LUND UNIVERSITY
School of Economics and Management

Decomposing grade inflation in Sweden's compulsory school

Bachelor's thesis (NEKH02), spring of 2021

Authors: Sofie Liang and Elias Nilsson

Supervisor: Roel van Veldhuizen

Department of Economics, Lund University

Abstract

In Swedish media, there has been a heated debate regarding the school system. Since 1992, free schools, which are similar to voucher schools, have been permitted as a competitor to municipal schools. This was combined with a new grading system where knowledge based criteria were implemented as opposed to the previous normally distributed grading system. Due to Sweden's lack of standardised and centrally graded tests, schools have been suspected of increasing merit points (grades) without a measurable increase in knowledge in the system as a whole and in free schools in particular. Thus leading to the purpose of our thesis, which is measuring grade inflation in Swedish compulsory school.

This thesis uses the Oaxaca-Blinder decomposition method to decompose the average grade differences for both the national tests and the final merit points given to pupils in grade 9 in order to separate reasonable differences from potential grade inflation. We find that there is a potential grade inflation between free schools and municipal schools when using variables collected by Skolverket and Statistics Sweden (SCB) ranging from about
18.00 to 34.63 percent depending on the test and variables used.

Keywords:
grade inflation, municipal schools, free schools, Sweden's school system

1. Introduction

In 1992, the Swedish government permitted free schools, also called independent schools or charter schools (Proposition 1992/92:95). The free schools receive public funding but are run by private organisers, which can be either profit or non-profit organisations (Friskolornas förbund, n.d.). The purpose of the reform was to broaden education alternatives that were different from the conventional structure that municipal schools had. Private ownership in a highly trust-based evaluation system has prompted claims that free schools are incentivised to set higher grades in order to advance in a market oriented school system (Hedman, 2018).

Funding is dependent on the number of pupils, which incentivises schools to increase their capacity. In order to attract more pupils, higher grades relative to their knowledge can be set since teachers set the grade for their own pupils (Vlachos, 2010). This phenomenon of higher grades without increased knowledge is called grade inflation. The Swedish school system was also decentralized in the 1990's, transferring the responsibility to maintain the quality of secondary and upper secondary education from the state to the municipalities. Altogether, municipalities only govern municipal schools, but fund schools regardless if they are run by municipality or private organisers.

Since the beginning of 2000s, Swedish PISA scores have decreased while the average in merit points (final grade) have improved, which has raised questions (OECD, 2015). The purpose of PISA, is to measure 15-year olds (9th graders) knowledge in literacy, mathematics and science and is organised by OECD, the Organisation for Economic Co-operation and Development. The increased gap therefore implies grade inflation. Sweden did score higher in PISA after 2012. The results from 2018 are however disputed due to improper handling of the exam and are therefore not included in our study (Riksrevisionen, 2021).

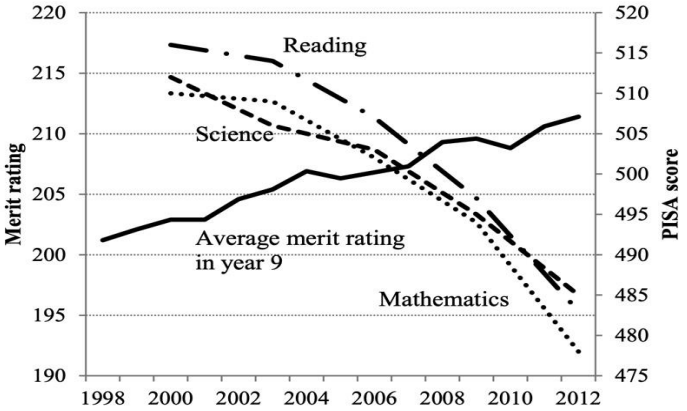


Figure 1.1 *PISA-scores compared to average merit rating (OECD, 2015, p.156)*

In a press release in 2019, Skolverket (The Swedish National Agency for Education) stated that a significant gap in grades between schools still existed (2019). Their analysis revealed that grade inflation is less likely in schools with a large number of high performing pupils compared to schools outweighed by low performing pupils.

Questions have also been raised about if grade inflation is exacerbated by schools with a profit motive to increase revenue, because of the school voucher system that funds pupils at both municipality and free schools (Vlachos, 2018). Another motive behind grade inflation could be the stiff competition between schools to attract pupils, which might prompt higher grades. However, higher grades in this context might either be due to inflated grades or improved educational quality, which is challenging to distinguish and measure. Vlachos further points out that free schools set higher grades compared to municipal schools given the pupils' level of knowledge.

Skolverket's research on school results in relation to family background pointed out that parental education and income has the most significant effects on grades (Skolverket, 2018a). Schools that have pupils with advantageous socioeconomic backgrounds tend to get higher grades compared to schools that have pupils with worse socioeconomic background. Moreover, some authors argue that the difference in results between schools are fueled by increased housing segregation and the free choice of school (Holmlund et al. 2014).

The Institute for Evaluation of Labour Market and Education Policy (IFAU), found that free schools are often established in areas that have a prominent share of families with superior socioeconomic position (Angelov & Edmark, 2016). This could refute the argument that free

schools could be the cause of grade inflation, since those areas tend to have high performing pupils to begin with. Nonetheless, there are shortcomings with this study due to the lack of data in regards to free school motives. It is difficult to prove that a private organiser has a profit motive behind establishing in those areas without sufficient information about their economic activity in terms of income and costs.

The purpose of this thesis is therefore to estimate the grade inflation in free schools in comparison to municipal schools. Since inflation is claimed to be more prominent in free schools, we will focus on presenting research that examines this notion. Considering that grade inflation cannot be directly observed, it is important to acknowledge all variables that affect pupils' grades in order to explain unobserved explanatory variables, which includes grade inflation. In order to detect possible explanatory variables to the dependent variable (merit), studying previous research to understand the multifaceted school system and how it affects the grade is crucial. This thesis analyses secondary school which will bring an extensive perspective on the subject of matter.

2. Background

The way grading works in Sweden for both national tests and merit points is twofold. Merit points is the final grade received in grade nine and is calculated based on seventeen subjects (Gymnasium, 2019). The grades range from A-F where an A is worth 20 merit points and the scale decreases in increments of 2,5 where an E is worth 10 merit points and an F is worth 0 merit points. The merit points are then summed up to a maximum of 340 merit points. The national tests are a standardised way of measuring knowledge in core subjects and are supposed to aid the teachers in grading (Skolverket, 2021). The national tests are taken by the pupils in grade 3, 6 and 9 in compulsory school. The national tests work the same way, but since they are subject specific, the points range from 0-20 in the same manner as before. Merit points are therefore the value of a certain grade.

Sweden's schools system is funded by vouchers. The vouchers are earmarked and travel with the pupils if they choose to change schools (Friskolornas förbund, n.d.). The vouchers are provided directly to the schools and the total amount is proportional to the number of pupils. This enables families to choose any school, whether it be privately or publicly run. The ambition behind the reform is to satisfy various educational preferences by diversifying

supply, considering that free schools commonly offer different methods of education or niches like languages (Vlachos, 2010).

Since the reform of 1992, the share of pupils in free schools have significantly increased (Holmström, 2020a). There has been growth in both quantity and versatility in terms of education and schools in Sweden (Holmström, 2020b). Establishing a new free school requires extensive paperwork, but before 2019, the suitability of the people behind it were not examined at all (SvD, 2018). Vlachos (2012) critiqued this lack of verification behind the motive of the private owner, stating that it is naïve to assume that free schools' main objective is education. As of 2019, the requirements to establish a free school demand the owners having legal capacity, suitability and financial stability.

Aside from being inspected by the Swedish Schools Inspectorate (Skolinspektionen), applicants will also be investigated by other state agencies (including Police Authority and Enforcement Authority) to disclose possible crimes that could affect their suitability. Since the recent regulations, there has been a decrease in applications (Aftonbladet, 2019). Skolverket (2014) has found that a few significant owners are dominating the school system, especially larger companies and groups such as Academedia, Thorengruppen, Kunskapsskolan and Internationella Engelska Skolan (IES).

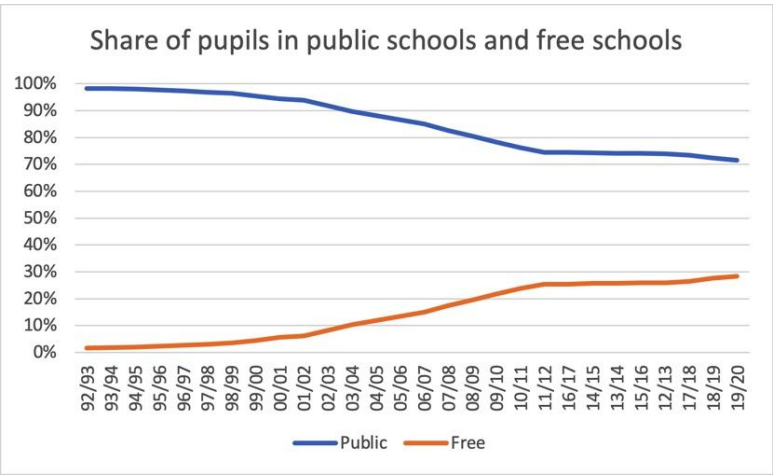


Figure 2.1 *Diagram that depicts the share of pupils in free schools and municipal schools from 1993-2020 (data from Holmström, 2020a).*

Competition has increased as another result of the reform according to Vlachos (2010). The purpose of the reform was to expand education and stimulate competition between all schools

to ultimately motivate schools to cost efficiently improve quality of education. This coincided with the decentralization of schools from state to municipality and the change from normally distributed grades to knowledge based ones. Since the implementation of knowledge based grades coincided with the reform of free schools in the 1990's, it is possible that these transitions either conceal their respective isolated effect or together amplify the grade inflation. Due to the lack of centralised and standardised tests, it is difficult to measure if the grade given is equivalent to the level of knowledge. In actuality, grading differs substantially depending on the teacher who grades (Vlachos, 2018).

Free schools have authority in selecting their pupils if demand exceeds supply, by prioritising siblings, housing proximity or queue time. On the other hand, municipal schools are obligated to principally apply the proximity principle or sibling prioritisation and not queue time according to Skolverket (2021a). In a study by multiple trade unions, free schools provided their estimate of queue time and the socioeconomic background of those in queue (Lärarförbundet et al., 2016). Queue time, a measurement of attractiveness which is positively correlated to the length of parental education, could last more than 5 years. The correlation indicates that popularity is strongly connected to the collective socioeconomic background at free schools. Highly educated parents are also presumably queuing earlier, which increases their chances of putting their child in preferred school. This is prevalent in more than one fourth of free schools, especially in the three biggest cities (Stockholm, Gothenburg and Malmö). Vlachos (2010) confirms that competition, parental education and share of pupils with foreign backgrounds are positively correlated to the share of pupils in free schools.

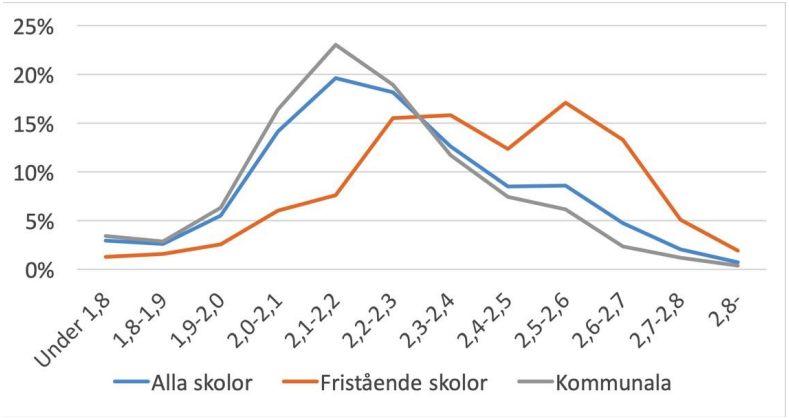


Figure 2.2 *The distribution of schools depending on the length of parental education (Lärarförbundet et al., 2016).*

Grades in subjects without national tests have been disproportionately inflated. Those subjects include artistic and practical subjects (music, arts and crafts, physical education) and some theoretical subjects (natural science and social science) (Vlachos 2010). Inflation is more prominent in artistic and practical subjects than theoretical subjects (Björklund et al., 2010). Subjects with national tests, like mathematics, Swedish and English, have had less inflation.

Sweden has national tests, a nationally standardised test whose purpose is to support equal and impartial grading, which is in fact graded locally at the school. Grading locally at the school increases the possibility for schools to use grades as a marketing tool in a competitive market. For example, there has been substantial evidence that schools in the U.S. tend to lower requirements for a certain grade when competition is stiff to be able to compete with other schools. Among few researches in the Nordic countries, there has been a similar notion that tough competition causes increased rating inflation. However, this does not indicate that free schools necessarily would be more likely to grade generously compared to municipal schools, since competition affects all schools (Vlachos, 2010).

Skolverket (2018b) reveals that pupils from free upper secondary schools perform worse at university, compared to pupils from municipal upper secondary school. Upper secondary graduates from free schools had higher merit compared to those from municipal schools. Since merit should covary with completed university credits, it was anticipated that students from free schools would perform better. On the contrary, the results show that graduates from municipal schools have a slightly bigger share of students that have completed 75 percent of the credits in their first year. The difference in share of completed credits is maintained when comparing students from the same upper secondary school program, and free upper secondary school graduates are at disadvantage in four programs that were included (economics, natural science, social science and technology). Public school graduates perform better regardless of gender, merit, program, parental education and foreign background.

Skolverket (2019) subsequently conducted an analysis about the difference in 9th graders' final grades in relation to their results in national tests. They found insignificant gaps between grades and national tests results, between different groups of pupils (categorised by gender, socioeconomic background and foreign background) within schools. Nevertheless, there are

notable differences in grading between schools with large numbers handing out both higher and lower grades than the national test. Analysis shows that free schools are more generous compared to municipal schools, but that it can solely explain a small part (1,5 percent) of the total grade gaps between schools. This could imply that free schools inflate their grades or have higher performing pupils compared to municipal schools. Another valid explanation to the difference in grading is split consensus among teachers. Skolverket concludes that different interpretations and evaluations in knowledge assessment is a weakness that has led to variation in grades.

Skolinspektionen (2021) initiated a reassessment of national tests results, between 2009 and 2019, to uphold equal grading . It appeared that the reassessment presented a different result compared to the original examiner in more than half of the reevaluated tests. Differences in results occur more frequently with text answers and is generally due to the original assessor being more generous. However, Skolinspektionen does not specify if free schools stand out. It is important to note that the result of the reassessment is not necessarily the correct answer. The outcome of this investigation was rather to identify dissimilar perception of criterias and perhaps explain unequal grading.

3. Theoretical foundations

The Swedish school system has proven to be a complicated structure to investigate in terms of identifying and preventing grade inflation. To start off, the school system has established a high degree of trust in teachers since external inspection of their consensus is absent (Vlachos, 2018). Grades are heavily dependent on the teacher's approach to the criterias, which can differ significantly, thus making grades uncertain in terms of measuring knowledge. It has been found that teachers in larger schools are less likely to inflate grades, since they represent a smaller share of the total average grade of the entire school (Wikström & Wikström, 2005). This notion predicts that free schools are more likely to inflate grades, since they generally are smaller in size compared to municipal schools.

The purpose of national tests is for teachers to assess pupils' knowledge by regulated standards in order to give more equal grades and prevent grade inflation (Skolinspektionen, 2021). However, since the national tests are locally graded, there is no guarantee that they are evaluated fairly and in unison with other schools, which ultimately undermines a part of its

purpose. It is difficult to determine if and how teachers inflate grades, since there is a notable variation in approach when evaluating knowledge, which means that inflation might occur due to misinterpretation of criterias rather than intentional grade inflation. As teachers are more considerate with text answers, inflation can occur by e.g. giving a larger share of points if the answer is only partially correct. This makes national tests an suboptimal source of the pupils' level of knowledge.

Subsequently, this raises uncertainty about the relation between national test results and grades that were positively correlated as demonstrated by Vlachos, where free schools tend to give pupils higher grades than their national test results compared to their peers at municipal schools (2010). Teachers that are generous with national test results tend to have the same approach when it comes to grades, which prompts skepticism about the information that national tests provide, making it uncertain to utilize it when measuring grade inflation (Figlio & Loeb 2010; Jacob & Levitt 2003).

Another element that makes the national tests results difficult to compare between schools is the level of preparation that might differ, e.g., giving pupils previous national tests to practice on (Skolverket, 2019). Despite these concerns, the national tests are the most rigorous and readily available metrics for our purposes.

This leads to the alleged superior incentive that might motivate schools to inflate grades – the funding that increases with every enrollment, also known as the school voucher system. Considering that most free schools are privately owned, there have been arguments about whether free schools' primary motives are driven by educational matters or with a profit motive, which is a motivation to inflate grades (Vlachos, 2010). This has been complicated to confirm due to inadequate knowledge about their financial operation. Free schools are not considered to be public authorities and are therefore not obligated to release annual financial reports (Friskolornas riksförbund, n.d.). It seems that the combination of private ownership and concealed distribution of revenue has led to raised suspicions about free schools inflating grades.

Free schools' tendency to establish themselves in municipalities that have a prominent share of families with advantageous socioeconomic backgrounds as stated by Angelov & Edmark (2016), might also evoke the argument that they perhaps have a motive other than education.

It is evident that some socioeconomic variables have proven to be beneficial in regards to grades, such as parental education, accumulated income and foreign background. Previous research has shown that free schools are more likely to have pupils of higher socioeconomic background and therefore have an overall beneficial composition of backgrounds which should result in higher grades. However, since it has been indicated that grades are becoming more dependent on the school's overall socioeconomic status composition, it might lessen the significance of the individual's own socioeconomic background Skolverket (2018a). That theoretically implies that a pupil with lower socioeconomic status would get higher grades if put in a school of overall high socioeconomic status and vice versa.

In the end, schools are equally competing for customers, in the form of parents and pupils. Since grades represent quality, schools can improve prestige by either investing in educational quality or solely feign high grades. As previously mentioned, there are few regulations that limit ways for schools to establish themselves as creditable, especially when incentives are so accessible. It is anticipated that there is a certain degree of grade inflation in the Swedish school system, since the benefits of the incentives outweigh the little to no repercussions of inflating grades, since good grades seem to be in everyone's favor.

4. Previous research

4.1 Free schools in correlation to merit and national tests

Vlachos (2010) investigated grade inflation for Konkurrensverket (Swedish Competition Authority), by considering the correlation between average merit points and national test results. The impact of competition was defined in relation to the increased share of free schools. Vlachos used components such as population and socioeconomic background to keep constant in the regression analysis. However, there are non-observable aspects that might covary with variables of interest, such as quality of education and political climate that affects grades and establishment of free schools respectively. Isolating a strict causal effect of competition in regards to grades is therefore difficult, or almost impossible, to conclude without sufficient data.

Currently, increased competition in correlation to increased share of free schools is insignificant in terms of grades. This could be due to a significant expansion of municipal

schools, which is positively correlated to increased share of pupils with top grades. Vlachos states that free schools had generous grading in the 2000's, but differences in grades between free schools and municipal schools are more insignificant in recent times. Although there is a gap, it is not necessarily caused by generous grading in free schools. For example, the higher grades could depend on high quality of education which is hard to measure. It has been stated by Vlachos that the study probably underestimates the true impact of competition regarding grade inflation.

4.2 Parental education in correlation to grades

Skolverket (2018a) studied the significance of family socioeconomic background, correlated to school results by observing three aspects: parental education, accumulated income and degree of social security allowance . These aspects were examined with the share of foreign born pupils taken into consideration, since there has been a significant influx of migrants in recent years.

According to their results, level of parental education is the most significant variable in correlation to grades. There has been increased significance in regards to accumulated income in relation to school results, whereas level of education has been constant. The increased significance of income and socioeconomic status in general, could possibly be due to the increase of foreign born families.

The difference in results between schools is, according to the study, caused by segregation between schools in terms of socioeconomic status. A pupil, regardless of background, that attends a school with an overall advantageous socioeconomic background composition, tends to perform better. However, the segregation of schools only partially explains the increased difference in results during the 2010's, which could be due to excluded factors such as grade inflation, increased immigration, additional background information (age of family members, number of siblings, marital status etc.) and factors that are impossible to measure (study motivation, parental support).

Also, there is evidence to suggest that some immigrant groups have higher academic expectations on their children, but this varies from culture to culture (Hao, L., & Bonstead-Bruns, M., 1998). Previous research by Plomin & Deary (2015) shows that IQ is

highly hereditary. If we believe that people with higher IQ perform better in academic circumstances, their future children will inherit a higher IQ and therefore also perform better in academic circumstances.

4.3 Parental education in correlation to free schools.

As opposed to municipal schools, free schools are permitted to use queueing as a selection for whom to admit if demand exceeds school capacity. This selection mechanism is connected to previous research in the paragraphs above about pupils at free schools having more educated parents on average, which in turn corresponds to pupils receiving higher grades. Lärarförbundet et al. (2016) found a positive correlation between educated parents and queue length. This suggests that popular free schools are selected by more educated parents which might partly explain why free schools receive higher grades on average.

Selection by queueing is advantageous for families that actively decide on school enrollment early on, since it improves the odds of being granted their school of choice. Because free school parents are more educated on average, this indicates that those who stand in line early are the well educated guardians. This could be a consequence of asymmetric information. As a result, pupils that have parents with similar length of education are gathered at free schools, which ultimately leads to a high total average of grades. On the other hand, municipal schools are restricted to primarily the proximity principle unless siblings already are involved.

For this reason, higher grades at free schools could be a result of the positive correlation between parental education and grades, and that their children are more likely to enroll at free schools. In other words, the grade inflation that is said to be more frequent at free schools, might partly be due to better knowledge among pupils since it is hard to distinguish inflation from knowledge.

4.4 Measuring grade inflation

Nordin et. al. (2019) states in their working paper that grade inflation exists in many countries and is often measured by the share of students that reach the top grade. This is also confirmed by Vlachos (2016) whose figures show the positively skewed grade distribution from when Sweden changed from a normally distributed grading system to a criterion based one.

Vlachos (2018) also uses the results in mathematics on the national test as a check for the other grades due to the reliability across schools being higher.

Sahlgren et. al. (2020) deploy a value added method when analysing The International English School (IES). By examining the difference in national tests between 6th and 9th grade in the same schools, idiosyncrasy is accounted for. They find that IES has a statistically significant higher value added compared to both other free schools and municipal schools, even when only analysing only municipalities where the IES has established schools.

Skolverket (2019) concludes that there is a significant variation in standard deviation in terms of grading among schools when comparing national test results and grades in all subjects . In order to estimate the deviation in subjects without national tests, the standard deviation and distribution effect of the subjects with national tests was applied to those subjects. That way, variation in grades in relation to national tests was possible to measure in other subjects that were more likely to be inflated, especially in non-theoretical subjects.

In all, grade inflation has been estimated in Sweden on numerous occasions. However, we were unable to find research papers that decompose the difference in grades into explanatory factors and potential inflation.

5. Method

The data regarding grades and variables was collected from Skolverket's database SIRIS (Skolverket, 2021b) which receives its data from Statistics Sweden (SCB). Since we are examining the national tests as a whole, the arithmetic average for the tests in English, Swedish and maths was calculated for the regression. The school year of 2018/2019 was used due to there being no later complete publication. In order to separate potential grade inflation from the factors of *parental education, foreign background, degree pedagogy* and *pupils per teacher*, a special technique called the Oaxaca-Blinder Decomposition method was deployed.

The Oaxaca-Blinder decomposition method is often used to analyse wage differentials between gender and ethnicity by separating qualifications, like work experience and years of schooling, from potential discrimination (Oaxaca & Ransom, 1994). By substituting the inputs with relevant variables, our method is able to differentiate quality improvements and

pupil composition from potential grade inflation when average grades are compared between free schools and municipal schools.

By treating the average free school as a municipal school by changing the free school's beta estimates to those of the municipal school, the grade difference between free schools and municipal schools can be divided into explanatory factors and potential inflation. If a difference occurs between the average free school's actual average grade and its predicted grade as a municipal school, we label this potential grade inflation. Given that all relevant quality and pupil factors are accounted for, the difference is only inflation. However, due to humility in our ability to gather all relevant information and the fact that everything is not documented, the potential difference is likely not all inflation. For example, we do not know how well the teachers teach, the cultural expectation for scholastic achievements and other unobservable values. In all, the Oaxaca-Blinder decomposition method will asymptotically reach the true level of inflation given perfect information and data.

The following OLS-equation was used for the test score on the national tests and the average merit points for both municipal schools and free schools, leading to four separate regressions. The OLS was performed in Gretl.

$$Test\ score = \beta_1 + \beta_2\,(degree\ pedagogy)_i + \beta_3\,(foreign\ background)_i + \beta_4\,(pupils\ per\ teacher)_i + \beta_5\,(parental\ education)_i + \varepsilon_i$$

Where

- Degree pedagogy is the share of teachers with at least a bachelor's degree in pedagogy.
- Foreign background is the share of students either not born in Sweden or born in Sweden with one or two parents born abroad.
- Pupils per teacher is the number of students in a school divided by the number of teachers.
- Parental education is the share of the pupils' parents with tertiary education.

In order to trust both the coefficients and p-values, the data needs to satisfy the Gauss-Markov assumption which makes the OLS BLUE (Best Linear Unbiased Least Squares). This suggests that the data needs to be random, linear, homoscedastic, exogenous and non-collinear. All the Gauss-Markov assumptions are rarely fulfilled at once with real world

data and proper countermeasures were taken when problems with the assumptions arose. The limitations in data and method are later discussed in this thesis.

6. Results

Using the aforementioned regression equation, the following outputs were received. Note that Skolverket does not include data on average test scores based on less than 10 pupils which decreases the number of schools with complete data to 290 free schools and 1128 municipal schools. In total, there are 3 982 compulsory municipal schools and 823 compulsory free schools (Skolverket, 2020c), but all of these do not have year 9 students. Also, some free schools are not obliged to share certain information which most notably The International English School (IES) with its 28 000 pupils does not. This likely skews the results since smaller schools probably are disproportionately excluded. The tables below will later be discussed in chapter 7.1.

1. Average national test scores in grade 9 for municipal schools (robust standard errors in parenthesis, n = number of schools).

Variable	**Coefficient**	**Standard error**	**p-value**
Constant	8.88857	0.229909 (0.274974)	1.33e-208 *** (1.37e-162 ***)
Degree pedagogy	0.549523	0.253748 (0.309001)	0.0306 ** (0.0756 *)
Foreign background	0.0391915	0.177873 (0.238641)	0.8257 (0.8696)
Pupils per teacher	0.0238449	0.0116935 (0.0163648)	0.0417 ** (0.1454)
Parental education	5.99757	0.256938 (0.304743)	1.46e-98 *** (2.78e-35 ***)

Figure 6.1 *(n=1128, R^2 = 0.49)*

2. Average merit score in grade 9 for municipal schools (robust standard errors in parenthesis, n = number of schools).

Variable	Coefficient	Standard error	p-value
Constant	169.709	4.07531 (4.58224)	6.87e-230 *** (8.39e-197 ***)
Degree pedagogy	0.229666	4.50490 (5.25229)	0.9593 (0.9651)
Foreign background	−11.9762	3.16723 (4.34836)	0.0002 *** (0.0060 ***)
Pupils per teacher	0.355866	0.207307 (0.275454)	0.0863 (0.1966)
Parental education	98.2731	4.55587 (5.53341)	1.32e-86 *** (2.22e-62 ***)

Figure 6.2 *(n=1127, R^2 = 0.47)*

3. Average national test score in grade 9 for free schools (robust standard errors in parenthesis, n = number of schools)

Variable	Coefficient	Standard error	p-value
Constant	6.97357	0.608730 (0.740684)	3.02e-25 *** (1.67e-18 ***)
Degree pedagogy	−0.152698	0.543304 (0.625017)	0.7789 (0.8072)
Foreign background	1.13516	0.450674 (0.501281)	0.0123 ** (0.0243 **)
Pupils per teacher	0.0644844	0.0274635 (0.0337195)	0.0196 ** (0.0568 *)
Parental education	8.79031	0.615363 (0.700047)	2.78e-35 *** (4.41e-29 ***)

Figure 6.3 *(n=290, R^2 = 0.52)*

4. Average merit score in grade 9 for free schools (robust standard errors in parenthesis, n = number of schools).

Variable	Coefficient	Standard error	p-value
Constant	107.260	10.7965 (14.1724)	3.64e-20 *** (5.27e-13 ***)
Degree pedagogy	−5.96069	9.63606 (9.82313)	0.5367 (0.5445)
Foreign background	32.0091	7.993 (8.75456)	7.93e-05 *** (0.0003 ***)
Pupils per teacher	2.82540	0.487095 (0.723525)	1.76e-08 *** (0.0001 ***)
Parental education	144.723	10.9141 (12.4476)	1.39e-31 *** (7.83e-26 ***)

Figure 6.4 *(n=290, R^2 = 0.49)*

	White's test for heteroscedasticity
National test for free school	p=4.07e-06 ***
Merit score for free schools	p=4.43e-09 ***
National test for municipal schools	p=1.10e-22 ***
Merit score for municipal schools	P= 7.77e-24 ***

Figure 6.5 *White's test for heteroscedasticity*

Because all the heteroscedasticity tests were statistically significant, the robust standard errors were included. This does not affect the coefficients that are still assumed to be unbiased and consistent.

6.1 Calculating the potential grade inflation

The Oaxaca-Blinder decomposition method gives us the following result presented in the table when the free schools are treated as municipal schools. The potential inflation in percent is calculated by the following equation:

$$Potential\ inflation\ (\%)\ = \frac{avg.\ grade\ free\ school - predicted\ grade\ free\ school}{avg.\ grade\ free\ school - avg.\ municipal\ school\ grade}$$

The potential inflation in percentage points is simply the potential inflation in percent multiplied by the grade differences in percent between free and municipal schools. The predicted grade is calculated by swapping the betas from the regressions as discussed earlier.

	Average grade: Free school	**Average grade: Municipal school**	**Difference in grades**	**Predicted grade for free schools**	**Potential inflation in percent**	**Potential inflation in percentage points**
National test	13.93	12.82	1.12 (9.9%)	13.66	24.37 %	2.12 p.p
Merit points	246.20	223.96	22.24 (8.7%)	238.50	34.63 %	3.44 p.p

Figure 6.6 *Oaxaca-Blinder decomposition model with all variables*

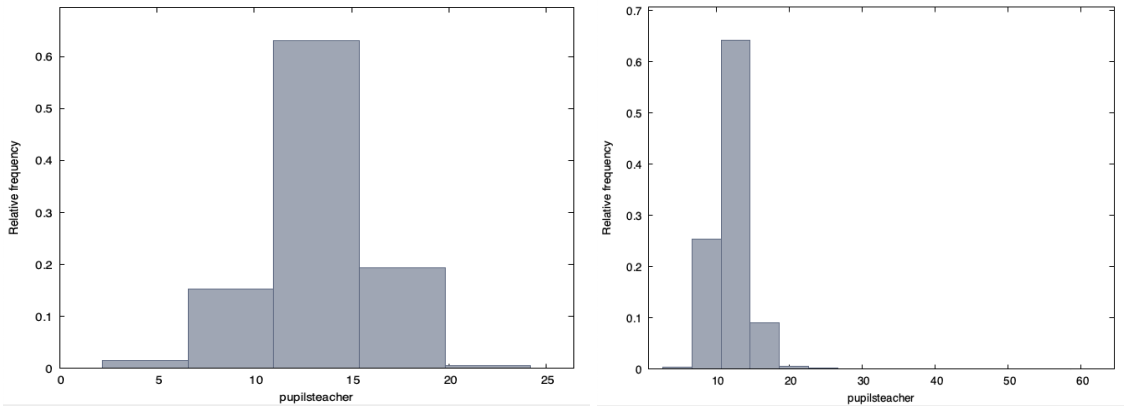
Due to *degree pedagogy* only being significant in the regression on national test scores for municipal schools (zero significant tests if robust standard errors are used), another Oaxaca-Blinder decomposition table is reasonable to include where the aforementioned variable is excluded. The OLS tables for the remaining variables *foreign background, pupils per teacher* and *parental education* are shown in the appendix.

	Average grade: Free school	**Average grade: Municipal school**	**Difference in grades**	**Predicted grade for free schools**	**Potential inflation in percent**	**Inflation in percentage points**
National test	13.93	12.82	1.12 (9.9%)	13.73	18.00 %	1.57 p.p
Merit points	246.20	223.96	22.24 (8.7%)	238.53	34.49 %	3.42 p.p

Figure 6.7 *Oaxaca-Blinder decomposition without "degree in pedagogy"*

When the insignificant variable *degree pedagogy* is dropped, the potential inflation decreases from 24.37 percent to 18.00 percent for the national test and from 34.63 percent to 34.49 percent for the merit points.

There is a difficulty in excluding too many variables to show, e.g., only pupil specific qualities and educational differences, which is that endogeneity increases in the OLS. If there were more available variables that examine the two aforementioned variables, these regressions would be more trustworthy to perform.



Figures 6.8 and 6.9 *The distribution of pupils per teacher in municipal schools (left) and free schools (right).*

7. Discussion

Our findings seem to indicate that the majority of the difference in grades can be accounted for, depending on the test used. Still, there is a reasonably large share of the grade difference that cannot be explained using our variables which make them subject to being potential inflation. Alternatively, we do not capture all quality differences between schools with the available variables.

One thing to keep in mind is that municipal schools, which we use as a benchmark for free schools, likely are not free from inflation either. Since Sweden's school system lacks independent standardised tests, it is difficult to ascertain whether or not municipal schools are consistent and fair in their grading. Vlachos (2016) shows that when Sweden went from a normally distributed grading system to a criteria-based one, the normality of the grades vanished due to an increased share of students reaching higher grades. Vlachos' findings indicate that inflation is intrinsic to the system as a whole and our paper only shows the idiosyncratic inflation for free schools.

It is quite surprising to find that the variable *degree pedagogy,* which shows the share of teachers that have a tertiary degree in pedagogics, is either negative or close to zero and not

significant in any regression using robust standard errors. If one speculates, maybe the degree in pedagogy comes at the cost of another degree in the same subject. For example, an engineer might be more knowledgeable in maths than a regular maths teacher due to a greater understanding of the field. In either case, this variable is not significant and the benefit of having a university degree might not be of great importance in grade 9 since the teachers likely will at least have completed upper secondary school.

The variable *foreign background* that tells us the proportion of pupils that are either born abroad or have at least one parent from a foreign country varies quite a lot depending on the test. One might intuitively think that immigrant children (or the children of immigrant parents) from battle stricken nations have a lower overall scholastic performance due to poor education in their home country. The only tests that have negative coefficients for *foreign backgrounds are* the merit points for municipal schools. However, this is not the right way to interpret the coefficients. The coefficients show the marginal effect ceteris paribus, so when all the other variables are held constant, there is usually a benefit of having a foreign background. This could be explained by the previous research that some immigrant groups have higher academic expectations on their children as discussed in the previous research.

One might think that the numbers of pupils per teacher should be negatively correlated with the grades since the teacher will spend less time on average per pupil. The lack of significance might be attributable to the relatively small spread with 63 % of the free schools having between 11.0 and 15.4 pupils per teacher and 64 % of the municipal schools having between 10.7 and 14.7 pupils per teacher.

Unsurprisingly, highly educated parents are a strong predictor of academic success. Partly because IQ is a strong predictor for education and is also highly hereditary as per previous research. Notably, this is the only variable that tilts in the favor for the free schools. In our dataset, 68% of the free school parents have tertiary education as opposed to 52 % in municipal schools. This result, in combination with having large and significant coefficients for educated parents, is the main reason for free schools having higher grades excluding inflation. Keep in mind that many smaller schools lack data which skews the results in favour of larger schools that more often are located in bigger cities where the educational level often is higher. Despite this, previous research from a joint operation between Lärarförbundet, LO

and Lärarnas Riksförbund (2016) shows that children of highly educated parents are overrepresented in free schools.

The fact that The International English School (IES) is excluded from the data sheet, even though they had 28 000 pupils in the school year 2020/2021, is not optimal. Sahlgren et al. (2020) calculated that the IES has a value added, measured in grades, between the national tests in grade 6 and 9 that far exceeds the average free school and the average municipal schools after adjusting for municipality differences. There is of course a risk that the IES also suffers from grade inflation, but their non-existence in the data sheet likely worsens the situation for free schools.

The Oaxaca-Blinder decomposition model has a tendency to exacerbate the discrimination (or in our case, inflation) since the size of the unexplained difference shrinks only when new explanatory variables are added. As stated previously, the test will asymptotically approach the true level of inflation given perfect information and data, which we do not have.

All in all, given our data sample we are able to explain the majority of the grade differences between municipal schools and free schools and the main contributor is parental education. Despite us being able to control a large part of the difference, there is still a reasonably big share of potential inflation in the system (18.00 percent to 34.63 percent), depending on the circumstances. Also, the national tests have lower overall inflation in our decompositions. This is quite intuitive due to a teacher not being permitted to examine his or her own pupils under those circumstances.

7.1 Limitations

Sweden has approximately 4800 compulsory schools, all of which do not have year 9. All of the compulsory schools with grades 7-9 do not have class sizes that exceed Skolverket's threshold for documenting the test statistics. This skews the data to include larger schools which may or may not disproportionately exclude smaller countryside schools. We do not claim our sample to be random since we initially had all the compulsory schools in Sweden, thus eliminating the need for random sampling. Due to the aforementioned problems with disproportionate exclusions, our findings only represent the potential inflation of our dataset and not the compulsory schools as a whole.

Due to the lack of data for unobservable variables, there might also be endogeneity in the model. It is arduous to disprove endogeneity which needs to be taken into consideration when examining our regression outputs. There are remedies but they were not suitable for the scope for this thesis. If given data that is more representative of Sweden's entire school system, the results would likely be more accurate. Despite this, our results are in line with previous research that grade inflation exists and worse in free schools.

8. Conclusions

Our thesis suggests that there is evidence for potential inflation when examining the grade difference between free schools and municipal schools. The degree of inflation varies across tests and does not constitute the entire difference between free schools and municipal schools. Our findings do not reflect quality differences between the schools since both pupil composition and quality measurements were used in the decompositions. Also the thesis does not indicate inflation in the school system as a whole, but rather the relative inflation between municipal schools and free schools.

If given complete data for all Swedish schools and perhaps more unobservable variables, the results would likely be more representative and could potentially be broken down separately into quality differences and pupil composition.

9. Future research

The Swedish school system is already well researched and public debate is frequent and intense. We would suggest quantifying variables like teacher quality, different pedagogical methods and classroom environment in order to get a more fair view of the system as a whole. Also, this paper only discusses grade 9, so investigating grade 3, 6 and upper secondary school would contribute to the understanding of Sweden's school system as a whole.

Sources

Aftonbladet (2019). Rekordfå ansökningar om att starta friskola https://www.aftonbladet.se/nyheter/a/QoMbpx/rekordfa-ansokningar-om-att-starta-friskola [2019-05-25]

Angelov, N. & Edmark, K. (2016), *När skolan själv får välja - om friskolornas etableringsmönster* (Rapport 2016:14). Uppsala: Institute for Evaluation of Labour Market and Education Policy (IFAU). https://www.ifau.se/globalassets/pdf/se/2016/r-2016-14-friskolors-etableringsmonster.pdf

Björklund, A., Fredriksson, P., Gustafsson, J., Öckert, B., (2010). *Den svenska utbildningspolitikens arbetsmarknadseffekter: vad säger forskningen?* (Rapport 2010:13). Uppsala: Institute for Evaluation of Labour Market and Education Policy (IFAU). https://www.ifau.se/globalassets/pdf/se/2010/r10-13-den-svenska-utbildningspolitikens-arbetsmarknadseffekter-vad-sager-forskningen.pdf

Figlio, D., Loeb, S., (2010). School accountability. Handbook of the economics of education, 3. Elsevier B.V.

Friskolornas riksförbund (no date). Värt att veta för dig som funderar på att starta en fristående skola. https://www.friskola.se/starta-driva-2/starta-driva/vart-att-veta-for-dig-som-funderar-pa-att-starta-en-fristaende-skola/ [2021-05-26]

Gymnasium (2019). Final School Grades A-F. *Gymnasium*. https://www.gymnasium.se/om-gymnasiet/gymnasiebetyg-engelska-17252 [2021-06-04]

Hao, L., & Bonstead-Bruns, M. (1998). *Parent-Child Differences in Educational Expectations and the Academic Achievement of Immigrant and Native Students. Sociology of Education,* 71(3), 175-198. doi:10.2307/2673201

Hedman, E. (2018). Professorn: Glädjebetyg är vanligare på friskolor. *Skolvärlden*. https://skolvarlden.se/artiklar/professorn-gladjebetyg-vanligast-pa-friskolor [2020-06-04]

Holmlund, H., Häggblom, J., Lindahl, E., Martinson, S., Sjögren, A., Vikman, U., Öckert, B. (2014). *Decentralisering, skolval och fristående skolor: resultat och likvärdighet i svensk skola* (Rapport 2012:25). Uppsala: Institute for Evaluation of Labour Market and Education Policy (IFAU). https://www.ifau.se/globalassets/pdf/se/2014/r-2014-25-decentralisering-skolval-och-friskolor.pdf

Holmström, C. (2020a). Elever i friskola. *Ekonomifakta*. https://www.ekonomifakta.se/Fakta/Valfarden-i-privat-regi/Skolan-i-privat-regi/Elever-i-friskola/ [2020-09-09]

Holmström, C. (2020b). Friskolor i Sverige. *Ekonomifakta*. https://www.ekonomifakta.se/fakta/valfarden-i-privat-regi/skolan-i-privat-regi/antal-friskolor-i-sverige/ [2020-09-09]

Jacob, B., Levitt, S., (2003). Rotten apples: An investigation of the prevalence and predictors of teacher cheating. *Quarterly Journal of Economics*, 118 (3), p. 843-877.

Lärarförbundet, Lärarnas riksförbund & LO (2016) *Ge alla elever samma chans* https://res.cloudinary.com/lararforbundet/image/upload/v1455183463/0bb3439d9a43eb38ddf8d37db4e38d57/friskoleval_v_7.pdf

Nordin, M., Heckley, G., Gerdtham, U. (2019). *The Impact of Grade Inflation on Higher Education Enrolment and Earnings*. Working Paper 2019:1. Lund: Lund University Department of Economics and Management. https://project.nek.lu.se/publications/workpap/papers/wp19_1.pdf

Oaxaca, R L, Ransom, M R (1994), On discrimination and the decomposition of wage differentials, Journal of Econometrics, volume 61, issue , p. 5-21, North-Holland https://www.sciencedirect.com/science/article/abs/pii/0304407694900744

OECD (2015). Improving schools in Sweden: An OECD perspective. Paris: OECD. p.156 https://www.oecd.org/education/school/Improving-Schools-in-Sweden.pdf

Plomin & Deary (2015), *Genetics and intelligence differences: five special findings, Mol Psychiatry*, p.p. 98–108 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4270739/
Sahlgren, H, Jordahl, G, Jordahl H (2020). *The Value Added of Internationella Engelska Skolan*. IFN Policy Paper nr 89. Stockholm: Institutet för Näringslivsforskning. https://www.ifn.se/publikationer/policy-papers/2016-2020/89/

Riksrevisionen (2021), *Otillräcklig uppföljning av Pisa-undersökningens genomförande 2018 https://www.riksrevisionen.se/om-riksrevisionen/kommunikation-och-media/nyhetsarkiv/2021-04-29-otillracklig-uppfoljning-av-pisa-undersokningens-genomforande-2018.html*

SFS 1991/92: 95. *Om valfrihet och fristående skolor*. Stockholm: Utbildningsdepartementet. https://www.riksdagen.se/sv/dokument-lagar/dokument/proposition/valfrihet-och-fristaende-skolor_GF0395

Skolinspektionen (2021). *Ombedömning av nationella prov 2019* (Diarienummer 2019:503). Stockholm: Skolinspektionen

Skolverket (2014). *Privata aktörer inom förskola och skola* (Rapport 410). Stockholm: Skolverket
https://www.skolverket.se/getFile?file=3307

Skolverket (2018a). *Analyser av familjebakgrundens betydelse för skolresultaten och skillnader mellan skolor* (Rapport 467). Stockholm: Skolverket
https://www.skolverket.se/download/18.6bfaca41169863e6a65d200/1553967875648/pdf3927.pdf

Skolverket (2018b). *Från gymnasieskola till högskola* (Rapport 466). Stockholm: Skolverket. https://www.skolverket.se/getFile?file=3902

Skolverket (2019). *Analyser av likvärdig betygsättning mellan elevgrupper och skolor* (Rapport 475). Stockholm: Skolverket. https://www.skolverket.se/publikationer?id=4035

Skolverket (2020). *Elever och skolenheter i grundskolan läsåret 2019/2020.* https://www.skolverket.se/download/18.6b138470170af6ce9149d0/1585039519111/pdf6477.pdf

Skolverket (2021a). *Välja förskoleklass och grundskola eller grundsärskola.* https://www.skolverket.se/regler-och-ansvar/ansvar-i-skolfragor/valja-forskoleklass-och-grundskola-eller-grundsarskola [2021-05-26]

Skolverket (2021b). SIRIS Database https://www.skolverket.se/skolutveckling/statistik/sok-statistik-om-forskola-skola-och-vuxenutbildning?sok=SokA

Skolverket (2021c), *Nationella prov* https://www.skolverket.se/innehall-a-o/landningssidor-a-o/nationella-prov

Svenska Dagbladet (2018). Snart tuffare krav på friskoleägare. *Svenska Dagbladet.* https://www.svd.se/snart-tuffare-krav-pa-friskoleagare [2018-05-25]

Vlachos, J (2010). *Betygets värde* (Uppdragsforskningsrapport: 2010:6). Stockholm: Konkurrensverket. https://www.konkurrensverket.se/globalassets/aktuellt/nyheter/betygets-varde.pdf

Vlachos, J (2016), Hur ser betygsinflation ut? *Ekonomistas*. https://ekonomistas.se/2016/04/27/hur-ser-betygsinflation-ut

Vlachos, J (2018). *Trust-based evaluation in a market-oriented school system*, IFN Working Paper No. 1217. Stockholm: Research Institute of Industrial Economics (IFN). https://www.econstor.eu/bitstream/10419/183446/1/wp1217.pdf

Vlachos, J. (2012). Är vinst och konkurrens en bra modell för skolan? *Ekonomisk debatt*, nr 4. https://www.nationalekonomi.se/sites/default/files/legacy/40-4-jv.pdf

Wikström, C., Wikström, M., (2005). Grade Inflation and School Competition: An empirical analysis based on the Swedish upper secondary schools. *Economics of Education Review*, vol.24, no.3, pp. 309-322. https://www.sciencedirect.com/science/article/abs/pii/S0272775704000895?via%3Dihub [2021-05-25]

Appendix

OLS tables excluding *degree in pedagogy* using only robust standard errors (n = number of schools).

The following OLS equation was estimated

$$Test\ score = \beta_1 + \beta_2\,(foreign\ background) + \beta_3\,(pupils\ per\ teacher) + \beta_4\,(parental\ education) + \varepsilon$$

1. National test for municipal schools

Variable	**Coefficient**	**Robust standard error**	**p-value**
Constant	9.21358	0.212586	4.69e-242 ***
Foreign background	0.0414123	0.239175	0.8626
Pupils per teacher	0.0223436	0.0175713	0.2038
Parental education	6.20315	0.285296	8.94e-88 ***

Figure 9.1 *(n=1128, $R^2 = 0.49$)*

2. Merit grade for municipal schools using only robust standard errors (n = number of schools)

Variable	Coefficient	Robust standard error	p-value
Constant	169.845	3.40525	4.52e-287 ***
Foreign background	0.0414123	4.34720	0.0060 ***
Pupils per teacher	0.355252	0.273724	0.1946
Parental education	98.3591	4.83126	1.13e-78 ***

Figure 9.2 *(n=1127, R^2 = 0.47)*

3. National test for free schools using only robust standard errors (n = number of schools)

Variable	Coefficient	Robust standard error	p-value
Constant	6.92364	0.724824	6.03e-19 ***
Foreign background	1.15473	0.496144	0.0206 **
Pupils per teacher	0.0635263	0.0335107	0.0590 *
Parental education	8.72335	0.604594	7.83e-36 ***

Figure 9.3 *(n=290, R^2 = 0.51)*

4. Merit grade for free schools using only robust standard errors (n = number of schools)

Variable	Coefficient	Robust standard error	p-value
Constant	105.310	14.1099	1.02e-12 ***
Foreign background	32.7730	8.69347	0.0002 ***
Pupils per teacher	2.78800	0.720448	0.0001 ***
Parental education	142.109	10.6037	4.09e-32 ***

Figure 9.4 *(n=290, R^2 = 0.49)*