

# Chapter 9

## Socioeconomic Inequality and Student Outcomes in Finnish Schools



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**Abstract** Since the release of the results from PISA 2000, Finland has been lauded as a high-performing, high-equity country. This success has been attributed in part to an egalitarian 9-year comprehensive school created by dramatic de-tracking reforms in the late 1960s and early 1970s. However, recent international assessments show this picture may be changing. Not only has Finland's average performance fallen in recent cycles of PISA, but inequality in achievement appears to be increasing. In this chapter, we examine long-term trends in socioeconomic achievement gaps using data from 18 international assessments conducted between 1964 and 2015. We find that SES achievement gaps declined after de-tracking reforms but have increased more recently. These results are robust to two alternate methods of computing achievement gaps and do not appear to be an artifact of dramatic changes in Finland's SES distribution over the time period studied. We suggest possible explanations for this rising inequality.

**Keywords** Student achievement • Socioeconomic status • Inequality • Finland

### 9.1 Introduction

In the present chapter, we focus on socioeconomic inequality and student outcomes in Finland. Finnish students have been very successful in the Programme for International Student Assessment (PISA, see Fig. 9.1). In 2000, 2003, and 2006, Finland's academic performance in reading, mathematics, and science was ranked at or near number one among all participating Organisation for Economic

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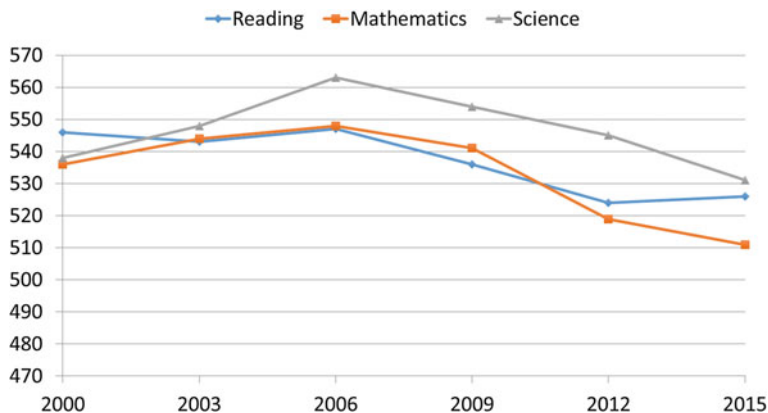
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**Fig. 9.1** Finnish scaled scores since the initial administration of PISA

Co-operation and Development (OECD) countries (Väljörvi et al., 2007). This exceptionally high attainment of Finnish students in PISA in 2000, 2003, and 2006 in all three literacy domains has led to continuous international interest towards the Finnish educational system (Väljörvi et al., 2007).<sup>1</sup> Finland was the top overall performing country among the OECD countries in 2000 and 2003 PISA studies. Finland was the only country that was able to improve performance (Väljörvi, Kupari, Linnakylä, Reinikainen, & Arffman, 2003). In the 2006 PISA survey, Finland maintained its high performance in all assessed areas of student achievement. In the context of science, the main focus of the PISA 2006 survey, Finnish students outperformed their peers in all 56 countries. Moreover, in the 2009 PISA study, Finland was again the best performing OECD country. According to the Organisation for Economic Co-operation and Development (2010), “Finland is one of the world’s leaders in the academic performance of its secondary school students, a position it has held for the past decade. This top performance is also remarkably consistent across schools. Finnish schools seem to serve all students well, regardless of family background, socioeconomic status, or ability” (p. 117). Until the publication of the first PISA results in December 2001, education in Finland did not have a high international reputation. Finnish results on previous international assessments had been average, or even lower than average. Even the Finns themselves thought their education system was nothing special. Thus, this international interest was something new for Finnish education.

However, during recent years there has been a decline in the Finnish students’ achievements in PISA. While Finnish students have continued to perform very well in PISA in recent years, there is a trend of decreasing scores. In 2009, 2012, and

<sup>1</sup>Finland has a new reform summer 2019 extending the compulsory education until age 18.

2015, though still near the top, Finland's scores began to decrease slightly (see Fig. 9.1). What about the role of socioeconomic background for academic achievement? In this chapter, we will examine the trends in academic achievement and socioeconomic background. First, we introduce and present the structure of the Finnish compulsory school system, and its governance and administrative processes used to develop and refine educational policies. Second, we present key characteristics of the student population followed by the educational outcomes of low-SES children and educational policy in Finland. Finally, we discuss the most recent challenges in Finnish education.

## 9.2 Structure of the Finnish Education System

The Finnish educational system aims at achieving equal opportunity with high-quality performance. The main objective of Finnish education policy is to offer all citizens equal opportunities to receive education. The structure of the education system reflects this main principle.

Finland has two official languages, Finnish and Swedish. About 5% of students in basic and upper secondary education attend a school where Swedish is the language of instruction. Both language groups have their own institutions at all educational levels, also at the higher education level. Local authorities are also required to organize education in the Sami language in Sami-speaking areas of Lapland. During recent years, there has been an increase of migrants to Finland, particularly in the metropolitan area of Helsinki. Local authorities organize preparatory education for migrants to enable them to enter basic or upper secondary education.

Pre-primary education is compulsory for children of the age of 6. Pre-primary education is provided both in kindergartens and in schools. In pre-primary education, children acquire basic skills, but learning is primarily through play.

Compulsory basic education starts in the year when a child turns 7 and lasts 9 years. Basic education comprises elementary (grades 1–6) and lower secondary (7–9) level education. Upper secondary school comprises grades 10–12. In grades 1–6 the pupils are mainly taught by one classroom teacher and in grades 7–9 mostly by specialized teachers for each subject.

After completing compulsory basic education after grade 9, young Finns can choose their educational track for the first time—whether to opt for general upper secondary education (academic track, high school) or vocational upper secondary education (vocational track). Student selection is mainly based on their grades in their basic education certificate. This choice is usually split quite evenly, with half of the school population matriculating to general upper secondary school, and the other half attending vocational school. Upper secondary education takes 3–4 years. Completion of upper secondary education—either general or vocational—gives students eligibility to continue to higher education.

The Finnish educational system is highly permeable. There are no dead-ends preventing progression to higher levels of education. The focus in education is on learning rather than testing. There are no national tests for students in basic education in Finland. Instead, teachers are responsible for assessment in their respective subjects on the basis of the objectives included in the curriculum. In Finland, the main types of student assessments are continuous assessment during the course of studies and the final assessment. Also, the grades in the basic education certificate given at the end of year 9 are assigned by teachers. On the basis of this assessment, students are selected for further studies. The only national examination, the matriculation examination, is held at the end of general upper secondary education. Commonly, admission to higher education is based on students' results in the matriculation examination and/or entrance tests. At the moment, a new reform will give the matriculation examination more importance in the admission to higher education.<sup>2</sup>

The high level of equity in the Finnish educational system can be explained by the same 9-year comprehensive education for all, which was launched in 1972 in the whole country and previously in 1968 in some parts of Finland (Simola, 2005). The Finnish educational system was highly stratified before these great reforms in the 1970s (Sahlberg, 2011). There was a visible achievement gap among young adults at the start of comprehensive school in the early 1970s due to very different educational orientations associated with the old parallel system (Simola, 2005). Thus, the most important goal of comprehensive school reform was to strengthen educational and social equality. The old structure of education that served Finland's class-bound, rural society well for decades could no longer meet the new demands of a changing population and time. Finland really needed a system that could deliver an equally rigorous education whether a student came from the rural or an urban neighborhood. Every child thus deserved a good basic education regardless of socioeconomic background, family income, social status, or place of residence (Simola, 2005). When comprehensive school reform began in the early 1970s, its basic goal was to guarantee all children the equal opportunity to a 9-year basic education regardless of their parents' socioeconomic status (SES) and give up pupil tracking completely. Comprehensive school reform was very successful and it achieved all of its goals regarding the structure and accessibility of education before the end of the 1980s (Aho, Pitkanen, & Sahlberg, 2006).

Most education and training are publicly funded in Finland. There are few private schools, so the overwhelming majority of students attend common public comprehensive schools. Prior to the comprehensive education reform in 1972, about 30% of Finnish lower secondary school students attended private schools (authors' own calculations from First International Science Study—FISS—1970 data). During the reform, most of these schools changed into public schools. There are no tuition fees at any level of education. An exception is the tuition fees for non-EU and non-EEA students in higher education, effective from autumn 2016. Most higher education

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<sup>2</sup>Finland has a new reform summer 2019 extending the compulsory education until age 18.

institutions introduced such tuition fees in 2017. In basic education, school materials, school meals, and transportation to school are also provided free of charge. In upper secondary education, students pay for their books and transport, but currently there is a reform in progress to provide them also free of charge. In addition, there is a well-developed system of study grants and loans.<sup>3</sup> Financial aid can be awarded for full-time study in upper secondary education and in higher education.

Governance has been based on the principle of decentralization since the early 1990s (Sahlberg, 2011). However, before the 1990s governance was very centralized. Broad core curricular guidelines are published for the basic and upper secondary school systems, but the local education providers (i.e., the municipalities) are typically responsible for the local design of the curriculum. Education providers are responsible for practical teaching arrangements as well as the effectiveness and quality of the education provided. Local authorities also determine how much autonomy is passed on to schools. For example, budget management, acquisitions, and recruitment are often the responsibility of the schools. Universities and universities of applied sciences (UAS) enjoy extensive autonomy. The operations of both UAS and universities are built on the freedom of education and research. They organize their own administration, decide on student admission, and design the contents of degree programs.

In the Finnish educational system, sociocultural factors—such as social capital, ethnic homogeneity, and the high professional status of teachers—play key roles when transferability of education policies is considered (Rinne, 2000). Teachers in Finland are well-respected, considered experts of their profession, and issues of classroom management and organization are less noticeable than in some other countries. Teachers have pedagogical autonomy. The Finnish educational system operates in collaboration with its Ministry of Education and Culture, municipalities, and schools. It calls upon all of these entities to be part of the process, with teachers having key roles. The national education administration is organized at two levels. Education policy is the responsibility of the Ministry of Education and Culture and the Finnish National Agency for Education is responsible for the implementation of policy aims. It works with the Ministry to develop educational objectives, content, and methods for education at all levels. Local administration is the responsibility of local authorities. Municipalities make the decisions of allocating of funding, local curricula, and they have autonomy to delegate decision-making power to the schools.

Finland as a country has suffered through major famines, unprecedented immigration, and foreign invasion (Sahlberg, 2011). As a consequence, Finland has had a difficult history and only achieved its independence about 100 years ago in 1917. Many leaders of the Finnish revolution were teachers and viewed as heroes. These early teacher leaders became identified with the importance of learning and its ability to allow for autonomous self-reflective choice. With limited natural resources, Finland's major resource is its population, its human capital which has

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<sup>3</sup>Finland has a new reform (summer 2019) extending compulsory education until age 18.

survived these conditions, faced challenges with an inscrutable sense of “*sisu*”—determination and persistence that defines a national distinctive identity (Salmela-Aro, 2017).

### 9.3 Key Characteristics of the Student Population

According to the most recent data available, Finland had a relatively socioeconomically advantaged population, compared to other OECD countries. In PISA 2015 and the Trends in International Mathematics and Science Study (TIMSS) 2015 fourth grade, only about 2% of students met the definition of low-SES used in this volume (i.e., low-parental education; their most educated parent had ISCED 2 or less), while nearly 50% of students in TIMSS and 60% of students in PISA had high SES (parental education of ISCED 5A or more). Thus, as defined by parental education, Finland is among the highest-SES countries considered in this volume. As mentioned at the beginning of the chapter, the very high levels of educational attainment are a recent change in Finland, reflecting rapid industrialization of the country in the twentieth century. In the First International Mathematics Study (FIMS) 1964, over 90% of Finnish students reported that their most educated parent had ISCED 2 or less. Even as recently as TIMSS 1999 and PISA 2000, over 20% of Finnish students reported low-parental education.

Among low-SES students in Finland in PISA 2015, 22% were from immigrant backgrounds (13% first generation and 9% second generation). This is an overrepresentation of students from immigrant backgrounds in the low-SES group, in a country where immigrants constitute only about 4% of the student population overall. As mentioned at the beginning of the chapter, the traditionally low levels of immigration in Finland have increased markedly in recent years. In TIMSS 1999 and PISA 2000, less than 2% of students reported a first- or second-generation immigrant background. By 2015, the share of students with an immigrant background approximately doubled to nearly 4% of students in PISA 2015, and over 5% of students in the slightly younger 4th-grade cohort of TIMSS 2015. In addition to increasing levels of immigration, the immigrant student population in Finland has also become relatively more socioeconomically disadvantaged (Motti-Stefanidi & Salmela-Aro, 2018; Salmela-Aro, Read, & Rimpelä, 2018). In TIMSS 1999 and PISA 2000, students from immigrant backgrounds actually had slightly *more* educated parents than non-immigrant students. While over 20% of non-immigrant students had parents with less than ISCED 2, the share was a couple of percentage points lower for immigrant students. By 2015, both immigrant and non-immigrant parents had become more educated, but immigrant parents had not kept pace with the rapid educational upgrading of the native-born Finnish population. In PISA 2015 and TIMSS 2015 fourth grade, less than 2% of non-immigrant students had low-parental education compared to about 10% of immigrant students.

Among low-SES students in Finland in PISA 2012 (the most recent year available), 36% reported living in single-parent families. This is an overrepresentation of single-parent backgrounds among low-SES students, given that only about 16% of students overall come from single-parent families in Finland. The share of single-parent families in Finland is somewhat high by international standards. Although the rate of single-parent households did not change markedly in Finland between PISA 2000 and 2012, the overrepresentation of single-parent households among low-SES students increased substantially in this period, along with the dramatic decline in the share of low-SES students. By 2012, the degree of overrepresentation of single-parent households among low-SES students in Finland was among the highest of OECD countries.

## 9.4 Educational Outcomes of Low-SES Children

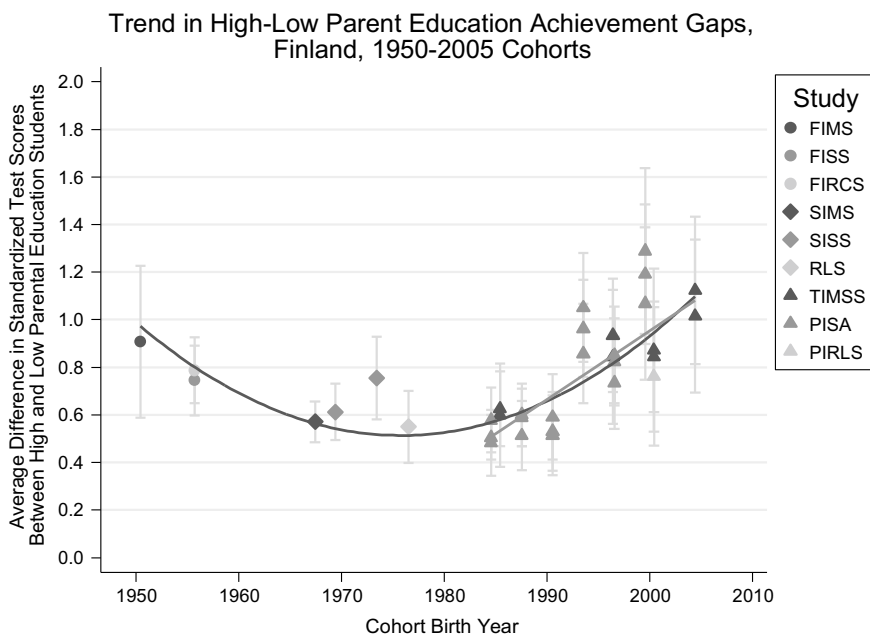
The main aim of the present chapter was to examine trends in socioeconomic inequality of student outcomes in Finland. In particular, we focus on SES achievement gaps, defined as disparities in academic achievement between students from low- and high-parental education backgrounds. In order to investigate long-term trends covering the period of comprehensive school reforms up to the present, we draw on data from 18 international large-scale assessments of math, science, and/or reading: the First and Second International Mathematics Studies (FIMS 1960 and SIMS 1980), the First and Second International Science Studies (FISS 1970 and SISS 1984), the first international reading comprehension study (FIRCS 1970), the Reading Literacy Study (RLS 1991), three cycles of TIMSS (1999, 2011, and 2015), one cycle of the Progress in Reading Literacy Study (PIRLS 2011), and six cycles of PISA (2000–2015). Although the different math, science, and reading assessments were not designed to be fully comparable, we standardize achievement by computing z-scores in each subject within the Finnish sample of each study, and then pool all subjects and studies into one analysis. We take this approach to maximize data coverage. In addition, as we have shown in previous research, trends in SES achievement gaps estimated from different studies (PISA, TIMSS, and PIRLS) tend to be similar to one another and to trends estimated from pooled data (Chmielewski, 2019).

We use parental education as our primary measure of family SES, taking the higher value when both parents' education is available. Parental education was generally reported in 6-8 categories, such as (1) None, (2) Primary/ISCED 1, (3) Lower secondary/ISCED 2, (4) Vocational upper secondary/ISCED 3B or C, (5) Academic upper secondary/ISCED 3A, (6) Postsecondary vocational certificate/ISCED 4, (7) Short or applied college degree/ISCED 5B, and (8) Bachelor's degree/ISCED 5A or more.

We impute missing parental education data in each study using multiple imputations by iterative chained equations and creating five imputed datasets for

each study. We use two different methods to compute parental education achievement gaps. First, we follow the method of other chapters in this volume and compute gaps between students with low-parental education (ISCED 2 or less) and all other students. However, due to the rapid educational upgrading of the Finnish population during the twentieth century, any long-term trends in SES gaps in outcomes are likely to be confounded by changes in the distribution of the parental education variable used as a measure of SES. Therefore, our second (and preferred) method computes achievement gaps between the study-specific 90th and 10th percentiles of parental education (90/10 SES achievement gaps), following Reardon's (2011) method for income achievement gaps. We also compute gaps between the top and middle (90th and 50th percentiles) of the parental education distribution and between the middle and bottom (50th and 10th percentiles) of the parental education distribution. In order to compute 90/10, 90/50, and 50/10 achievement gaps, we retain the maximum available categories of parental education in each year and each study. For both types of SES achievement gaps, we adjust each gap for the estimated reliability of students' or parents' reports of parental education, as well as for each test. We compute bootstrap standard errors for each gap. (See Chmielewski (2019) for more methodological details.)

Figure 9.2 displays results from the first SES achievement gap method, the high–low-parental education category difference. Each data point represents this difference in the Finnish subsample of the international assessment indicated,



**Fig. 9.2** Trend in high-low parent education achievement gaps, Finland, 1950–2005 cohorts



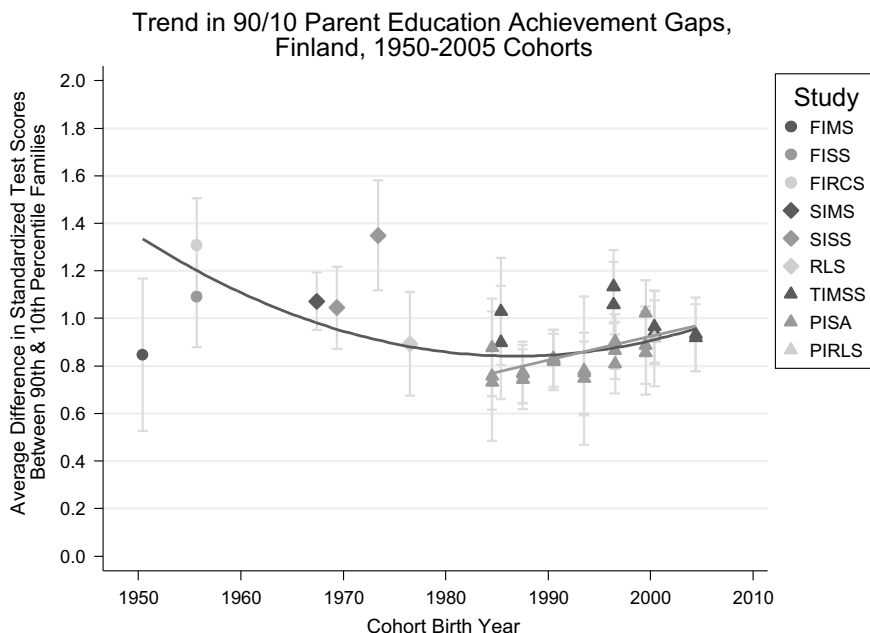
meaning that higher values correspond to greater socioeconomic inequality in achievement. The gaps are plotted against the birth year of sampled students, which ranges from approximately 1950, corresponding to 14-year-old students tested in FIMS 1964, to approximately 2005, corresponding to 10-year-old students tested in TIMSS 2015. The dark gray line is a quadratic fit line estimated from all data points in the figure, and the light gray line is a linear fit line estimated from only the cohorts born in or after 1984. Both fit lines are weighted by the estimated inverse sampling error variance of each gap. Figure 9.2 shows a pronounced U-shaped trend in SES achievement gaps across the Finnish 1950–2005 cohort birth years. SES achievement gaps declined to a low point in approximately the 1984 birth cohort (corresponding to the PISA 2000 sample) and then increased from 1984 to 2005 birth cohort.

However, the estimated trend in Fig. 9.2 is confounded by dramatic changes in the distribution of the parental education of children born over this 55-year period in Finland. Over time, as the high-parental education group expands, it becomes less positively selected and its achievement is expected to decline. Likewise, as the low-parental education group shrinks and becomes more negatively selected, its achievement is expected to decline as well. Thus, the achievement gaps in Fig. 9.2 may not capture well the overall level of socioeconomic inequality in achievement, as these selection effects drive high–low-parental education gaps higher in early and recent birth cohorts when the high- and low-parental education groups are very unequal in size and drive gaps lower in middle cohorts when the high and low groups are more evenly distributed.

The second method for computing SES achievement gaps avoids this issue by computing gaps between the cohort-specific 90th and 10th percentiles of the parental education distribution. This percentile-based approach relies on the assumption that SES is a positional good, and that having highly educated parents confers mainly relative rather than absolute advantages to children’s academic achievement. In the FIMS 1964 Finnish sample, the 90th percentile of parental education falls at only 9 years of education, the 50th percentile at 6 years of education, and the 10th percentile at 4 years of education. In the TIMSS 2015 fourth-grade Finnish sample, the 90th percentile of parental education falls at graduate degree (“beyond ISCED 5A first degree”), the 50th percentile at ISCED 5B, and the 10th percentile at ISCED 3. In the PISA 2015 Finnish sample, the parental education gap is poorly estimated because both the 90th and 50th percentiles fall at ISCED 5A. Therefore, we also examine trends in SES achievement gaps for two other measures of SES—parental occupation and number of books in the household, which have more evenly distributed categories—to check the robustness of the parental education gap trend results.

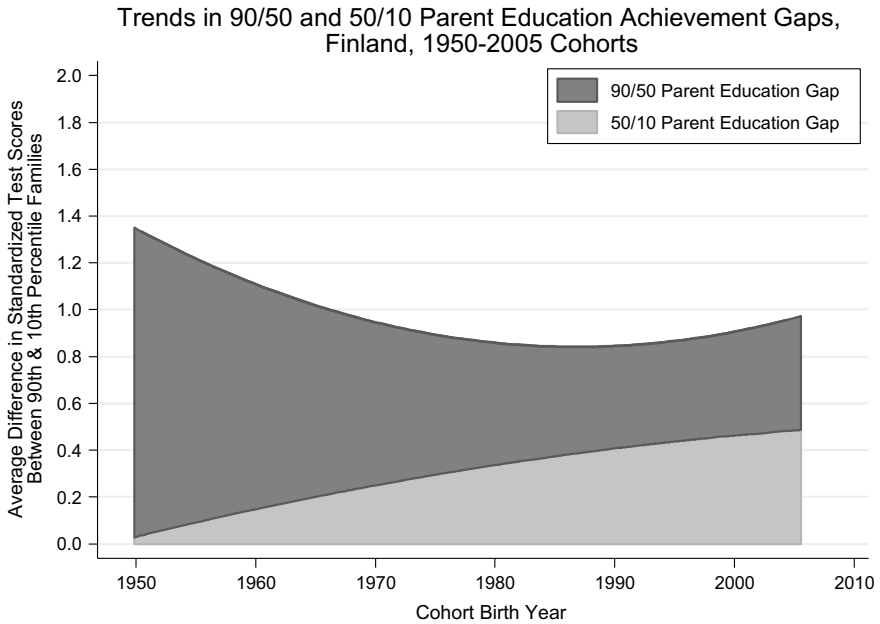
Figure 9.3 displays the results of the 90/10 SES achievement gap analysis. Here each data point is the estimated gap between students at the 90th and 10th percentiles of parental education in a given study. Again, the two fit lines are derived from weighted least squares regressions with quadratic and linear cohort terms.

Figure 9.3 shows that the U-shaped trend in Fig. 9.2 is not entirely an artifact of the changing distribution of parental education. Using a method that captures



**Fig. 9.3** Trend in 90/10 parent education achievement gaps, Finland, 1950–2005 cohorts

inequality in achievement across the entire SES distribution, we find that gaps in early birth cohorts do not decline as expected but in fact *increase*. This indicates that, at that time, there were large differences in achievement not only between the group whose parents had more than ISCED 2 and the rest but also among all the lower levels of parental education below ISCED 2. As expected, gaps in middle cohorts are larger in Fig. 9.3, reflecting that the more even distribution across the two SES groups in Fig. 9.2 does not fully capture inequality in achievement across the entire SES distribution. Also as expected, gaps in the most recent cohorts are smaller in Fig. 9.3, due to the extreme negative selection at work on the low-parental education group in these cohorts in Fig. 9.2. However, after all these changes, the quadratic trend seen in Fig. 9.2, though less extreme, is still visible in Fig. 9.3. A squared term for cohort birth year is significantly different from zero in the weighted least squares regression. As in Fig. 9.2, SES achievement gaps are smallest in the 1984 birth cohort, and the increase in gaps thereafter, though less extreme than in Fig. 9.2, is also still present. A linear term for cohort birth year is significantly different from zero in a weighted least squares regression for gaps from the 1984 cohort and later. Trends in 90/10 achievement gaps for two alternative measures of SES, parental occupation and books in the household, also displayed very similar U-shaped patterns, with a decline until the 1984 cohort and increase thereafter (results not shown).



**Fig. 9.4** Trends in 90/50 and 50/10 parent education achievement gaps, Finland, 1950–2005 cohorts

A further advantage of the percentile method is the ability to compute 90/50 and 50/10 parental education gaps. Figure 9.4 displays these results. The dark gray region represents the gap between the 90th and 50th percentiles of parental education, and the light gray region represents the gap between the 50th and 10th percentiles of parental education. It is apparent from Fig. 9.4 that there has been a marked change in 90/50 and 50/10 gaps across the 1950–2005 birth cohorts. In the 1950 cohort, the 90/10 gap was dominated by the gap between the top and middle of the parental education distribution; there was hardly any achievement difference between the 50th and 10th percentiles of parental education. By the 2005 cohort, the 90/10 gap was roughly evenly split between the top and bottom of the distribution. Therefore, the large decline in the 90/10 gap between the 1950 and 1984 birth cohorts seen in Fig. 9.3 was entirely due to an even more dramatic decline in the achievement gap between the top and middle of the parental education distribution. This decline was somewhat offset by a steady increase in the gap between the middle and bottom of the parental education distribution. Since the 1984 birth cohort, the 50/10 gap has continued to increase, while the decline in the 90/50 gap leveled off and even increased slightly in recent years. As mentioned above, the 90/50 gap may be underestimated in recent years of PISA due to the large number of observations in the ISCED 5A category. However, results are very similar when removing PISA 2009–2015 from the trend. 90/50 and 50/10 trend results for gaps based on parental occupation and household books are also similar (results not shown).

These results suggest that major Finnish educational reforms creating comprehensive lower secondary schools in the 1960s and 1970s may have reduced SES achievement gaps for subsequent cohorts, particularly gaps between the top and middle of the SES distribution. The timing of the reform would lead us to expect a decline in achievement gaps between the 1956 birth cohort (corresponding to FISS 1970) and the 1966 birth cohort (corresponding to SIMS 1980). That the declines continue for two more decades after these cohorts may indicate a prolonged implementation process and/or the effects of other equity-promoting reforms apart from de-tracking. That the reduction in gaps was concentrated between the top and middle of the distribution suggests that primarily only high-SES students benefitted from the old academic track schools, while middle- and low-SES students did not have access. The results for recent years suggest, however, that the equitable effects of the comprehensive school may not have been sustained in the long term, namely, that the Finnish educational environment has grown more unequal since the 1984 birth cohort (corresponding to PISA 2000). Increases in SES gaps have occurred primarily between the middle and bottom of the SES distribution. However, the gap between the top and middle of the distribution remains substantial, constituting about half of the total 90/10 SES gap.

## 9.5 Educational Policy

Finnish educational policies can be characterized by sustainable and stable rather than conflicting reforms and fundamental shifts in political directions. Rather than revolutions, the Finnish educational system has experienced a gradual evolution.

Providing equal opportunities for all citizens to high-quality education and training is a long-term objective of the Finnish education policy. The keywords in Finnish education policy are quality, efficiency, equity, and recently also internationalization (Lonka et al., 2015; Salmela-Aro & Trautwein, 2013; Wang, Chow, Hofkens, & Salmela-Aro, 2015). The basic right to education and culture is recorded in the constitution. The policy is built on the principles of lifelong learning and tuition-free education. Education is seen as a key to competitiveness and well-being of the society (Lonka et al., 2015).

There is a widespread consensus on the main pillars of education policy, and the policy is characterized by cooperation and continuity. Tripartite partnership among government, trade unions, and employer organizations is an integrated part of policymaking. Participation and consultation of a wide range of different stakeholders play a central role in educational reform. Teachers—with the Trade Union of Education as their representative—are key players in the development of education. The main objectives and broad lines of the policy are defined at the central level, but the implementation of these is the responsibility of the local level.

According to a recent international UN survey, Finnish people are the happiest population in the world (United Nations Sustainable Development Solutions Network, 2018), but they too are facing some of the same problems as other

countries. The homogenous population in Finland is beginning to show some signs of the problems associated with integrating a diverse new immigrant population. And while the country as a whole holds its teachers in high regard and places a high degree of social trust in their expertise to provide all of their children with an excellent education, the teachers themselves are increasingly showing signs of burnout—which in Finland is shown by increased stress, absenteeism, and feelings of inability to work (Pietarinen, Pyhältö, Soini, & Salmela-Aro, 2013; Salmela-Aro, 2017).

## 9.6 Recent Challenges in the Finnish Education

Recently, in the interest of advancing technology, entrepreneurial activity, and environmental sustainability, the Finns began devising core aims and objectives for their elementary and lower secondary schools, and created the Finnish National Core Curriculum for Upper Secondary School, effective from 2010 onwards. The Finnish national core curriculum highlights the need for students to actively acquire and apply science knowledge and twenty-first century or generic competencies (attitudes, knowledge, and skills), with an emphasis on the use of technology in learning both in and out of school. The Finnish curriculum and models of learning and instruction emphasize the design and use of science and engineering practices in order to support students in learning science, prepare them for understanding the actual work of scientists, and make science careers more interesting to them. In Finland, decisions about which scientific practices and curriculum content should be enacted in classrooms are made with the deep involvement of professional teachers, who have subject area expertise and empirical science research experience.

Finnish students have traditionally performed very well in PISA, but in recent years there is a trend of decreasing scores. In 2000, 2003, and 2006, Finland's academic performance in reading, mathematics, and science was ranked at or near number one among all participating OECD countries. In 2009, 2012, and 2015, though still near the top, Finland's scores began to decrease slightly. A recent concern in Finland is that the country has the largest gap in PISA achievement between native-born and immigrant students (Motti-Stefanidi & Salmela-Aro, 2018; Salmela-Aro et al., 2018).

In Finnish comprehensive schools, there has historically been a rule of neighborhood school attendance (Söderström & Uusitalo, 2005). Thus, children enter the closest school in the area they live in. However, parental choice of schools outside of the assigned catchment area boundary was introduced in the Basic Education Act of 1998 (Seppänen, 2003) as a part of a larger school reform promoting freedom, decentralization, and choice in education (Seppänen, 2003). Studies in Finland show the influence of the distinctive school choices made by the upper social class (Kosunen & Seppänen, 2015). Since 1998, school choice has increased in popularity, as have schools with a special subject emphasis (e.g., science, arts, or sports)

and selective admission by aptitude tests. Recent research shows that school enrollment in a major metropolitan area in Finland is more socioeconomically segregated than would be predicted based on assigned catchment areas, suggesting that school choice increases socioeconomic segregation (Bernelius & Vaattovaara, 2016; Kivirauma, Klemelä, & Rinne, 2006; Kosunen, Bernelius, Seppänen, & Porkka, 2016). The study paths of students from different socioeconomic backgrounds are now becoming diversified, meaning that students from different socioeconomic backgrounds tend to make different choices and end up in different study paths in relation to the selectiveness at comprehensive school (Kosunen, 2014; Seppänen, Kalalahti, Rinne, & Simola, 2015). In addition, peers seem to share a similar SES, educational aspirations, and educational pathways (Kiuru et al., 2012; see also Tynkkynen, Tolvanen, & Salmela-Aro, 2012; Tynkkynen, Vuori, & Salmela-Aro, 2012).

All of these recent policy developments, as well as our results in this chapter showing increasing SES achievement gaps in recent cohorts, indicate that Finland's international reputation as an extremely egalitarian system is in peril. Finnish education policymakers must take seriously this increasing inequality and seek to address it in future reform efforts.

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