

# Report on Bachelor Thesis

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

<b>Student:</b>	<b>Daniel Benčík</b>
<b>Advisor:</b>	<b>Mgr. Lukáš Vácha, PhD.</b>
<b>Title of the thesis:</b>	<b>Modeling financial markets using heterogeneous agent models</b>

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

The Bachelor thesis examines dynamics of advanced heterogeneous agent models (HAM) in financial markets. In the first part the motivation for the HAM in finance is explained, mainly limitations of the mainstream approaches such as the Efficient Market Hypothesis and the Rational Expectations theory. Next part of the thesis explains in detail the basic agent-based model developed by Brock and Hommes (1998) and continues with description of the new model proposed by Barunik, Vacha and Vosvrda (2009), which is based on the Brock Hommes model. The last part of the work thoroughly examines behavior of the modified model. Simulation setup is described in detail and discussion of large portion of results follows. Simulations are focused on sensitivity of the model to noise, response to change in control parameters with 3D graphs, bifurcation diagrams and evolution of descriptive statistics. These large simulations give a new complex view on the model's dynamics. This part of the thesis offers interesting discussion of the model's behavior, mainly its ability to capture stylized facts observed in real financial markets.

The submitted thesis is well structured so the reader is able to understand the motivation of the thesis and the main results of the simulations. Author clearly demonstrates he understands the topic and uses relevant literature.

In my opinion, the results brought by this bachelor thesis are very valuable as they give different perspective of agent-based models dynamics. Since we have discussed the simulations and the results many times, I have no additional questions.

I recommend the bachelor thesis of Daniel Benčík for the defense with grade excellent ("výborne" - 1). As I consider the work to be excellent at the level of a Bachelor student, I kindly recommend the board of examiners to award the thesis with "distinction for an extraordinarily good bachelor's thesis".

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

<b>CATEGORY</b>	<b>POINTS</b>
<i>Literature</i> (max. 20 points)	20
<i>Methods</i> (max. 30 points)	30
<i>Contribution</i> (max. 30 points)	30
<i>Manuscript Form</i> (max. 20 points)	20
<b>TOTAL POINTS</b> (max. 100 points)	<b>100</b>
<b>GRADE</b> (1 – 2 – 3 – 4)	<b>1</b>

**NAME OF THE REFEREE:** Mgr. Lukáš Vácha, PhD.

**DATE OF EVALUATION:** 27.8.2010

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*Referee Signature*

### **EXPLANATION OF CATEGORIES AND SCALE:**

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

Strong                  Average                  Weak  
20                          10                          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.*

Strong                  Average                  Weak  
30                          15                          0

**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.*

Strong                  Average                  Weak  
30                          15                          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.*

Strong                  Average                  Weak  
20                          10                          0

### **Overall grading:**

TOTAL POINTS	GRADE		
81 – 100	<b>1</b>	= excellent	= výborně
61 – 80	<b>2</b>	= good	= velmi dobře
41 – 60	<b>3</b>	= satisfactory	= dobře
0 – 40	<b>4</b>	= fail	= nedoporučuji k obhajobě