Report on Bachelor / Master Thesis

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

Student:	Jan Jezek
Advisor:	Karel Janda
Title of the thesis:	Analysis of Dynamic Networks in Large Biofuels Related Financial and Economic System

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

Please provide a short summary of the thesis, your assessment of each of the four key categories, and an overall evaluation and suggested questions for the discussion. The minimum length of the report is 300 words.

Short summary
This thesis deals with a question How does the blending of corn ethanol influence the prices U.S. consumers pay at the gas pump? This thesis is a part of a bigger project on the topic of price transmission in the biofuels/fuels supply chain. We started this project already in Spring of 2022 and I hoped that by Christmas of 2022 Jan Jezek will be essentially done with his thesis. Well, he was somehow done with a first part of his thesis by early 2023, but in order to finish his thesis, he took additional one and half year to do the second part (wavelet coherence).

Contribution
This thesis is somehow like a scaled down PhD thesis because it essentially includes two separate paperes. First paper is a replication of Du and Hayes model – standard econometrics approach to investigation of influence of ethanol production on gasoline price. Second paper is wavelet coherence paper using the data from the first paper, but with totally different methodology.
The first paper- replication and data updating of Du and Hayes model has an interesting background: There was a strong (rather bitter) exchange between Du and Hayes (well, mainly Hayes) and Knittel and Smith. Essentially Knittel and Smith in their Energy Journal paper „Ethanol Production and Gasoline Prices: A Spurious Correlation" strongly critisized Du and Hayes model that „We show that these estimates were generated by implausible economic assumptions and spurious statistical correlations. To support this last point, we use the same statistical models and find that ethanol production "decreases" natural gas prices, but "increases" unemployment in both the U.S. and Europe. We even show that ethanol production "increases" the ages of our children." Given that Knittel and Smith in detail critically described the Du and Hayes model, their data and associated institutional situation in ethanol/gasoline supply chain, Jan Jezek had a good opportunity to update Du and Hayes estimation with new data. However I think he did not emphasize enough in his thesis that Knittel and Smith provided a good econometrics critique of the Du and Hayes model, saying that it is essentially bad model, leading to spurious results. The contribution of Jan Jezek was mainly to take a recent data up to 2022 and to do a replication of Du and Hayes model and also to do a small extension of this model along the lines suggested by Knittel and Smith.
The second paper on wavelet coherence uses methodology introduced by Barunik, Vacha and later used by Vacha, Kristoufek, Janda etc. in analyzing comovement of biofuels related commodities and financial indicators. This second paper proves ability of Jan Jezek to learn a new technique, not covered in standard econometrics programmes.

Literature

As far as a factual content of literature references, the thesis is O.K. Jan Jezek is using proper literature and during the work in our biofuels research team he learned enough about the relevant literature. Definitelly at least as much as it is common for a usuall good IES thesis.
I like good brief review of literature on impact of ethanol on retail price of gasoline (section 3.1) – by this I do not mean section 3.1.1 which deals with Du and Hayes versus Knittel and Smith controversy.

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I think the reporting of this controversy in this thesis is biased towards Du and Hayes argument and does not really capture the general econometric essence of the Knittel and Smith critique.

Thank to using Latex, there are not any problems with missing proper correspondence between citations in the text and List of References and the formal work with references is not noticeably worst than in some non-Latex theses. However I think Jan Jezek could do a better work with formal technical features of bibtex. In particular, I consider it unfortunate that Jan Jezek and Vendula Letovska were not able to coordinate on better sharing of bibtex file (database). [To be clear, Jan Jezek and Vendula Letovska were working on the same research question, but each of them used totally different methodology. So each of the two theses are fully original and do not copy anything from one another. However, naturally, a lot of their bibliographies overlap, so it would be efficient to share the bib files.]. The beauty of bibtex database is that it may be used for several related papers (theses), economising on checking individual reference items. For example in the list of literature of Jan Jezek's thesis there are deficiencies like these:

References like:

Administration, E. I. (2005): "History of ethanol." Technical report, U.S. Department of Energy.

Agency, E. P. (2010): "Renewable fuel standard program (rfs2) regulatory impact analysis." Technical report, U.S. Environmental Protection Agency.

Agency, E. P. (2020): "Renewable fuel standard program." Technical report, U.S. Environmental Protection Agency.

Association, R. F. (2020): "Fueling a high octane future: 2020 ethanol industry outlook." Technical report, Renewable Fuels Association.

are clearly caused by using wrong bibtex style (most likely it is an article style). However, just reading the references inside the text of the thesis (Administration, 2005; Agency, 2010) or looking at the List of References, it is clear that there is technically something wrong here. Sure, there is present a usual mistake of IES students of not making sure that bibtex is capitalizing properly (by using curly brackets {} around the names like US).

What should I say about reference like this?:

Kristoufek, L., K. Janda, & D. Zilberman (2012b): "Mutual responsiveness of biofuels, fuels and food prices." Kristoufek, L., K. Janda and D. Zilberman (2012)."Mutual Responsiveness of Biofuels, Fuels and Food Prices", CAMA Working Paper 38.

Simply, students should read the List of References in their thesis.

Manuscript form

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The thesis is well written, it is easy to read. Again, thanks to Latex, the work with tables etc. looks pretty O.K. But there are again some deficiencies caused by insufficient attention. There is a number of small typos which could be removed after careful reading of the thesis.

Examples of some small deficiencies:
p. 5 – when using term like E-85, you should define it first. (it is actually defined on page 8, and the definition is not really correct, because surprisingly E-85 does not really mean that there is 85% of ethanol, it is usually between 51-83 percent.)

When copying sentences like this "Corn's dominance in U.S. agriculture market comes at the expense of our environment, our health, and some of our farming communities." (page 7), try to think first. Firstly, this is not proper academic style. Secondly, "us (our)" is US, not us.

Typos on pages 29-31 seem to suggest that the author did not read sufficiently carefully the final submitted version, actually it looks more like he did not look at the final version at all (at least for these pages).

Biodiesel: you should use the term biomass-based diesel (BBD) instead. Because BBD includes biodiesel (produced by transesterification, leading to FAME) and renewable diesel (hydrotreated vegetable oil). Several years ago essentially all biomass diesel was biodiesel (FAME) – that is why in older literature everybody is talking about biodiesel and ethanol, however nowadays, especially in US, renewable diesel is much stronger than biodiesel. Actually "renewable diesel" is a drop-in fuel (chemically almost identical to conventional crude oil based diesel), while biodiesel is not (this is often wrong in the older literature, possibly including my own papers or presentations). This is a side issue for this thesis, since it is about ethanol, but as a biofuels expert, Jan Jezek could learn about this relatively recent technological development and clarification.

The conclusion should be based on the original research done in this thesis. Therefore I do not consider fully appropriate the discussion of health effects of biofuels or market distortions (support for big farmers versus small farmers) in the Conclusion since these effects were not investigated in the empirical part of the thesis at all.

Overall evaluation and suggested questions for the discussion during the defense

Thanks to intensive envolement of Jan Jezek in bigger biofuels project during 2022, 2023, he definitelly satisfied the requirements for good IES thesis – he learned about an interesting research topic, outside of standard classbook coverage in IES classes, he learned how to work on research project, he proved his ability to use appropriate quantitative techniques and to

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write a research report. His thesis is substantial enough since he uses two different techniques to analyse the issue of price transmission in the ethanol related supply chain. He is writing about a topic he has sufficient knowledge about.

My first question is about the context of the topic of this thesis: In the 1ˢᵗ paragraph of the thesis, it is written:
"However, while the environmental benefits of biofuels are widely acknowledged, the economic implications of their integration remain a subject of intense debate and scrutiny."
Is Jan Jezek really able to confirm that environmentalists do not have serious issues with biofuels? Actually, I do not think that economists are primary group of people, who would have negative attitude to biofuels, that primary group of anti-biofuels people are … (it is actually part of my question, from which scientific areas the major objections to biofuels are coming from.)

Page 41: Could Jan Jezek explain with the help of figure 6.3 his following statement:" From 2016 to 2018, there's a significant coherence at the lower frequencies (around 16 to 32 periods), indicating a strong relationship between ethanol production and the crack ratio during this period."

Wavelets by PADD: Analysis of Ethanol outside of PADD 2 (Midwest) does not seem economically very meaningful in the way it is conducted in this thesis. What exact data (from the point of view of regional coverage) were used for PADD level wavelet coherence analysis?

In my view, the thesis fulfills the requirements for a master thesis at IES, Faculty of Social Sciences, Charles University, I recommend it for the defense and suggest a grade C, however as long as Jan Jezek does a good job during the defence I would not object upgrading his grade to B .
The results of the Turnitin analysis do not indicate significant text similarity with other available sources.

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

CATEGORY	POINTS
Contribution *(max. 30 points)*	23
Methods *(max. 30 points)*	24
Literature *(max. 20 points)*	15
Manuscript Form *(max. 20 points)*	15

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TOTAL POINTS	(max. 100 points)	77
GRADE	(A – B – C – D – E – F)	C

NAME OF THE REFEREE: Karel Janda

DATE OF EVALUATION: **August 15, 2024**

Digitally signed (August 15, 2024)Karel Janda

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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.*

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.*

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

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.*

Overall grading:

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