SUMMARY OF
REPORT 374

Educational equity in the Swedish school system?

A quantitative analysis of equity over time

Skolverket
Swedish National Agency for Education

ISBN 978-91-7559-120-9
Published by National Agency for Education,
SE-106 20 Stockholm, Sweden
Graphic design: AB Typoform
Cover photo: Getty Images

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Background

The question of educational equity between different student groups related to social background, among other factors, has been a central issue in Swedish education policy for a long time. In recent years, however, interest in equity issues has increased further, partly as a result of the extensive reforms that took place in the beginning of the 1990s, and partly because the emergence of international studies has provided better opportunities for making comparisons of equity aspects between different countries' school systems.

At the beginning of the 1990s, extensive educational reforms were carried out in Sweden. The reforms followed the pattern of decentralisation and marketisation that swept over large parts of the world (Musset 2012). Municipalities were given greater responsibility (municipalisation), students and parents were able to choose which school students would attend to a greater extent (freedom of choice reform) and independent schools were entitled, in principle, to the same public funding per student as municipal schools (school voucher system). In addition, the state took a step back in terms of teaching and allowed teachers and principals to decide on the content and form of teaching to a larger extent (curriculum reform). There were several aims behind the reforms: greater freedom of choice, better adaptation of resources to local needs and to parents' and students' preferences, and more efficient resource management through increased competition.

The reforms also aimed at improving equity by providing opportunities for better needs-controlled resource allocation through decentralisation to the responsible officials that worked more closely with schools. Right from the very start there were those who believed that the reforms could potentially reduce equity in different ways. It is not surprising, therefore, that the interest in equity issues increased markedly from the mid-1990s – both in Sweden and internationally.

When the OECD international educational survey PISA (*Programme for International Student Assessment*) was carried out in 2000 and presented in 2001, equity issues were given a more prominent postition in the international education policy debate. PISA, through its broad system perspective, put equity issues in focus by analysing a number of so called equity indicators, such as variations in results between schools and socio-economic indicators.

The first PISA study showed that the Swedish school system had a high degree of equity in comparison with other countries in the OECD. In particular, the spread of results between schools was very low in Sweden. Subsequent PISA studies (PISA 2003 and 2006) showed that although equity in Swedish schools was still good, there was a slight decline compared with the first PISA report due to increased differences in results between schools.

In 2006 the Swedish National Agency for Education published a report: *What is happening to equity in Swedish schools? A quantitative analysis of variation and equity over time*, which contained a more comprehensive picture of equity and its development over time (The Swedish National Agency for Education 2006). The report largely confirmed the results of the PISA surveys, even though the trend according to grades did not always point in the same direction as the PISA results. The report concluded that equity had deteriorated in Swedish schools and that the freedom of choice reforms at the beginning of the 1990s were likely to have contributed to this development.

In 2009 the Swedish National Agency for Education also published a summary: *What affects results in Swedish schools?* in which the focus was on trends in results, but equity issues were also analysed (Swedish National Agency for Education 2010). Here, too, it was concluded that equity had decreased in Swedish schools. The PISA 2009 survey also showed a negative development of equity based on several of the indicators that PISA measures (OECD 2010). There is thus reason to recompile existing data and follow up the 2006 report by the Swedish National Agency for Education with all available data from recent years. This report uses new methods and analyses both new and previous data, and provides an updated overall picture of trends in equity in Swedish schools.

In recent years, many extensive quantitative research results have also been published related specifically to equity and segregation aspects in the Swedish school system. These findings form a part of the overall picture of equity that the report describes.

What is meant by equity in schools?

The starting point for interpreting the concept of equity is what is stated in the steering documents for compulsory schools. The concept of equity can be divided into three fundamental aspects: *equal access to education, equal quality* of education and the *compensatory* nature of education.

The formulations cited below are from the new, revised Education Act (2010:800) and curriculum (LGR 11) but equivalent formulations could be found in previous documents.

Equal access to education:

"Everyone, irrespective of their geographical location and social and economic circumstances, shall have equal access to education in schools unless otherwise stated in specific provisions of this Act." (Chapter 1 Section 8 Education Act).

Equal quality of education:

"Education in schools shall be equal within each form of school and within leisure-time centres, regardless of where in the country it is arranged." (Chapter 1 Section 9 Education Act).

The word "quality" is not mentioned in the above paragraph, but in the constitutional comments to the government bill, this is made clear:

The term "equal" does not mean that education should be equivalent in the sense of alike, but that the quality of education should be of such standards that the established goals can be achieved, regardless of where in the country the education is carried out. How educational activities should be arranged to achieve the goals may vary, depending on local needs and circumstances. There are different ways of achieving the established goals. Consideration should be given to children's and students' different circumstances and needs. There is space for adaptation of teaching and the organisation of education to the needs of different children and students, as long as they are ensured equal access to equal education.

This underlines a geographical and social dimension in the context of equity. Wherever in the country a student may live and whatever his or her social circumstances, access to education shall be equal and the quality of education shall be of equal value.

But the government does not confine itself to providing equal education for all students; it also takes into account different students' needs and *compensates* for unfavourable home circumstances and other differentiation of circumstances. This is one aspect that has become clearer in the new Education Act:

"In education, account must be taken to children's and students' different needs. Children and students shall be given support and stimulation so that they develop as much as possible. One ambition must be to compensate for differences in children's and students' ability to assimilate education." (Chapter 1 Section 4 Education Act).

Students of all abilities and social circumstances shall be given the support and stimulation to maximise their potential. At the same time there must be an *ambition* to compensate for students' different circumstances.

The government bill states that the intention of the paragraph is to draw attention to the responsibility of the profession and the responsible authorities in their allocation of resources, organisation, and choice of methods and working practices, to adapt their activities to the students' different needs and circumstances.

In the curriculum for compulsory school there is an equivalent formulation regarding requirements for equal access, needs adaptation and compensation under the heading *Equity in education*:

The teaching and learning environment shall be adapted to each student's circumstances and needs. It shall promote students' continued learning and assimilation of knowledge on the basis of students' background, previous experience, language, and knowledge.

The Education Act prescribes that education at every school and leisure-time centre shall be equal, regardless of where in the country it is organised. Standards for equity are specified in the national goals. An equal education does not mean that teaching must be designed in the same way everywhere, or that resources for schools should be allocated equally. Account must be taken of students' different circumstances and needs. There are also different ways of achieving the goals. Schools have a special responsibility for students who, for various reasons, have difficulties achieving the educational goals. For this reason, education can never be planned in the same way for everyone.

Clearly, the meaning of equity in education is not the same as all education being alike. On the contrary, education must be adapted to students' different circumstances at home and other circumstances such as having Swedish as a second language , gender, possible disabilities etc.

In one sense, the government's requirements on education can be described as absolute – students shall have equal access to education and education shall be of equal quality over the whole country. In practice, of course, it is hardly possible to achieve any absolute levels in these respects. The quality of education is determined to some degree by the teachers and the school. All teachers and all schools cannot be equally "skilled" in providing all students with the opportunity of developing as much as possible based on their circumstances – but the school system can be more or less equal in these respects.

When it comes to compensating for students' different circumstances, there are no set of absolute requirements: there should be an *ambition* to compensate, as schools have a "special responsibility" under the national curriculum for students who have poorer prospects of achieving the goals and for providing special support to students who are at risk of not achieving the goals. Thus, it is also difficult to determine whether the Swedish school system is "sufficiently good" at compensating for students' different circumstances. In the report *Tomorrow's citizen* this is expressed in the following way:

If the school system shows significant differences between girls and boys, between students from different social classes, between students with different countries of

origin, between students in different schools or who live in different regions – then there is reason to suspect that equity is not sufficient. But exactly where the boundaries lie for what can be considered to be significant differences in results is not specified in the steering documents.

There is, therefore, no given measure of if/when the school system shows sufficient equity. It is possible, on the other hand, to compare equity in the Swedish school system with other countries in various respects, and it is possible to describe trends in Sweden over time: has the school system become more or less equal?

Sources of data and methodology

The methodology in the report is quantitative and aims to clarify systematic patterns and structures that can be used for generalisations. The analyses in the report and the sources that are cited are thus based only to a very limited extent on non-representative case studies.

The statistical method used in most of the analyses is multilevel regression analysis. Expressions such as the effect of a variable on results are often used in the report. The word effect should not to be interpreted in a causal sense, since in such cross-sectional studies it is difficult to prove a cause-and-effect relationship. Instead, the word effect should be interpreted as describing a statistical covariation between the variable in question and the result.

The report is based on analyses of different data sources:

- PISA 2000–2009 (15-year-olds, Reading Comprehension, Mathematics and Science).
- TIMSS 1995–2007 (grade 8, 14-year-olds, Mathematics and Science).
- PIRLS 2001–2006 (grade 4, 10-year-olds, Reading Comprehension).
- Final Grades from compulsory school 1998–2011 (grade 9, grade point average (meritvärde) and individual grades in Mathematics and English).
- Register data of parents' education and country of birth, as well as students' country of birth.

In order to measure trends in student performance, grades and results from international studies are used. The various data sources provide somewhat different pictures of the trends in student performance over time, and this also affects the analyses of equity.

PISA, TIMSS and PIRLS are studies based on nationally representative samples. The results at the national level are robust. The studies are also designed to measure trends, i.e. changes over time. But because they are sam-

ple studies, the uncertainty increases when subgroups or specific variables are analysed. This is particularly true for comparisons over time, as the uncertainty from individual measurement points are accumulated.

The international studies are not directly derived from Swedish curricula and syllabuses. Comparative analyses, however, show that the framework and test data of the international studies have high compliance with the Swedish curricula and national tests (Swedish National Agency for Education 2009 a and b). The studies thus have high relevance for Sweden. One problem, however, is that the international studies only cover some of the subjects taught at compulsory school.

Grades are gathered for all students and so there is no statistical uncertainty from a sample perspective. This makes it possible to analyse different subgroups, e.g. students with a foreign background and groups of students with different socio-economic backgrounds. The grades also cover all subjects taught at compulsory school. In principle, the grades should be of high validity. Grades shall be given on the basis of grade criteria in the syllabus. However, there is reason to believe that grades do not fully represent students' knowledge. The Swedish National Agency for Education, for example, annually reports statistics that show significant systematic differences in the correlation between schools' average results in the national tests and schools' average final grades.

There are also signs of a certain "inflation" in grades, i.e. that the requirements for achieving a specific grade have fallen over time. Grades have increased or remained at the same level, at the same time as international measurements of knowledge and skills relatively clearly show that Swedish students' knowledge is decreasing. It is also clear that grade inflation is more extensive in subjects that do not have strong standardisation in the form of national tests. More specifically, analyses of the relationship between grades and results from national tests show that teachers have a tendency to pass students when grading, even if they do not achieve the goals set. In addition, analyses of the subject of mathematics show that the requirements for a particular grade are higher at high-performing schools. Both of these phenomena tend to have a dampening effect on the total variation of grades. Differences in setting grades of the nature described above tend to underestimate the equity problem.

In this report, the aim is to analyse equity on the basis of "real" knowledge. Grades have certain deficiencies as measurements of trends, but it is important to remember that final grades from compulsory schools are relevant equity indicators in themselves since they are important for both students and schools, regardless of whether the scores are set "fairly" or not.

Furthermore, different measurements are used for students' socio-economic backgrounds in the analyses. In this respect, too, different data sources have different properties and thus different advantages and disadvantages. The information from international studies regarding students' background is based on students' answers in questionnaires. There are reasons to suspect that students misjudge several of the background questions, for example about the level of their parents' education, which increases the uncertainty of these measurements. On the other hand, information from student questionnaires provides valuable complementary information about the students' socio-economic background, such as information about the number of books in their homes, access to newspapers, a private place to study, etc. In the PISA reports, several different measurements and data have been used to create a socio-economic index (ESCS) that captures a wider aspect of students' socio-economic background than only information on their parents' education. The assessment is that even though there are deficiencies in some parts of this index, it provides a reliable picture of students' socio-economic background.

In the analyses of grades, register data on parents' educational backgrounds are used. The advantage, of course, is that such data are very reliable. Parents' level of education, however, does not cover all essential aspects of socio-economic background. The measurement used for parents' education is also coarse. In most analyses in the report, the division of parents' education only has two levels: whether they have higher education or not. During recent years, however, a more precise variable covering seven levels has also been used in certain analyses. One reason for using fewer levels for parents' education is that the analyses otherwise become very complex and the results difficult to interpret. However, it should be noted that there are very large differences in grades between students depending on what sort of higher education their parents have.

The above review shows why it is important not just to rely on the results from a single study or data source, but rather to make an overall assessment of how equity has changed over time on the basis of a number of different indicators and studies.

Results

In this report, the trends from the late 1990s until 2011 are described by a number of indicators which together give a picture of how equity in Swedish schools has changed over time. At the beginning of the main report, a number of questions were raised which the report would try to answer. Here is a summary of these questions and the responses our analyses provide:

▸ Has the overall variation in student performance changed over time?

Yes, both the grades and the results of PISA indicate a greater variation in student performance (Figure 2.1 and 2.5). The main increase in the variation of grades occurred during 1998–2001 and can probably be attributed to an adaptation of grading because of the introduction of the new grading system. Even after 2001 there is a wider distribution in the individual grades of Mathematics and English (Figure 2.2). A further indication that the overall variation in student performance has increased is that the proportion of students who are not qualified to proceed to upper secondary school increased while the proportion of students reaching the maximum grade point average, 320 points, also increased (Figure 2.3). The TIMSS surveys, which extend until 2007, do not, however, show any increased variation in student performance (Figure 2.4).

▸ Has the variation in results between (a) municipalities (b) schools and (c) classes changed over time?

(A) Yes, the variation in results between municipalities is generally low, but has been increasing in the last few years (Figure 3.6).

(B) Yes, absolutely. Both grades and PISA shows a marked upturn in between school variation over the whole period (Figure 3.1, 3.2 and 3.3). As a proportion of the total variation, the between school variation of scores more than doubled and according to PISA (reading literacy), there has also been a significant increase between 2000 and 2009. The between school variation has continued to increase over the entire period. The between school variation is greatest in urban areas, while the largest increase occurred in the larger cities and suburban municipalities. However, the between school variation in smaller municipalities and rural municipalities have been more or less constant (Figure 3.4).

(C) Yes, the variation between different classes within schools has increased in recent years (Figure 3.5). This may indicate that principals to larger extent stream students into different classes based on their expected ability. The use of "profile classes" can further increase the variation between classes within the

school. However, since there are some questions regarding the quality of the class variable, the results should be interpreted with caution.

▸ Has the importance of a student's socio-economic background for school results changed over time?

The importance of a student's socio-economic background for the results remains high and there are some indications that the importance has increased in recent years. In particular, PISA shows that this may be the case and the grades do not contradict such an interpretation (Figure 4.1, 4.2 and 4.3). The increase is, however, not large and future studies are needed in order to clarify whether the trend that can be discerned is robust (or significant) in the longer perspective. Over the whole period, 1998–2011, however, there seems to be no major changes in the importance of student socio-economic background.

▸ Has the importance of a student's foreign background for school results changed over time?

Students who were born in Sweden with a foreign background have slightly lower grades compared to students with Swedish background, but the differences have decreased during the time period (Figure 4.4). The importance of being born abroad has increased, especially in recent years. A contributory factor to this trend is that the student's average age at the time of immigration has increased in recent years. Students, who immigrated before the school start, perform at the same level as students born in Sweden with foreign background.

▸ Has school segregation with respect to (a) socio-economic background and (b) a foreign background changed over time?

(A) Based on the analysis of the proportion of students with parents who have post-secondary education, only a marginal increase in school segregation during the 00's can be seen (Figure 5.1). However, there are other studies that show a greater increase in school segregation, mainly based on parental income. Moreover, previous studies have shown that school segregation with respect to parental education increased during the 1990s. Our analysis shows some "regional" differences where larger cities have experienced a slight increase in socio-economic school segregation in the 00s (Figure 5.2).

(B) Yes. School Segregation with respect to foreign background shows a more noticeable increase over the time period (Figure 5.3). There are also significant regional differences with a significant increase in cities and larger towns, while school segregation with respect to foreign background in other types of munic-

ipalities has increased to a much lesser extent or not increased at all (Figure 5.4).

▸ Is there hidden segregation, and has it increased over time?

Yes, there is some empirical evidence to suggest that. A significant proportion of the increased differences in schools' performance are likely to be due to students, who choose to change schools, have characteristics that are "hidden" or difficult to measure, and that these characteristics differ from most of the students in the schools they are leaving. The limited empirical evidence that are available proposes that students who exit their schools are slightly more motivated and high performing than their socio-economic and foreign background suggests. Thus, it is more unusual that the most unmotivated or underperforming students leave for another school. In that sense, it is reasonable to speak of a hidden/invisible segregation, hard to capture by conventional statistical measures such as parental education and foreign background. There is empirical evidence to suggest that this type of hidden segregation has increased over the time period. Hidden segregation is a relatively unexplored phenomena and more research is needed before a clear picture can be given.

▸ Has the importance of which school a student attends changed over time? This means: (a) Is the socio-economic composition of the school more or less important in explaining a student's school performance? (B) Is the student composition of the school, in terms of their foreign background more or less important in explaining a student's performance?

(A) A larger proportion of students with high socio-economic background have a positive effect on educational attainment for all students at the school and this effect has increased significantly during the time period (Figure 6.1 and 6.2). This means that which school a student attends is now more important in explaining a student's expected school performance. One possible explanation to this increased effect is that there has been an increase in sorting students between schools based on hidden or invisible properties that affect their performance. But one cannot exclude the possibility that the school level effect is also influenced by increasing quality differences and increasing changes in teaching practices. The increase in the school-level effect is reinforced by peer effects and teacher expectations.

(B) A larger proportion of students with a foreign background are associated with a negative effect on educational results for all students at the school, but the effect has not increased over time (Figure 6.3).

Our conclusions

The National Agency for Education believes that educational equity in the Swedish school system has deteriorated during the investigated period. This conclusion is based on the fact that the variation in schools' average performance has increased significantly and that the student composition of the school is more important in explaining student achievement. Peer Effects and teacher expectations are also likely to contribute and possibly also increasing quality differences between schools. This means that which school a student choose has become more important over time. The school choice reform and the decentralization reforms in the early 1990s have most likely contributed to this trend although other factors may also have played a part. (Östh et al 2013) It is very doubtful whether the compensatory resource allocation to schools and students has been extensive enough to have offset the negative trend of educational equity.

All indicators have not changed to the same extent. It has been a significant increase in performance differences between schools, while school segregation by socio-economic composition increased only marginally during the 00s. However, school segregation in terms of foreign background has increased in recent years. There are also indications that students are increasingly segregated by other characteristics such as motivation.

The importance of student socio-economic background of the results remains high and there are some indications that the importance has increased in recent years. Over the entire period, 1998–2011, there has not been any major change in the importance of socio-economic background. However, it is important to understand that when students increasingly choosing another school, the effect on the results due to the background of the student appears immediately. In contrast, the consequences of such things as peer effects and teacher expectations associated with the new school (or changed environment for the students who remain in the old school) work over much longer time horizons.

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Appendix: Figures

Figure 2.1 Total variation in grade point average, 1998–2011, measured as the standard deviation in the transformed grade point average scores (Z-scores).

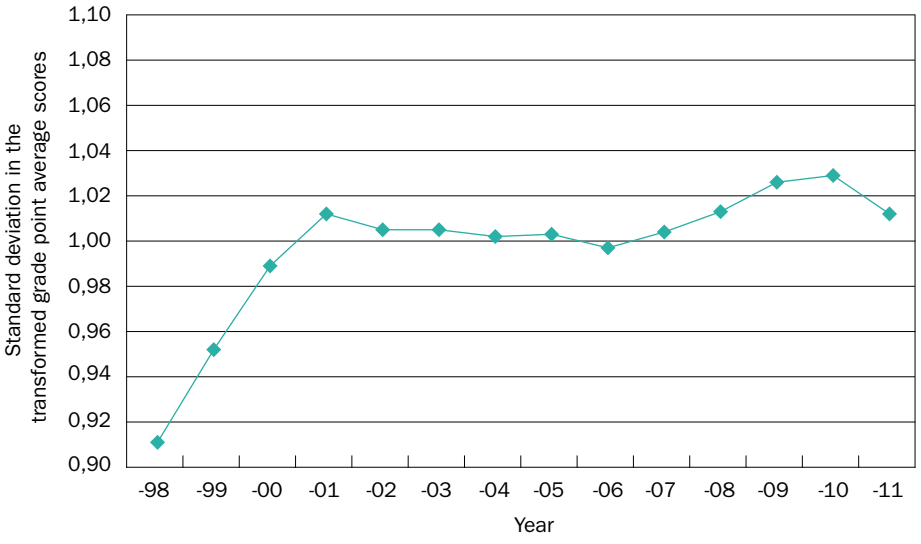

Figure 2.2 Total variation in Mathematics and English grades, 1998–2011, measured as the standard deviation in the transformed grade point scores (Z-scores).

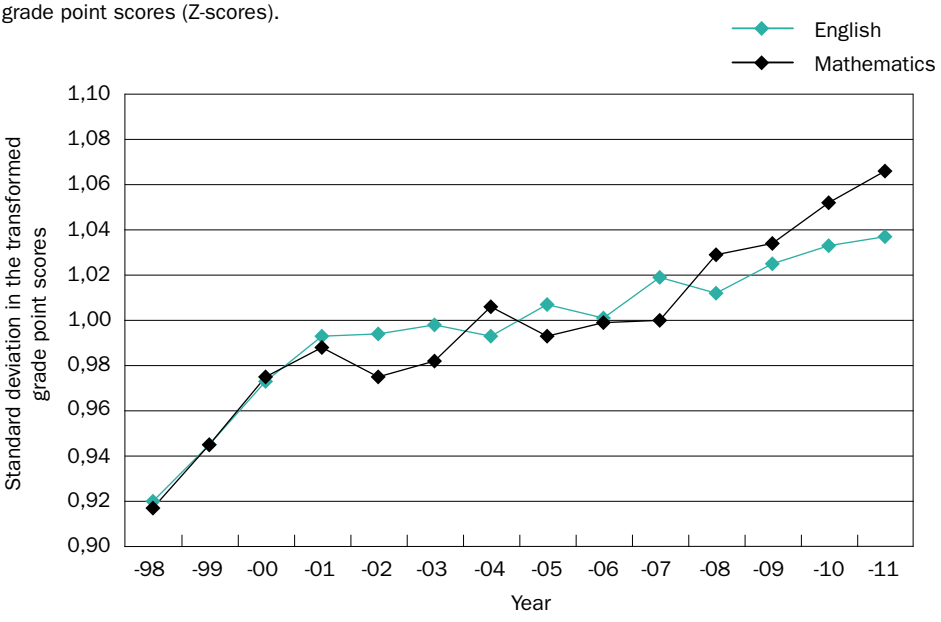

Figure 2.3 Proportion of students, not qualified for upper secondary school and the proportion of students with maximum grades (320 points), 1998–2011.

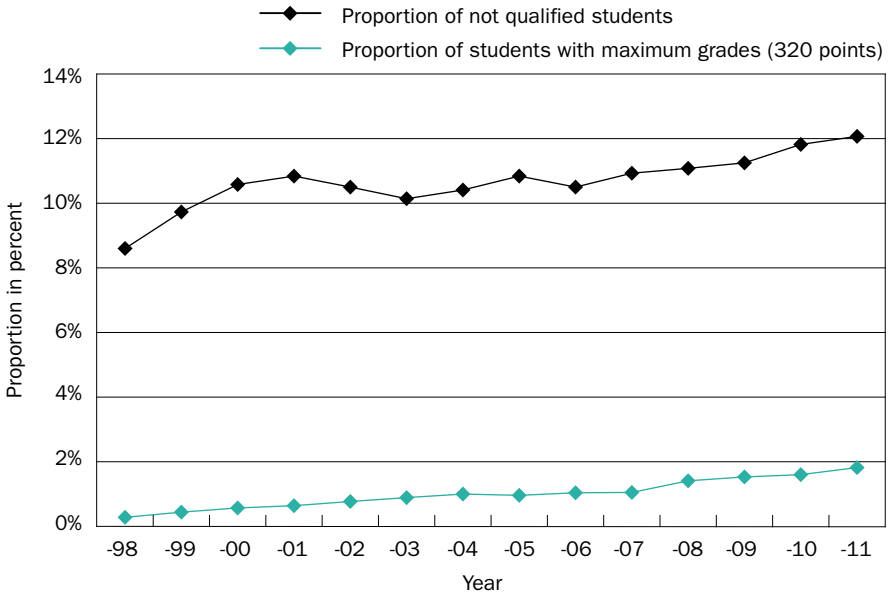

Figure 2.4 Change in the total variation in student performance according to TIMSS, Mathematics and Science.The relative change is calculated as the ratio of the standard deviation one year and the starting year (1995).

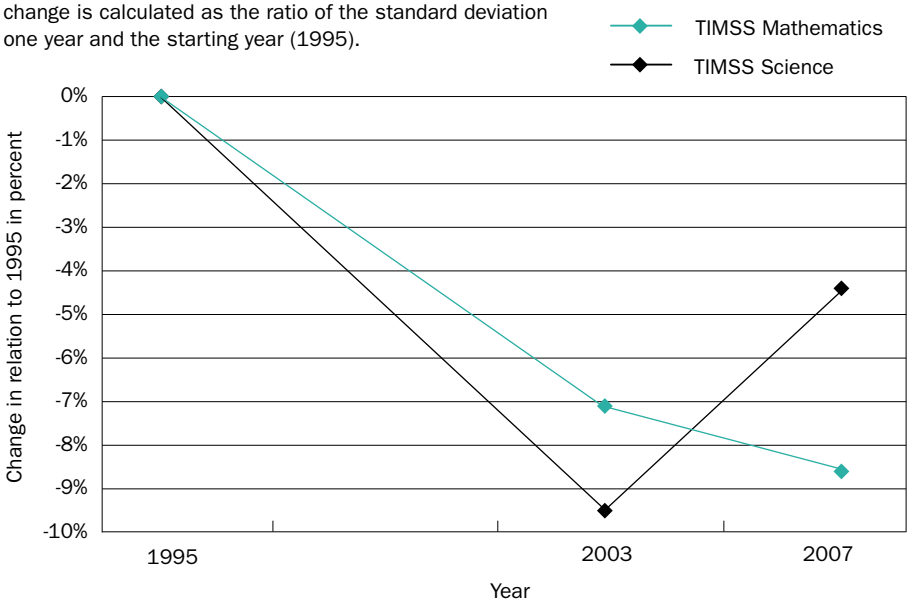

Figure 2.5 Change in the total variation in student performance according to PISA, Reading-, Mathematics- and Science Literacy. The relative change is calculated as the ratio of the standard deviation of one year versus the starting year for each domain.

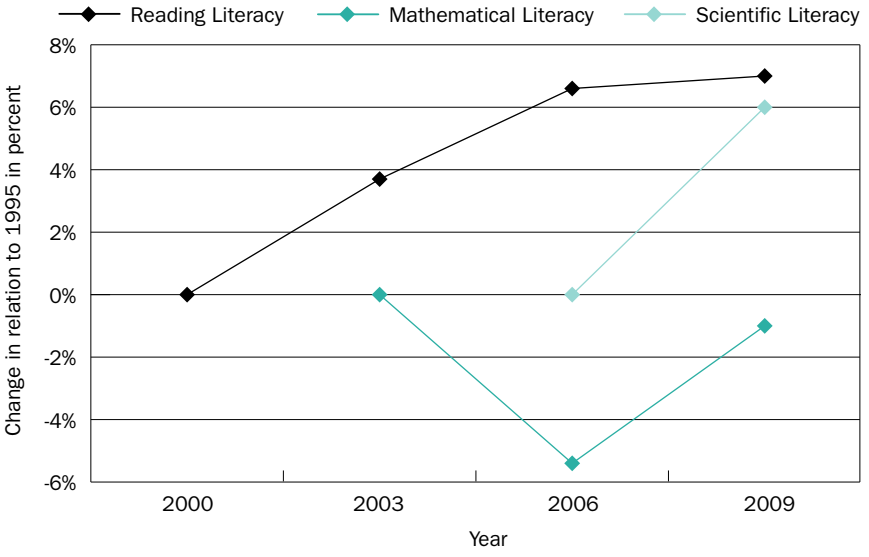

Figure 3.1 Between school variation according to grades, expressed as the proportion of total variation (the variance) in students' grade point average scores, 1998–2011, for all schools as wellas for public schools respectively. The schools are weighted by the number of students.

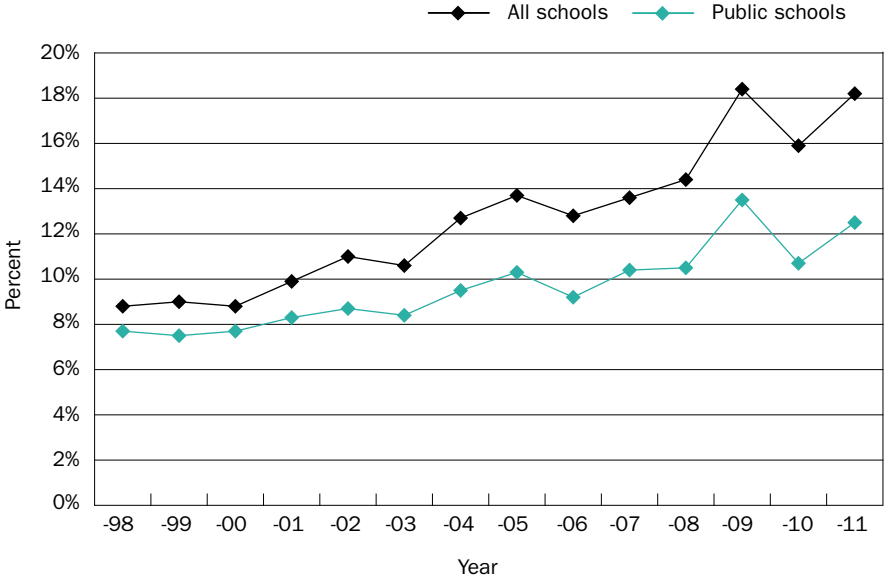

Figure 3.2 The proportion of students in schools with a high/low proportion of students not qualified to attend upper secondary school, 1998–2011. A student is not qualified to attend upper secondary school if he/she does not obtain at least "Pass" (G) in all of the three subjects Swedish, Mathematics and English.

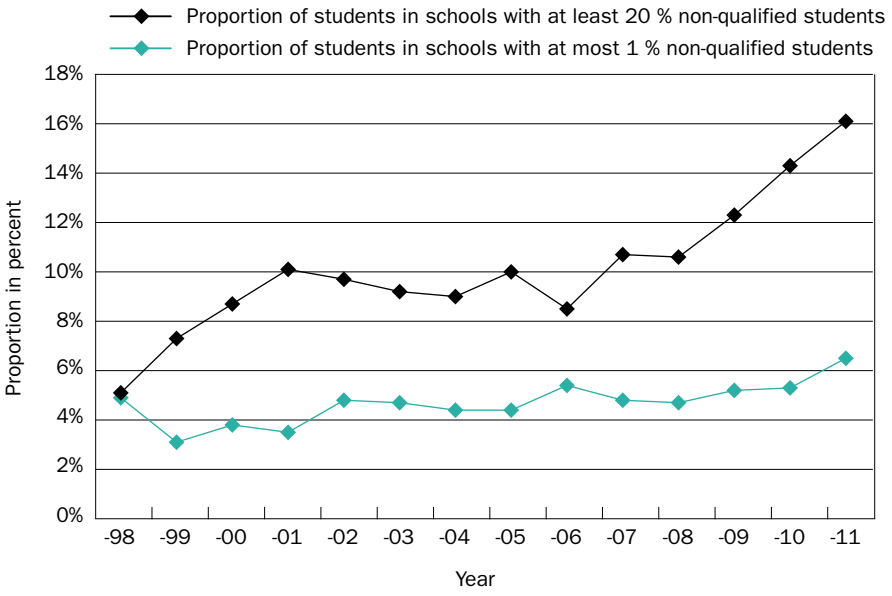

Figure 3.3 Between school variation according to PISA 2000–2009. Expressed as the proportion of total variation in student performance in Reading-, Mathematics- and Science Literacy.

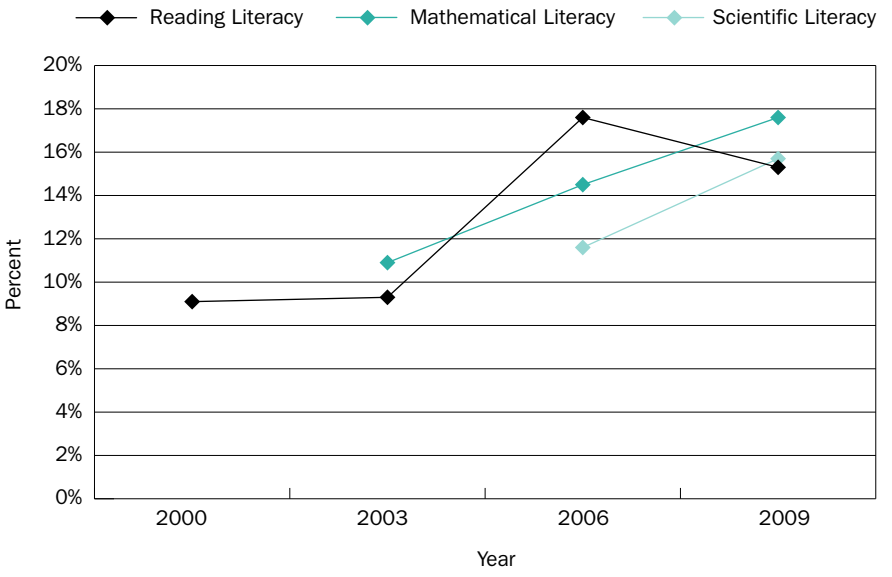

Figure 3.4 Between school variation within different types of municipalities, based on grade point average scores, 2001–2010.

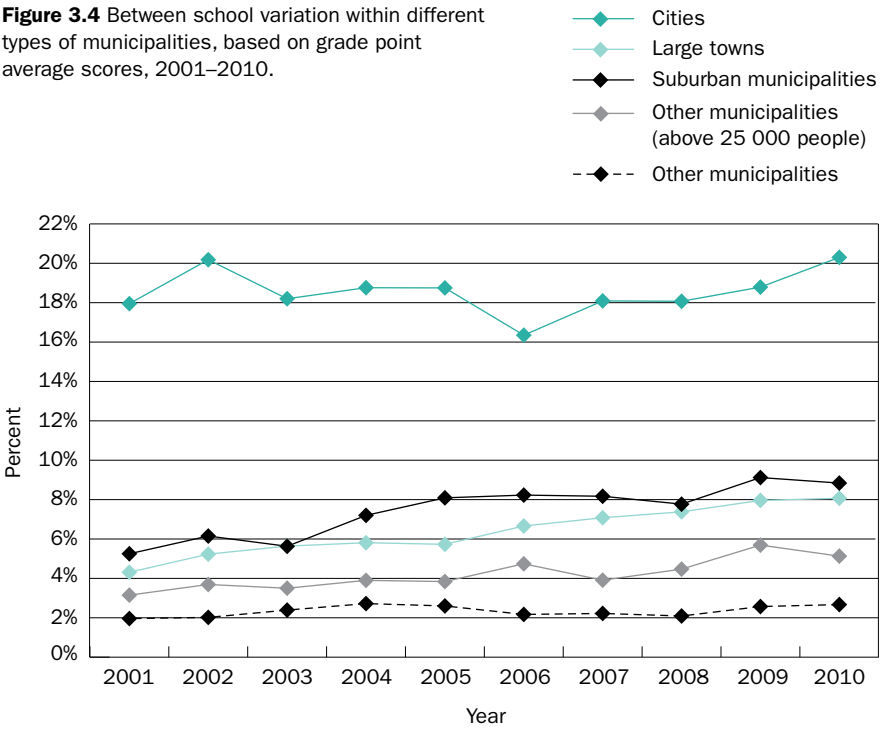

Figure 3.5 Between class variation (within schools). Expressed as the proportion of total variation in grade point average scores, based on a 3-level model including student-, class- and school level.

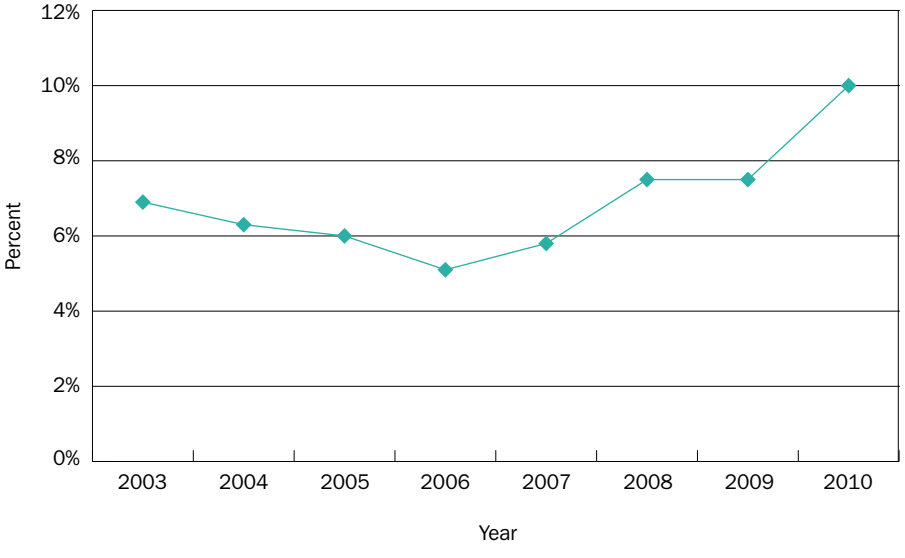

Figure 3.6 Variation in grade results between municipalities, expressed respectively as the proportion of total variation in students' grade point average scores and the proportion of total variation in the sum of the mathematics and english grades. The analysis is based on a 2-level model including student- and municipality level.

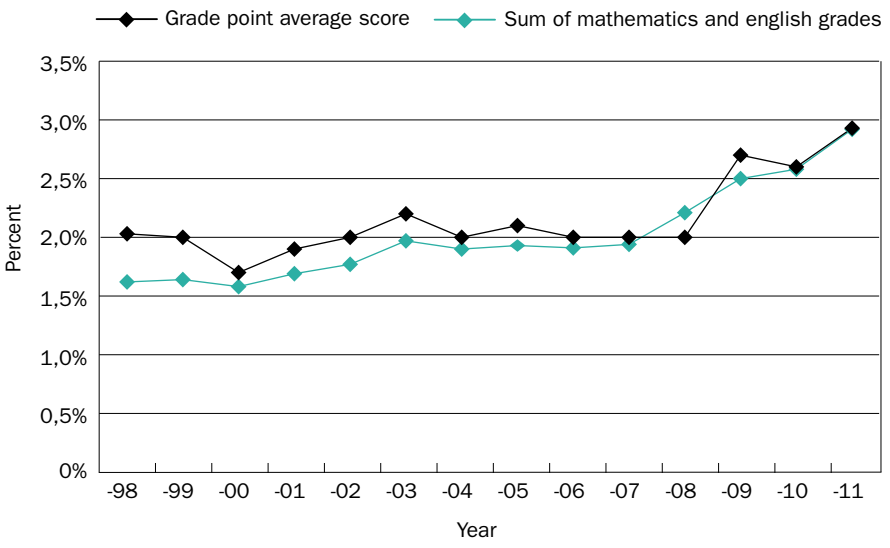

Figure 4.1 Total effect of parents' level of education on grade point average score. The effect is presented in two different ways. 1. The standardised effect of having at least one parent with a post secondary education. 2. The standardised effect of parents' level of education, where the education variable is expressed on a seven level scale.

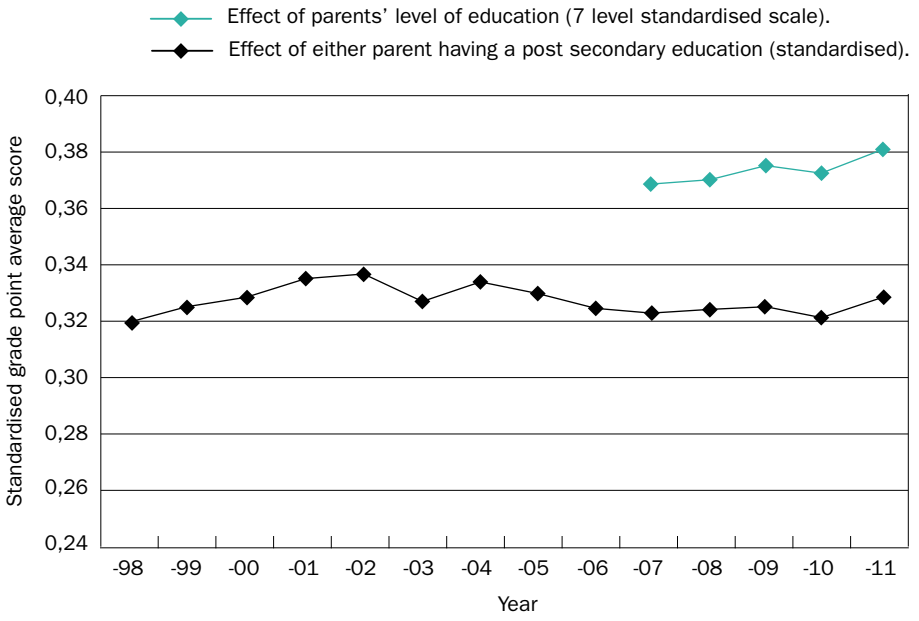

Figure 4.2 Total effect of parents' level of education on mathematics grade. The effect is presented in two different ways. 1. The standardised effect of having at least one parent with a post secondary education. 2. The standardised effect of parents' level of education, where the education variable is expressed on a seven level scale.

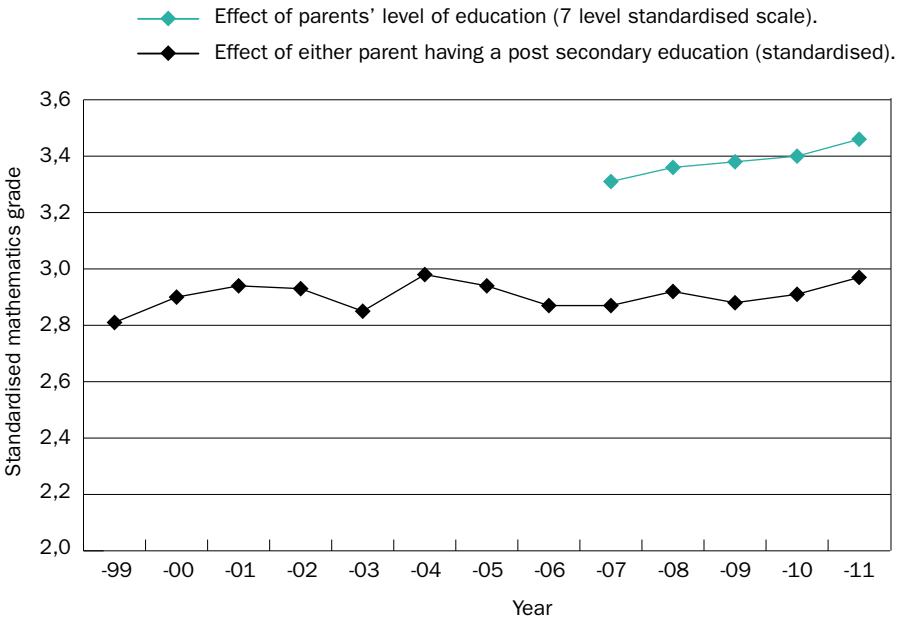

Figure 4.3 Total effect of socio-economic background on student performance in reading literacy according to PISA. The effect is estimated in a single regression model where the dependent variable is the reading score and the independent variable is the socio-economic background of the student, measured with the PISA index for Economic, Social and Cultural status (ESCS). The effect is standardised.

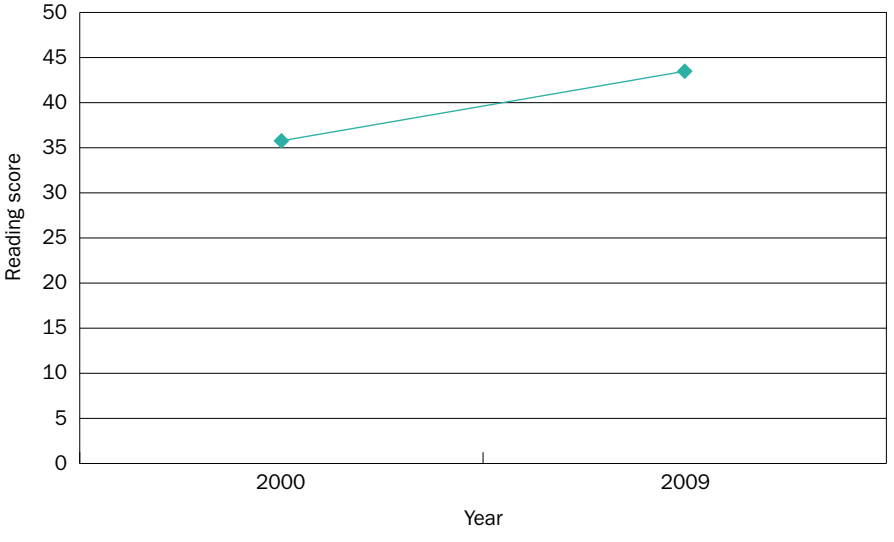

Figure 4.4 Total effect on students' grade point average score due to students' migration background. The effect is expressed in relation to the reference group, students with a Swedish background (born in Sweden with at least one parent born in Sweden), which is represented as the zero line.

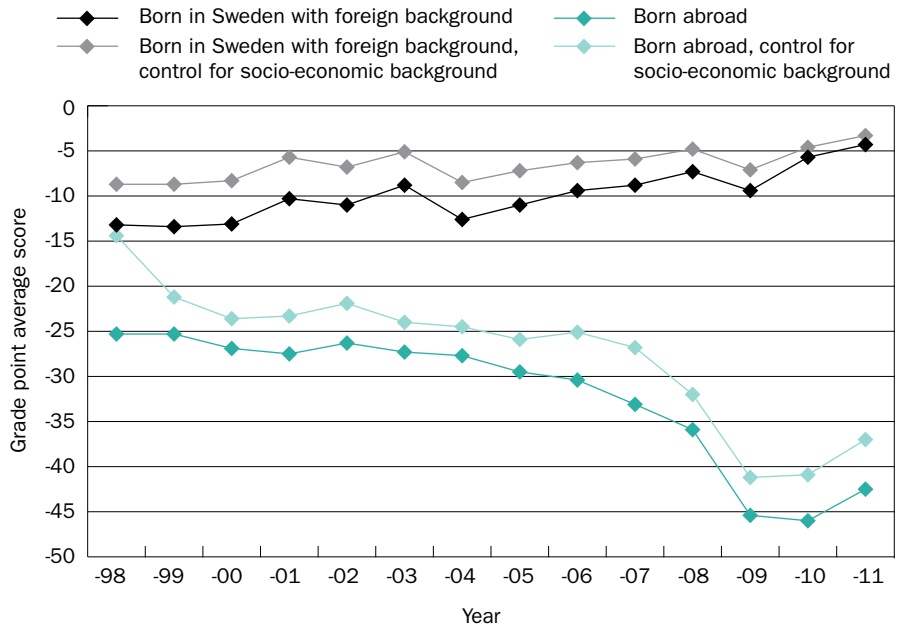

Figure 5.1 School segregation in terms of proportion of students with "highly educated" parents, measured as the standard deviation in the proportion of students with at least one parent having a higher level of education than upper secondary school. Schools are weighted by the number of students.

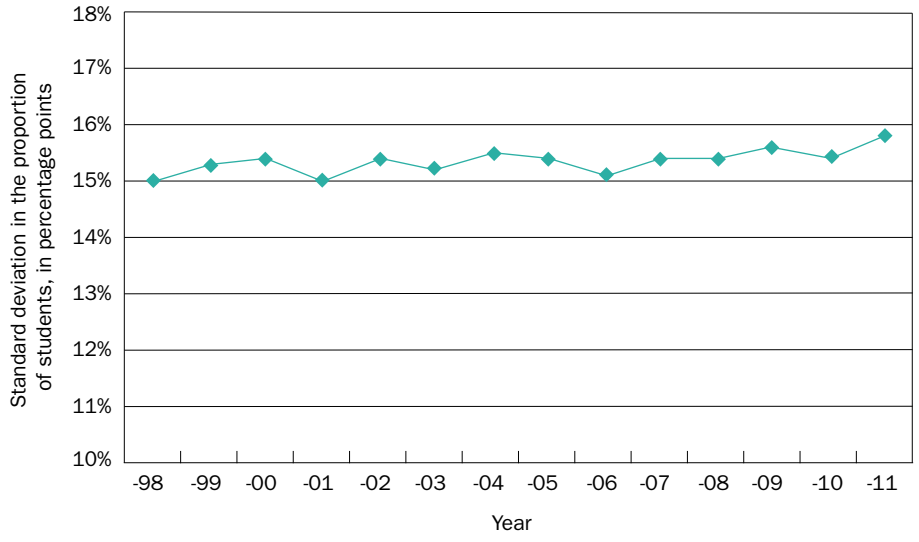

Figure 5.2 School segregation in terms of proportion of explained variation in students' parents' level of education that can be explained by variation between schools, categorised by different types of municiplaities. Each dot represents the average for the municipalities in the respective municiplaity group (weighted by number of students in each municiplaitity).

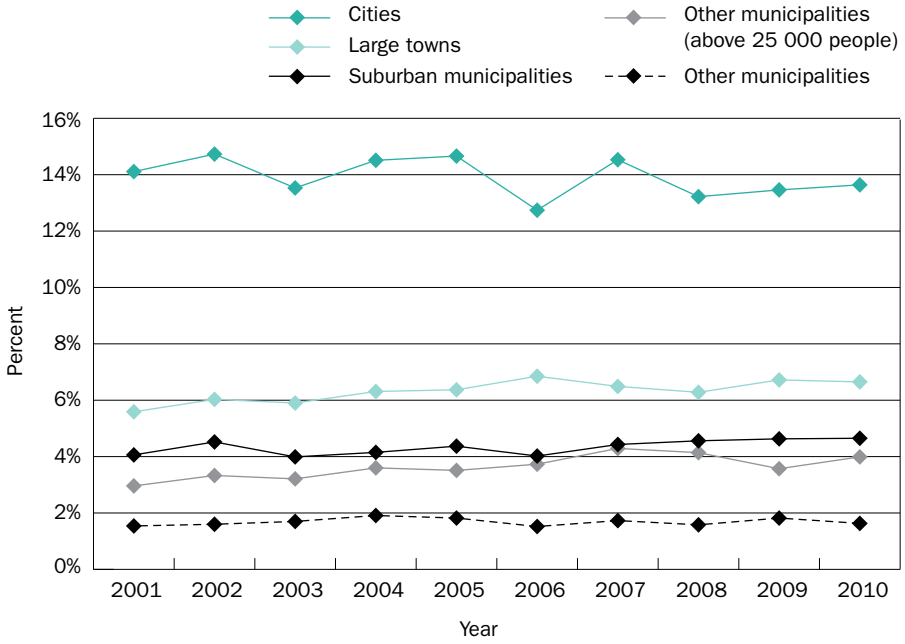

Figure 5.3 School segregation in terms of proportion of students with a migration background, measured respectively as the standard deviation in the proportion of students born outside Sweden and the proportion of students with a migration background (i.e. students born outside Sweden or students born in Sweden with neither of the parents born in Sweden). Schools are weighted by the number of students.

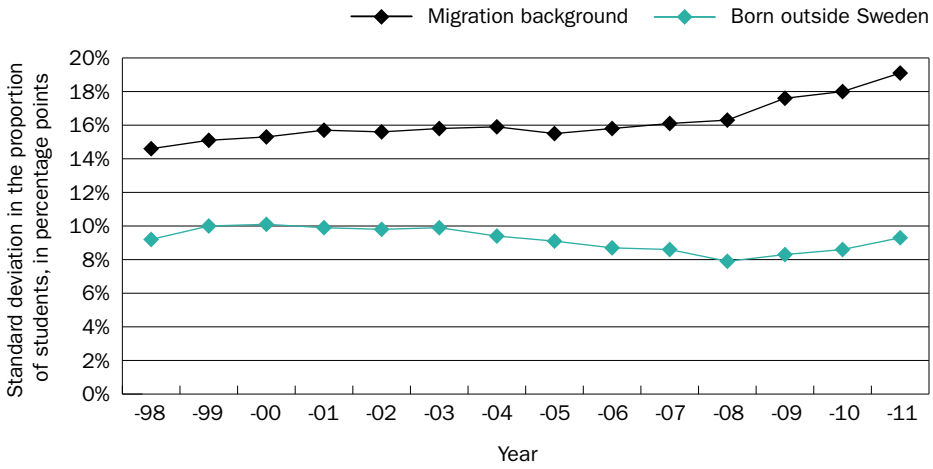

Figure 5.4 School segregation in terms of proportion of students with a migration background, measured as the proportion of explained variation in whether a student has a migration background or not, that can be explained by variation between schools. The municipalities are grouped by type of municipality. Each dot represents the average for the municipalities in the respective municipality group (weighted by number of students in each municipality).

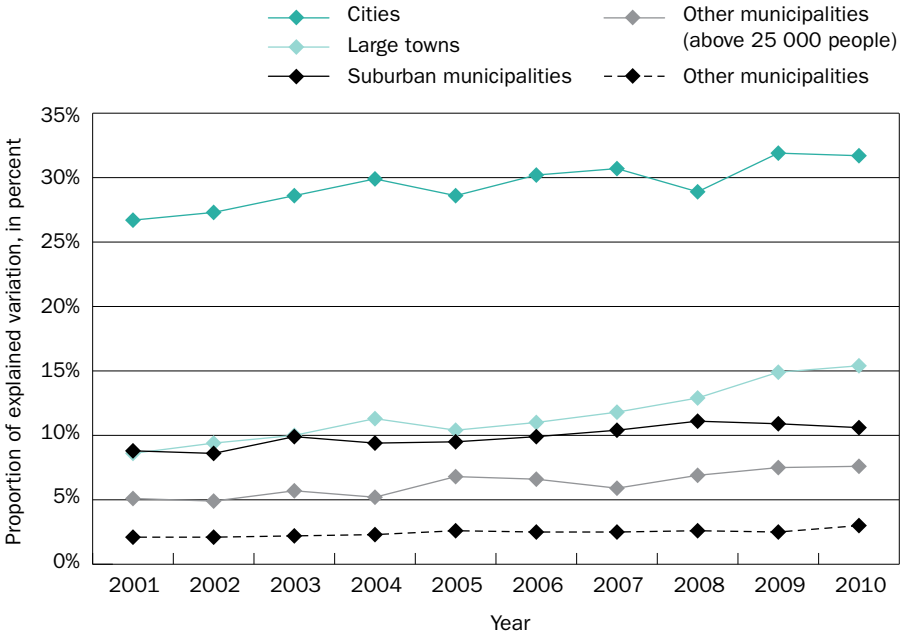

Figure 6.1 School level effect of the socio-economic composition of the school on on the grade point average score of the student. The socio-economic composition of the school is measured as the proportion of students with parents with a "high" level of education (i.e. at least one parent with more than upper secondary school).

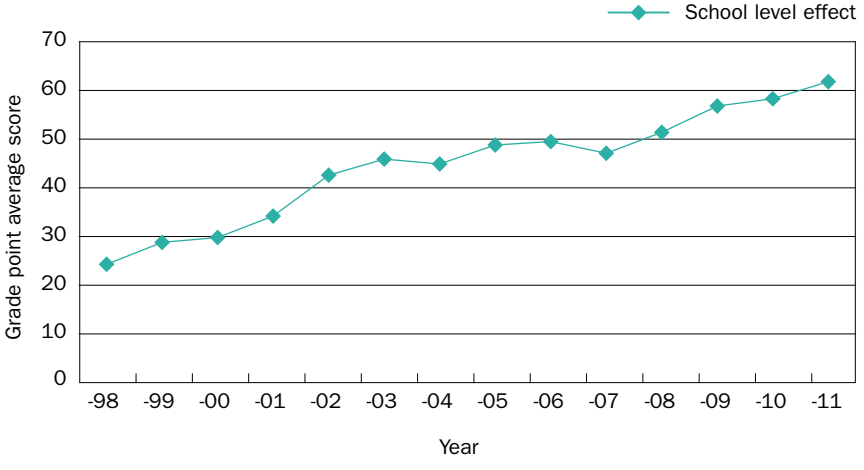

Figure 6.2 School level effect of the socio-economic composition of the school on student performance in reading literacy, according to PISA.

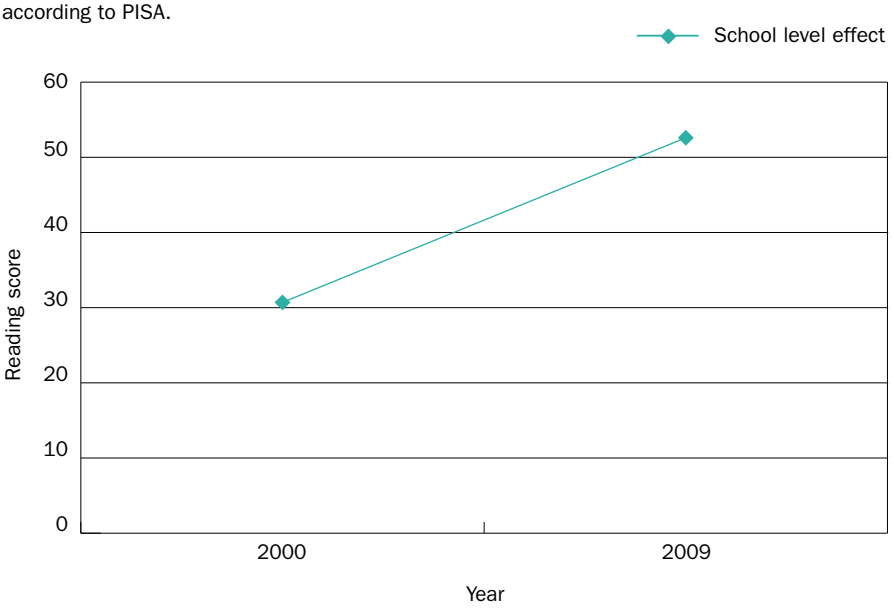

Figure 6.3 School level effect of the proportion of students not born in Sweden on the grade point average score.

This report is an English summary of the original report 374, which was published in April 2012. The aim of the translation is to make the results available to policy makers, researchers and other stake holders outside Sweden with an interest in equity aspects of school systems.

In the summary, trends from the late 1990s until 2011 are described by a number of indicators which together give a picture of how equity in Swedish schools has changed over time.

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