



Which teaching practices improve student performance on high-stakes exams? Evidence from Russia



Andrey Zakharov^a, Martin Carnoy^{b,*}, Prashant Loyalka^c

^a National Research University Higher School of Economics, 20 Myasnitskaya Ulitsa, Moscow 101000, Russia

^b Graduate School of Education, 485 Lasuen Mall, Stanford University, Stanford, CA 94305, United States

^c Freeman-Spogli Institute, Stanford University, Stanford, CA 94305, United States

ARTICLE INFO

Keywords:

Teaching practices
High-stakes exams
Educational policy

ABSTRACT

This study examines the relationship between student achievement and teaching practices aimed at raising student performance on a high stakes college entrance examination—the Russian Unified State Exam (USE). Data come from a survey of 3000 students conducted in 2010 in three Russian regions, and the analysis employs a student fixed effects method that estimates the impact of mathematics and Russian language teachers' practices in advanced and basic tracks on students' exam results. The study finds that the only practices positively affecting test outcomes are greater amounts of subject-specific homework, and that the most effective type of homework differs across tracks.

© 2014 Published by Elsevier Ltd.

1. Introduction

Although a generation of research on “educational production” has greatly increased our knowledge of what works to improve student learning, there is little research on which teaching practices impact high school students who face high-stakes exit/entrance examinations. In most countries, including China, India, Russia, Germany, Brazil, and the United States, high school students must take entrance exams to qualify for college and particularly elite colleges (Carnoy et al., 2013). In other countries, such as France, Spain, and Italy, high school students are required to take high school exit exams to qualify for a degree.

Evidence suggests that, when preparing students for such high-stakes examinations, teachers use certain types of practices more than others to increase student achievement. Bishop (1996, 1997) showed that teaching practices in Canadian provinces with curriculum-based high school exit examinations were more likely to focus on more complex learning skills. Teachers also assign more homework related to the exam and give more practice exams compared to provinces without such examinations. Whether and which of these teaching practices in fact help students to improve their performance in a high-stakes environment, however, has not yet been rigorously tested in the empirical literature.

Given this lack of evidence, the goal of our study is to examine which teaching practices improve the performance of high school

students on a high-stakes examination. We use a unique data set from a survey from three regions of Russia of almost 3000 final-year (11th grade) high school students who were preparing for the national college entrance exam (the Unified State Exam or USE) in 2010. We use the data and a cross-subject student fixed effects model (Clotfelter et al., 2010) to estimate the effect of three specific teaching practices on student examination outcomes: (a) the proportion of homework exercises targeting specific entrance exam items (hereafter known as “test-specific homework exercises”); (b) teachers' use of practice (or mock) examinations; and (c) teachers' use of websites geared to help students prepare for the exam.

We find that of the three practices only “test-specific homework exercises” has a positive and significant effect on student performance. The effect is rather large—about 0.2 of a standard deviation (SD) in exam score. Further, we find that the effectiveness of test-specific homework exercises is greater for students in the advanced track when homework exercises are focused on more difficult test items. Similarly, the effectiveness of test-specific homework exercises is greater for students in the basic track when homework exercises are focused on easier test items. The results suggest that we can identify those teaching practices that improve high school student performance on high-stakes exams.

The structure of the rest of the paper is as follows: Section 2 provides background on research that is relevant to this study and on the Russian education system, in particular the USE examination. Section 3 describes the data. Section 4 discusses the estimation strategy. Section 5 presents the results. Section 6 discusses the results and concludes.

* Corresponding author. Tel.: +1 650 856 7722.

E-mail addresses: ab.zakharov@gmail.com (A. Zakharov), carnoy@stanford.edu (M. Carnoy), loyalka@stanford.edu (P. Loyalka).

2. Background

2.1. Research on teacher impacts

Recent discussion on the effectiveness of school inputs in raising student outcomes focuses on teachers, showing that students with more effective teachers perform better on achievement tests (for example, Sanders and Rivers, 1996; Rockoff, 2004; Hanushek et al., 2005; Nye et al., 2004; Boyd et al., 2006). However, much of the emphasis in identifying effective teachers has been on teacher characteristics associated with higher student outcomes rather than on teaching practices. Such teacher characteristics are important for our study because they help identify the “quality” of teachers that should be controlled for in estimating the effect of teacher practice on student examination performance. For example, some studies suggest that greater teacher experience contributes significantly to student achievement (Ferguson and Ladd, 1996; Clotfelter et al., 2007; Rockoff, 2004; Hanushek et al., 2005). Other studies suggest that positive effects on student outcomes result from the quality of teachers’ pre-service education (Clotfelter et al., 2007; Darling-Hammond, 2009; Goldhaber and Brewer, 1997, 2000; Kukla-Acevedo, 2009; Monk, 1994) and teacher certification (Boyd et al., 2006; Clotfelter et al., 2007).

Alongside the emphasis on teacher characteristics, there has also been a history of trying to link teaching practices to student achievement (for a review of research in the United States, see Hill et al., 2005). More recently, researchers have used large-scale samples to measure the link between teaching practices and student test scores gains. In the United States, the effort has culminated in an extensive study of teacher effectiveness—a sample of 3000 primary and middle school teachers in urban areas. In particular, the study collects information on teaching practices through videotaped observations and student survey responses. The aim of the study, however, was to create a composite indicator of an effective teacher rather than to estimate the impacts of specific teaching practices (Kane et al., 2013). In Botswana and South Africa, Carnoy et al. (2012) show that observational ratings of sixth-grade mathematics teaching quality have significant and large effects on mathematics achievement. Schwerdt and Wuppermann (2011) find that lecture-style teaching in U.S. schools significantly increased students’ achievement. In contrast, von Klavere’s (2011) estimates using Dutch TIMSS data show that time spent lecturing in front of the class has no significant effect on student outcomes. Overall, while all of the above research on teacher practices informs our study, none of the research refers to high school students or to high-stakes examinations.

2.2. The Russian context

Since 2009, Russia has required that all grade 11 (the final year of academic schooling) students take a national exit examination that also functions as a college entrance examination (the USE). In fact, most students who complete general (academic) high school sit for the USE (98 percent of students in 2009).¹ The scores on the USE (along with whether students won an award at a recognized academic competition and students’ college choices) are the primary criteria used to match students into different colleges and majors. Because of the extremely high proportion of students taking the USE and the central role of the USE in college admissions, the exam is high-stakes.

Along with the USE being a high-stakes exam for students, it is high-stakes for teachers and principals. Teacher performance is assessed, in part, according to their students’ USE scores. USE

scores are also an important criterion that determines principal bonuses.² Furthermore, the reputation of schools is affected as they are ranked according to students’ USE results.³ Teachers and school principals therefore have strong incentives to use teaching practices that will maximize student performance on the USE.

The USE has two main features other than its high stakes that are important for our analysis of the impact of teaching practices on student performance. First, each student takes two mandatory subject-specific exams, Russian language and mathematics, as well as three subject-specific exams of his/her own choosing. As explained in the section on empirical strategy below, we use within-student variation across the mandatory subject-specific exams to help identify the causal impacts of teaching practices on student USE performance.

Second, the subject-specific exams contain items of varying difficulty. The mathematics test includes two types of items: B and C. The B-type items are short-answer questions that require some basic analysis. The C-type items are also open-ended but of a higher level of complexity. They require students to give detailed answers and show their work.

The Russian language test also includes B and C-types of items. Both of them are of a high level of difficulty. The B-type items are short answer questions that evaluate students’ linguistic competence. The C-type items engage the students in writing compositions and are supposed to reflect students’ ability to communicate effectively.

3. Data

In May 2010, we conducted a survey of 2927 students in 182 classes in 127 schools in three regions of Russia: Pskovskaya and Yaroslavl’skaya *oblasts* and Krasnoyarsky *krai*. The three regions were chosen because they represent a diversity of economic and educational contexts in a large and heterogeneous country. Krasnoyarsky *krai* in Siberia is Russia’s second largest region (13 percent of the national territory) and is one of the richest in natural resources and industrial production. Yaroslavl’skaya *oblast* is located in the central part of the country, north of Moscow. Pskovskaya *oblast* is in the northwest of Russia and borders Estonia, Latvia, and Belarus. Both *oblasts* are small and, compared to Krasnoyarsky *krai*, are less developed economically.

We chose the schools in each region using stratified random sampling. After obtaining a list of all the schools in each region, schools were sorted into strata by region, school type (regular, magnet, etc.), settlement type (rural, urban, *oblast/krai* center), by administrative district and high school size (the number of 11th grade students). In each stratum, schools were selected using simple random sampling. The sample included 14.5 percent of all schools in Pskovskaya *oblast*, 8.9 percent in Yaroslavl’skaya *oblast*, and 4.1 percent in Krasnoyarsky *krai* (Table 1).

We surveyed three types of respondents: students, teachers, and school principals. The student survey questionnaire asked students about their individual and family background characteristics. We also obtained data from the school on students’ 10th grade grades and later, on students’ math and Russian-language USE scores (in summer 2010, after students took the USE). The teacher survey surveyed math and Russian teachers. The teacher survey form asked teachers about their background (including gender, birth year, education, teaching experience), qualifications, textbooks used, and teaching practices used. The principal survey included questions on the principal’s characteristics, school characteristics (urban, rural, size), and the number of basic and

¹ 98.2 percent of students sat the Russian language USE and 98.1 percent sat the math USE. Estimated from <http://www.ed.gov.ru/files/materials/11987/76rik.pdf>.

² See <http://old.mon.gov.ru/files/materials/6772/model-nsot.pdf>.

³ For example see http://ria.ru/sn_edu/20130423/930945392.html.

Download English Version:

<https://daneshyari.com/en/article/356116>

Download Persian Version:

<https://daneshyari.com/article/356116>

[Daneshyari.com](https://daneshyari.com)