

Report on Master Thesis

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

Student:	Šimon Scharf
Advisor:	Barbara Pertold-Gebicka
Title of the thesis:	Gender Gap in Math Score: Does Teacher Gender Matter?

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 the submitted Master Thesis Šimon Scharf asks whether teacher's gender matters for math scores of girls and boys in 4th grade of primary school. It is well documented that gender gaps open up early in life. Among them, the most pronounced are gaps in math: in most countries boys have better math grades than girls and perform better than girls in math tests. Šimon asks whether this can be to some extent explained by who teaches math: a male or a female teacher. To answer this question, he turns to a rich microdataset containing 4th graders' scores in standardized math test and detailed information about children, their families, schools, and teachers. Following the previous literature Šimon worries that teachers might be nonrandomly assigned to students and thus a simple OLS analysis of students' math score on teachers' gender might give biased results. This is why he proposes to use a matching estimator. In the first step students' propensity to be taught by a teacher of specific gender is computed. In the second step, math scores of students with similar propensity taught by a male and a female teachers are compared. The final estimator is computed as a weighted average of these differences. Šimon discusses the pros and cons of such approach and proposes several ways of matching and of weighting. The thesis features large number of estimates: for the pooled sample and for each country separately; using different matching approaches; as well as using OLS. The conclusion is that the relationship between teachers' gender and students' math scores is very heterogeneous across countries. When looking at the pooled data, it seems that girls' math scores in the 4th grade are not affected by teachers' gender, while boys grades are a bit lower when they are taught by a male teacher.

Contribution

Šimon's thesis is contributing to the wide literature comparing academic performance of male and female students. It has been shown that gaps in academic performance – especially in math – open up quite early. This is why it is relevant to investigate which factors are responsible for this. One of the potential channels discussed in the previous literature is the role of teachers, their academic quality, role modelling, and teaching styles. This is why Šimon asks whether teachers' gender matters for how well students do in math. While this research question has already been investigated for the case of teenagers, there is little evidence for younger students. Basically, there are just two analyses for specific U.S. states. Thus, the main value added of the presented thesis lies in investigating whether there is any effect of teachers' gender on math score among younger primary school students and whether this effect is universal or is just present in specific countries.

Methods

Inspired by the earlier research (which usually investigates teenage students) Šimon expects that selection of students to teachers is not random and thus a simple OLS might give biased estimates. Unfortunately he cannot methodologically follow the previous research and incorporate students' fixed effects to the analysis, because (1) in the used dataset each student is observed for only one period, and (2) students in 4th grade are usually taught by a single teacher. This is why Šimon decided for an alternative identification strategy: matching on observables. He models selection of students to teachers and then compares observationally similar students taught by teachers of different gender. He uses nearest neighbor matching (with or without replacement) to pair students taught by a male

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and female teacher. This matching algorithm is the simplest one, but at the same time is the most sensitive to outliers and to unevenly distributed data. It would benefit the thesis if a more advanced matching algorithm (at least radius matching) was also applied. Nevertheless, the results presented in the thesis seem robust. Šimon tries two matching algorithms and two different weighting schemes. Given that propensity scores distribution is very similar for students taught by male and female students (i.e. it seems that in the end there is not much selection going on, on average), Šimon also estimates several linear models: simple OLS controlling for selection variables, OLS estimated on the matched sample, etc. This allows him to assess the role of specific students', their families', and teachers' characteristics in predicting test scores. It seems that the teachers' gender effect – if present – can be attributed to teachers' quality.

Literature

The previous literature is investigated in the thesis extensively. The whole review is logically structured and gradually leads the reader from the big picture to the specific question analysed in this thesis. I especially like how Simon presents studies devoted to the same research question as his. He first discusses the mechanisms and other reasoning present in the literature and then reviews papers sorted by empirical approach. What could be written better is the summary/conclusion to be taken from the literature review. I would say that there is some consistent pattern in the results, as most studies find that (teenage) girls benefit from being taught math by a female teacher.

Manuscript form

The manuscript is generally well written. The introduction is informative, and the whole thesis is logically structured.

I miss a bit some wrapping-up, returning to the discussion from the introduction and the literature review when summarizing the results and concluding. I strongly advise that this is discussed during the defense.

Another disadvantage of the manuscript is the description of the methodology. While it is generally correct (with some minor exceptions), it is a bit chaotic and might be hard to understand for a reader not familiar with matching.

Overall evaluation and suggested questions for the discussion during the defense

All in all the thesis by Šimon Scharf is a very good piece of work. It opens an interesting topic, presents a comprehensive literature review and proves that the author is able not only to apply sophisticated econometric methods, but also understands them and knows how to interpret and whether their application is useful. Despite some minor issues mentioned above, I believe that the presented thesis fulfills the requirements for a bachelor thesis at IES, Faculty of Social Sciences, Charles University, I recommend it for the defense and suggest a grade A if during the defense Šimon convincingly discusses the results of his analysis in relation to the previous literature (theoretical and empirical).

The results of the Urkund/Turnitin analysis do not indicate significant text similarity with other available sources.

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

CATEGORY	POINTS
<i>Contribution</i> (max. 30 points)	27
<i>Methods</i> (max. 30 points)	26
<i>Literature</i> (max. 20 points)	20
<i>Manuscript Form</i> (max. 20 points)	18
TOTAL POINTS (max. 100 points)	91
GRADE (A – B – C – D – E – F)	A

NAME OF THE REFEREE: *Barbara Pertold-Gebicka*

DATE OF EVALUATION: 23.1.2023

Digitálně podepsáno (23.1.2023)

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