under financial stress. The quality and level of the theoretical methodology outlined and of the empirical work done is very high and the results are interesting. The methodology is based on relevant references but at the same time can be recognized as an original contribution of the author. The empirical results obtained on large data sets used do present an original contribution in the area of asset return correlation and dependence modeling. The paper corresponding to the second chapter has been already published in a highly impacted journal, the results presented in Chapters 3 and 4 allow, in my opinion, their publication in a respected economic journal. I have only a few minor comments that are given below.

The first paper focuses on oil-stock dependence and the diversification benefits. My understanding of the results of the realized GARCH with time varying copula is that the diversification benefits are lower than commonly believed (2.6 Conclusions and Figure 2.3). But conclusions at the end of Section 2.4 say the opposite: “Our results have serious implications for investors as they suggest that diversification possibilities may be even larger than commonly perceived from the mere dynamics of the correlations.” I have asked the author to clarify the inconsistent interpretations of the results. In response to the pre-defense comments the author says “*In fact this is some misunderstanding caused by the text. Up to the end of Section 2.4 we are considering the cumulative results which do not take into consideration conditional diversification benefits (CDB).*” I am not fully satisfied with the explanation. I still think that it is confusing to create an expectation of “larger diversification benefits” and then, introducing an exact measure (CDB), conclude the opposite. Moreover looking on the CDB definition in more detail I would like the author to clarify the definitions of the “lower and upper bound of the portfolio”. While the standard notion of the expected shortfall is defined mathematically, an exact formal definition of these two components is missing. Is that the only diversification measure? Did the author test any other alternative?

According to Section 2.5.1, it appears that the investigated diversified portfolio of stocks and oil is equally weighted and the weights do not change over time. However, the changing volatilities and correlations (copula parameters) allow rebalancing of the portfolio optimizing the diversification benefit, for example, measured by the diversification index proposed in the paper. The changing volatilities and dependence structure may just cause the equally weighted portfolio being less optimal, not necessarily implying a lower diversification benefit on an optimally diversified portfolio. The author has explained sufficiently this objection in his response to the pre-defense comments.

The second paper uses high frequency data and the nonlinear quantile regression framework to study conditional quantiles of returns on a pool of the most liquid US assets across different industries. Minor formal remarks have been resolved after the pre-defense.

Finally, the last paper focuses on Conditional Value at Risk estimated using the nonlinear quantile copula regression technique and using the same dataset as the second paper. The “benchmark” model is based on VaR estimated by rescaling the realized volatility, but still using the same linear quantile regression for CoVaR estimation (Section 4.2.3). It is surprising why the author does not use as a basic benchmark a simpler and easier to implement model, e.g. based on constant correlations and multivariate normality, or DCC GARCH, etc.? This question has been well answered in the response to the pre-defense comments.

Besides the minor comments above there is a more general practical question I would like to ask. It is obvious that the complex realized GARCH dynamical copula and quantile regression modeling framework is technically very demanding in terms of presentation and implementation. On the other hand, it brings a better precision of the VaR estimations, conditional dependence measures, portfolio diversification, etc. Does the author think that, from the practical point of view (of banks, financial institutions, and investors), the benefits out-weight the “costs”? The author’s response with the pre/defense comments reaction appears to be positive and could be explained as part of the defense.

To conclude, the comments raised at the pre-defense have been addressed in the author’s response and in the dissertation submitted to the regular defense. My overall

assessment of the dissertation text is highly positive **and I recommend the thesis to be defended without major changes.**

Date:	11.2. 2016
Opponent's Signature:	Jiří Witzany
Opponent's Affiliation:	Doc. RNDr. Jiří Witzany Ph.D. FFÚ VŠE