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

The thesis is devoted to the topic of relationship between daily spot and futures prices of various maturities of a specific type of crude oil. The main workhorse used in the thesis is the wavelet analysis, applied to data set covering period of 1987 to 2015.

The structure of the thesis is clear and well-established. The author starts with literature overview in the field of crude oil markets and covers also existing references on relationship of futures and spot crude oil prices. The presentation of basics of theory of futures and wavelet analysis follows. Section 4 contains detailed description the data used in the authors analysis. The thesis concludes with presentation of numerical results.

Despite clear structure, I find the text lacking reasonable academic standard. Especially in Sections 2 and 3 the author does not pay much attention to the possibility that the reader might be unfamiliar with certain key terminology (e.g. Gaussian window, dyadic time series or father wavelet are left unexplained) or bits of theory presented (e.g., what is $C_\psi$ and from what follows that it can be expressed in three different integral forms $(3.10)$, $(3.11)$ and $(3.12)$?) and confronts the reader with statements which neither do not follow from the text, nor are accompanied with literature reference (e.g. from what follows equation $(3.15)$?).

The presented text suffers unbearable amount of mistakes in English (and Czech, cf. Czech version of the abstract) which is very distractive and a bit annoying for the reader. The mistakes/misprints appear in the headers (e.g., ,,2.2 Literature“, ,,5.1.2 Summary“, ,,5.2.3 SUMmary“), regular and mathematical text (e.g. page 5 line 6 „accident historic books“, page 8 line 4 from below „become more awareness“, page 26 line 8 „adminisibality condition“, page 27 line 4 „komplex conjugate“, page 29 line 8 „we made artifical data were made to demonstrate“, missing bracket in $(3.45)$, page 58 line 18 „distuinguish“, and many more) and on occasion also in footnotes. I am quite confused by arbitrary use of capitals when referring to certain terms, e.g. I found no reason for the reader to distinguish among „crude oil“, „Crude oil“ and „Crude Oil“. The author frequently uses non-slanted text when clearly referencing to mathematical symbols. Also, the author frequently omits spacing at the start of a new sentence. To conclude my comments regarding the misprints and mistakes in the text, I personally find it very rude to make a misprint in the name of the supervisor.

I find it a bit distractive not to use alphabetical order of references in cases, when the numerical ordering is not used in the text. Some references I find incomplete, e.g., for reference [13], as it is an online publication, a link and date of retrieval should be included. Further, I find incomplete references [9], [10], [12], [13], [17], [18], [19], [44], [56]. Reference [48] appears to be two separate papers. Also, there is no unified form of the referencing the books and/or papers in the text.

Why is the numbering of footprints reset at the start of each chapter? Is it really necessary for each and every footnote in this thesis to be a footnote? I find some confusing rather than explanatory, e.g. footnote 7 in chapter 3 or footnote 5 in chapter 5.

I find the presentation of advanced theory sketchy and I am not sure if the reader without prior knowledge of wavelet analysis will be able to assess this thesis and its presented results. On top of that, I am very much disturbed by the last paragraph of Conclusion (page 64) where author admits possible mistakes in derived results and tries to strip himself from the responsibility for his presented conclusions based on his application of wavelet analysis.
Report on Master Thesis
Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

| Student: | Bc. Quang Tuan Tran |
| Advisor: | PhDr. Jozef Barunik, Ph.D. |
| Title of the thesis: | The time-frequency relationship between spot and futures prices of crude oil |

Suggested questions for the defense are:

- Please, explain the meaning of the last paragraph in the section Conclusion.
- Please, explain what kind of information one gets from the values of „CI.mean.0.95“, „KPSS test“, „ADF test“ and „J-B test“ (and explain the referenced tests) reported in Tables 4.1 and 4.3.
- Please, provide sufficient evidence for the claim (page 12 lines 3-5) „in past decades…oil price volatility was one of the major forces behind global macroeconomic developments“.

For the reasons above, I decided for the point awards in each category as presented in the table below, and thus my resulting recommendation (in the case of a successful defense) is grade „2“.

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

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>POINTS</th>
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<tbody>
<tr>
<td>Literature</td>
<td>13</td>
</tr>
<tr>
<td>Methods</td>
<td>21</td>
</tr>
<tr>
<td>Contribution</td>
<td>24</td>
</tr>
<tr>
<td>Manuscript Form</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL POINTS</strong></td>
<td><strong>62</strong></td>
</tr>
<tr>
<td><strong>GRADE</strong></td>
<td>(1 – 2 – 3 – 4)</td>
</tr>
</tbody>
</table>

**NAME OF THE REFEREE:** RNDr. Michal Červinka, Ph.D.

**DATE OF EVALUATION:** 6.2.2016
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.

<table>
<thead>
<tr>
<th>Strong</th>
<th>Average</th>
<th>Weak</th>
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<tr>
<td>20</td>
<td>10</td>
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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.

<table>
<thead>
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<th>Weak</th>
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<tr>
<td>30</td>
<td>15</td>
<td>0</td>
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</table>

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.

<table>
<thead>
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<tbody>
<tr>
<td>30</td>
<td>15</td>
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</table>

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.

<table>
<thead>
<tr>
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<tr>
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Overall grading:

<table>
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<tr>
<th>TOTAL POINTS</th>
<th>GRADE</th>
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</thead>
<tbody>
<tr>
<td>81 – 100</td>
<td>1 = excellent</td>
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<tr>
<td>61 – 80</td>
<td>2 = good</td>
</tr>
<tr>
<td>41 – 60</td>
<td>3 = satisfactory</td>
</tr>
<tr>
<td>0 – 40</td>
<td>4 = fail</td>
</tr>
</tbody>
</table>

= výborně
= velmi dobře
= dobře
= nedoporučuji k obhajobě