



Does shadow education help students prepare for college? Evidence from Russia



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ABSTRACT

Given the lack of causal evidence from developing countries, we examine the impact of participating in shadow education (private tutoring or other fee-based academic activities outside of formal schooling) on high school student achievement. Specifically, we analyze a unique dataset from Russia using a cross-subject student fixed effects model. We find that shadow education only positively impacts the achievement of high-achieving (and not low-achieving) students. Shadow education also does not lead students to substitute time away from their studies. Instead, our findings suggest that low-achieving students participate in low-quality shadow education which, in turn, contributes to inequality in college access.

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An important way that high school students compete to enter college and, especially selective colleges, is by hiring private tutors or attending fee-based academic activities outside of formal schooling (Bray, 2007). Such types of fee-based, out-of-school activities are collectively known as “shadow education” (Bray, 2007). Students (and their parents) pay for shadow education with the hopes that it will help them get better grades and score relatively higher than their peers on college entrance exams (Lee and Shouse, 2011; Baker and LeTendre, 2005; Bray, 2007; Lee et al., 2009; Stevenson and Baker, 1992). Low-achieving high school students, in particular, may believe that participating in shadow education can help them to be more competitive with their high-achieving peers (Baker et al., 2001). Because the number of students that have completed high school and are competing to enter college has grown markedly in developing countries in the last two decades, the market for shadow education has also grown rapidly (Bray and Lykins, 2012; Buchmann et al., 2010; Silova et al., 2006; Bray, 2006).

Despite its perceived benefits and growing prevalence, the degree to which shadow education can help students meet college entrance requirements is unclear. In theory, high school students can substitute time spent in shadow education for time spent on

other learning activities outside of school, such as homework, self-study and preparation for entrance exams (Carnoy et al., 2013; Schmidt, 1983). If these other learning activities are equally valuable in terms of helping students meet college entrance requirements, students may not need to invest in shadow education. Furthermore, some students may lack information on the quality of various shadow education offerings and may therefore participate in programs that are not beneficial. Indeed, the quality and scope of shadow education programs appear to vary greatly (Lauer et al., 2003). Research has shown more generally that low-achieving students are more likely to lack information about the quality of education programs (Hastings and Weinstein, 2008).

The possibility that shadow education may not help some students meet college entrance requirements may be counterintuitive, given how much students and their families spend on it. It is estimated that by 2018, students and their families worldwide will spend—at all levels of schooling—over \$100 billion annually on shadow education (Forbes, 2012). If participating in shadow education has a relatively small academic payoff, then spending such large sums would seem to be a highly inefficient use of resources. If spending on shadow education fails to benefit certain types of students—for example, low-achieving or economically disadvantaged students—it may not only be inefficient but also may contribute to social inequality (Silova et al., 2006). The strikingly large investments made in shadow education combined with its potential implications for economic efficiency and social inequality, suggests that it is important to examine the

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consequences of participating in shadow education for different types of students.

Unfortunately, there is little evidence to date about whether shadow education helps students in general, or disadvantaged students, in particular, fulfill college entrance requirements. Specifically, few studies from developing countries use rigorous causal research designs to measure the impact of shadow education on student achievement during primary, junior high, and high school (Dang and Halsey Rogers, 2008), or to measure the impact on the ability of students to fulfill end-of-high-school competitive college entrance requirements.

Given the dearth of evidence, our paper has two major goals. The first is to examine the causal impact of participating in shadow education on the achievement of high school students. The second goal is to examine the differential impacts of participating in shadow education on the achievement of low versus high-achieving high school students. In addition to these two major goals, we also explore why participating in shadow education may or may not impact high school student achievement.

To fulfill our goal, we examine the impacts of participating in shadow education on the college entrance exam performance of a representative sample of approximately 3000 high school seniors in 127 schools from three regions of Russia. Russia is a good case to study since students in the country are required to take a national college entrance exam at the end of high school. Similar to other large developing countries such as China, India, and Brazil (Carnoy et al., 2013), performing well on the exam is often the main, and usually only, requirement for entering college and selective colleges. In light of its high-stakes nature, a large proportion of high school students in Russia participate in shadow education to prepare for the exam.

We seek to identify the causal impacts of participating in shadow education on student performance by utilizing a cross-subject student fixed effects design. This design has been used in a number of recent studies (for example, Zakharov et al., 2014; Van Klaveren, 2011; Schwerdt and Wuppermann, 2011; Clotfelter et al., 2010; Kingdon and Teal, 2010; Dee, 2005, 2007). We examine the impacts of two major types of shadow education on exam results: (a) college preparatory courses and (b) private tutoring. We also examine whether participating in college preparatory courses and private tutoring has different impacts on low-achieving and high-achieving students. Finally, we examine a possible reason why participating in shadow education may work for some students and not others: that is, we test the hypothesis that participating in shadow education crowds out time for other out-of-school studies.

1. Background

1.1. Previous studies that estimate the impacts of shadow education

Studies of the impacts of participating in shadow education on the performance of students (in various levels of schooling) show mixed results. Several studies argue that there are positive associations or impacts from participating in various types of shadow education. For example, Buchmann et al. (2010) find positive correlations between preparatory courses or private tutoring and SAT achievement in the United States. Guimarães and Sampaio (2013) find strong, positive correlations between private tutoring and college entrance exam results in Brazil. Dang (2007) finds much smaller but still positive impacts of private tutoring on the achievement of lower secondary students in Vietnam. Kuan (2011) also finds small but positive impacts of preparatory courses (i.e. attending cram schools) on the achievement of grade 9 students in Taiwan.

Other studies, however, show that there are few, if any, positive impacts from participating in shadow education. For example, Byun and Park (2011) find no significant relationship between private tutoring and SAT achievement among high school students in the United States. Gurun and Millimet (2008) actually find negative impacts of private tutoring on university placement in Turkey.

Studies on the impacts of participating in shadow education on the performance of low-achieving students are also inconclusive. On the one hand, shadow education may result in substantial learning gains for low-achieving students (Lauer et al., 2003). On the other hand, shadow education may have larger impacts on higher achieving than lower achieving (or higher socioeconomic status than lower socioeconomic status) students (Buchmann et al., 2010; Domingue and Briggs, 2009).

One reason why studies find different impacts from participating in shadow education may be that they vary in the degree that they estimate impacts using rigorous causal research designs (Dang and Halsey Rogers, 2008). The main challenge in estimating the causal effect of participating in shadow education on student performance is selection bias. Students that participate in shadow education may have different levels of achievement than students that do not participate in shadow education because there are other factors that are correlated with participation in shadow education and student achievement. Analyses that fail to adequately control for these factors can produce biased estimates of the impact of participating in shadow education on student performance (Domingue and Briggs, 2009).

Previous studies have attempted to address the threat of selection bias in various ways. Some studies have invoked the assumption of selection on observables and used linear regression with covariate adjustments (Guimarães and Sampaio, 2013; Byun and Park, 2011; Buchmann et al., 2010; Tansel and Bircan, 2005; Stevenson and Baker, 1992) or propensity score matching (Kuan, 2011; Zimmer et al., 2010; Domingue and Briggs, 2009; Hansen, 2004). Dang (2007) attempted to estimate the unbiased impacts of participating in shadow education by using an instrumental variables strategy. Unfortunately, the key assumption underlying the paper's instrumental variable strategy—that the instrumental variables are correlated with student outcomes only through participation in shadow education—is difficult to justify. Finally, a few, small-scale randomized experiments in the United States have tested the impacts of participating in specific types of shadow education, namely SAT preparation (e.g. Becker, 1990). These studies are of limited external validity, however, since they are small-scale, involving a few hundred individuals, unrepresentative of the wider population of high school students in the United States, and mostly take place before 1990. In contrast to earlier studies (and as explained below in Section 3), we attempt to deal with selection bias by using a cross-subject student fixed effects model (see, for example, Zakharov et al., 2014; Van Klaveren, 2011; Schwerdt and Wuppermann, 2011; Clotfelter et al., 2010; Kingdon and Teal, 2010; Dee, 2005, 2007).

1.2. Preparing for the college entrance exam in Russia

Since the collapse of socialism, the market for shadow education has been growing rapidly in Russia (and indeed in the rest of Eastern Europe and Central Asia—Kozar, 2013; Silova, 2010; Silova et al., 2006). By 2012, the annual amount of spending on shadow education reportedly exceeded 800 million US dollars (Rusetskaya, 2013). Approximately 25–30% of this spending was at the high school level, up 23% from the previous year (Rusetskaya, 2013).

A major reason for the popularity of shadow education at the high school level in Russia is the substantial competition

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