Report on **Master Thesis**

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

Student:	Bc. Barbora Jakubová
Advisor:	PhDr. Lucie Bryndová
Title of the thesis:	Efficiency change in inpatient care provision under the DRG-based reimbursement mechanism in the Czech Republic

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

Short summary
The thesis explores efficiency change in inpatient care provision in the Czech Republic during a five-year period, which followed after a major payment mechanism change. In line with international evidence and research, the author focuses on inpatient length of stay to proxy hospital efficiency development. The author uses extensive dataset of patient-level data, including over 500 000 observations from several hospitals, including 8 out of 12 university ones.

The thesis proves there was a clear change in the behaviour of hospitals, resulting in lower average length of stay and, further to it and even more importantly, less variances in care provision. The author employs various subsets to research differences in behavioural changes based on hospital size, for patients with different level of comorbidities, and for selected procedures. Care standardisation is investigated through analysis of time trend of standard deviations of length of stay.

The thesis is well structured, reads nicely, and builds clear argumentation, which is justified by using existing scientific literature. The author demonstrated her ability to define correctly her research area and hypotheses, to use econometric skills properly, and also to orient herself in a very complicated medical terminology to be able to properly work with the dataset and define her research interest. The thesis profited from consultation process held with Advance Hospital Analytics, who have kindly provided the data and insights on the medical aspects of the thesis topic. The student also regularly consulted her progress in analysis and thesis drafting with me as her thesis supervisor.

Contribution
The thesis contributes to building the evidence on hospital efficiency development and care standardisation following a payment mechanism change - the DRG implementation in the Czech Republic. The contribution of the thesis is valuable especially for the amount of data it analysed and the scope of hospitals involved in the sample – this is the first time in the Czech Republic primary hospital data are reviewed in such broad scope, as a time series, including important part of the big and medium size hospitals, and controlling for patient characteristics.

While aggregate data of the Czech hospital sector (published by the CZSO) indicate that DRG implementation had the desired outcome in terms of average length of stay, aggregates do not allow insights on whether the implementation of DRG contributed to care standardisation in a statistically significant manner. The thesis main contribution is in that it does show there is such a trend and, moreover, identifies the subsamples where the care standardisation improvements were the most important. As such the thesis proves that the logic behind DRG introduction in the Czech Republic had materialised and that there had been a steady development over the observed period.

The thesis findings are based on extensive set of patient-level data and after controlling for patient characteristics and comorbidities – together with the rigorous approach of the thesis to researching the topic, this makes the thesis an outstanding one, also in terms of international community of research on DRG.

Methods
The tools used are relevant to the research question being investigated, and adequate to the level of master studies at the IES FSV UK. The thesis topic is comprehensively analysed.

Report on **Master Thesis**

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

Student:	**Bc. Barbora Jakubová**
Advisor:	**PhDr. Lucie Bryndová**
Title of the thesis:	**Efficiency change in inpatient care provision under the DRG-based reimbursement mechanism in the Czech Republic**

The research methods are well selected and supported by proper research and tests, justifying the final model selection. A zero truncated negative binomial model was chosen, while the zero-truncated Poisson model was used for one of the submodels.
A important part in the analysis, before actually running the econometric analysis, was to carefully choose selection criteria for patient-level data to censor length of stay and trim outliers. The author demonstrated high ability to review and critically evaluate the existing literature to select the criteria that will support, and not bias, her data sample, especially regarding the intention to test the hypothesis #2

Literature
The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way. The author deals with existing evidence and knowledge in two chapters – in chapter 2 on financing mechanism in CZ and DRG-related evidence, and in chapter 3 focusing on recent research on length of stay.

The author shows the ability to run a relevant literature search and to build her argumentation alongside the latest evidence. I especially value the way the author handled international evidence, and nicely fitted it with the local context. This was especially relevant when the author was building her hypotheses and searched for evidence of international experience with the impact of DRG on care quality and standardisation, stratifying her data sample into subsamples, and selecting methods and criteria for trimming of outliers.

Manuscript form
The thesis is well structured and easy-to-follow for a reader. 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 evaluation and suggested questions for the discussion during the defense
Overall, the thesis is written in a very high standard and the topic is handled accurately, demonstrating high level of author's knowledge of econometric skills as well as knowledge of associated medical issues. Hypothesis were carefully chosen, the methods applied are accurate, and the author relates nicely her research to the current international evidence, demonstrating her full understanding of the health sector payment issues in acute inpatient care.

While it is perhaps more analytically demanding to select and perform the set of tests related to hypothesis #1, for health policy and decision makers, the highest value added is in the thesis's elaboration on testing the hypothesis #2, which deals with care standardisation. Prior to this thesis, no work in the CZ was done to explore whether the LOS decreasing trend, observed in aggregate numbers, was due to statistically improved care standardisation, or due to other factors. This thesis fills this gap by analysing more than 500 000 observations from Czech hospitals, involving 8 out of 12 university hospitals and many regional ones, and dealing with patient-level data, thus controlling for individual patient characteristics and comorbidities.

This is a very high value that the thesis has and it will have consequences for further policy measures which will aim to target standardisation of hospital care, and payments, across hospital levels and specialisation. **For this particular reason, and for the quality of the thesis in terms of its high academic standards, I recommend the defence review committee to select the thesis for a competition/award.**

Report on **Master Thesis**

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

Student:	**Bc. Barbora Jakubová**
Advisor:	**PhDr. Lucie Bryndová**
Title of the thesis:	**Efficiency change in inpatient care provision under the DRG-based reimbursement mechanism in the Czech Republic**

- Improving inpatient care efficiency is a long-time mission and improvements do not happen overtime. The thesis nicely documents that such improvements did happen in the Czech hospital sector during the reviewed period (in 2015-2019). During the defense, could you elaborate on what are the channels to transmit the changed financial incentives of hospital management and health workers into greater efficiency? Does this target also care quality? You may also want to share, based on your experience gained while on internship in Advance, which measures are taken (or recommended to take) to increase care standardisation.

- Please explain why there is generally a time lag between the new payment mechanism introduction and results observed in hospital behaviour which lead to changes in their outcomes. Are the Czech findings of your thesis in line with international evidence?

- In the thesis you stratify nicely your subsamples to explore variations by hospital size and variations by different procedures/diseases over the selected time for which data is available. How do you explain some hospitals were able to profit more from the payment incentive-induced change than others?

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 A.**

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)*	30
Methods	*(max. 30 points)*	30
Literature	*(max. 20 points)*	20
Manuscript Form	*(max. 20 points)*	20
TOTAL POINTS	*(max. 100 points)*	**100**
GRADE	**(A – B – C – D – E – F)**	**A**

NAME OF THE REFEREE: PhDr. Lucie Bryndová
DATE OF EVALUATION: June 17, 2023

Digitally signed June 17, 2023

Lucie Bryndová

_____
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:

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