



The impact of teacher credentials on student achievement in China



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ARTICLE INFO

Article history:

Received 23 June 2014

Received in revised form 19 August 2015

Accepted 19 August 2015

Available online 28 August 2015

Keywords:

China

Teacher credentials

Teacher quality

Student achievement

ABSTRACT

Teacher quality is an important factor in improving student achievement. As such, policymakers have constructed a number of different credentials to identify high quality teachers. Unfortunately, few of the credentials used in developing countries have been validated (in terms of whether teachers holding such credentials actually improve student achievement). In this study, we employ a student-fixed effects model to estimate the impact of teacher credentials on student achievement in the context of the biggest education system in the world: China. We find that having a teacher with the highest rank (a credential based on annual assessments by local administrators) has positive impacts on student achievement relative to having a teacher who has not achieved the highest rank. We further find that teacher rank has heterogeneous impacts, benefiting economically poor students more than non-poor students. However, whether a teacher attends college or holds teaching awards does not appear to provide additional information on teacher quality (in terms of improving student achievement).

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A key finding in the economics literature is that education is important for economic growth (Hanushek & Woessmann, 2010; Schultz, 1961). Educational attainment (as measured by average number of years of schooling in a population) is consistently and positively related to economic growth (Aghion & Howitt, 1998; Romer, 1990). Studies have also documented a larger, positive relationship between student achievement (reflecting cognitive ability) and economic growth (Hanushek & Woessmann, 2008; Hanushek & Kimko, 2000). Indeed, researchers have argued that failing to raise national levels of student achievement can ultimately cause economies to stagnate (Hanushek & Woessmann, 2010, 2012).

An important factor in raising student achievement is teacher quality (Hanushek & Rivkin, 2010; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004). Studies in the United States have shown that a student improves three times more in his or her academic achievement when taught by a high quality teacher (relative to a low quality teacher—Hanushek, 2011). Although fewer in number, studies from developing countries have also documented how variation in teacher quality can lead to substantial differences in student achievement (e.g. Kingdon & Teal, 2010).

Recognizing the importance of teacher quality in raising student achievement, policymakers and researchers in developed countries have sought to identify the specific teacher credentials that signal teacher quality (and raise student achievement). For example,

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researchers have established that educational background (Harris & Sass, 2011; Kukla-Acevedo, 2009), professional certifications (for example, fulfilling professional teaching requirements set by a national agency—Clotfelter, Ladd, & Vigdor, 2007; Harris & Sass, 2009; Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2006), and teaching experience (Rockoff, 2004; Ferguson & Ladd, 1996) raise student achievement in primary schools.

In contrast to research from developed countries, much less is known about the types of teacher credentials that positively impact student achievement in developing countries, their impact on different types of students, and how they translate to improvements in student achievement. Existing studies have estimated the impact of teacher subject-specific knowledge and union membership on student achievement (in Peru and India—Metzler & Woessmann, 2012; Kingdon & Teal, 2010). However, these two studies did not explicitly focus on those teacher credentials that are more often used by policymakers or school administrators in teacher hiring, assignment, and compensation decisions (such as educational background or professional certification). Moreover, to our knowledge, there have not been any studies in the context of developing countries that focus on measuring the differential impact of teacher credentials on the achievement of disadvantaged (poor or low-performing) students. Finally, even less is known about *how* such credentials might translate to improved student achievement (e.g. what the credentials tell us about the actual behavior of the teacher).

One country that especially could benefit from an evaluation of teacher credentials is China. China has one of the largest education systems, and hence one of the largest teacher labor forces, in the world. In 2012, approximately 5.6 million teachers taught nearly 100 million primary school students (MOE, 2014). About 42% of these teachers worked in rural areas (not including rural–urban transition areas—MOE, 2014). The size of the rural teacher labor force in China is noteworthy as it exceeds that of entire developed countries such as the United States (which had approximately 2 million primary school teachers in 2011–2012—NCES, 2013).

Surprisingly, almost no studies examine which teacher credentials actually improve student achievement in China. With the exception of one unpublished study (from over a decade ago—Park & Hannum, 2001), we know of no study from China that systematically examines which teacher credentials raise student achievement and to what degree. Moreover, we know of no study that examines the heterogeneous impacts of teacher credentials or how such credentials lead to improvements in student achievement. Lacking empirical evidence on which teacher credentials matter for student achievement, policymakers and school administrators in China (and other developing countries) may make inefficient decisions about teacher hiring, assignment, and compensation.

The goal of this paper is to examine which teacher credentials improve student achievement in China. As part of this goal, we have three specific objectives. First, we identify the impact of three commonly used teacher credentials (introduced in the section below) on the achievement of the average primary school student. Second, we consider whether there are heterogeneous impacts of teacher credentials on the achievement of economically poor and low-performing students (as well as by gender). Third, we explore whether “additional teacher effort” (the total amount of non-class time that teachers spend on their teaching activities, both inside and outside of school) is a plausible mechanism through which teacher credentials impacts student achievement.

To estimate the impacts of teacher credentials, we analyze data on approximately 4000 students from 70 rural primary schools in one province of Northwest China.¹ Similar to a number of recent studies on the effects of teacher credentials, our identification strategy relies on a cross-subject student-fixed effects model (Kingdon & Teal, 2010; Van Klaveren, 2011; Clotfelter, Ladd, & Vigdor, 2010; Dee, 2005, 2007). The model removes potential sources of bias that can result from the non-random sorting of students to teachers and schools. Our analytical models also control for a large set of cross-subject student and teacher covariates.

The rest of the paper is organized as follows. Section 2 provides a background on policies underlying teacher credentials in China, describes our data, and outlines our analytical approach. Section 3 presents results of the impact of teacher credentials on student achievement. In the analysis we examine the effect of teacher credentials on the average student as well as on disadvantaged (poor, female, or low-achieving) students. In Section 3, we also explore one potential mechanism by which teacher credentials may affect student achievement. Section 4 discusses the results and concludes.

1. Research design

1.1. Teacher credentials in China

To identify teacher quality (and thus facilitate the effective hiring, assignment, and compensation of a large teacher labor force), policymakers and school district administrators in China have traditionally relied on three teacher credentials: teacher education background, teaching awards, and teacher rank (MoE, 1986). First, policymakers have traditionally used teacher education background to screen individual teachers for prerequisite training and ability (MoE, 1993a). For example, elementary school teachers are required to hold at least a vocational college degree as a pre-requisite to teach (with college degrees or higher considered favorably in hiring and promotion decisions—MoE, 1993a).

Second, policymakers have developed a system where teachers bestow teaching awards to one another based on results from classroom audits. Multiple award categories (such as excellence in classroom management or pedagogy) are usually given on an annual basis. Administrators and principals consider teachers who garner teaching awards more favorably when making promotion and hiring decisions (MoE, 1993b).

¹ We choose to focus on rural schools because improving student achievement in rural China is relevant for the country's future economic development. Rural China will provide a large share of the labor force in the coming years and there is a danger that China could fail to make the transition from developing to developed country if the average rural child is not being educated to support a modern, industrial society. Unfortunately, a number of studies already show that rural students are far behind their urban counterparts in a variety of educational outcomes (Yi et al., 2012; Mo, Zhang, Yi, Luo, Rozelle, & Brinton, 2013).

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