Report on **Master Thesis**

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

Student:	**Nikola Borýsková**
Advisor:	**Barbara Pertold-Gbicka**
Title of the thesis:	**The effect of weather on high-stakes exam performance: The case of Czech Republic and Slovakia**

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

In her Master Thesis Nikola Boryskova asks if weather conditions affect humans' productivity. Specifically, she analyzes the case of high-stake exams organized in Czechia and Slovakia by the SCIO company that are used as university entrance exams. Using linear regression model with a proxy variable Nikola finds that outside air temperature (within the range from 0 to 10 degree Celsius) positively affects exam performance, while rain affects exam performance negatively. Detailed mediation analysis reveals that these effects are direct, meaning that they do not operate through affecting the quality of night sleep or through affecting the commuting time.

Contribution

This is the first analysis of the relation between weather conditions and productivity (exam performance) for the Czech Republic. Given low variation in weather conditions (roughly between 0 and 10 degree Celsius; across 30 exam locations), identification of statistically significant effects suggests that the relationship is strong and robust. Findings presented in this thesis have important policy implications. Changes in external (not controlled by students or exam organizers) conditions have visible effects on exam performance. This means that a one-shot exam might not be a reliable measure of one's abilities. Related policy recommendation is to allow for more trials so that the effect of external conditions is averaged-out.

Methods

Nikola uses individual-level data on exam performance, basic demographics, quality of sleep, and commuting time combined with exam-venue data on weather conditions before and during the exam.

She starts the empirical analysis with a simple linear model augmented with a proxy variable – average venue-specific exam performance in the previous year – which is supposed to proxy for unobservable differences in student quality across venues. This is the best approach given the structure of the data. Ideally, Nikola wanted to use student panel data (i.e. data from several attempts within the same academic year) but unfortunately we did not have access to individual-level data from other exam days. In this preliminary step Nikola identifies the weather conditions which might have an effect on exam performance.

The core of the thesis is the mediation analysis. Here, Nikola zooms on the two weather conditions identified as potentially relevant (rain and temperature) and asks if their effect on exam performance is direct or indirect (i.e. operates through affecting the quality of night sleep or commuting time). By comparing coefficients in a full model (with both weather conditions and potential mediator) and in partial models (effect of weather on exam performance; effect of weather on potential mediators), she comes to the conclusion that the effect of weather is direct. Because the analyzed data is multilevel (individual-level exam performance, sleep patterns, and commuting time; exam-venue-level weather conditions) and because mediation analysis combines coefficients from several separate regressions, standard errors of the estimated effects are computed using block-bootstrapping.

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Literature

The literature review is detailed and to the point. Nikola reviews all relavant studies and places them in the context of her thesis. It is visible that she really studies the literature and used it as inspiration for the thesis.

Manuscript form

The manuscript is logically organized and written in a very good English. Nikola is a keen writer what results in some sections (for example, the data description) being unnecessairly long, but makes other sections (introduction and literature review) easy to read and very informative. My only reservation regards presentation of the methodology and results of the mediation analysis. It is a bit hard to follow for an uninformed reader. I would appreciate naming the effects already in the methodology section (page 35) and adding coefficient names (Greek letters) to the diagram presented in Figure 4.1. It would be also good to explicitly compare the results obtained in the mediation analysis with the baseline results. Equation (4.3) in the mediation analysis is very similar to equation (4.2) in the baseline analysis. A reader should be reassured that the effect of relevant weather conditions on exam performance estimated in both cases are (more-less) the same.

Overall evaluation and suggested questions for the discussion during the defense

It was a pleasure to supervise Nikola. She is an independent analyst, she knows how to look for information and how to process it, and also knows when to ask for advice. She was working on the thesis regulairly, critically approached all steps, looked for inspirations in the literature, and tried different specifications. I am confident that she fully understands each step of the analysis together with its advantages and weaknesses. 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. We plan to produce a journal article based on this thesis.
The results of the Turnitin analysis do not indicate significant text similarity with other available sources.

Question for defense:
Is there anything you would do differently, if starting the analysis from scratch. Why?

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

CATEGORY		**POINTS**
Contribution	*(max. 30 points)*	29
Methods	*(max. 30 points)*	27
Literature	*(max. 20 points)*	20
Manuscript Form	*(max. 20 points)*	17
TOTAL POINTS	*(max. 100 points)*	**93**
GRADE	**(A – B – C – D – E – F)**	**A**

NAME OF THE REFEREE: Barbara Pertold-Gebicka

DATE OF EVALUATION: 10.6.2025

Digitálně podepsáno 10.6.2025
Barbara Pertold-Gebicka

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**