

# Report on Master Thesis

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

<b>Student:</b>	<b>Jakub Nikodym</b>
<b>Advisor:</b>	<b>Ladislav Křišťoufek</b>
<b>Title of the thesis:</b>	<b>Application of machine learning methods for estimating apartment prices in the Czech Republic</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 proposes an alternative way of estimating apartment offering prices based on machine learning techniques. Author collects unique dataset about Czech properties, and then builds several machine learning based models to explain the offering prices. Hence the contribution is both methodological as well as empirical and the results are of interest to general public, policy makers as well as academia.

### **Methods**

Author uses modern machine learning tools including decision trees, random forests, neural networks that are far beyond the standard curriculum and require deep advanced knowledge of statistics as well as programming skills. It is noteworthy that author collected his own database by scraping the data himself which alone is a considerable contribution and requires lot of work.

### **Literature**

Author demonstrates deep understanding of the literature and gives credit to all important as well as relevant studies. The author works with relevant literature properly and develops his own original ideas based on proper understanding of the previous literature. With this respect, author provided excellent work.

### **Manuscript form**

The text is logical, well written, connects findings to the existing literature well. Formally, manuscript meets all requirements, the only shortage is language which lacks precision and flow at some places, as well as few errors and typos including those in equations and formal presentation. This nevertheless does not significantly impact the high quality of the work.

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

In conclusion, I believe that during the work author proved himself to be an independent researcher, obtained interesting original results, mastered advanced econometric techniques, and finally was able to use all these skills to deliver sound and economically relevant work. Hence the thesis deserves to be defended without doubts. The only important question to the defence I would suggest is following.

The data used are only from single day of March 24, 2019. How robust are the results to the sample selection bias? The author should discuss if he believes the data is a good random draw that represents the population well.

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In case the author is confident in presenting the details of the work during the defense, and especially present economic motivation and importance of the discussion, I suggest to award the work with grade „A“.

## **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)	17
<b>TOTAL POINTS</b> (max. 100 points)	<b>97</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