

# Report on Master Thesis

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

<b>Student:</b>	<b>Sabyrzhan Tyuleubekov</b>
<b>Advisor:</b>	<b>Jozef Barunik</b>
<b>Title of the thesis:</b>	<b>Can Model Combination Improve Volatility Forecasting?</b>

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

*Please provide your assessment of each of the following four categories, summary and suggested questions for the discussion. The minimum length of the report is 300 words.*

### **Contribution**

The thesis under review studies volatility forecasting. While ability to forecast volatility accurately is crucial for practitioners, academics as well as policy makers, it still remains one of the most challenging issues due to noisy information measured from data. Literature interested in time series forecasting developed numerous distinct frameworks for the forecasting task. One of them, modern Machine Learning techniques are promising, but as any other method or model are conceptually restricted. With the fact that any model has its advantages and disadvantages, Sabyrzhan decided to combine traditional time series tools with modern machine learning techniques with hope that model combination will bring improvement in forecasts. The idea of model forecast combination is not new in the literature, but very limited amount of studies combines machine learning techniques. The contribution of Sabyrzhan is in unique combination of wide variety of methods. The empirical results show that the combination bring desired improvement. The thesis is hence modern empirical contribution.

### **Methods**

Sabyrzhan works with large number of existing methodologies from simple classical time series techniques to complex neural networks and machine learning that is not covered by standard curriculum of our institute. He therefore needed to study deeply the advanced methodologies. Reading the thesis, one quickly learns how deeply Sabyrzhan understands all the frameworks.

### **Literature**

Working with such a wide spectrum of methodologies itself proves deep knowledge of literature. A short survey of most important concepts in each approach further shows confidence of Sabyrzhan to build such a wide exercise.

### **Manuscript form**

Handling so many methods in one text is a difficult task and Sabyrzhan managed to keep the text under control. The text is logical, well written, connects findings well to the existing literature. Sabyrzhan worked consistently to obtain the results and we have discussed the results as well as text at all stages. Sabyrzhan managed to incorporate my various comments.

### **Summary and suggested questions for the discussion during the defense**

In conclusion, I believe that during the work Sabyrzhan proved himself to be an independent researched, and obtained results interesting to wider audience. As a result of his hard work, we are able to read excellent piece of work. The thesis hence deserves to be defended and I suggest to consider grade „A“.

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

<b>CATEGORY</b>	<b>POINTS</b>
<i>Contribution</i> (max. 30 points)	30
<i>Methods</i> (max. 30 points)	30
<i>Literature</i> (max. 20 points)	20
<i>Manuscript Form</i> (max. 20 points)	15
<b>TOTAL POINTS</b> (max. 100 points)	<b>95</b>
<b>GRADE</b> (A – B – C – D – E – F)	<b>A</b>

**NAME OF THE REFEREE:** Jozef Barunik

**DATE OF EVALUATION:** Sept 4, 2019

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**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.*

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
30	15	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.*

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
30	15	0

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

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
20	10	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.*

<i>Strong</i>	<i>Average</i>	<i>Weak</i>
20	10	0

**Overall grading:**

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