



Better luck next time: Learning through retaking



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ABSTRACT

In this paper we provide some evidence that repeat taking of competitive exams may reduce the impact of background disadvantages on educational outcomes. Using administrative data on the university entrance exam in Turkey we estimate cumulative learning between the first and the *n*th attempt while controlling for selection into retaking in terms of observed and unobserved characteristics. We find large learning gains measured in terms of improvements in the exam scores, especially among less advantaged students.

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1. Introduction

It is well understood that educational outcomes tend to be tied to family background all around the world: in Australia, children are twice as likely to attend university if their parents are professionals rather than laborers (Group of Eight Australia, 2014). In the US, children from the highest income families (with household income above US\$ 100K) are more than twice as likely to attend university compared to children from lowest income families (household income below US\$ 20K) (James, 2012). Although the difference in Canada is not as stark, it is still significant (90% versus 60%) as shown in Belley et al. (2013). According to Hopenhayn (2012), in Latin America, the probability that a young person with college-graduate parents will graduate from college is more than twenty times higher than the probability that a young person with parents without primary education will do so.

A central question in education policy is how to reduce this dependence of educational outcomes on background. Merit based allocation mechanisms may help promote fairness in access to education. Yet, to the extent that performance and educational investment choices are both driven by past educational investments, educational outcomes may remain closely related to socioeconomic characteristics even in mostly merit based settings like the US. For example, Cameron and Heckman (2001) finds that although differences in family income are significantly correlated with and account for about half of the gap between black and white college attendance rates, the impact falls to about 5% when scholastic ability is controlled for.

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Moreover, [Hoxby and Avery \(2014\)](#) shows that low-income higher achievers tend not to apply to selective colleges. Despite being likely to be admitted with financial aid into selective schools, poor high achievers usually attend non-selective schools where they end up paying even more than they would at the former.

We ask whether repeat taking of entrance exams might have some promise in alleviating the indirect effect of background on placement outcomes. We do so in the context of the meritocratic centralized admission system to tertiary education in Turkey. Using administrative data on the university entrance exam (ÖSS) in Turkey, we estimate cumulative learning in repeated attempts, while controlling for selection into retaking in terms of observed and unobserved characteristics. We rely on multiple performance measures and build a simple dynamic model of learning and retaking that guides our estimation strategy. We find that, indeed, retaking has considerable promise in this dimension. We find important cumulative learning gains among repeat takers once selection into retaking is controlled for. For example, we find that learning gains in the second attempt fluctuate around 5% of the predicted initial score. Most important, we identify larger gains among repeat takers from less advantaged backgrounds. Students who come from public schools and households in the lowest income category experience larger learning gains than more privileged students from elite schools or higher income households. This is a form of catch up.

Our model's key assumptions are (i) students know their own ability though it is unobserved by the econometrician, (ii) learning is a draw from a distribution that is allowed to vary with observables and/or unobservables, and (iii) performance in high school and on the entrance exam is partly determined by observables and unobserved ability and partly random. Following [Carneiro et al. \(2003\)](#) and more recent contributions such as [Cooley Fruehwirth et al. \(2011\)](#), we impose a factor structure on performance outcomes. Net of the effects of observables, high school grade point average (GPA) and admission exam scores are thus determined by two factors: unobserved ability and randomness. The correlation between GPA and raw exam scores residuals will therefore be driven by student ability.

While we focus on the Turkish experience, the issues we study are far more general. Countries rely on different admissions systems to place students that vary in terms of the role of merit in outcomes. In the US, placement is loosely based on merit as admissions officers have considerable leeway in using grades, SAT scores, extra curricular activities, and "fit" to rank students. This adds an extra level of complication in studying outcomes in the US. In centralized merit based systems, as in Turkey, admission depends only on well defined and observable metrics and students' preferences. This makes the Turkish setting much more tractable. Moreover, the public school system in Turkey allocates seats in publicly funded magnet schools (called Science and Anatolian Schools) based on merit. This may help reduce the gap in educational outcomes between advantaged and disadvantaged students earlier on. If retaking enables disadvantaged students in this setting to catch up as our results suggest, it may play even more of a role in more unequal settings. Policies allowing multiple attempts may thus help reduce the role of background inequalities on college admissions outcomes whenever there is a positive weight on performance in rationing seats.

Our work is also tangentially related to that on affirmative action. The evidence on whether catch up occurs or not when preferences are given on the basis of race is mixed (see [Frisncho and Krishna \(2015\)](#) for a sketch of this work and for evidence against catch up in the Indian context). However, settings in which affirmative action policies are in place are not an ideal place to look for evidence of catch up as the goal post is continually moving, making it difficult for the disadvantaged to close the performance gap relative to their peers. In contrast, in our setting, the level of the exam remains fixed with retaking. To the extent that disadvantaged students can improve substantially in terms of mastering specific material when given time and training, our results suggest that remedial and targeted programs that bring disadvantaged groups up to speed may have considerable promise.

Although relatively scarce, there have been previous attempts to measure catch up in an environment similar to ours, that is, in the period between high school graduation and college enrollment. [Nathan and Camara \(1998\)](#) shows that 55% of the juniors taking the SAT in the US improved their scores as seniors while 35% worsened their scores. [Vigdor and Clotfelter \(2003\)](#) use data on undergraduate applicants to three selective US universities to look at the evolution of SAT scores over multiple attempts. They implement a two-stage Heckman sample-selection procedure and estimate that between 70% and 90% of the observed score increase remains when selection into retaking is accounted for.

We contribute to this literature in several ways. First, our paper makes an attempt to directly control for the role of observables and unobservables in retaking choices which is model-based and an improvement over previous studies. Second, we extend the scope of the conclusions in [Vigdor and Clotfelter \(2003\)](#) and [Nathan and Camara \(1998\)](#). Their work is limited to the US college admission system which differs from other systems in crucial respects. To begin with, the SAT is purposely designed not to be aligned with the high school curriculum. This is not the case in many countries that use standardized exams to allocate seats. In addition, though the SAT score matters, a variety of other admission criteria also factor in. Thus, the role played by the SAT performance is far less important than in other countries. This would likely reduce the effort expended and the likelihood of learning between attempts. The current US system also encourages retaking because many schools use the highest-score in the SAT, not the latest one as is the case in most other admission mechanisms. As [Vigdor and Clotfelter \(2003\)](#) show, this policy is not neutral and may generate distortions in the allocation of students that are not present in the Turkish and other admission systems. For all these reasons, we believe that our conclusions are more relevant for most countries. Third, beyond our contribution to the existing literature on catch up, our paper also provides a methodological innovation since we propose a simple way to estimate learning gains among repeat takers despite only having cross-sectional data. We overcome the lack of panel data using information on repeat takers along with a rich set of performance measures.

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