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Geographical variations in the relation between final course grades and results on the national tests in social sciences, 2015-2017

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ABSTRACT

Grade inflation, involving comparisons between public and independent schools, is presently under discussion in Sweden. This paper reports on discrepancies between national test results and the final course grade in social sciences, in year 9. Open data at school level were used in OLS regression analyses to scrutinise systematic differences between independent and public schools and between different geographical units. The geographical analysis was used to highlight systematic geographical inconsistencies between national test results and the final course grade. The main findings of the present study are: 1) The differences in grading between private and public actors are small when considering important background factors like the average educational level of parents, the school's grade point average (GPA), and which national test in social sciences was carried out at the school. 2) Schools in metropolitan areas are more inclined to give pupils a higher final course grade than their national test result, and it is less likely that schools in metropolitan areas and in municipalities surrounding the metropolitan areas give pupils a final course grade that is lower than their national test result. The regional differences might well affect pupils' continued studies, and the ambition of providing an equitable school to all children in all parts of Sweden has thus not been successful.

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Grading; grade inflation; independent vs public schools; geographical analysis of grade inflation; equitable education

Introduction

Political discussions around grading and the potential effects of competitiveness have been ongoing since the Swedish school choice reform, 1992. Significant downfalls during the early part of the 21st century, manifested by the PISA investigations,[1] contributed to the criticism of the Swedish school system. From the year 2009 and up to PISA 2015, a negative trend in terms of the Swedish pupils' results in reading comprehension, mathematics, and science, is obvious. In the PISA investigation of 2012, Swedish pupils achieved below the average of the OECD-countries in all three knowledge areas. The negative trend was however broken in PISA 2015, when the pupils in Sweden attained results at or above the average level. The results from PISA 2018 will

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be published in December 2019. Given that the PISA-investigations are relevant as an instrument for measuring the knowledge of Swedish pupils, (Serder & Jakobsson, 2015), the steadily raising grades may actually be a sign of grade inflation, i.e. a general raise of the grades with no corresponding knowledge increase achieved by the pupils (Wikström & Wikström, 2005).

If a grade inflation is de facto occurring, it poses a threat to the legitimacy of the school system and its grading system, and of the body of teachers. It has been suggested that independent schools have a generous grading system in order to attract pupils, thereby securing the schools' profits. The National Agency for Education (NAE) (Skolverket, 2018a) revealed that pupils having attended an independent upper secondary school achieved inferior results at the university in comparison with pupils having attended a municipal school, although both groups had earned the same grades in upper secondary school. The differences in grading between independent and public schools are particularly high in municipalities with strong competition between different actors on the school market (Skolverket, 2019). It should be noted that in Sweden, the syllabus of each subject is *identical*, regardless of the school being independent or municipal.

Butler and Hamnett (2007) argued that the issue of school choice to a considerable degree is an urban matter. It is in the city that the neoliberal policy has the largest impact through the advancement of independent school alternatives, where the middle-class parents are discarding certain schools and pupil populations, making choices that they believe will promote their children's success in school. The authors furthermore argued that we should investigate and comprehend the development of the school primarily from an urban perspective, the reason being that gentrification processes, residential segregation, and income differences are what contribute – in the city – the most to further segregation of the pupils, which might impair their future career opportunities. Butler and Hamnett (ibid.) thus called attention to a geographical dimension of the school world. This had not been included in the Swedish discussions about how a liberalised school market might affect pupils' future continued education.

The school system, grading, and national tests in Sweden

The school system in Sweden comprises a compulsory nine-year comprehensive school. In 1980, a new curriculum was introduced, in which choices of contents and methodology was decentralised and left for the teachers to decide. The directions given focused on the teaching's goal, a focus that was further developed in the forthcoming curricula. In the current curriculum, the goals set up for the teaching are clarified, as are written tests to be used when evaluating a pupil's knowledge. Common for Swedish school reforms of all times is that the school and the teaching shall foster the pupils to citizens in a democratic society.

In 1992, the independent school reform enabled other actors than the Swedish municipalities to start and run schools. This in turn led to a free choice of school, where pupils and parents had the right to choose school. This system required a just financing, which led to the establishment of the so-called school voucher, i.e. a sum of money "attached" to each pupil, regardless of school choice. School fees are still prohibited by law in Sweden.

In the school year 1992/1993, only one percent of the comprehensive school pupils attended an independent school. Twenty years later (2012/2013), this figure had increased to 13.3 percent, and during 2017/2018 it reached 14.9 percent (820 independent schools), while the corresponding figure for the upper secondary school (433 independent schools) during the same period amounted to 26.5 percent (Holmström, 2018; Skolverket, 2018a). The number of independent schools and independent school units has steadily increased in Sweden, the proportion reaching 17 percent for the comprehensive school and 32.9 percent for the upper secondary school during the school year 2017/2018 (Skolverket, 2018a). The school choice allowed parents to choose schools for their children. This meant that schools with a certain pedagogic idea would benefit, and rural schools threatened by closure could be kept open through other actors than the municipality. Those criticizing the reforms point to increased segregation and reduced equality in the school system, and problems with profit seeking actors engaged in competition rather than education (Englund, 2018; Molander, 2017). Another consequence of the independent school system is that assertive parents tend to pressurise teachers into giving their children high grades. An additional problem in this context, is that the shortage of teachers has resulted in uneducated teachers being employed to a larger extent, and these teachers will also set the pupils' grades. Grade inflation has according to Molander (ibid.) become a well-known phenomenon.

An important method of tackling inequality, simultaneously improving the chance of making informed choices about schools, is to measure pupils' performances in *various* ways. National tests are an important part of measuring equality in the school system as is measuring school performance. The Swedish school has since the middle of last century practiced central tests, the reason being that teachers might utilise different angles for their tests, which thus leaves no room for comparison between pupils from different regions. Up to the curriculum of 1994, these comprised the subjects mathematics, Swedish, and English. In 1997, national tests were introduced. They are carried out in years 3, 6, and 9 in the comprehensive school, but also in the upper secondary school. The subjects involved are the same: Swedish, English, and mathematics. In 2010, more subjects were added to the list for year 9: geography, history, religion, and civics (social sciences) as well as biology, physics, and chemistry (natural sciences). The pupil is writing one test in each category. Which test each school will write at a given time is randomised, and information about which subject is allocated to a school is revealed a few weeks prior to the test date given for the whole country. Even the exact point of time for the test is regulated, i.e. all pupils in Sweden are writing the test simultaneously in order to minimise the risk of cheating.

National tests are not examination tests; they constitute only part of the foundation for the teacher's accumulated assessment of a pupil's knowledge in the subject in question. Notwithstanding, the national test result is regarded as important information for the teachers who set the final grade, and in the directions given by the National Agency for Education, it is stated that the results on the national tests shall *particularly be taken into account* when setting the grades. National tests are constructed strictly in accordance with the syllabus of the subject, which comprises three parts: the purpose of the subject, the central content, and the knowledge requirements. Incorporated in the purpose are a number of subject specific abilities that the teaching of the subject is meant to develop. These subject specific abilities are what forms the foundation for the test questions in relation to the central content and the knowledge requirements. The

national test in geography for year 9 consists of two parts, A and B, together containing about 30 test questions that consist of a combination of question types: closed-end questions (*multiple choice* and *matching*) and open-ended questions (*performance tasks*), where the pupil must reason in writing in order to answer the question.

Setting the grade

The compulsory school in Sweden comprises nine years, and the pupils in the compulsory school are graded from year 6 after the autumn semester, which is the first semester of the school year. After finishing compulsory school, the pupil receives a school-leaving certificate that can be used to apply for further studies in the upper secondary school. As fundamentally all pupils in compulsory school do continue their studies, the grades from year 9 are important when applying to the upper secondary school.

There are documented knowledge requirements for each subject in compulsory school, stating what a pupil must know to receive a certain grade in a subject. The scale comprises five passing grades: E, D, C, B, and A. The letter F denotes that the pupil did not pass the subject.

A *few* of the knowledge requirements for grade A in geography, year 9, may be outlined as: The pupil possesses **very good knowledge** about …, showing this by **well developed** and **well underpinned argumentation** about processes that form and change … This example illustrates the problems associated with fair assessment. The bold expressions are vague and might be interpreted differently by the teachers.

According to Gustafsson and Erickson (2018), these kinds of descriptions of knowledge requirements are problematic. The Swedish Government Official Reports of 2007 specify that the knowledge requirements shall be so explicitly expressed that the teachers will not need to interpret and reformulate them. It has become clear, however, that the formulation of the knowledge requirements for each subject, written into its syllabus, leaves ample room for interpretation. This became evident in a study that the government ordered from the NAE (Skolverket, 2016). The largest problem was that the knowledge requirements were vague, and that it was difficult to concretise the value words separating the steps in the scale of grades.

A problem brought up in several studies, e.g. Gustafsson, Cliffordson, and Erickson (2014) and Vlachos (2013), is that all aspects of the knowledge requirements must be accomplished in order to receive a certain grade. The report by the NAE (Erickson, 2016) furthermore disclosed that the majority of the teachers observed that attaining national equality in the grading process was problematic. The Swedish National Audit Office (Riksrevisionen, 2004, 2011) investigated whether the national tests supported equality in grading and found irregularities. Gustafsson and Erickson (op.cit.) furthermore show that the mean national test grade varies considerably over time for many subjects. They argue that given that the national knowledge level fluctuation among pupils from one year to the next presumably is relatively small, it is confounding to find large test grade fluctuations in many subjects.

As the purpose of national tests is to promote equal assessment and a just grading, as well as providing a foundation for an analysis of the extent to which the knowledge requirements are accomplished at school level, this poses a problem.

In 2012, the Schools Inspectorate (2018) carried out an appraisal of the conduction and follow-up of national tests. The result disclosed that nearly all schools included in the survey (11 comprehensive schools and 9 upper secondary schools) displayed inadequacies in terms of the conduction of the tests as well as the follow-up. The results on the national tests were rarely compared with the pupils' final course grades. The Schools Inspectorate drew the conclusion that the national tests did not function as a guideline for grading as was the intention. In 2018, they presented results from a surveillance of 20 schools, which revealed that 15 schools show large discrepancies between the national test and the final course grade. A selection criterion for the schools was that a large proportion of the pupils had a higher final course grade in the subject of Swedish in comparison with their result on the national test. The Schools Inspectorate (ibid.) maintains that deficient equality is common in terms of grading pupils. Grading is a problem that has been identified in various inquiries, as well as in the Schools Inspectorate's investigations and previous quality reviews.

Brevinge (2016) revealed in a study, using the final course grade in mathematics as a starting point, that certain independent upper secondary schools give all their pupils a higher final course grade in certain mathematics courses than what they achieved on the national tests. The NAE (Skolverket, 2018a) shows that pupils who have attended a public upper secondary school are achieving better results at the university college than pupils from independent schools, in spite of the latter group having received higher grades. Sixty-six percent of the pupils having attended a public school are accomplishing 75 percent or more of their university college studies during a semester, while the corresponding figure for pupils from independent schools is 61 percent (Svensen, 2018). Pupils receiving unjustified higher grades from comprehensive and upper secondary schools, and their admittance to universities and university colleges, leads to negative economic consequences, since these pupils have difficulties to succeed in their studies. This results in the university colleges receiving less economic support from the government than was calculated (Vlachos, 2018). The NAE (Skolverket, 2018b) proclaims that the correlation between grades accomplished on the national tests and final course grades has to some extent weakened over time. It should be noted, however, that a majority of pupils have final course grades that correspond to the results they attained on the national tests. Vlachos (2010) furthermore showed that the systematic discrepancies, if any, between the grading in independent schools and public schools in year 9 are small in comparison with upper secondary school. He maintained that this is because the syllabuses at the upper secondary school are not as clearly linked with the national tests. Vlachos (2018) reveals in his study, which encompassed the four largest profit-driven school corporations running upper secondary schools, that after including the results on national tests, all independent schools[2] consistently give higher grades than public schools. Vlachos writes that about two thirds of the independent schools being in leading position can be ascribed to grading. These findings suggest that unfair grading exists in independent upper secondary schools, while the compulsory school seems less affected.

In order to counteract generous grading, the government resolved to change the purpose of national tests (see The School Ordinance, 2017:1107, Chapter 9, Comprehensive school). The formulation was previously: "The main purpose of the national tests is to support an equal and fair assessment and grading, and to provide

a foundation for an analysis of to which extent the stipulated knowledge requirements have been fulfilled at school level, the school ownership level, and the national level." This formulation was recently replaced by: *The purpose of national tests is to support an equal and fair grading*.[3] In 2017, the government ordered that when deciding the final course grade, national tests must be specifically considered,[4] and the new formulation was to be inserted into the Education Act (2010).

Variations in grading

There is empirical evidence of grade inflation in the Swedish comprehensive school. Vlachos (2010) has for instance corroborated that the proportion of pupils with high grades has increased (1997–2008), but the PISA results do not follow this trend (see also Skolverket, 2018a). Other studies have focused on upper secondary school grades and pupils' further studies at university colleges and universities. Cliffordson (2004) has in this context shown that while the amount of accomplished university college credits remains at a constant level, the upper secondary school grades are increasing. Furthermore, the NAE (Skolverket, 2018a) reported that pupils with high grades from independent schools tend to accomplish less at university colleges and universities than pupils from public schools having corresponding grades. Their report confirmed a grade inflation, although moderate. Higher grades not being in agreement with an increase of pupils' knowledge is not solely a Swedish phenomenon; it has been confirmed in several countries (e.g. Hurwitz & Lee, 2017; Moreno-Herrero, Sanchez-Campillo, & de Dios Jimenez-Aguilera, 2014; Pressman, 2007).

There are several factors that could affect grading, and in turn increase the discrepancies between final course grade and national test grades. For instance, Jurajda and Munich (2011) found differences between the genders in terms of their response to a competitive test-taking environment. There were no gender differences in a less intense test environment, while women performed substantially worse than men in a highly competitive situation, e.g. when aiming at applying to very popular universities. Lekholm and Cliffordson (2008) showed that other factors than test results affect pupils' subject grades. For instance, pupils having parents with lower educational background received somewhat higher grades than the average grade level at their school. The authors suggested a compensatory grading practice at these schools as the grades given were higher than the test scores. The motivation behind this might be that teachers try to pass as many pupils as possible, which in turn might be the result of competition for pupils between schools. Schools with a large proportion of pupils not passing are at risk of being avoided by parents. Such actions may lead to grade inflation and quality differences between schools. (Cliffordson, 2004; Wikström & Wikström, 2005).

The issue of potential avoidance of certain schools is closely related to the possibility of choosing schools. Böhlmark and Lindahl (2015) found a positive effect of this competition on pupils' grades at municipality level, but found no significant grade inflation in higher grades in municipalities with high levels of school competition. In contrast, Hennerdal, Malmberg, and Andersson (2018) showed that when individual data are used, grades are affected by school segregation when the composition of school peers along with own and peers' parental background are taken into account. Hennerdal et al. (ibid.) drew the conclusion that the effect of school competition masks the effect of

contextual factors (e.g. school composition and segregation) on grading, when aggregating data to municipality level. Östh, Andersson, and Malmberg (2013) highlighted a direct effect of free school choice on increased ethnic school segregation. The socioeconomic segregation in Swedish schools has also escalated, as middle-class parents are prepared to commute longer distances and are more active in terms of school choice, primarily in the metropolitan areas (Börjesson, 2016; Östh et al., 2013).

It is, however, noteworthy that Wikström and Wikström (2005) found that rivalry between public schools in a municipality resulted in modest grade inflation. Non-native pupils received for instance higher grades in contexts with competition than in single school environments. In contrast, the grades in independent schools appeared to be highly inflated. A comparison between final course grades and national test results in upper secondary schools in Sweden 1997 disclosed that a male pupil having previously achieved averagely, would improve his position by approximately 15% if graded in an independent school.

Competition thus seems to weaken the link between final course grades and national test results. School competition is fiercer in metropolitan areas, potentially affecting grading in both public and independent schools. Vlachos (2010) also found no strong indications of larger systematic discrepancies between independent and public actors in the final years in compulsory schools.

The revised implications of the free school choice and school competition highlights the importance of Butler's and Hamnett's (2007) call for investigating school issues as an urban issue. Gentrification, segregation, and socioeconomic differences are for obvious reasons often more sizeable in big cities. Nonetheless, there are a few studies with a regional geographical perspective on the school system's effects on pupils' final grades in Sweden. Fjellman, Yang Hansen, and Beach (2018) investigated the implications of school choice for equity among independent Swedish upper secondary schools the central issue being the conflict between growing regional differences and equitable access to education. The study shows that the independent school market's idea of market mechanisms compensating for social divergencies has failed. The NAE (Skolverket, 2018b) furthermore discloses a clear correlation between performance at university colleges and pupils' place of birth.

The present study fills a gap in the Swedish school debate, by scrutinizing systematic discrepancies between national test grades and final course grades in social sciences in year 9, focusing on geographical differences. The study also illuminates the consequences for pupils in various geographical settings, which is important to recognise when extending the discussion on national school issues to an international context.

Materials and methods

The present study was founded on open data in the database of the National Agency for Education (NAE) (SIRI: Skolverket, 2016). Although data on individuals are not accessible via this database, compiled data on school level is available, proffering information on pupil composition from each school in Sweden, in terms of gender, parents' educational background, and the proportion with foreign background. In addition, there is information on the average grades in all subjects (GPA), results on the national tests in all subjects, as well as on how large a proportion of the pupil population is given a higher,

equal, or lower final course grade than the results on the national test. These three last variables are of particular interest and were used as outcome variables in Ordinary Least Squares (OLS) regression analyses. The variables comprised the share of pupils receiving a higher, equal, or lower grade compared to the national test result. It is thus possible to have anything between 0 and 100 percent on these variables at any given school, but added up, the three variables equal 100 percent. The three variables were analysed in separate regressions, since weak agreements between national test grades and final course grades might be caused by various factors that are hard to control.

Some of these variations would look similar, depending on which of the different social sciences tests the schools have been allotted, and some would vary between tests and years. This variation was controlled by dummy variables for the different tests and the year the tests were carried out. A difference between the different municipality types used in the models was however not anticipated. Significant divergencies between different types of regions would fundamentally be a sign of a geographically unequal school.

The municipalities were categorised in accordance with Sweden's municipalities' and county councils' [SKL] categorization into (1) metropolitan, (2) suburban, (3) larger cities, and (4) rural areas, respectively. Another set of key variables is the type of school. Schools were categorised into publicly run schools and two broad categories of independent schools. The empiric models distinguished between for-profit independent schools (run as stock companies) and nonprofit independent schools (run as foundations or cooperatives). This rationale was based on Vlachos' findings (2018), showing that the largest for-profit school corporations tend to give pupils a higher final course grade than they have earned, although at the upper comprehensive level, no such systematic discrepancies between public and independent schools were observed (Vlachos, 2010). The present investigation covered all schools that carried out the national tests in history, geography, religion, and civics in year 9, during the years 2015–2017.

A paired sample t-test was used to examine the dependent variables, such as pupils' results. Some features of the dependent and independent variables, i.e. key statistics and definitions, are listed in Table 1.

Collinearity statistics were employed, and tests of normal distribution of the variables were carried out, also for the residuals in post-checks.

The dependent variables comprised the share of pupils at each school receiving a final course grade (six levels F [fail] to A [highest passing grade]) above, equal to, or below the national test grade (same six-levelled scale as final course grade). Explanatory variables, deemed important for analyzing grading variations, were included in the models. The share of pupils at public schools in each of Sweden's 290 municipalities was calculated for the cohort each year, and does not represent the total school system; this variable was intended as a proxy for the independent/public school competition within municipalities. The SIRIS database provided data on the average national test grade. This variable was calculated using the same principal strategy as for the grade point average. The six levels in the grading scale were assigned a numeric value (F = 0, E = 10, D = 12.5, C = 15, B = 17.5, A = 20) and divided with the number of pupils taking the test. The GPA was calculated in the same way for each pupil as a mean score of the sixteen best subject grades.

Table 1. Descriptive statistics for variables used in the analysis. Data on school level (> 20 pupils) for all schools participating in the national tests in social sciences in year 9, 2015–2017.

Variable	N schools	Mean	Median	S.D.
Share of pupils with subject grade > grade on national test	4197	43.7	41.3	24.6
Share of pupils with subject grade = grade on national test	4197	49.1	52.3	25.4
Share of pupils with subject grade < grade on national test	4197	7.0	3.6	9.6
Share of pupils in municipality at public schools	4197	0.8	0.8	0.2
Share of foreign background pupils in school	4197	22.3	16.0	20.2
Average test grade	4197	13.0	13.2	2.2
Modelled Grade point Average (GPA)*	4197	226.6	227.0	21.7
Parents' educational level (mean of three levels at each school. 1 = compulsory school, 2 = high school, 3 = university)	4197	2.2	2.2	0.2
Categorical variables (1 = Yes)	N schools	%		
Metropolitan area	649	15.4		
Suburban areas	818	19.5		
Larger cities	1593	38		
Rural and other areas	1140	27.2		
Test in geography	1066	25.4		
Test in history	1048	25.0		
Test in civics	1031	24.6		
Test in religion	1052	25.1		
Independent school (total)	982	23.4		
Independent for-profit school	677	16.1		
Year 2015	1393	33.2		
Year 2016	1408	33.5		
Year 2017	1396	33.3		

Source: SIRIS database, the Swedish National Agency for Education. Authors' calculations.
Notes:*Modelled GPA is an estimation of the grade point average with a regression including control variables found to influence school results.

The data in the present study included a modelled version of the GPA. Modelled GPAs were calculated by using a regression model with control variables deemed to be important for school results (SIRIS: Skolverket, 2016).

Using OLS regression strategies to estimate the variations in the relation between national test grades and final course grades might present a problem. There are however currently no indications that alternative modelling strategies are better suited. Nevertheless, a set of alternative models (using multinomial logistic regressions, with alternative threshold values to separate different groups and a combined outcome variable, using an OLS regression) are summarised in the section *Robustness checks*.

Results and discussion

Table 2 displays the mean values of scores achieved at Swedish schools taking part in national tests in social sciences subjects 2015–2017. The average scores on the tests as well as the mean values of all pupils' cumulative grade point average (GPA) at the different schools were higher at independent schools in comparison with the national average. It is furthermore indisputable that the national test grades only showed a relatively marginal variation, while the GPA varied more between different types of schools.

Table 3 shows the same information as Table 2, though in accordance with the municipality type. First, the proportion of independent schools in metropolitan areas is considerably larger in comparison with other municipality types. Second, GPAs are

Table 2. Descriptive statistics. Mean test score (range 0–20), mean share of pupils with final course grade below, equal to or above test grade, social sciences subjects, 2015–2017.

	Mean test score (S.D.)	Course grade < test grade (S.D.)	Course grade = test grade (S.D.)	Course grade > test grade (S.D.)	GPA – modelled (S.D.)	Schools (N)
Public schools	12,7 (2,1)	6,7 (9,2)	49,0 (24,9)	44,2 (24,2)	221.8 (20.5)	3213
Independent nonprofit schools	14,1 (2,2)	8,5 (11,2)	50,1 (29,1)	41,3 (27,2)	246.4 (19.2)	207
Independent for-profit schools	13,8 (2,2)	7,7 (10,6)	49,2 (26,1)	43,0 (25,0)	240.2 (16.7)	677
All schools	13.0 (2.1)	7.0 (9.6)	49.1 (25.4)	43.7 (24.6)	226.6 (21.6)	4197

Source: SIRIS database, the Swedish National Agency for Education. Authors' calculations.

Table 3. Descriptive statistics. Mean national test score (range 0–20), mean share of pupils with final course grade below, equal to or above national test grade, social sciences subjects, across different geographical locations, 2015–2017.

	Mean test score (S.D.)	Course grade < test grade (S.D.)	Course grade = test grade (S.D.)	Course grade > test grade (S.D.)	GPA – modelled (S.D.)	Schools (N)
Metropolitan – public	13,0 (2,5)	5,8 (8,4)	48,4 (24,4)	45,7 (24,4)	219,5 (29,7)	381
Metropolitan – independent nonprofit	14,1 (2,5)	7,4 (9,8)	51,7 (29,2)	40,8 (26,1)	243,8 (22,7)	107
Metropolitan – independent for-profit	14,0 (2,5)	6,9 (9,1)	47,2 (24,6)	45,7 (24,6)	239,7 (20,6)	158
Metropolitan – total	13.4 (2.5)	6.4 (8.8)	48.6 (25.6)	44.9 (24.8)	228.5 (28.7)	646
Suburban/ commuting – public	13,3 (1,9)	6,2 (8,5)	50,1 (24,5)	43,5 (23,7)	229,9 (19,6)	603
Suburban – independent nonprofit	14,5 (2,1)	9,5 (11,8)	49,4 (29,8)	40,9 (29,2)	251,0 (13,5)	69
Suburban – independent for-profit	14,4 (1,9)	6,8 (9,8)	51,5 (26,6)	41,6 (25,4)	243,3 (15,4)	146
Suburban/ commuting – total	13.6 (2.0)	6.6 (9.1)	50.3 (25.3)	43.0 (24.5)	234.1 (19.8)	818
Larger city areas – public	12,5 (2,1)	6,8 (9,3)	48,8 (25,0)	44,3 (24,2)	221,1 (20,2)	1241
Larger city areas – independent nonprofit	14,0 (1,8)	9,0 (11,1)	50,0 (28,7)	40,9 (26,8)	248,1 (19,4)	96
Larger city areas – independent for-profit	13,5 (1,9)	8,9 (11,8)	47,9 (24,9)	43,0 (24,0)	239,9 (14,7)	256
Larger city areas – total	12,8 (2,1)	7.3 (9.9)	48.7 (25.2)	43.8 (24.4)	225.7 (21.3)	1593
Small cities and rural – public	12,5 (1,9)	7,2 (9,6)	48,8 (25,2)	43,8 (24,5)	218,7 (15,1)	988
Small cities and rural – independent nonprofit	13,3 (2,5)	8,3 (14,2)	47,1 (29,3)	44,4 (28,8)	240,6 (13,2)	35
Small cities and rural – independent for-profit	13,2 (2,2)	7,3 (10,3)	51,5 (28,2)	41,1 (27,1)	237,8 (16,3)	117
Small cities and rural – total	12.6 (1.9)	7.3 (9.8)	49.0 (25.7)	43.5 (24.9)	221.3 (16.6)	1140
Total	13,0 (2,1)	7,0 (9,6)	49,1 (25,4)	43,7 (24,6)	226,6 (21,6)	4197

Source: SIRIS database, the Swedish National Agency for Education. Authors' calculations.

in general higher in independent schools in comparison with the average of all schools. It thus appears as if pupils in independent schools attain better results than pupils in public schools. This is in agreement with the somewhat stronger results on national tests in independent schools. Since independent schools display high average test results, it is not surprising that a larger proportion of pupils in these schools are receiving a lower final course grade in comparison with their achievement on the national tests. Pupils simply cannot be given a higher final grade than their test result, when their test results are at the higher end of the range of test results. A slightly smaller proportion of pupils in independent schools were given a higher final course grade than what was achieved on the national test. Nonetheless, it is remarkable that *when situated in metropolitan regions*, independent schools (operated as stock companies) have a higher share of pupils attaining higher final course grades than what their accomplishments on the national tests show. This might be a sign of a more generous grading at these schools in comparison with other schools. The largest proportions of final course grades above the national test grades are however found in public schools situated in metropolitan and suburban areas. A distinct school segregation in metropolitan areas – and in municipalities close to these – might explain the conspicuous differences in achievements on the national tests in these areas, and also the comparatively large standard deviations with regards to national test grades observed in these municipality types. Nonetheless, the differences between municipality types across the variables in Table 3 are relatively modest and show that public schools across municipality types are more inclined to set a higher final course grade than the accomplished national test grade, although the standard deviations for this variable are high also among independent actors on the school market.

The GPA is meant to be a measure of how well pupils perform in various schools, and is used to compare school units. However, several drawbacks are of course evident. For instance, increasing socioeconomic and ethnic segregation in Sweden's school system has resulted in increased GPA differences between schools. Uneven distribution of pupils with various social, economic, and educational backgrounds, along with the distribution of teachers and their educational level, and also the pupil/teacher ratios, affect the GPA.

Even though the correlation between these measures was strong, 0.804 ($p < 5\%$), the modelled GPA measure was used to further control for varying compositional characteristics of the schools analysed (See SIRIS, Skolverket, 2016).

Empirical models

In the first regression analysis (Table 4), the dependent variable was *share of final course grade < national test grade*. This kind of analysis discloses whether there is anything systematic about which type of school gives a lower final course grade than the grade given on the national test. The analysis would reveal on which type of school the national tests have low legitimacy. The model has however mainly a low explanatory power, not really supporting the explanation of which type of school gives lower final course grades than national test results. Keeping this in mind, it is noteworthy that independent schools (albeit not run as stock companies) are more predisposed than

Table 4. OLS-regression. Dependent variable: share with final course grade < national test grade, social sciences test, school level data, 2015–2017.

	Model 1	Model 2	Model 3
Variable	B (S.E.M) Sign.	B (S.E.M) Sign.	B (S.E.M) Sign.
Constant	6.78 (0.17) ***	−1.06 (1.65)	−2.84 (2.43)
Independent nonprofit school (yes = 1)	1.59 (0.57) **	1.20 (0.59) *	1.25 (0.59) *
Independent for-profit school (yes = 1)	−0.60 (0.66)	−0.59 (0.64)	−0.55 (0.64)
Parents' educational level		1.06 (1.79)	1.20 (1.80)
Modelled GPA		−0.02 (0.02)	−0.02 (0.02)
Average test grade		0.79 (0.08) ***	0.79 (0.08) ***
Metropolitan areas (ref. = rural)		−1.70 (0.47) ***	−1.59 (0.54) **
Suburban areas (ref. = rural)		−1.38 (0.43) **	−1.33 (0.45) **
Larger cities (ref. = rural)		−0.07 (0.36)	0.00 (0.37)
Share of pupils in municipality at public school			1.19 (0.89)
Share of foreign background pupils			0.00 (0.01)
R	0.054	0.290	0.291
R2	0.003	0.084	0.085
S.E.M	9.616	9.227	9.228
N = 4197			

Source: SIRIS database, the Swedish National Agency for Education. Authors' calculations.
Notes: Models 2 and 3 contain dummy control variables for year and type of national test. ***/**/* Significant at the 1%/5%/10% level, respectively.

public schools to give pupils a lower final grade on a course than they achieved on the national test. The model moreover shows that schools in metropolitan areas and their surrounding municipalities are less disposed than schools in other municipality types to give pupils a lower final grade on a course than the results attained on the national test.

A tentative conclusion might be that either the national tests have lower legitimacy in the metropolitan areas, or the schools in these areas are less liable to lower the pupils' grades in relation to the accomplishments on the national tests.

In a second step, a regression analysis was carried out where the dependent variable was *share of final course grade = national test grade*. This analysis was expected to reveal which school type tends to give the same grade on the course as on the tests, and possibly also point to schools where the grades given on tests have a particularly strong influence on the final course grade.

Table 5 shows that the model has a relatively weighty explanatory power; 56% of the variations in the dependent variable may be explained through the independent variables of the model. No significant geographical variations were discerned. Interestingly, however, the proportion of pupils receiving the same grade on the course as on the tests is strongly correlated with how well the pupils are doing in general on the tests at the school. High national test grades seem to generate more pupils receiving the same final course grade. There appears to be no difference in this sense in terms of school ownership. It is however thought-provoking that schools with higher modelled GPA do not seem to comply with the national test grades. This might be interpreted as high GPAs being acquired as a result of a less strict final course grading in relation to the results on the national tests. It is also possible that high GPAs are earned through teachers grading tasks and accomplishments not measured in the tests.

In the final regression analysis, the dependent variable was *share of final course grade > national test grade* (Table 6). This model revealed that schools in the metropolitan areas are considerably more inclined to give pupils higher final course grades than they

Table 5. OLS-regression. Dependent variable: share with final course grade = national test grade, social sciences test. School level data, 2015–2017.

	Model 1	Model 2	Model 3
Variable	B (S.E.M) Sign.	B (S.E.M) Sign.	B (S.E.M) Sign.
Constant	49.03 (0.45) ***	57.70 (3.01) ***	61.28 (4.43) ***
Independent nonprofit school (Yes = 1)	1.28 (1.52)	0.65 (1.07)	0.63 (1.07)
Independent for-profit private school (Yes = 1)	−1.10 (1.75)	−1.12 (1.16)	−0.99 (1.17)
Parents' educational level		−2.19 (3.27)	−2.08 (3.29)
Modelled GPA		−0.09 (0.04) **	−0.11 (0.04) **
Average test grade		2.58 (0.15) ***	2.58 (0.15) ***
Metropolitan areas (ref. = rural)		−1.44 (0.86)	−1.03 (0.98)
Suburban areas (ref. = rural)		−0.12 (0.79)	0.06 (0.82)
Larger cities (ref. = rural)		−0.22 (0.66)	−0.11 (0.68)
Share of pupils in municipality at public school			−0.42 (1.63)
Share of foreign background pupils			−0.02 (0.02)
R	0.013	0.751	0.751
R2	0.000	0.564	0.564
S.E.M.	25.47	16.84	16.84
N = 4197			

Source: SIRIS database, the Swedish National Agency for Education. Authors' calculations.
Notes: Models 2 and 3 contain dummy control variables for year and type of national test. ***/** Significant at the 1%/5% level, respectively.

Table 6. OLS-regression. Dependent variable: share with final course grade > test grade, social sciences test. School level data, 2015–2017.

	Model 1	Model 2	Model 3
Variable	B (S.E.M) Sign.	B (S.E.M) Sign.	B (S.E.M) Sign.
Constant	44.19 (0.44) ***	43.37 (3.02) ***	41.57 (4.46) ***
Independent nonprofit school (Yes = 1)	−2.87 (1.47)	−1.85 (1.08)	−1.87 (1.08)
Independent for-profit school (Yes = 1)	1.70 (1.69)	1.71(1.17)	1.54(1.18)
Parents' educational level		1.11 (3.29)	0.86 (3.30)
Modelled GPA		0.12 (0.04) **	0.13 (0.04) ***
Average test grade		−3.37 (0.15) ***	−3.37 (0.15) ***
Metropolitan areas (ref. = rural)		3.14 (0.86) ***	2.62 (0.98) **
Suburban areas (ref. = rural)		1.50 (0.80)	1.27 (0.82)
Larger cities (ref. = rural)		0.29 (0.66)	0.11 (0.68)
Share of pupils in municipality at public school			−0.77 (1.63)
Share of foreign background pupils			0.02 (0.02)
R	0.033	0.728	0.728
R2	0.001	0.530	0.530
S.E.M.	24.64	16.93	19.93
N = 4197			

Source: SIRIS database, the Swedish National Agency for Education. Authors' calculations.
Notes: Models 2 and 3 contain dummy control variables for year and type of national test. ***/** Significant at the 1%/5% level, respectively.

accomplished on the national tests. This geographical pattern persists also after including the additional control variables *share of pupils at public schools* and *share of pupils with foreign background*.

Furthermore, schools at which the pupils are accomplishing well on the national tests, do not give higher final course grades than the attained results on the national test. The explanation for this is obviously that the highest grade on a test parallels the highest possible grade on the course. It is interesting to note that schools with higher GPA do not comply with the results from the national tests when setting the final course grades,

and that these schools are liable to set a higher rather than a lower final grade on a course than what has been accomplished by the pupils on the national tests.

Exploring the dependent variables (which were normally distributed), using a paired sample t-test ($t = -0.6$, $p = 0.00$, $n = 4197$), revealed that the discrepancies between final course grade and national test grades were significant, and this was true also when comparing public and independent schools' grading in social sciences. No significant differences were however disclosed between the four categories of municipality types.

Interestingly, as a result of *GPAs* varying geographically, using the GPA measure renders municipality type variables nonsignificant. This is because the distribution of pupils receiving higher grades are concentrated toward urban areas. However, this coincides with an uneven distribution of parents with higher socioeconomic resources and with teachers having higher educational level. These insights signified the use of a modelled version of the GPA measures as to control for effects of unevenly distributed resources within the school system.

Grading practices varying geographically is not the whole problem. The geographically *unequal outcomes* for various pupils in the school system is rather what should be at the centre of the debate. Both municipal and private actors were found to give higher grades in metropolitan areas. A plausible explanation for this is that the competition for pupils between the different actors are most severe in these areas, and generous grading becomes a factor that might attract pupils to a specific school. The liberalisation of the Swedish school consequently renders geographically unequal possibilities for pupils to pursue educational careers. This constitutes a serious democracy predicament.

The unveiled geographical differences between various types of municipalities were present even after controlling for competition, with the proxy variable share of pupils in public schools. Possibly, there were cumulative effects of competition, and these were not addressed with the variables used in the present study. Investigating alternative and co-existing influences of various aspects that increase unexplained variations in grading is advisable. Studies on grade inflation *over time* would furthermore be of great import. Does establishment of independent schools lead to public schools being swept along in the grade competition? This could be explored by looking at grading practices in cities before and after start-up of private actors.

Robustness checks

The results from the OLS regression models might be viewed as questionable. No multicollinearity was however discovered when testing for possible issues of concern, and the outcome variables and residuals followed the normal distribution. Other models were however tested in order to reach robust interpretations of the data in the study. Multinomial logistic regression models (MNL) were fitted to the data, in which the outcome variable was divided into *high shares* (> 1 S.D. above mean), *mid shares* (< 1 S.D. above and > 1 S.D. below mean), and *low shares* (< 1 S.D. below mean). In the model where the outcome variable was *shares with lower final course grades*, no shares with 1 S.D. below mean were observed. The cut-off point for the *low*-category was thus set to the mean. The three MNL-models confirmed the results in the empirical section. Notably, when examining municipality types, significant positive results in terms of high shares of final course grades were observed only in metropolitan areas. Comparing

metropolitan and suburban areas with other locations yielded significant positive results as to assigning medium shares of higher final course in relation to national test grades.

As a final robustness check, an OLS regression was conducted with a dependent variable using the deviations between *the proportion with higher final course grades* and *the proportion with lower final course grades*. This model included an extra explanatory variable, *the share receiving final course grades equal to national test grades*. The outcome variable consequently measured the inclination to set generous final course grades, while taking into account deviations in the other end of the spectra.

The Swedish National Audit Office (Riksrevisionen, 2011) argued that the best way to study grade inflation is to conduct international studies, in which the result development is compared with the grade development in different countries. Unequal grading might be the result of teachers interpreting the knowledge requirement differently, or that teachers are giving higher grades to pupils than they deserve, or that the grades are given on other grounds than the policy documents specify. The NAE (Skolverket, 2016) reported an increase of the variation in the schools' net discrepancy. In comprehensive school, this is clearly true for the subjects English, Swedish, mathematics, and the natural sciences subjects. Furthermore, the report pointed out that after introducing the new knowledge requirements and the new grading scale, the equality in grading deteriorated. From 2018, the results on the national test are particularly taken into account when setting the grade. Notwithstanding, the foundation outlined by teachers for setting the grades on the national tests poses a risk for decreased equality and reduced legal certainty, particularly as the teachers are assessing their own pupils. The government has suggested that the teaching teachers should not be the ones assessing their pupils' answers, that pupil answers should be anonymized, and that the national tests and the national assessment guidelines should be digitalised. The first digital national tests will be launched in 2022.

When the nine-year compulsory comprehensive school started in 1962, the ambition was to create a democratic and equal school system in Sweden. It appears that this ambition has more or less failed. With reforms like freedom of choice and exposure to competition since the beginning of the 1990s, the Swedish school system has undergone a fundamental change. First of all, the socioeconomic and ethnic segregation has increased, as pupils from a Swedish-born middle class tend to discard schools with pupils from a lower socioeconomic background. Furthermore, the consequence of competition between schools is grade inflation. Our argument that the reforms have the largest consequences in the metropolitan areas is in line with Butler and Hamnett (2007). The present study reveals however that the competition may well lead to a grade inflation that varies, depending on the geographical context. This means that schools that are subjected to competition – and these are to a larger degree found in the metropolitan areas – generate a grading practice that differs from the other parts of Sweden. From an international perspective, the Swedish school system is unique. Freedom of choice and public financing are not found in other countries. Neither is this the case in all parts of Sweden. This study highlights the risks with a school exposed to competition, also pointing out how the reforms carried out in Sweden have generated large regional differences in school, in the grading system, and the future equality. This constitutes a significant democracy predicament. The regional differences –

produced by the school – can have repercussions for pupils' continued studies, and have indeed had consequences for the ambition to create an equal school for all children in the whole of Sweden.

This is highlighted by Hinnerich, Höglin, and Johannesson (2015) who investigated whether pupils with different ethnic backgrounds were discriminated against in terms of how they were assessed on national tests in the subject Swedish. Randomly selected tests were marked by the pupils' own teacher, first with pupils' names showing and then again with the tests being anonymized. The results revealed that when pupils were identifiable, pupils with a Swedish background received higher marks than pupils with a foreign background. The effect of discrimination was large, approximately 10% of the mean value, or 20% of one standard deviation for the anonymous test.

If questioned whether it is positive to have freedom of choice in the education system in terms of independent/public school, many will probably answer yes, most likely because the expression *freedom of choice* is positive. If, however, the question concerns whether segregation is a good thing, or grade inflation, the answer might be different. Freedom of choice comes with a societal cost, and why is it not possible to proffer choices in the public school?

Concluding remarks

The robustness checks strengthened the conclusions drawn from the empirical models. Independent nonprofit schools and schools where pupils do well on the tests do not tend to set final course grades higher than the test results, while schools in metropolitan areas and in suburbs tend to do so, even after taking into account the composition of pupils and the ownership statuses of these schools.

All things considered, the conclusion is that competition could play a significant role when setting grades. Both municipal and independent actors have been found to give higher grades in metropolitan areas than in other types of municipalities. A plausible explanation for this is that the competition between the different actors is most severe in these areas, and generous grades become a factor that might attract pupils to a specific school. It should be noted that resources of independent for-profit schools are the same as those of all other schools. By generally offering higher grades, these schools may attract more pupils, and in consequence receive more school vouchers, thereby safeguarding their profit.

Further studies are crucial to unveil the mechanisms by which competition on the school market operates, and these must include all school subjects. Grade inflation over time would furthermore be imperative to study. Is the establishment of independent schools in the central parts of the metropolitan areas perhaps leading to competition with the public schools in the surrounding municipalities? If that is the case, this might result in these schools being swept along in the grade competition. To explore these questions, the grading practices in cities where private actors start up need to be scrutinised.

Equivalent and unprejudiced grading is a prerequisite in a democratic society. Market forces are however currently striving in the opposite direction. The prospect of attaining higher grades, coaxing pupils to choose a certain school, is an unjust and disgraceful

system, as it mostly afflicts pupils to whom the option of choosing school is not available, or who make a choice but are not admitted, or who are not residing in large cities.

Notes

1. PISA is an international study, investigating 15-year old pupils' knowledge in mathematics, science, reading comprehension, and problem solving. It is the world's largest pupil study and is conducted every third year. Thirty-three OECD-countries have participated in all four PISA-investigations since 2006, comprising reading comprehension, mathematics, and science.
2. Independent schools were divided into four groups – schools belonging to the corporations Akademia, the International English School (IES), Kunskapsskolan, and all others.
3. The new formulation went into effect 2018–06-29.
4. General grading guidelines. The School Ordinance (2017):1107, chapter 9, comprehensive school.

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