Changes in educational policy for Swedish upper secondary school during two decades: Consequences for distribution of school resources, recruitment and outcomes

1. Purpose and aims

The Swedish educational system has during the last two decades changed dramatically with respect to organization, system of governance and curriculum. There are reasons to believe that these changes have had consequences for the distribution of students and resources over schools and municipalities, and that they also have had effects on the level and variation of educational outcomes. However, little is known about the consequences of the reforms for the efficiency and equity of the Swedish school system, particularly so for upper secondary school. One main purpose of the project is therefore to investigate some of the effects of the reforms implemented on knowledge and skills at upper secondary school level. Another main purpose is to investigate consequences of free school choice on student recruitment and resource distribution. This proposed project attempts to find answers to the following research questions:

1. How has the quasi-market system with allowance of independent schools and free school choice changed the Swedish school system in terms of: (1) the structure and distribution of schools and educational offerings over municipalities; (2) the distribution of students with respect to socio-economic background, foreign background, and grades from compulsory school over schools and municipalities; (3) the distribution of teachers with respect to certification, years of experience and level of education over schools and municipalities?
2. How has the pattern of student recruitment to different study programs in upper secondary schools changed over the last two decades, and how has the student completion of programs changed? How have the effects of individual, structural and contextual determinants of recruitment and program completion changed over time?
3. What was the causal effect on knowledge and skills of the lengthening of the vocational programs from two to three years, and what were the effects of the curriculum reform and change of the grading system in the mid 1990s?

2. Survey of the field

Before the 1990s the Swedish educational system was centralized, with a highly prescriptive national curriculum, resource allocation according to fixed rules, and limited opportunities for choice of school. However, during a short period of time Sweden went from having one of the most centralized education systems in the West to one of the most decentralized (OECD, 1998).

The decentralization reforms included a municipalisation of the school system, implying that the responsibility for both compulsory and upper secondary education was moved from the state level to the local level. Teachers and other school personnel became municipal employees instead of state employees and school resources were governed by the local authorities. A system of school vouchers was introduced, which meant that students could choose between municipal schools, and also between public and independent schools.

Basically anyone got the right to run a school and get public funding corresponding to the average cost per student. A goal- and results oriented management system was introduced, as was a criterion-referenced grading system.

With an increasing local autonomy and greater freedom the idea was to reduce or remove the previous rule-based governance entirely and particularly to increase the professional autonomy of teachers and school leaders. The market-oriented school-choice system was also intended to increase efficiency and lower costs. Other intentions of the reforms were to strengthen and improve the system to better and more effectively nurture knowledge and skills with increased compliance to individual preferences and differences among students as well as to the societal needs for the future.

Partly as a consequence of observations of declining student achievement in the early 2000s, changes were made which implied more of evaluation and accountability, and a re-centralization. Thus, in 2007 school inspections were introduced on a large scale, there is more of centrally prescribed content in the curricula of 2011, and a new grading scale also is introduced with stronger emphasis on grading criteria. The market-orientation is kept unchanged, however.

The reforms implemented in Sweden are similar to those implemented in many other countries even though they have been more thorough and far-reaching than in most other school systems. Sahlberg (2011) identified a set of common features in education policies and reforms that many education systems have implemented to improve the quality of education. These features are performance standards and evaluation, focus on core subjects, use of corporate management models, and test-based accountability policies. Sahlberg (2010) argues that these features are harmful to education in that the policy logic of these features is based on ideas of competition whereas education innovation would rather benefit from policies based on ideas of collaboration, and promotion of creativity, trust, and risk-taking.

Along similar lines, Ravitch (2011) argues that school-choice and testing are harmful to education. According to Levin (2002), market theory suggests that a system of school choice will create competition among schools for student enrolment resulting in schools being more responsive to the needs and interests of parents and students by providing different types of programs for different types of families. But Levin also observed that school choice may contribute to the further social fragmentation of society and give privileges to the middle-classes who have the economic, social, and cultural capital to use the education market as a strategy to reproduce their social class and secure their relative advantage.

Van de Werfhorst and Mijs (2010) concluded in a review of the comparative literature on the impact of educational institutions on inequality in student achievement, that organizational differentiation magnifies inequalities, while a higher level of standardization with regard to central examinations and school autonomy decreases inequality.

This background implies several interesting hypothesis that will be elaborated in the planned research project.

Project Description

Below we describe a project which uses large-scale databases to describe and analyze the development of the upper secondary school in Sweden during a period of 20 years. The project consists of three subprojects, one of which focuses on consequences of school-choice, one on changes in recruitment to and completion of programs in upper secondary school, and one on causal effects of reforms on knowledge and skills. These programs will draw upon

theories and previous research findings in several different areas and below the most important of these are briefly described.

Theoretical framework

Issues of equity are central in the project, with a special focus on socio-economic background, but also on foreign background and gender. Our research on these issues will in particular take advantage of the theoretical framework developed by Boudon (1974), in which the theoretical distinction between primary and secondary effects to explain observed inequality in educational attainment is central. Primary effects are those influences that are expressed through uneven academic performance of students with differing social origins. Secondary effects are influences of social origin that operate over and above academic performance. Applied to the case of socially uneven recruitment, the primary effects suggest that this is due to the fact that children from socially advantaged home perform better in school than other children do, and the secondary effect suggests that despite equal performance, children from socially advantaged home more often than children from less advantaged homes will choose further education, and particularly so academic tracks. These two explanatory factors were identified in the early studies of recruitment to higher education by Boalt (1947) and Härnqvist (1958), and have also been observed in later studies of the transition from compulsory to upper secondary school (Härnqvist, 1999) and the transition from upper secondary school to university (Erikson & Jonsson, 1993). According to Erikson and Rudolphi (2011) empirical results show that secondary effects are about twice the size of the primary effects. However, the relative importance of primary and secondary effects is likely to vary, among other things, as a function of easiness of access to upper secondary education and as a function of quality of schooling, and both these factors are likely to vary over time.

Another issue of central importance in the project of relevance for equity concerns segregation of students as a function of choice of school and of program, and consequences of segregation. Due to peer effects, among other things, homogeneous grouping of students is typically negative for low-performing students, while it is positive for high-performing students. However, as has been established in a long series of studies by e.g. Marsh and Hau (2003), differentiated instruction tends not to yield the expected positive effects for high-achieving children, due to negative effects on self-esteem and motivation caused by the Big-Fish-in-Little-Pond effect.

Several other theoretical notions are important in the research project, but these are referred to in connection with description of the three subprojects.

Data sources

The project will rely on two main sources of data: population based register data from Statistics Sweden and data from an international comparative study of adult competencies. These data sources are described below.

The Gothenburg Educational Longitudinal Database (GOLD)

The Gothenburg Educational Longitudinal Database (GOLD) compiles information from many different sources, taking advantage of the fact that in Sweden register data is stored with a personal identification number. The first data was collected in 1961 at the initiative of Kjell Härnqvist in the “Individual Statistics” project. In collaboration with Statistics Sweden, a 10 % random sample of all students born in 1948 was investigated. The students took cognitive ability tests, and answered a questionnaire about school related issues. From school registers, information was collected about grades, national achievement tests, and parents’ occupation.

The cohort born in 1953 was then sampled, followed by the 1967 cohort, and thereafter new cohorts have been added every fifth year. The database currently goes under the name UGU ("Utvärdering genom uppföljning") and has financial support from the RFI under the SRC.

The UGU database currently includes data from 9 cohorts born between 1948 and 1998, the sample for each cohort typically comprising some 9 000 students. We also have made follow-up data collections in upper secondary school, and for some cohorts we have collected data after the students have left upper secondary school. Information also has been added through excerpts from official registers (e.g., military enlistment data, study finance information, higher education exam, and income).

Another key component of GOLD is register data for all cohorts of 16-year-olds born from 1972 and onwards. For each individual there is a rich set of information concerning family background, school achievement, higher education, study finance, municipal adult education, the Swedish Scholastic Aptitude Test, employment, and income, among other things. Currently the database includes information all persons born between 1972 and 1995, and it is continuously extended with new cohorts and updated information.

Data of the School Statistics section in GOLD is especially useful. It covers grades from compulsory school and it also includes information on upper secondary education, such as year of graduation, academic track or program and school grades in all subjects or courses.

It should be observed, however, that there are limitations with respect to the usefulness of the grades from upper secondary school as an outcome variable. One of the main ideas of the criterion-referenced grading system that was introduced with Lpo94 and Lpf94 was that the grades would provide information about the development over time of educational outcomes in the form knowledge and skills. However, as was observed by Gustafsson and Yang Hansen (2009) the compulsory school grades suffer from grade inflation which limits their usefulness for such purposes. Previous research (e.g., Cliffordson, 2004, Wikström, 2005, Vlachos, 2010) has also shown that grade inflation is much more of a problem in upper secondary school than it is in compulsory school. We will therefore not use grades from upper secondary school as indicators of levels of knowledge and skills. However, grades are useful as a source of information about completion of the upper secondary school and of eligibility for tertiary level education, and this will be a main indicator of outcomes in our analyses. While grades from compulsory school also to some extent suffer from effects of grade inflation, these are still useful for studying differences in educational achievement between persons and groups (Gustafsson & Yang Hansen, 2009).

Another important source of information is the population based Teacher Register (TR), which since the late 1980s includes information about all teachers employed in Swedish schools. Among other things the database includes information about certification, type of teaching assignment, level of education, years of experience, school and municipality. It is not possible, however, to connect the information in the TR to the student data in GOLD, except at the school level.

International comparisons of knowledge and skills

One international study of great interest in the current context is Programme for the International Assessment of Adult Competences (PIAAC). This study, which is conducted by the OECD, is currently under way and will be completed in 2013. It comprises 25 countries, which also are involved in the PISA study, and includes samples of at least 5000 individuals in the age range 16 to 65 years. It assesses reading, writing, mathematics, information technology skills, and problem solving skills. There is also a background questionnaire and self-assessment of a wide range of non-cognitive skills, such as influence, self-direction,

interaction skills, and learning skills. PIAAC is based upon IALS (International Adult Literacy Survey) which was conducted 1994 and 1998, and there is item overlap between the studies so that change over time can be investigated.

The subprojects

Below we describe the three subprojects within which the main activities of the project will be conducted.

Subproject 1: Consequences of free school choice

The main aim of the project is to investigate how the market-like system of free school choice has changed the Swedish school system in terms of: (1) the structure and distribution of schools and educational offerings over municipalities; (2) the distribution of students with respect to socio-economic background, foreign background, and grades from compulsory school over schools and municipalities; and (3) the distribution of teachers with respect to certification, years of experience and level of education over schools and municipalities.

While the municipalities have the main responsibility for providing their inhabitants with opportunities to get access to upper secondary education, the students are, in principle, free to choose a program at a municipal or independent school in any municipality. Since this free school choice was introduced in the mid 1990s it has had major impact on the structure of the Swedish school system and the provision of educational offerings. One consequence of the free school choice is that actual choices available are determined by a large number of local and regional factors, such as the number of inhabitants and transportation facilities, in addition to the educational offerings made available by municipalities and independent schools. This implies that the analysis cannot be restricted to the municipality level, but must explicitly identify the actual school markets available.

In a recently conducted method study, Skolverket (2011) investigated methods to identify local school markets, through adapting methods developed by Statistics Sweden for identifying local labor markets. Using information about the home municipality and the school municipality of all students in upper secondary school during the academic year 2009/10, they identified 94 local school markets defined by municipalities between which there is a large exchange of students. The 94 local school markets were further divided into six different market types. The local school markets cannot be assumed to be stable over time, and in comparisons with 2003/04 Skolverket (2011) found changes in the structure of the local school markets.

The idea of local school markets and different school market types is a promising approach to describe changes over time of the Swedish upper school system and to be used as a tool in analyzing consequences of the introduction of quasi-market principles for students, teachers, schools, municipalities and for the nation. In a first step the structure of the local school markets will be analyzed for seven different time periods (1994/95, 1997/98, 2000/01, 2003/04, 2006/08, 2009/10 and 2012/13). The local school markets resulting from these analyses will in later steps be used for analyses of variation at the school and municipality levels with respect to different variables using multi-level modeling techniques, including two-level latent profile analysis (Yang Hansen & Munck, in press). These analyses will focus on student variables (socio-economic status, foreign background, and previous achievement as measured by grades from compulsory school) in order to study change in segregation. Analyses will also be made of teacher variables (certification, level of education, and years of experience) in order to investigate change in resources over time. The local school markets

and market types will also be used in the analyses of recruitment to and completion of upper secondary school to be conducted in Subproject 2 below.

In the identification of local school markets, the same basic approach as was used by Skolverket (2011) will be employed. However, given that this is a new area of research, there will be a special focus on methodological issues. One issue that will be given special attention is the possibility to analyze commuting and exchange of students also between different parts of a municipality. Given that much of mobility of students is within the larger municipalities it seems important to develop such analytical tools to be able to describe and analyze variation at the school level. Within the GOLD database there is information about smaller geographic areas defined by what Statistics Sweden calls Small Area Market Statistics (SAMS) units, which should be useful for this purpose.

The analyses within this sub-project will be based on information in the GOLD database and in the Teacher Register. Except that these registers need to be updated with information during the project period, they are presently current and ready to be used for the analyses.

Subproject 2: Determinants of recruitment to and completion of upper secondary school

One main aim of this subproject is to investigate how the recruitment of students to different programs in upper secondary school changed from the early 1990s to the early 2010s, and how the student completion of programs has changed. Another main aim is to determine how the effects of individual, structural and contextual determinants of recruitment and program completion have changed over time.

In previous research much interest has been focused on the importance of social background for recruitment to different tracks of study in upper secondary school (e.g., Eriksson & Jonson, 1993; Gustafsson, Andersson & Hansen, 2000; Svensson, 2006). These questions still are highly relevant and little is known about the development in this field during the latest changes of upper secondary school.

Another question of interest is whether studies in upper secondary schools are successfully completed or not. One reason for not completing upper secondary school is, of course, that the student was not recruited, but nowadays the most common reason is that the student drops out before the prescribed period of study, or that the student has not reached the stipulated requirements at the end of the studies. Thus, the introduction of Lpf94 was associated with a decline in the proportion of students who successfully completed upper secondary school (e.g., Svensson, 2007). For example, among those starting upper secondary school in 1988 close to 85% completed their studies, while among those who started upper secondary school in 2008, only around 72 % completed. The decline was larger for vocational programs than for theoretical programs, and one of the main hypotheses to account for this was that the third year added for the vocational programs was the reason for this. An alternative hypothesis is that it rather was the introduction of the criterion-referenced grading system, with a pass/fail grade, that accounted for the decline. Given that introduction of the third year in the vocational program is not perfectly associated with the introduction of the criterion-referenced grading system, it is possible to disentangle the effects of these two determinants.

In this project the population data for the birth cohorts 1973 - 1992 will be used to investigate the influence of different determinants of recruitment to and completion of upper secondary school, such as for example different curricula and program types. A unified approach will be taken to analysis of these two issues, using logistic regression models to investigate main effects and interactive effects of a large number of potential determinants, and analyzing change over time.

The determinants are of both structural and individual kinds. One main category of variables represents contextual factors, such as the local school markets and market types identified in Subproject 1, and factors associated with the schools and municipalities. Another main category represents program characteristics, such as the different upper secondary school curricula that have been in effect, and whether the program is vocational or theoretical. A third category of determinants represents individual characteristics: socio-economic background, foreign background, sex and educational achievement in compulsory school. Variables will typically be entered as dummy variables, even though there are also continuous variables. Interaction variables will be created as cross-product variables.

The models will be built up successively to study the influence of the different determinants and categories of determinants, and through the use of population data for the 20 cohorts born 1973 to 1992 it will be possible to obtain a very powerful analysis of the influence of different factors on recruitment to and completion of upper secondary school. Given that it will be impossible to comprehend and interpret the models in their entirety, different aspects and categories of variables will be focused on in different articles, which will published in scientific journals.

Subproject 3: Effects of upper-secondary school reforms on knowledge and skills in adulthood

The main aim of this project is to investigate causal effects on knowledge and skills, and on non-cognitive skills, of two of the educational reforms implemented during the 1990s. As has already be observed no useful measures of educational outcomes other than completion of upper secondary school are available to be used as outcome variables in investigations of effects of reforms. However, in analyses of causal effects we will take advantage of the fact that the PIAAC data covers consecutive age groups between age 16 and 65, and that an interesting set of outcome and background variables is available. The general approach will be to study variation among different adjacent age groups in the PIAAC data, which have been exposed to different upper secondary school curricula, or other changes in the structure and organization of the upper secondary school, using regression discontinuity designs for determining causal effects.

The introduction of the third year in the vocational programs in 1991 is one of the reforms we will focus upon, and can serve as an example. The students who started upper secondary school in 1990 were typically born in 1974, and they will be 37 years old when tested with PIAAC in 2011, while those who started upper secondary school in 1991, will be 36 years old when tested with PIAAC. A difference in level of knowledge and skill between these two age cohorts could thus be an effect of introduction of the third year, even though there may of course be other explanations, such as differences in experience. Through using a wider range of age groups, a regression discontinuity design with age as cut of variable can be used to make a stronger causal inference. This causal inference would thus pertain to the average effect of the introduction of the third year of study in the vocational programs.

One main threat to using this approach to causal analysis is that power may be too low to allow detection of the relatively low effect sizes that may be expected. However, with a required minimum of 5 000 participants in each country, there will be around 100 participants in each year-group, which allows for sufficient power for detection of medium effects. For example, with 50 observations in each group, there will be a power of .70 to detect an effect size of .50. It is, furthermore, possible to increase power through adding more age groups, and through adding data from other countries in which no change is expected, power can be increased even more. It could be argued that the outcome is quite distant from the treatment, but it certainly is one of the most valid outcomes that could be obtained.

This general regression discontinuity design approach will also be used to investigate the causal effect on knowledge and skill in adulthood of the introduction of the new curricula in 1994, and of the new criterion-referenced grading system. Given that students with the new curriculum kept the old norm-referenced grading system for one year, this implies that, in theory at least, the effects of these two factors can be separated. Causal effects of other changes which occurred abruptly at one point in time can also be evaluated with this approach.

The conduct of the project

The projects will be conducted within the FUR group, a well-established research environment at the department of education and special education at the University of Gothenburg. Professor Monica Rosén is in charge of the project, and she will also have the main responsibility for Subproject 2. Docent Kajsa Yang Hansen will have the main responsibility for Subproject 1, while professor Jan-Eric Gustafsson will have the main responsibility for Subproject 3. We also apply for three doctoral students, who will be involved in the subprojects. However, resources will not be divided equally among the three subprojects, given that subproject 1 will require a considerably larger investment of time than will subproject 3. We plan for all three senior researchers to be partly involved in subproject 1 along with 1.5 doctoral students; subproject 2 will mainly be conducted by Rosén and Gustafsson with 1 doctoral student; while subproject 3 will involve 0.5 doctoral student along with Gustafsson and Rosén.

Research Ethical Considerations

The ethical problem of the data from IEA and PISA has already been thoroughly dealt with by the National Research Coordinator in each participating country. Since the present project is a secondary analysis of these international survey data, no individuals can possibly be identified. The data is accessible publically at IEA and OECD PISA web pages1 for which the informed consent is not required, and neither is approval of a regional ethics committee required.

4. Significance

In Sweden, there is a long tradition in the field of education to use large-scale empirical research when developing, implementing and evaluating educational reforms. Longitudinal studies of educational development and changes have made a significant contribution to both policy-makers and the general audiences to understand the effects of the policy changes in education (see e. g., Härnqvist & Svensson, 1973; Svensson, 2011). Studies such as the ones proposed in this project will provide important knowledge about the effects of decentralization and deregulation (Lundgren, 1999), and will in particular, examine the impact of the market-oriented reforms on efficiency and equity of the Swedish educational system. As mentioned previously, such reforms have become a part of a global trend in the field of education, and the research presented in this project may offer insights and valuable empirical evidence for other countries. The current project also will contribute methodological development of value in research on effects of school choice. Finally, it can be seen as a baseline study for future evaluation of policy measures taken to reduce segregation and inequality, and improving educational efficiency.

[1] homepage for IEA and PISA international survey data: http://rms.iea-dpc.org/ http://www.pisa.oecd.org

As the competence needed for large scale quantitative research has become a limited commodity within the field of education, there is a huge need of capacity building. Within the near future most of the experienced scholars within this field of research will retire. A valuable synergy of this project is therefore the upbringing of a new generation of researchers that are able to handle and conduct large scale studies with sufficient methodological knowledge.

5. Preliminary results

The group has previously been working on the large-scale population data bases on many issues related to the current project. One early example is the work by Gustafsson (2006) to develop a municipal school segregation index (cf. Gustafsson & Yang Hansen, 2011), and another example is the work by Gustafsson, Andersson and Hansen (2000) on social factors in recruitment to upper secondary school. This and other related work has contributed to development of considerable experience in dealing with population based register data for purposes of research.

6. Data publication plan

The project will not collect any new data, but will rely on existing data from international studies and population registers. The international data are publicly available, while the register data cannot be distributed outside of the project, because they are made available by Statistics Sweden under conditions of non-disclosable statistics ("statistiksekretess").

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