Economics of Education Review 42 (2014) 12–33

Contents lists available at ScienceDirect

Economics of Education Review

journal homepage: www.elsevier.com/locate/econedurev

The effects of early tracking on student performance: Evidence from a school reform in Bavaria

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ARTICLE INFO

Article history:
Received 18 January 2013
Received in revised form 15 June 2014
Accepted 18 June 2014
Available online 6 July 2014

JEL classification:
I20
I21
I24

Keywords:
Tracking
Student performance
PISA

ABSTRACT

This paper evaluates a school reform in Bavaria that moved the timing of tracking in low- and middle-track schools from grade 6 to grade 4; students in high-track schools were not affected. To eliminate state-specific and school-type-specific shocks, I estimate a triple-differences model using three PISA waves. The results indicate that the reform reduced the performance of 15-year-old students both in low- and middle-track schools. Further evidence suggests that the share of very low-performing students increased in low-track schools.

1. Introduction

Countries differ greatly in both the extent and the timing of separating students into different school tracks. Some countries separate students into more vocationally oriented and more academic school tracks as early as age 10, whereas other countries do not track students until the end of compulsory schooling at age 16 (OECD, 2004, p. 262). Timing of tracking is a potentially important feature of the school system since it might affect both the level and the distribution of students' cognitive skills which, in turn, affect individual earnings and economic growth (Hanushek & Woessmann, 2008). During the last decades, several European countries have moved from a selective to a more comprehensive school system (Leschinsky & Mayer, 1990). In many cases, however, it is rather difficult to isolate the impact of the timing of tracking because the reforms simultaneously changed both the timing of tracking and other features of the school system, for example, the amount of compulsory years of schooling (e.g. in Sweden and Norway).

This paper studies the effect of separating students two years earlier into different school tracks on student achievement. The variation in the timing of tracking comes from a school reform in the German state of Bavaria in 2000, where students in the basic track (*Hauptschule*) and middle track (*Realschule*) were separated at the end of grade 6 prior to the reform and at the end of grade 4 after the reform. Importantly, the reform did not change the amount of schooling. Students in the most academic track (*Gymnasium*) were not affected by the reform; both before and after the reform, (future) Gymnasium students attend the four-year primary school together with the (future) basic and middle track students before entering Gymnasium (see Fig. 1 for a graphical representation of the reform). The effect of the reform is estimated in a difference-in-differences-in-differences approach. Student performance before the reform is compared with student performance

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http://dx.doi.org/10.1016/j.econedurev.2014.06.002
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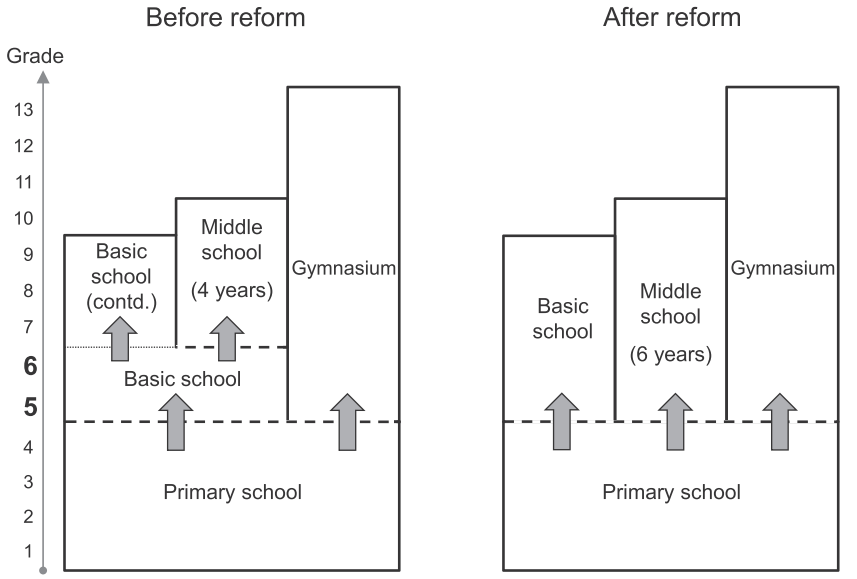

Fig. 1. School system in Bavaria before and after reform.
Source: own presentation.

after the reform. To eliminate Germany-wide trends, performance is furthermore compared between students in Bavaria and students in other German states, where the timing of tracking did not change. Because the reform effect might still be confounded by state-specific or school-type-specific trends, performance is additionally compared between students in the school tracks affected by the reform (non-Gymnasium tracks) and students in the unaffected school track (Gymnasium).[1] Performance of 15-year-old students in math, reading, and science comes from the German extension studies (PISA-E) of the Programme for International Student Assessment (PISA) in 2000, 2003, and 2006.[2]

The results indicate that the reform lowered students' performance both in the basic and middle track. The performance decreased by about 13 PISA points in both tracks which equals approximately the performance gain in about half a school year. While the decline in the middle track might be due to the hiring of additional, inexperienced, teachers and to (unobservable) implementation problems related to the reform, lower student performance in the basic track is most likely due to peer effects only. Importantly, the results cannot be explained by a change in student composition since the share of students attending the different tracks remained stable in this period. Overall, the reform also increased the performance dispersion, suggesting greater inequality of opportunity since achievement is strongly correlated with family background (Hanushek & Woessmann, 2011). With early tracking, the share of very low-performing students increased in the basic track. An alternative measure of student performance—whether a student is below grade given her age—also indicates detrimental effects of the reform, especially for basic track students. Finally, using additional performance data from another student assessment in 2009, the negative impact on student performance seems to persist for several years after the reform went into effect.

The impact of tracking on student performance is theoretically ambiguous (see Betts, 2011; Meier & Schütz, 2008). On the one hand, tracking might increase student performance because teachers face more homogeneous classrooms, allowing them to adjust their teaching style to the students' ability level and to use different pedagogical methods. Furthermore, schools can adjust the curriculum to the students' achievement level or adjust their resources, for example, by hiring teachers with certain qualifications. On the other hand, tracking might lower equality of opportunities since track placement might be affected by a student's socioeconomic status (see, e.g. Dustmann, 2004; Tamm, 2008 for Germany). Tracking might also be detrimental when ability is measured with noise because then some students are likely to be allocated to the wrong track (Brunello, Giannini, & Ariga, 2007). Opponents of tracking also argue that both low-performing and high-performing students benefit from interacting with each other: weak students benefit from the help of strong students, while strong students benefit through explaining the subject material to weak students since this consolidates their knowledge.

Several educational reforms have been exploited to investigate the effect of timing of tracking on student performance and labor-market outcomes. In the 1950s, Sweden simultaneously replaced the academic and non-academic track with comprehensive schools, increased

[1] The terms *school track* and *school type* are used interchangeably in this paper.

[2] Since an official data request to use the PISA-E student-level micro data was refused, the analyses in this paper are based on aggregated performance data published by the German PISA consortium. Most importantly, the reform effect on student performance is identified with the aggregated data, since the published data are representative for each school track within each state, and therefore vary at the same level as the Bavarian school reform.