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Measurement of Socioeconomic Status as an Instrument to Study Educational Equity A Swedish Case

Kajsa Yang Hansen

Department of Education and Special Education, University of Gothenburg,
Sweden

Importance of Socioeconomic Status in Research and Policy making

- Setting the systematic goals in education;
- Monitoring the function of school system;
- Evaluating school reforms;
- Offering empirical evidences for policy-making.

Policy Changes in Swedish Educational System

- Policy changes post world war II until 1980s
- Decentralization and deregulation of the Swedish educational system
1989 – 1995:
 - Municipalities organize schooling and employ the school personnel
 - Schooling offered by independent (private) providers and municipalities
 - Free choice of schools, financed with a voucher system
 - Funding allocated as a lump sum, without central directives
 - Curricula which specified goals, but neither content, nor methods
 - A criterion-referenced grading system
- Partial recentralization 2007 –
 - More control and accountability (School inspections, grades from Grade 6; more national tests)
 - New curricula, specifying central content

Aspects of Educational Equity and Equality

Two different aspects:

- inequality in learning outcomes, measured by variation in grades across schools and municipalities;
- inequality of educational opportunity with respect to SES and migration background.

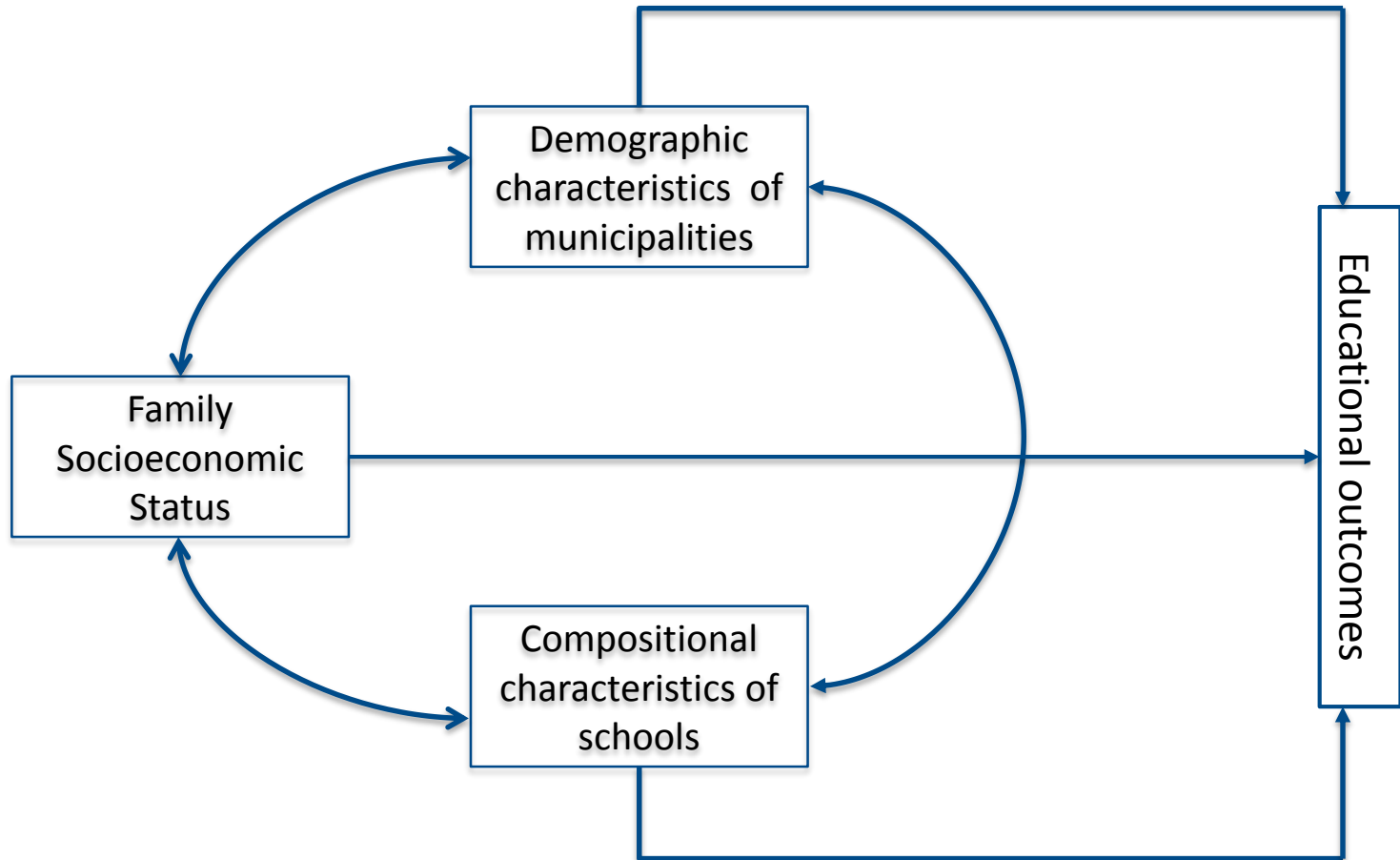
These two aspects are “theoretically and empirically linked”
(p. 408, Van de Werfhorst & Mijs, 2010).

Operationalization of socioeconomic status

- The most commonly used indicators of SES are parental education, parental occupational status and family income (The Big Three; Duncan, Featherman & Duncan, 1972);
- An expanded SES measure could include neighborhood and school resources, eligibility to free or reduced cost lunch, different home possessions, number of books at home, and ownership of different highbrow cultural items etc. (e.g., Cowan et al., 2014; Sirin, 2005).
- SES can be treated as a categorical variable as in social class, or as a continuous variable describing the social gradient of an individual.
- SES can be measured by a single indicator or by multiple indicators, or by a composite of multiple indicators.



Socioeconomic Status imposes its Effect on Academic Outcomes at Multiple levels



Evaluation through follow-up (ETF)

The Evaluation Through Follow-up (ETF) is a large cohort-sequential database with, up to today, ten cohorts, including individuals born between 1948 and 1998. Each cohort comprises about 9000 pupils, sampled to be nationally representative.

Besides response to questionnaires, test data, and school achievement from the students, information is available from parents, teachers and principals for some cohorts.

By means of the Swedish Personal Identity Number, it is possible to link to other sources of information administered by Statistics Sweden to study relations among e.g., education, occupation, income and health.

<http://ips.gu.se/forskning/forskningsprojekt/ugu>

Evaluation through Follow-up (ETF)

	Cohort	1	2	3	4	5	6	7	8	9	10
	Birth year	1948	1953	1967	1972	1977	1982	1987	1992	1998	2004
compulsory school	grade 3				1982	1987	1992	1997	2002	2008	2014
	grade 4				1983	1988	1993	1998	2003	2009	2015
	grade 5				1984	1989	1994	1999	2004	2010	2016
	grade 6	1961	1966	1980	1985	1990	1995	2000	2005	2011	2017
	grade 7	1962	1967	1981	1986	1991	1996	2001	2006	2012	
	grade 8	1963	1968	1982	1987	1992	1997	2002	2007	2013	
	grade 9	1964	1969	1983	1988	1993	1998	2003	2008	2014	
Upper secondary school	Grade 1	1965	1970	1984	1989						
	Grade 2	1966	1971								
	Grade 3	1967	1972			1996	2001	2006	2011		
	Grade 4	1968	1973								

Bold and Italic notes that there were even questionnaire data collection available.

Source: Chapter 1, History and development (p. 42) in Svensson, A. (Ed.). (2011). Utvärdering genom uppföljning. Longitudinell individforskning under ett halvsekel. [Evaluation through Follow-up: Longitudinal research of individuals in half a century](Gothenburg studies in educational sciences, nr. 305). Göteborg: Acta Universitatis Gothoburgensis.

Information Sources of Socioeconomic Classification

Population and Housing Censuses (FoB) 1960–1990:

→ Socioeconomic Classification (SEI);

Swedish education nomenclature (SUN-code)

School outcomes are from the so-called school administrative data, which consists of information about school, class, possible support efforts for example. These data are then collected annually as long as the pupils are in compulsory school.

An Example of 1967 Cohort in ETF Database: Background Variables

Birth year and month

Gender

Place of birth; County or country

Nationality child

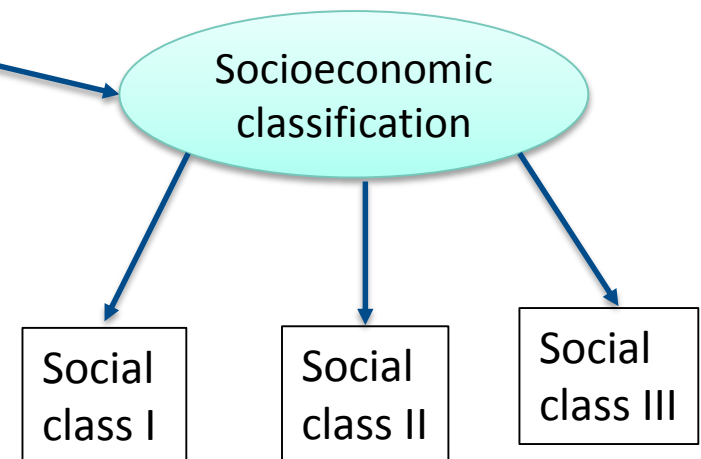
Nationality father

Nationality mother

Social background family's highest FoB80

Social background father FoB80

Social background mother FoB80

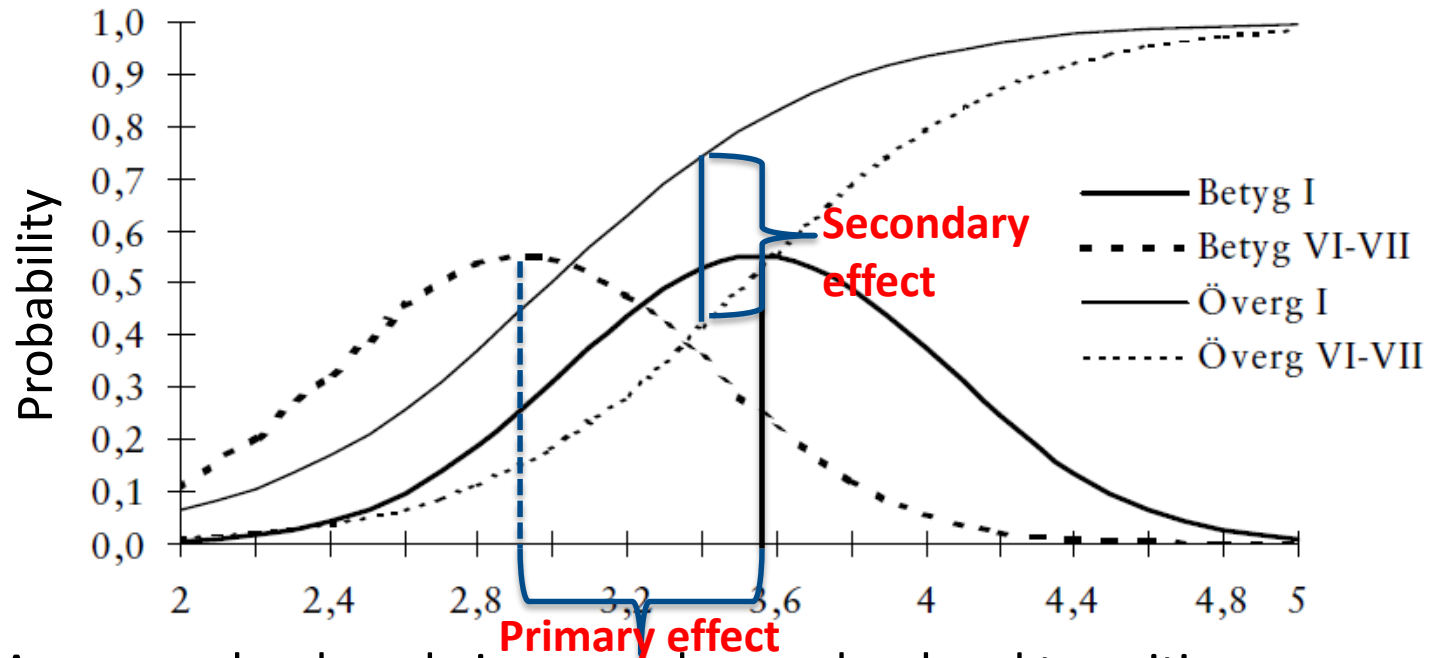


Does social class inequality in recruitment of students to upper secondary education persist?

	Man			Women		
Social group	I	II	III	I	II	III
Nature science subjects	47	28	15	36	22	12
Social science subjects	25	22	16	42	38	31
Vocasional program: techniques	8	21	31	2	5	7
Other vocational program	11	16	18	14	25	35
Specially designed program	6	7	6	5	5	4
Individual program	3	6	14	2	6	11

Choice of study orientation in upper secondary school. The material is divided by gender and social background (in %)

Why is the social selection pattern persistent?



Average school grade in compulsory school and transition probabilities to theoretical upper secondary schools for children of social class I and social group VI-VII.



Göteborg Educational Longitudinal Database (GOLD)

- "Individual Statistics" (IS) project – first data collection in 1961.
- Samples of around 9 000 students from 8 cohorts born between 1948 and 2004.
- Follow-up data collections in upper secondary school
- Data excerpts from official registries (e.g., military enlistment data, study finance information, higher education exam, and income).

Another key component of GOLD is registry data for all cohorts of 16-year-olds born from 1972 and onwards.

- family background; school achievement; higher education; study finance; municipal adult education; the Swedish Scholastic Aptitude Test; (for males) test scores from the military enlistment battery; employment; and income.

Currently the database includes information about 2.2 million persons born between 1972 and 1995, and it is continuously extended with new cohorts and updated information

Trend In Educational Inequality at individual, school and municipality levels

The SES measure is parental educational level:

- 6 categories of parental educational level when their children is 16

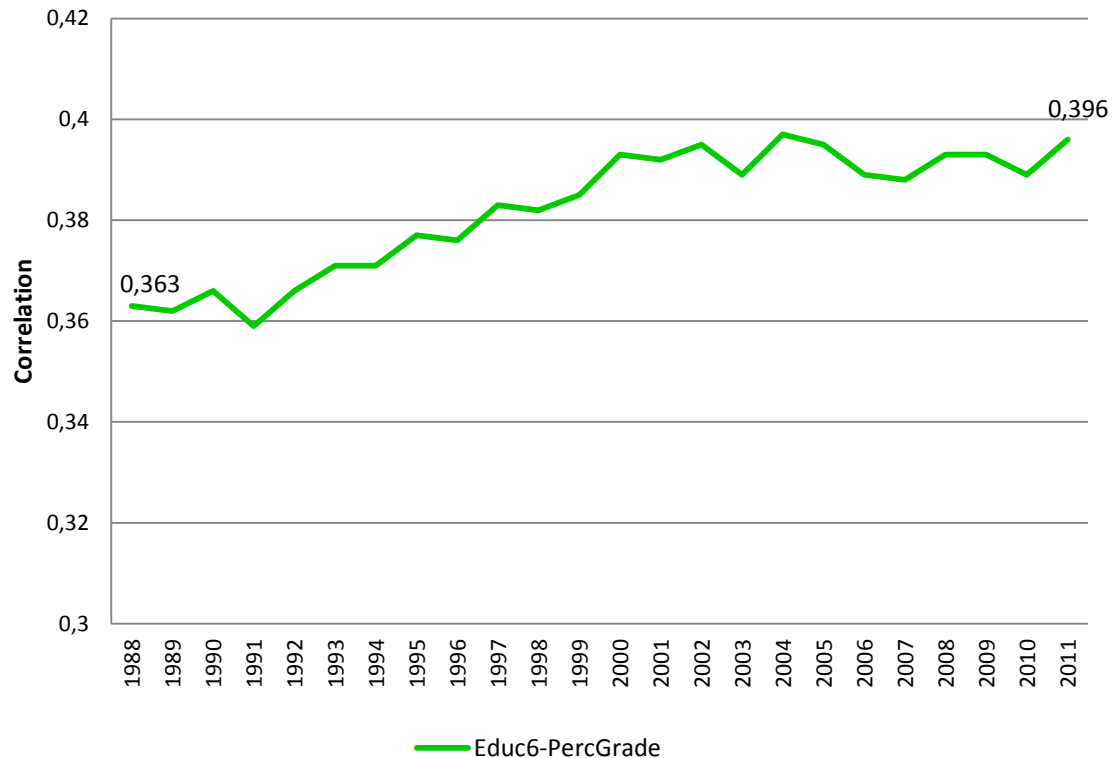
Outcome variable is student's school grade:

- Norm-referenced grades 1988 to 1997
- Criterion-referenced grades 1998 to 2014
- Percentile transformed school grade for all cohorts

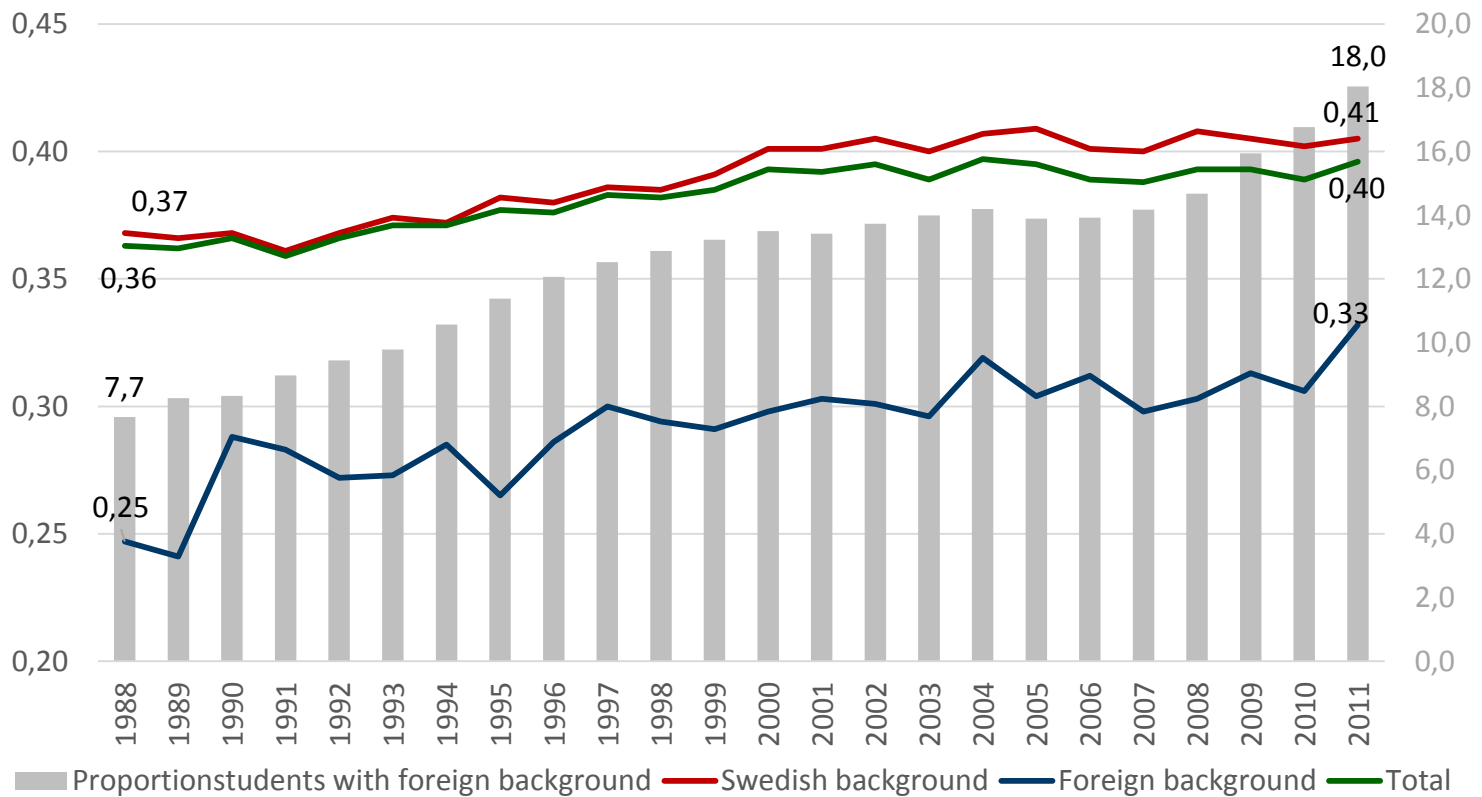
Swedish register data for cohorts between 1972 and 1996 in GOLD



Correlations between parental education and student achievement 1988 to 2011



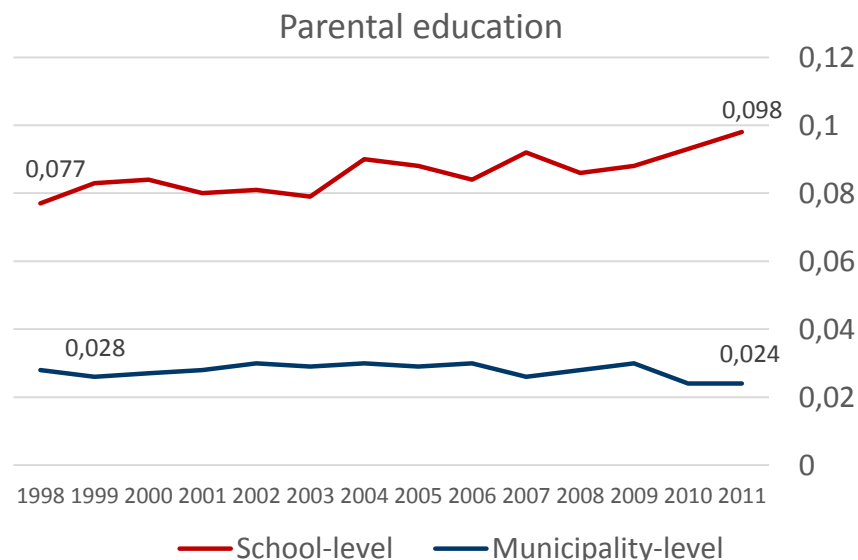
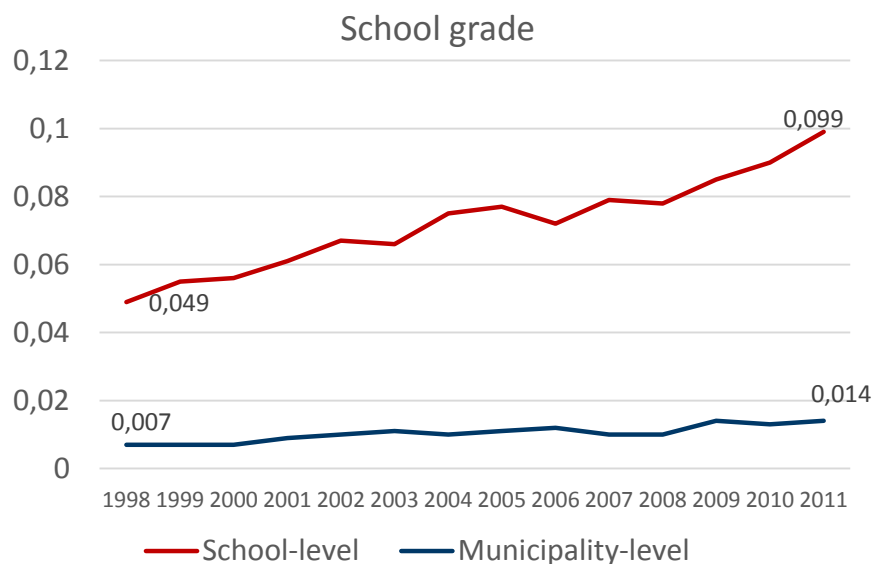
Correlations between parental education and student achievement 1988 to 2011 for students with Swedish background and foreign background.



Three-level analysis of SES effect on school grade

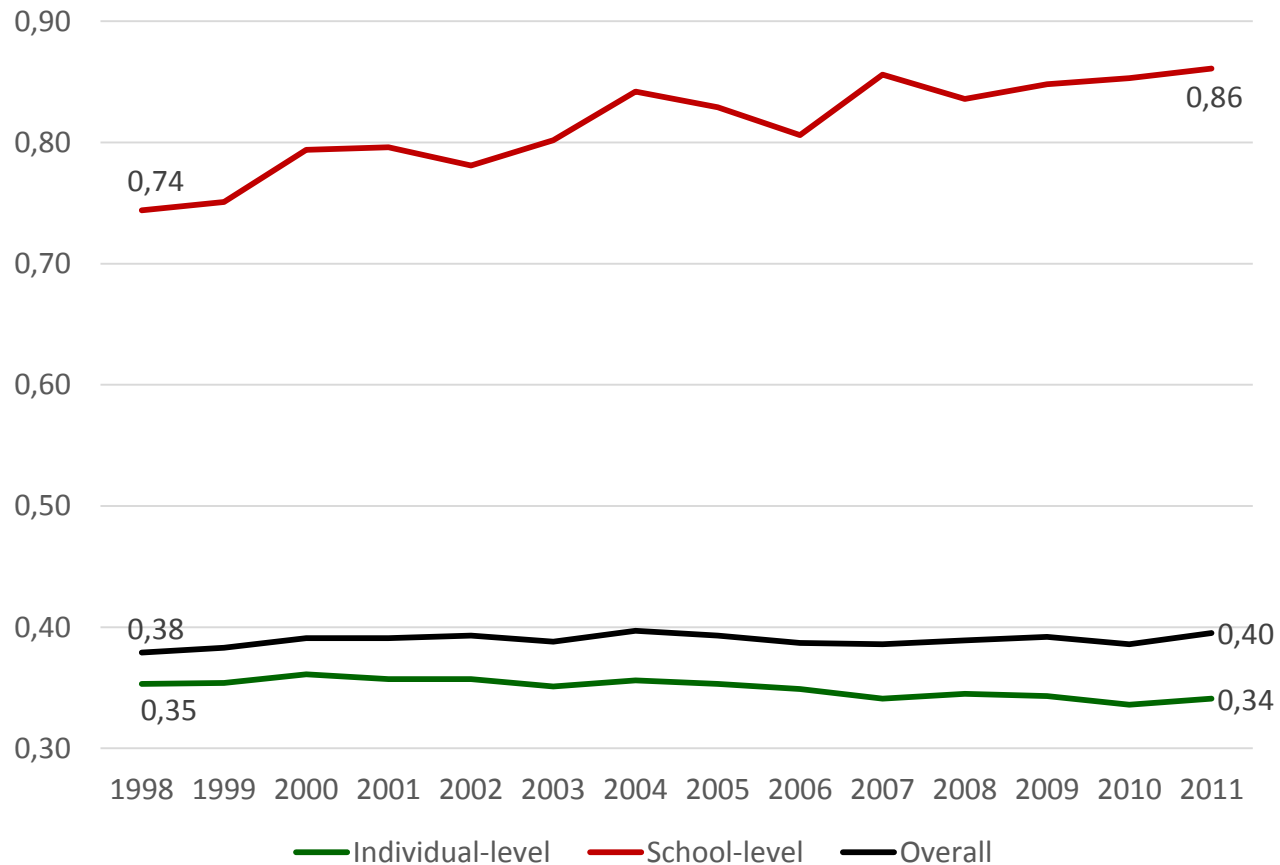
- We extended the single level model to a multilevel model by including individual, school and municipality levels simultaneously, so that we can study where exactly the changes occurred.
- Three-level model thus can decompose the total variation in School grade and parental educational level into different sources of variation according to levels of observation. A three-level model give us a chance to examine the consequences of system level reforms;
- We focused only on the percentile transformed criterion-referenced grade (1998-2011), since the norm-referenced school grade do not have much variation at higher level nationwide. 6-scaled parental educational level was used as SES indicator.

Proportion of Differences in School Achievement and Family Educational Background across Schools and Municipalities





SES-Achievement Correlation at Individual-level and School-level



To conclude

- School segregation with respect to achievement gap and parental education differences has increased over time and
- the intensified socioeconomic differences in academic achievement across different schools are the major contributions to the trend in overall SES effect on achievement.
- This raises the hypothesis that varying learning opportunities such as changing instructional time, quality and increasing emphasis on student's responsibility for self-regulated learning, may lead to intensified the educational inequality over time.

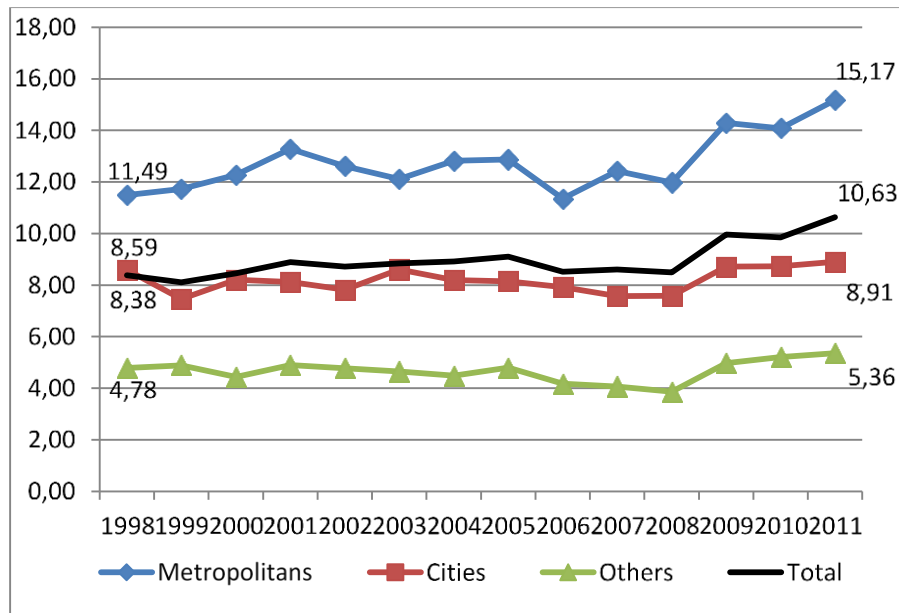
To Examine the Causes of the Changes in School Segregation

Subjects: 9th grade students who left compulsory school between 1998 and 2011.

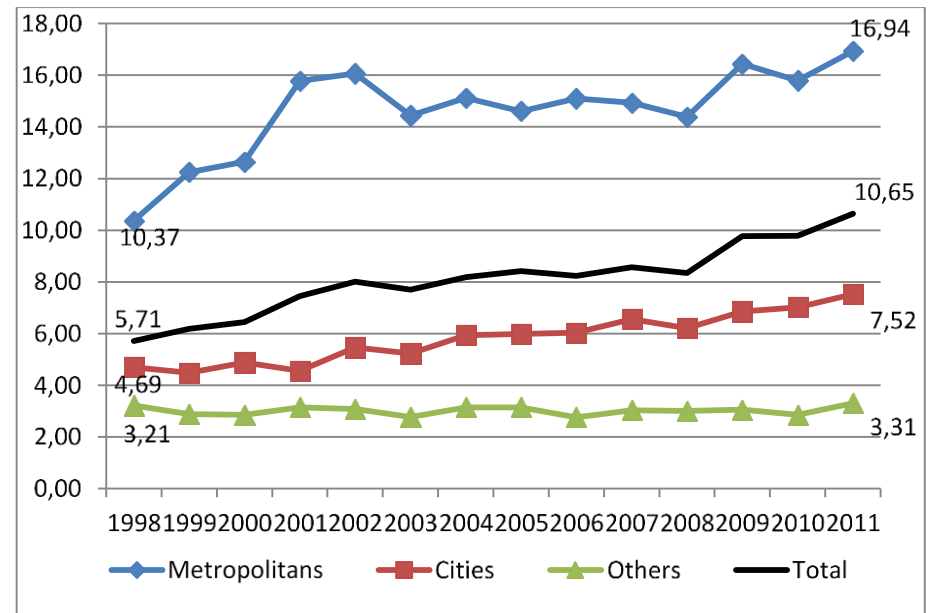
Variables:

- sum of the school grades in 16 school subjects;
- Student's parental education level;
- Student's migration background;
- Percentage of students whose parents have more than 2 years tertiary education;
- Proportion of students with migration background at school;
- Municipality types (1 = Metropolitan; 2 = Big city; 3 = Small town or others);
- **SAMS units (Small Area Market Statistics) were originally created for commercial purposes and pertain to small geographic areas with boundaries defined by homogenous types of buildings and the inhabitants.**

Changes in the between-school differences in school grades between the fictitious and actual schools across types of municipality over time.

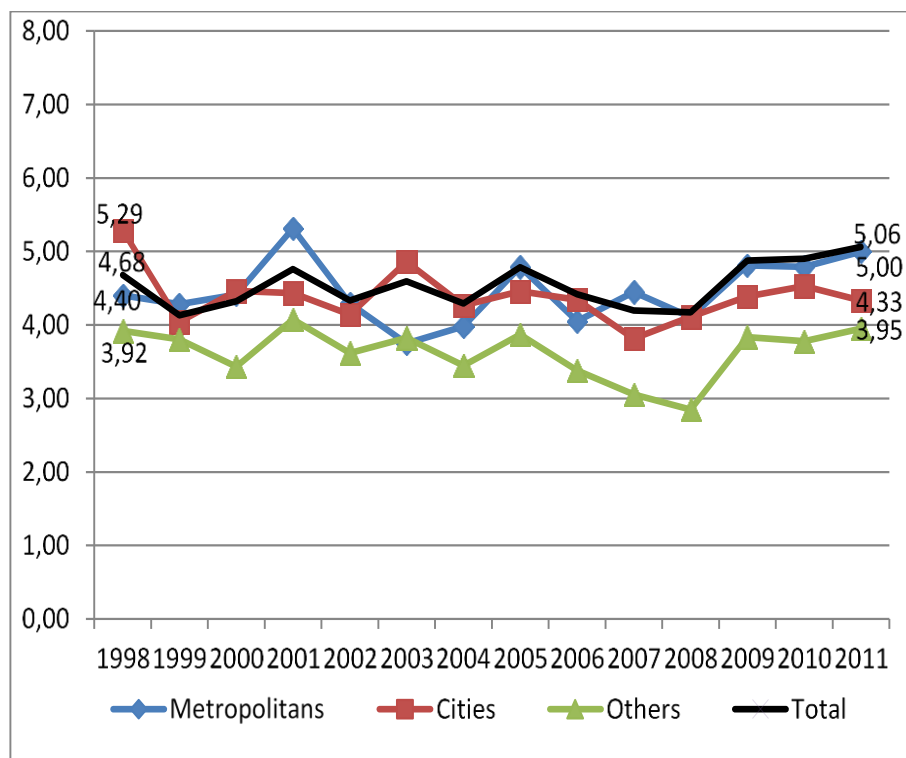


Fictitious school model

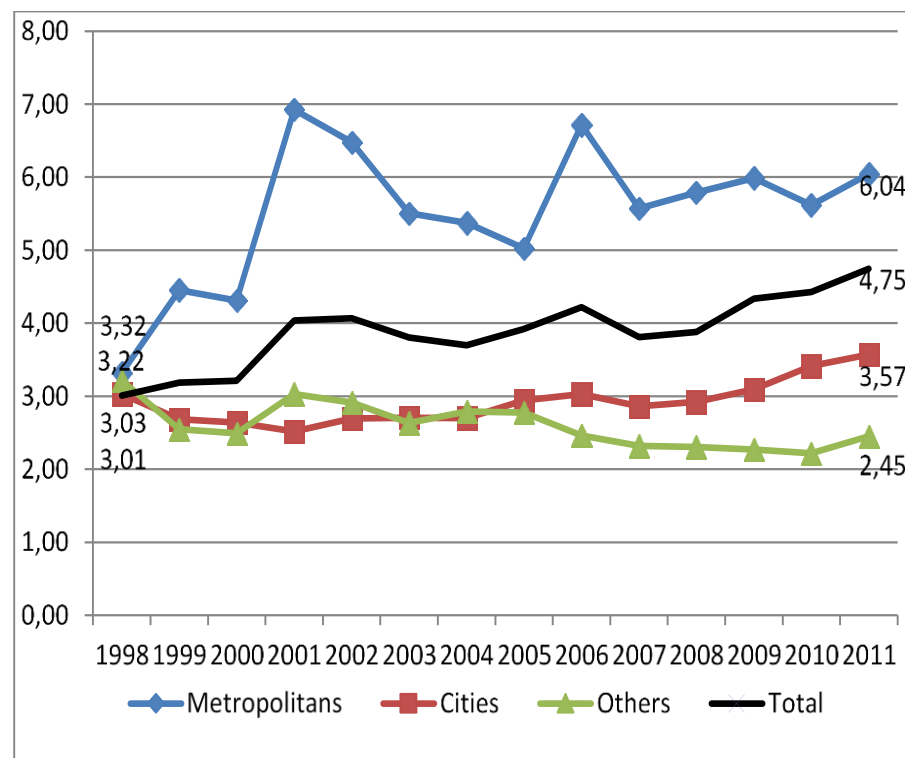


Actual school model

Changes in the between-school differences in school grades between fictitious and actual schools across types municipality over time, after controlling for student's parental education and migration background, and school intakes' parental education and migration composition.



Fictitious school model



Actual school model

Major Conclusion

School choice does contribute to the intensified segregation in Swedish compulsory school over time, beyond the effect of residential segregation.

However,

The substantial between-school differences in achievement left, after controlling for the differences in parental education and migration background at both individual and school levels may imply that school choice is a complex practices.

It may not only based on the school intake's socioeconomic and ethnic composition, other aspects, such as, a set of basic values or school culture, e.g., clear goal-orientation, enthusiastic teachers and high expectations; the pedagogical practices exercised at school and communication with school principal and staff, are also the key choice preferences.

And in the Metropolitans and big cities, these alternative preference-based choices are more pronounced due to the fact that more independent schools were established.

Centre for Comparative Analyses of Educational Achievement (COMPEAT)

COMPEAT is an infrastructure database of international large-scale studies in educational achievement, conducted by IEA and OECD before year 2000, and to support secondary analyses of these data.

Pilot Twelve-Country Study 1960

The First International Mathematics Study (FIMS64) 1961-1965

The Six Subject Survey (SSS70)

The First International Science Study (FISS) 1966-1975

The Study of Reading Comprehension 1967-1973

The Study of Literature Education 1966-1973

The Study of English as a Foreign Language 1968-1975

The Study of French as a Foreign Language 1968-1975

The Study of Civic Education 1967-1976

The Second International Mathematics Study (SIMS80) 1976-1989

The Second International Science Study (SISS84) 1979-1991

The Written Composition Study (WCS85) 1980-1988

The Reading Literacy Study (RLS91) 1985-1994

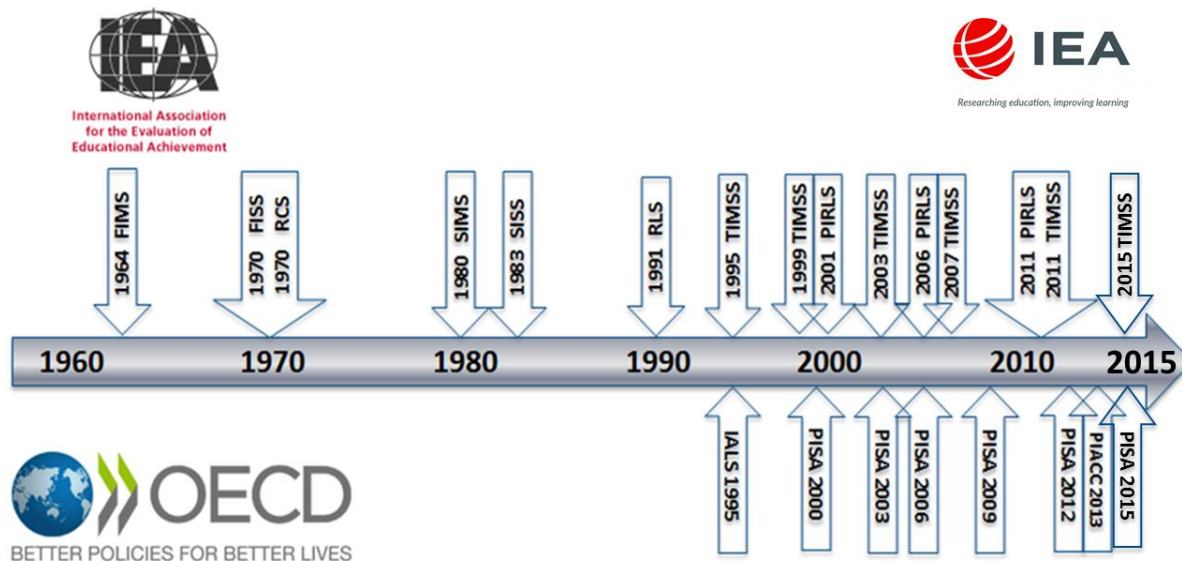
Indicators of Socioeconomic Status (SES) in the International Large-Scale Studies in Education

Individual level data:

Home possession items; Number of books at home; Language use at home; Parental education, occupation and income; parents born in the country; child born in the country; cultural capital indicators

School-level data:

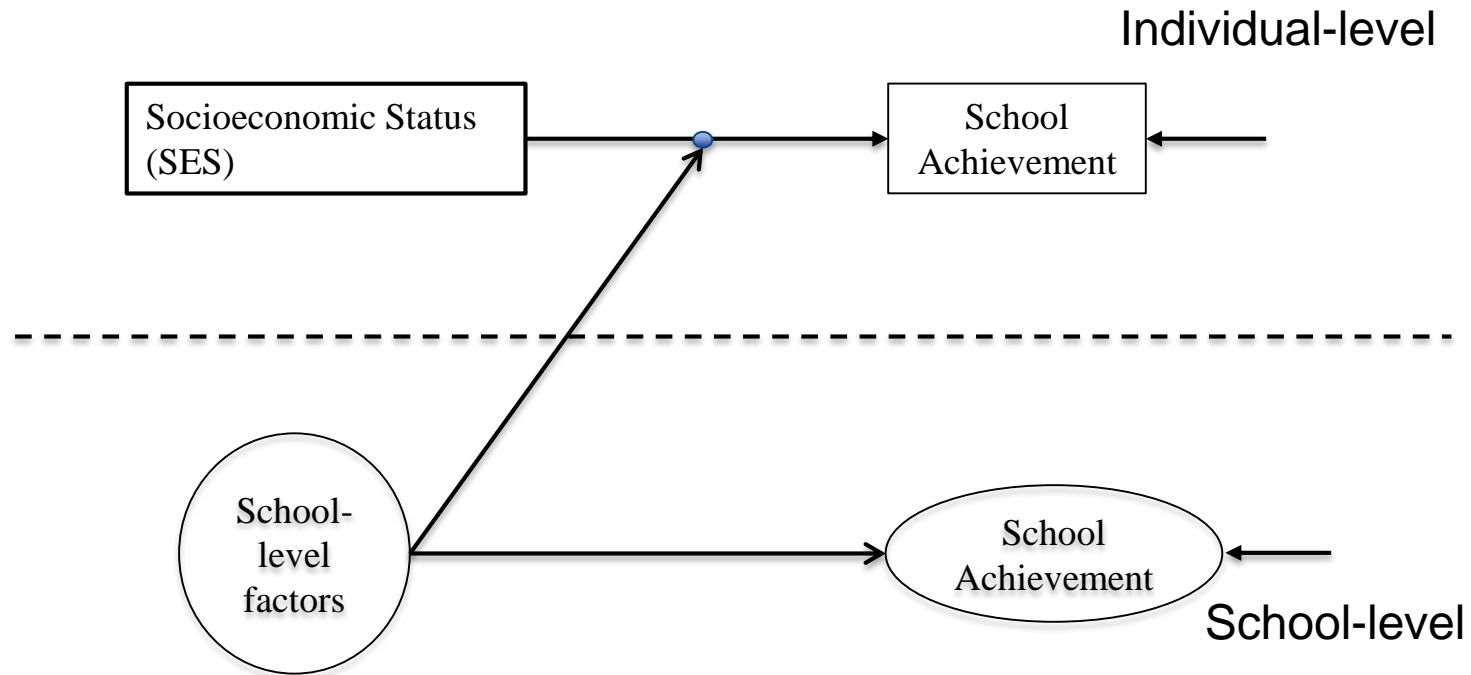
Percentage of children from wealth family; proportion immigrant students; neighborhood sociodemographic information



Educational Equity in Different School Systems with Respect to the Cross-level Interaction between the School SES Composition and the Within-school SES –Achievement Relationship

Data

- TIMSS 2011, grade 8, mathematics
- 50 countries
- Variables
 - Home Educational Resources Scale (SES)
 - Yearly hours of instruction (Hours)
 - Student assessment of instructional quality (InQua)
 - School emphasis on educational success (SEAS)
 - Safe and orderly school (Order)
 - School SES



The Two-level Random Slope Model



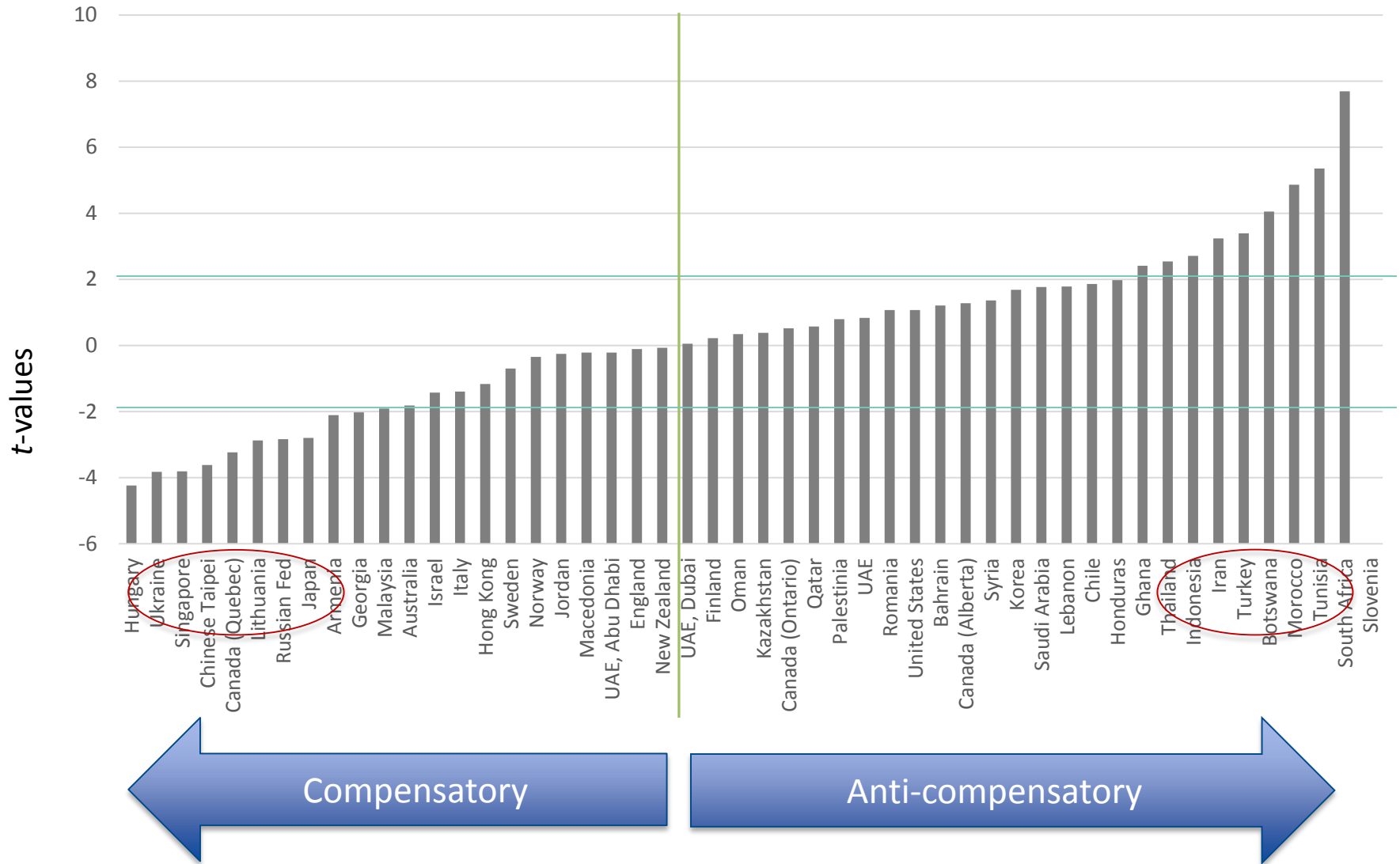
Gustafsson, J.-E., Nielsen, T., & Yang Hansen, K. (2016). School characteristics moderating the relation between student socioeconomic status and mathematics achievement in grade 8. Evidence from 50 countries in TIMSS 2011. *Studies in Educational Evaluation*. <http://dx.doi.org/10.1016/j.stueduc.2016.09.004>

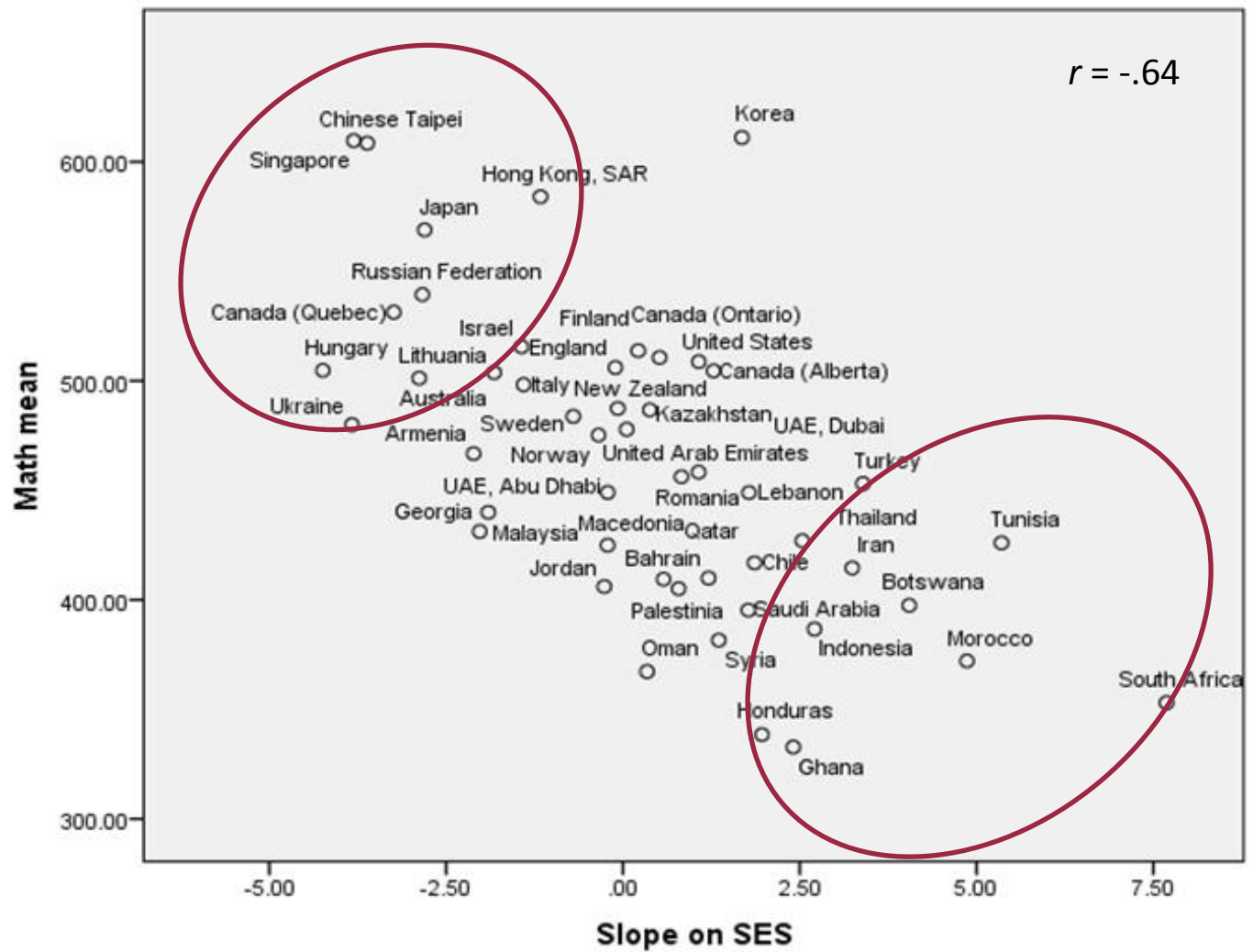
Two-level Random Slope Models

- Variation in the relationship between student math achievement and their SES across different schools is captured by the so-called random slope parameter at school-level;
- The random slope has a mean and a variance for each country;
- The random slope can be predicted by other school level variables, such as school SES;
- The regression coefficient of the random slope on school SES can be used as a measure of how a school system may (or may not) compensate for socioeconomic inequality of educational outcomes among their school children;
- The regression coefficients may be interesting to relate to other system level variables, such as country mean and dispersion of math achievement



School SES Effect on Student's SES-Achievement Relationship





To conclude

- Different school systems have different ability to compensate the impact of student's family socioeconomic background on their school performance (i.e., educational equity);
- The result give an indication that educational quality and equity can reinforce each other, which hypothesis can be tested in future studies.

Take-away messages

Changes in the Socioeconomic differences in educational outcomes among individuals, between schools and municipalities can reveal important information about:

1. How well educational systems manage to improve educational equity and equality;
2. How effective the educational reforms actions are to reinforce or exacerbate educational equity, in turn have impact on educational quality;
3. How different school systems in the world with differentiated organizational functions can compensate or anti-compensate for their school children's socioeconomic disadvantages, since →
4. the cross-level interaction between the school SES composition and the within-school SES –achievement relationship is a powerful indicator of a school system's educational equity



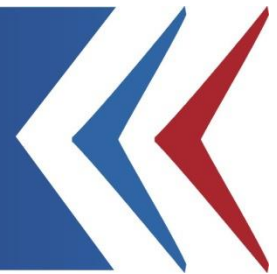
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Thank you for your attention!





Kajsa Yang Hansen, University of Gothenburg



Prezentace byla využita na mezinárodní konferenci **Spravedlivost ve vzdělávání**
Na kontextu záleží aneb možnosti zjišťování kontextu vzdělávání pomocí indikátorů
v rámci Individuálního projektu systémového Komplexní systém hodnocení.

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