

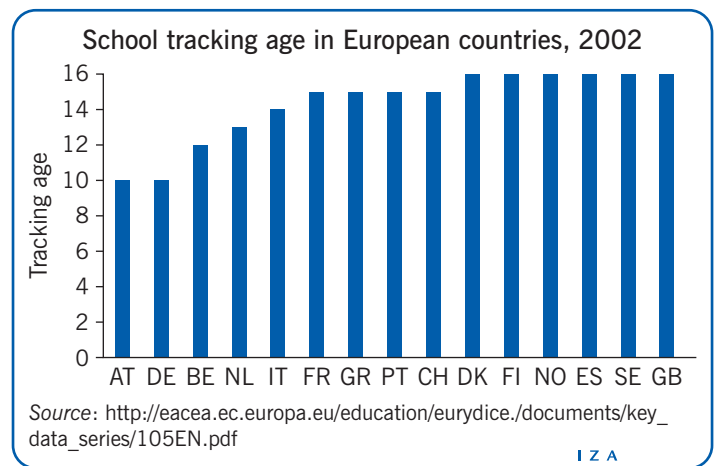
# School tracking and intergenerational social mobility

## Postponing school tracking can increase social mobility without significant adverse effects on educational achievement

Keywords: tracking, intergenerational mobility, educational attainment

### ELEVATOR PITCH

The goal of school tracking (assigning students to different types of school by ability) is to increase educational efficiency by creating more homogeneous groups of students that are easier to teach. However, there are concerns that, if begun too early in the schooling process, tracking may improve educational attainment at the cost of reduced intergenerational social mobility. Recent empirical evidence finds no evidence of an efficiency–equality trade-off when tracking is postponed.



### KEY FINDINGS

#### Pros

- + There is no empirical evidence of an efficiency–equality trade-off when school tracking is postponed.
- + Postponing school tracking weakens the association between pupils’ educational achievement and parental background, improving social mobility.
- + Postponing school tracking leads to greater income mobility across generations.

#### Cons

- There is no evidence that postponing school tracking has large effects on average achievement.
- Postponing school tracking may increase dropouts among low-achieving students.
- Postponing tracking may increase the total cost of the educational system.

### AUTHOR’S MAIN MESSAGE

The effects of early tracking on educational achievement are very modest, even slightly negative. However, empirical evidence shows that delaying school tracking until a later age is good for social mobility without significantly affecting average educational achievement. Thus, there is no evidence of a trade-off between educational efficiency and equality of educational attainment. But postponing tracking is not a cure-all policy that can be used to improve educational achievement regardless of other factors.

## MOTIVATION

Countries in the Organisation for Economic Co-operation and Development (OECD) differ in how they segregate or “stream” students into different types of school on the basis of ability, a practice known as school tracking (see **Different types of tracking**). One of the main differences between countries is the age at which tracking begins. While some countries track students as early as age ten, many others postpone tracking to age 16 and beyond.

Because educational tracks differ in curricular content and in the further educational opportunities they provide, many opponents of early tracking have voiced concerns that it could reduce social mobility between generations. They argue that early tracking decisions are more probably determined by parental background than by a student’s innate abilities. In contrast, proponents of early tracking emphasize the greater efficiency that results from teaching students in more homogeneous ability groups. These conflicting arguments suggest that early tracking opens the potential for a trade-off between efficiency of education and equality of educational opportunity.

### Different types of tracking

**School tracking** refers to the practice of assigning students to different types of school at some point during compulsory education in public school systems. Typically, students are assigned to different tracks based on their abilities, educational achievement, and aspirations. School tracks often differ in the kinds of curriculum they teach, and they often apply very different pedagogical methods. The most common type of tracking is into vocational or academic curricula. School tracking is implemented nationally across a country’s public education system.

**Ability grouping**, or **within-school tracking**, is the practice of separating pupils into different ability groups within a school. Unlike school tracking, the division is decided at school level, and the different groups usually follow the same curriculum and have the same educational goals.

## DISCUSSION OF PROS AND CONS

### School tracking and ability grouping

While the number of tracks differs across countries, the most common pattern is to separate students into schools that teach more academic material and those that concentrate on vocational subjects that prepare students for more immediate entry into the labor market. Consequently, school tracks differ in the kinds of opportunities they offer for further education. In some countries, being assigned to a vocational track explicitly rules out the possibility of entering university education.

The initial tracking age in European countries in 2002 varied from ages ten to 16, with Austria and Germany applying the earliest tracking. By the 1960s, after several decades of educational reforms, most countries in Western Europe had delayed tracking to some extent. Only German-speaking countries have retained the pre-World War II system of early tracking.

It is important to distinguish school tracking, the topic of this paper, from ability grouping within schools (see **Different types of tracking**). School tracking explicitly allocates students to different curricula and standards, whereas ability groups usually follow the same educational goals (or are supposed to do so). Furthermore, school tracking is a feature of the whole educational system and can be more easily affected by educational policies, whereas ability grouping is often at the discretion of individual teachers or school administrators.

## Measuring intergenerational social mobility

The persistence of economic and occupational status across generations is one of the most thoroughly studied subjects in the social sciences. One reason is that measures of persistence of status have been seen as a way to assess how far societies are from reaching the objective of equality of opportunity. According to this widely accepted principle, an individual's lifetime status should depend as little as possible on circumstances beyond the person's control, such as parental background.

Persistence of economic status is measured by estimating the association between children's lifetime earnings or educational status and those of their parents. When trying to understand the mechanisms underlying the intergenerational persistence of status, researchers often also examine intermediate outcomes such as test scores and educational transitions, such as from secondary to tertiary education. Here, the focus is on studies of the effect of early school tracking on intergenerational mobility that look at the persistence between generations of both early educational achievement and adult outcomes, such as labor market status or completed schooling.

## The efficiency–equality trade-off

### *The efficiency argument*

The proponents of early school tracking argue that because students are fundamentally heterogeneous in their abilities, aspirations, and academic interests, assigning them to different types of school results in efficiency gains from both improved academic achievement and better use of resources. Tracking students based on these attributes makes individual schools more homogeneous and makes it easier to tailor the curriculum and teaching practices to student needs. Thus, the argument goes, tracking should improve the quality of teaching and lead to better educational outcomes. To fully reap these benefits, tracking should take place as soon as teaching moves beyond basic skills in reading, writing, and arithmetic.

Early tracking also makes it easier to allocate appropriate resources across the tracks. For example, class sizes can vary depending on the track, and the same applies to the qualifications required of teachers. This flexibility makes it possible to fine-tune resource allocation to address the problems of particular groups. Furthermore, tracking should save resources by allowing schools to concentrate on teaching subjects that are more closely related to the future needs of students.

In emphasizing these efficiency gains, proponents of early tracking argue that tracking should improve average academic achievement. Moreover, as the efficiency argument

relies on the better design of teaching that tracking allows, academic achievement should improve in all tracks. Proponents do not see early tracking as an obstacle to social mobility, arguing that the assignment of pupils to tracks should depend on parental background only to the extent that pupils' academic ability or aspirations depend on background. Indeed, early tracking may enable some high-ability students from disadvantaged backgrounds to overcome the obstacles created by their background and therefore even enhance mobility (see **The efficiency and equality debate**).

### **The efficiency and equality debate**

**Efficiency** of the education system and of educational outcomes is enhanced by tracking, proponents argue, as a result of grouping students of similar abilities. This in turn allows teaching and curricula that are better tailored to students' needs and a more efficient allocation of resources across tracks.

**Equality** generally refers to equality of educational opportunity. If this is reduced by early school tracking, the outcome may be lower educational achievement, lower earnings, and limited intergenerational mobility.

**The efficiency–equality trade-off** rests on the belief that efficiencies in education that result from tracking come at the cost of diminished intergenerational mobility when tracking is begun too early.

**Intergenerational (social) mobility** refers to the changes in social status that occur between the parents' generation and their children's. Higher mobility is considered desirable. Low social mobility between generations is referred to as intergenerational persistence.

### ***The equality argument***

The opponents of an early start to school tracking base their arguments on considerations of both fairness and efficiency. The concern about fairness arises from the arbitrariness of early tracking decisions. Tracking is usually based on test scores, grades, or teacher recommendations. These are all noisy measures of academic ability, and they are likely to be especially noisy in the early years. This measurement problem raises the concern that early tracking decisions are driven by family background. That means that early tracking could be an obstacle to intergenerational social mobility and could aggravate the persistence of both labor market and educational inequalities.

Opponents further argue that the claimed efficiency gains from tracking may fail to materialize. Student educational achievement depends on the quality of the peer group around them as well as the quality of teaching. Tracking may reduce the quality of the peer group for students who end up in less demanding tracks. If low-achieving students are more sensitive to peer effects than high-achieving students, tracking may reduce average achievement by changing the composition of peer groups in ways that work to these students' disadvantage. The opponents of early tracking also point out that resources tend to be allocated unequally across tracks: Typically, the less demanding tracks receive fewer resources than the more academically orientated tracks.

Because of these concerns related to the fairness and efficiency of early tracking, opponents argue that early tracking condemns many able children from disadvantaged backgrounds to lower educational achievement as well as lower lifetime earnings. Therefore, early tracking should lead to a higher correlation of educational and labor market outcomes across generations and have insignificant and potentially negative effects on average educational achievement.

### **Empirical evidence on the effect of school tracking on educational achievement and social mobility**

The theoretical arguments for and against early tracking suggest that it comes with an efficiency–equality trade-off. Proponents argue that early tracking should increase average educational achievement, while opponents assert that early tracking could increase the inequality of educational achievement and make achievement more dependent on parental background. This section assesses the empirical evidence for both of these claims.

Various strategies have been used to study the effect of early tracking on mobility and average achievement. The key methodological problem is that variation in tracking age needs to be uncorrelated with unobservable determinants of achievement such as the quality of schools or the student population. There are essentially two sources of variation in tracking age, and both create problems for this type of study:

- The first is the variation in tracking age across countries and sometimes across regions within countries. When this kind of variation is used, the analysis needs to take into account other determinants of achievement at the country or regional level that are correlated with tracking age.
- Second, many countries have gone through educational reforms that included changing the tracking age. Several studies have used these reforms to try to infer the effect of tracking age. However, this approach assumes that it is really the change in tracking age—and not other changes associated with the reforms—that is driving the effects.

The choice of outcome variables also differs across studies. Some studies focus on short-term outcomes, such as test scores in secondary school. These outcomes have the advantage that they are directly linked to tracking decisions. Furthermore, there are international test scores that provide comparable measures of achievement across countries, such as the Program for International Student Assessment (PISA), Progress in International Reading Literacy Study (PIRLS), and Trends in International Mathematics and Science Study (TIMSS). To get a fuller picture of the effects of tracking, it is also instructive to examine longer-term outcomes, like final educational attainment or labor market outcomes. These measures are more commonly used in studies of social mobility.

#### ***Early tracking and social mobility***

Some studies that use international test score data, such as PISA and TIMSS, to study the effect of early school tracking on inequality rely on cross-country variation in initial tracking age to identify the effect of early tracking [1], [2]. Although the studies

differ in details, their common conclusion is that early tracking increases inequality in test scores. The study that examines how the dispersion of test scores changes across grades finds that the dispersion of test scores increases more in countries where tracking starts between primary and lower-secondary school than in countries where

### **Program for International Student Assessment (PISA)**

This is a worldwide study, conducted by the Organisation for Economic Co-operation and Development (OECD) in member and non-member nations. It looks at 15-year-old school pupils' performance in mathematics, science and reading, with a view to improving education policies and outcomes. Each student takes a two-hour written test made up of multiple-choice and fuller-answer questions. In some countries, computer adaptive testing is being introduced. Students then also answer a questionnaire on their background, including their learning habits, motivation and family.

The PISA tests are repeated every three years and the results are then tabulated by country. The mean scores of countries and their rankings can then be analysed to see if differences are statistically significant.

### **Progress in International Reading Literacy Study (PIRLS)**

This is an international study of reading literacy achievement in fourth graders, conducted by the International Association for the Evaluation of Education Achievement (IEA). It is intended to provide a baseline for future studies of achievement trends. Each student undertakes a written reading comprehension test and completes a background survey. The assessment focuses on three main areas of literacy: process of comprehension, purposes for reading, and reading behaviors and attitudes. Each student receives 80 minutes to complete two passages and then time to complete the survey. Parents, caregivers, teachers and schools also complete background surveys.

The PIRLS tests are carried out every five years and the results published, showing trends in reading achievement over time for participants in the previous assessments, as well as student performance at the PIRLS International Benchmarks.

### **Trends in International Mathematics and Science Study (TIMSS)**

This is a series of international assessments of the mathematics and science knowledge of students around the world, established by the International Association for the Evaluation of Educational Achievement (IEA) and aimed at allowing educational systems to compare students' educational achievement and learn from the experiences of others in designing effective education policy. Each student sits a written paper made up of multiple-choice and fuller-answer questions. The assessment time is 90 minutes for eighth grade and 72 minutes for fourth grade. There is an additional 30 minutes for a student questionnaire.

TIMSS studies are in a four-year cycle, which allows participating counties to use the results between the fourth and the eighth grades to track the changes in achievement and certain background factors from an earlier study. The collected information is presented in different formats, with an application to help with conducting statistical analysis and data file combination.



it starts later [1]. The study of the association of test scores from PISA and PIRLS with family background (proxied by number of books in the household) finds that this association is stronger in countries where there is early tracking [2]. Another study that uses test scores from TIMSS finds very similar results [3].

A 2013 study uses test score data to analyze within-country reform [4]. The study looks at the effect of the Finnish comprehensive school reform on cognitive tests taken during the mandatory Finnish military service. This reform raised the initial tracking age from 11 to 16 and was rolled out at different times across regions, so the effect of the change in tracking age on test scores can be estimated while controlling for regional differences in educational attainment. The reform increased test scores among recruits from families with little formal education and had no effect on recruits from highly educated families. This result again suggests that early tracking leads to a stronger association between educational achievement and family background.

Studies of intergenerational mobility typically focus on the cross-generational association between measures of adult status rather than of the educational achievement of adolescents. To get a fuller picture of the effect of early tracking on mobility, it is therefore useful to look at the effect of early tracking on the association between adult outcomes and parental background. Whether early tracking accentuates the association between family background and these kinds of long-term outcomes has also been investigated using the time variation in tracking policies in several countries in 2007 [5]. The study finds a stronger association in countries with early tracking between parental background and long-term outcomes, such as final educational attainment and adult earnings.

Other studies focus on long-term outcomes using educational reforms within countries to estimate the effect of initial tracking age. One study finds that the comprehensive Swedish reform, which postponed tracking by two years, had a positive effect on the earnings and final educational attainment of children from low-education backgrounds [6]. Another estimates the effect of the Finnish comprehensive school reform on the association between the earnings of parents and their children, the most commonly used measure of intergenerational mobility [7]. The reform, which postponed tracking by five years, significantly increased intergenerational income mobility.

### ***Early tracking and efficiency***

Quite a few studies focus on the effect of early tracking on inequality. A much smaller number address its effects on efficiency by looking at average educational outcomes, largely because of the econometric problems associated with estimating the effect of tracking using cross-country data. Typically, these studies cannot separately identify the effect of tracking from other country-level characteristics.

One exception is a 2006 study that exploits differences in initial tracking age in different countries to investigate the effect on test score dispersion across grades [1]. This strategy also makes it possible to estimate the effect of early tracking on average test scores. Early tracking has no clear effect on score levels, and the study concludes that the hypothesis that early tracking has no effect on this outcome cannot be rejected.

While the use of cross-country data makes assessing the efficiency argument very difficult, within-country educational reforms allow researchers to estimate the effect

of changes in tracking policies on the level of educational attainment. The study of the efficiency effects of the Finnish comprehensive school reform using Finnish military test scores as outcomes finds modest positive effects of the reform for one of the three tests used by the military [4].

Postponing tracking by five years had a small positive average effect on the verbal skills of the Finnish military recruits. Using a similar strategy to look at the effects on long-term outcomes in Sweden, a study finds that the comprehensive school reform had no significant effects on educational attainment or adult earnings [6]. The only study that finds clearly negative effects from postponing tracking shows a higher probability of dropping out among low-achieving students in Sweden when tracking is postponed beyond the end of compulsory schooling [8].

### **Is there an efficiency–equality trade-off?**

The theoretical arguments for and against early school tracking suggest that policymakers face a trade-off between the efficiency of the educational process and the equality of educational opportunity offered to students in different tracks. In theory, making schools more homogeneous by tracking students early can boost average educational achievement, but at the cost of increased intergenerational persistence of educational and labor market outcomes. How much weight should be placed on equality effects and how much on efficiency effects depends on the social preferences of the policymakers. If intergenerational mobility is viewed as very desirable, theory posits that policymakers could choose to postpone tracking even at the cost of average educational achievement.

However, in the light of the empirical results summarized here, it is legitimate to ask whether there is any relevant trade-off to speak of. The evidence shows quite clearly that early tracking leads to a stronger association between child outcomes (whether test scores during adolescence or educational and labor market outcomes during adulthood) and parental background. And there is no empirical evidence that early school tracking improves average achievement. Nor is there evidence that the educational achievement of any subgroup will dramatically benefit from early tracking. Thus, these studies suggest that higher social mobility may be achieved by postponing tracking without imposing any large negative effects on average educational attainment.

### **LIMITATIONS AND GAPS**

The empirical findings on the effects of early tracking on average achievement and intergenerational social mobility come from studies using observable variations in tracking across countries and regions or within countries over time. But these results might confound the effects of tracking with other, unobservable factors. Ideally, randomized experiments would study the effect of initial tracking age on educational achievement. Since school tracking is a characteristic of public school systems and difficult to change without changing the system, such experiments are not very feasible.



There are a few studies based on randomized experiments, but they involve ability grouping within schools rather than school tracking and are not widely generalizable. A study summarizing experiments with ability grouping within schools in American secondary schools before the early 1970s finds little evidence of any effect on student achievement [9]. More recently, an experiment in Kenya in 2011 finds that ability grouping with random teacher assignment and the same curriculum across groups benefits all students—strong evidence for narrowly defined ability grouping—but the results might not apply to developed countries [10]. Further, as school tracking implies different curricula and nonrandom selection of teachers across tracks, it is unclear how informative the evidence from ability grouping experiments is for school tracking policies.

## SUMMARY AND POLICY ADVICE

School tracking is a controversial policy topic, since the main arguments for and against it suggest that early tracking is beneficial for average educational achievement but potentially harmful for intergenerational social mobility. That puts educational policymakers in the difficult position of having to make judgments about an efficiency–equality trade-off.

However, recent empirical evidence on the effect of early tracking on average educational achievement suggests these effects are very modest or even slightly negative. At the same time, there is consistent evidence from studies applying different strategies and using data from many countries that early tracking leads to higher persistence of economic and educational status across generations. Thus, there is no empirical evidence to support the theoretical argument that policymakers face an efficiency–equality trade-off.

If increased social mobility is desired, recent empirical research shows that delaying tracking can enhance social mobility without impairing the quality of learning. However, the evidence also shows that moving to late tracking is no panacea for arriving at the high achievement levels that some late-tracking countries have reached. Postponing tracking should be seen as a policy to address concerns about fairness and not necessarily as a way of improving average educational attainment.

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## Competing interests

The IZA World of Labor project is committed to the *IZA Guiding Principles of Research Integrity*. The author declares to have observed these principles.

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## REFERENCES

### Further reading

Betts, J. R. “The economics of tracking in education.” In: Hanushek, E. A., S. Machin, and L. Wößmann (eds). *Handbook of the Economics of Education*. Volume 3. Amsterdam: North-Holland/Elsevier, 2011; pp. 341–381.

Björklund, A., and K. G. Salvanes. “Education and family background: Mechanisms and policies.” In: Hanushek, E. A., S. Machin, and L. Wößmann (eds). *Handbook of the Economics of Education*. Volume 3. Amsterdam: North-Holland/Elsevier, 2011; pp. 201–247.

### Key references

- [1] Hanushek, E. A., and L. Wößmann. “Does educational tracking affect performance and inequality? Differences-in-differences evidence across countries.” *Economic Journal* 116 (2006): C63–C76. Online at: <http://hanushek.stanford.edu/sites/default/files/publications/Hanushek%2BWoessmann%202006%20EJ%20116%28510%29.pdf>
- [2] Ammermueller, A. “Institutional features of schooling systems and educational inequality: Cross-country evidence from PIRLS and PISA.” *German Economic Review* 14:2 (2013): 190–213.
- [3] Schütz, G., H. W. Ursprung, and L. Wößmann. “Education policy and equality of opportunity.” *Kyklos* 61:2 (2008): 279–308.
- [4] Pekkala Kerr, S., T. Pekkarinen, and R. Uusitalo. “School tracking and development of cognitive skills.” *Journal of Labor Economics* 31:3 (2013): 577–602.
- [5] Brunello, G., and D. Checchi. “Does school tracking affect equality of opportunity? New international evidence.” *Economic Policy* 22:52 (2007): 781–861.
- [6] Meghir, C., and M. Palme. “Educational reform, ability, and family background.” *American Economic Review* 95:1 (2005): 414–424.
- [7] Pekkarinen, T., R. Uusitalo, and S. Pekkala Kerr. “School tracking and intergenerational income mobility.” *Journal of Public Economics* 93 (2009): 965–973.
- [8] Hall, C. “The effects of reducing tracking in upper secondary school: Evidence from a large-scale pilot scheme.” *Journal of Human Resources* 47:1 (2012): 237–269.
- [9] Slavin, R. E. “Achievement effects of ability grouping in secondary schools: A best-evidence synthesis.” *Review of Educational Research* 60:3 (1990): 471–499.
- [10] Duflo, E., P. Dupas, and M. Kremer. “Peer effects, teacher incentives, and the impact of tracking: Evidence from a randomized evaluation in Kenya.” *American Economic Review* 101:5 (2011): 1739–1744.

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