IFAU – INSTITUTE FOR
LABOUR MARKET POLICY
EVALUATION

The effects of mixed-age classes in Sweden

Elly-Ann Johansson
Erica Lindahl

WORKING PAPER 2008:21

The Institute for Labour Market Policy Evaluation (IFAU) is a research institute under the Swedish Ministry of Employment, situated in Uppsala. IFAU's objective is to promote, support and carry out scientific evaluations. The assignment includes: the effects of labour market policies, studies of the functioning of the labour market, the labour market effects of educational policies and the labour market effects of social insurance policies. IFAU shall also disseminate its results so that they become accessible to different interested parties in Sweden and abroad.

IFAU also provides funding for research projects within its areas of interest. The deadline for applications is October 1 each year. Since the researchers at IFAU are mainly economists, researchers from other disciplines are encouraged to apply for funding.

IFAU is run by a Director-General. The institute has a scientific council, consisting of a chairman, the Director-General and five other members. Among other things, the scientific council proposes a decision for the allocation of research grants. A reference group including representatives for employer organizations and trade unions, as well as the ministries and authorities concerned is also connected to the institute.

Postal address: P.O. Box 513, 751 20 Uppsala
Visiting address: Kyrkogårdsgatan 6, Uppsala
Phone: +46 18 471 70 70
Fax: +46 18 471 70 71
ifau@ifau.uu.se
www.ifau.se

Papers published in the Working Paper Series should, according to the IFAU policy, have been discussed at seminars held at IFAU and at least one other academic forum, and have been read by one external and one internal referee. They need not, however, have undergone the standard scrutiny for publication in a scientific journal. The purpose of the Working Paper Series is to provide a factual basis for public policy and the public policy discussion.

ISSN 1651-1166

The effects of mixed-age classes in Sweden[♦]

by

Elly-Ann Johansson and Erica Lindahl[♥]

October 6, 2008

Abstract

Mixed-aged classes (MA-classes) are a common phenomenon around the world. In Sweden, these types of classes increased rapidly during the 1980:s and 1990:s. But the scientific evidence of the benefits of MA-classes is not convincing. In this paper, we estimate the effect of attending an MA-class during grades 4–6 on students' cognitive skills. Using a unique survey with information on students, parents and teachers, we are able to control for many factors that could otherwise bias the results. We find a negative effect on the short-run cognitive skills, as measured by grade 6 cognitive tests.

Keywords: education, mixed-age classes, multi-grade classes
JEL-codes: J13, I21

[♦]We are grateful to Peter Fredriksson and Per Johansson for valuable guidance. We would also like to thank Mikael Elinder, Patrik Hesselius, Jenny Nykvist, Peter Skogman Thoursie, Andreas Westermark and seminar participants at the Department of Economics, Uppsala University, for valuable suggestions and comments. Åsa Arnell is acknowledged for the research idea. The financial support from the Swedish Council for Working Life and Social Research, FAS (dnr 2004-1222) is also acknowledged.
[♥] Department of Economics, Uppsala university, e-mail: elly-ann.johansson@nek.uu.se and erica.lindahl@nek.uu.se

Table of contents

1 Introduction

Mixed-age classes are a common phenomenon in schools both in Sweden and in other countries. In mixed-age classes (henceforth MA-classes), students from different grades are mixed into one class for two major reasons: either out of demographic and economic necessity (too few children in each grade to form a class) or because it is believed that these classes have pedagogical benefits. For example, it is argued that students of different age and school experience interact and learn from each other. This belief contributed to the rapid increase of MA-classes in Swedish schools during the 1980:s and 1990:s.

However, the scientific evidence on the effects of mixed-age grouping is ambiguous. Among the Swedish studies used to motivate the introduction of MA-classes there is, to our knowledge, no study using representative samples. Many studies are simply questionnaires collected among teachers in MA-classes. International studies are available, but they are also of varying quality with very few studies using representative samples. The internationals studies often yield contradictory results, with both positive, zero and negative effects of MA-classes. However, most studies conclude that the effect, if any, is small in magnitude.

From an economic point of view, investigating the effect of MA-classes is important since it may be one possible way towards greater cost-efficiency within schools. If it is the case that MA-classes, as is often claimed, are a less expensive way to organize students than traditional classes, and if the students in these classes perform equally well or better than students in traditional classes, introducing MA-classes in a larger scale would be an efficient way towards reduced costs and/or increased student performance. This is particularly interesting in relation to one of the most debated policies in the economic and educational literature during the last years, namely reducing class-size. In contrast to class-size reductions, introducing MA would imply practically no extra costs.[1]

[1] For reviews of the class-size literature, see: Krueger (2003) and Hanushek (1999).

Examining the effect of MA-classes also sheds light on the question of how knowledge is produced. Economic research has mainly focused on quantitative aspects of education – if and how much resources matter for student achievement. But equally important are more qualitative aspects of the educational production function, and the effect of MA-classes is one such aspect.

The purpose of this paper is to estimate the effect of MA-classes in Sweden on students' cognitive skills. We focus both on short-term effects on grade 6 cognitive tests and on long run effects on grade 9 credits. We also allow the effect of attending an MA-class to vary between different groups of students considered potentially important: girls, low performing students and students with non-Swedish background.

A rich and representative data set allows us to control for many potential selection problems. In addition to register data on important socioeconomic variables, we have access to a unique survey with information on parents and teachers and their attitudes towards school related issues.

The results show a negative effect of attending an MA-class in grades 4–6 on the grade 6 cognitive tests. In addition, this effect is not statistically different for girls, low performing students or students with a non-Swedish background. The point estimate of the effect of MA-class-attendance on grade 9 credits is negative but not statistically significant.

2 Background

2.1 MA-classes in Sweden

MA-classes have always been present to some extent in most countries' school systems. Historically, it has often been the only available mean to form a class due to limited numbers of children of the same age in a particular area. In Sweden, as in most developed countries, MA-classes were abandoned in favour of single-age groups as the population grew larger. Around 1980, however, the belief that MA-classes were pedagogically superior to single-age groups started to spread, and in the years to come, the number of MA-classes increased rapidly (Vinterek 2003). In 2000, approximately one third of all Swedish students in the first three years of school attended MA-classes and

about one fourth of the students in grades 4 and 5. That is nearly twice as many as only five years earlier. The share of students attending an MA-class during the last three years of compulsory schooling in Sweden is still rather small; about 2 percent of all students in these grades were in mixed-age groups between 1996 and 1998.

MA-classes are introduced primarily out of two different reasons: economic or pedagogical. We do not know whether the rapid increase in the number of MA-classes in Sweden is due to pedagogical reasons or economic reasons (Vinterek, 2003). There is some evidence that pedagogical motives dominated in the lower grades 1 to 3, whereas economic motives dominated in the higher grades 4 to 6 (Sandquist, 1994). In grades 7 to 9, mixed-age classes are scarce, and if they do exist, they tend to be motivated by demographic necessities (Sandquist, 1994). There is also evidence that mixed-age classes are more prevalent in schools with many low performing students (Vinterek, 2003). The initiative to start an MA-class has usually come from groups of teachers within a school, often supported by the school management (Vinterek, 2003). However, since the beginning of 1990 it seems to be the case that MA-classes have been introduced by politicians against the will of teachers and parents (Vinterek, 2003; Edlund and Sundell, 1999; Sundell, 2002 and Sandquist, 1994).

According to Sandqvist (1994) and Vinterek (2003), there is some evidence suggesting that students in MA-classes work more individually. One reason could be the large heterogeneity within the class, making cooperation between students and group activities more difficult since they are at different knowledge levels. This implies that learning takes place through quiet reading and writing more than through listening and speaking. (This is somewhat contradictory, since one common argument for MA-classes is that the larger heterogeneity within the class enhances learning through group activities.) There are also tendencies to grade-specific teaching also in MA-classes. However, there are large differences depending on subject. Social sciences are often taught to all grades simultaneously, and leave large possibilities for group work and a thematic organization of the subject. In subjects like Mathematics or Athletics teaching is more often done separately for each grade. This can be achieved in different ways. Sometimes one grade within the class works individually with one subject while the other grade(s) listens to the teacher lecturing in another subject. In other cases, the highest graders stay

in school later in the afternoon and have time to learn more advanced Mathematics when their younger classmates have left for the day.

2.2 Arguments for and against MA-classes

There is no clear consensus in the literature about what mixed-age classes and mixed-age teaching really is. According to the educationalist Monika Vinterek (Vinterek, 2001), the arguments used in favour of MA-classes are mainly found in popular science magazines while the arguments against are found in scientific journals. The concept of mixed-age grouping is often not clearly defined. Sometimes it denotes all classes consisting of children of different ages, sometimes also the teaching needs to be of a special fashion (usually more group work). In addition, the arguments used to support mixed-age classes are often contradictory. For example, the students' cognitive and non-cognitive skills are often assumed to be enhanced by the greater heterogeneity in the classroom, either because this heterogeneity in itself is beneficial for student development, or because it allows ability grouping (more homogeneity) within the classroom.

In the following we give an overview of the most commonly used arguments for and against MA-classes. The literature is mainly concerned with the supposed benefits of MA-classes. In contrast, arguments against such classes are scarcer. Hence, also this exposition will focus mainly on the pro-arguments but the reader should keep in mind that this does not mean that they are supported scientifically.

Veenman (1995) discusses the following benefits of MA-classes: MA-classes are claimed to enhance the children's security and confidence as they form relationships with a wider variety of children. MA-classes also invite cooperation, and children benefit from learning from and teaching each other. Furthermore, MA-classes are considered to have a more relaxed atmosphere, and be more stimulating as similar, but not equally able, children meet. It is also claimed that the self-concepts of slower, older students are specially enhanced when they are asked to tutor younger students.

In order to motivate the introduction of MA-classes in Sweden, the following arguments have been used by many local politicians in local school directives (Sandqvist, 1994). MA-classes enable greater adaptation to individual maturity in different subjects and generate greater social training since the group is more heterogeneous with respect

to age. In addition, mixed age grouping is claimed to give rise to more acceptance for deviating behaviour among classmates.

Some local politicians also refer to the pedagogical idea that students are assumed to be naturally curious and hungry for knowledge and that children spontaneously learn from each other and willingly teach each other.[2] Given this view of schooling and children, a more heterogeneous group is desirable. Another argument, connected to the former, is that the new post modern information intensive society requires knowledge about how to *search* for information. To work in project teams and to cooperate among students in order to search for information are new features in the school directives that is claimed to fit well with MA-teaching.

Sundell (1995) also describes the arguments used in directives from the former Swedish National Agency for Education (Skolöverstyrelsen). Among the arguments in favour of MA-classes, the supposed positive impact on students' cognitive development is claimed to stem from the teaching adapted to the individual that is connected with MA-classes, as well as the idea that younger students learn from their older peers. The reason for the former argument is that in an MA-class, working groups are formed in accordance with the individual child's mental maturity rather than its actual age.

Further, it is often claimed that the individually adapted teaching connected with MA-classes specially benefit low performing students. The reasons are several. First, it is argued that the individually adapted teaching results in more teaching time to those in special need. Second, teaching in an MA-class is to a higher degree organized in small groups, which benefit low performing students. Finally, as stated above, in an MA-class low performing students have the possibility to compare themselves with younger children and in this way they do not need to perform worst.

The arguments used against MA-classes are in many cases similar to the ones used in favour of them. For example, it is argued that MA-classes impose a greater workload on the teachers and that most teachers are not adequately prepared to deal with MA-groups (Veenman, 1995). This can be compared with a similar pro-argument: it is claimed that MA-classes are supposed to give the teachers a better working environment as only a

[2] The Montessori pedagogy is mentioned in some local school directives (Sandqvist, 1994).

share of the class is new every year (Sundell, 1995). Thus, there is no clear theoretical consensus about the mechanisms behind MA-classes.

2.3 Earlier studies

The scientific evidence on the effects of MA-classes is ambiguous and many studies are of poor quality. For example, Veenman (1995) summarizes evidence from 56 international studies. There were no experimental studies at all, and virtually no studies based on representative samples of the student population with well-defined treatment- and comparison groups. Many studies did not even make any attempts to condition on initial differences between students in MA-classes versus traditional classes. The studies yield contradictory evidence, and when summarizing the results from the studies of best quality, the average effect of attending an MA-class becomes zero. The reason for this zero effect is discussed by Burns and Mason (1996). They argue that selection of better students and/or teachers into MA-classes are counteracted by less effective instruction in these classes.

Using Swedish data, Sundell (2002) estimates the effect of MA-class-attendance in grade 2 on a number of abilities. Important to note is that the 752 students included in his study are not randomly sampled. When controlling for social and pedagogical background as well as initial achievements, the results show that students in MA-classes performed worse than other students in 12 out of 13 dimensions. The MA-students had for example lower mathematical ability, a less developed vocabulary and were perceived as more shy and troublesome by their teachers. However, they did perform better in reading comprehension.

3 Data

In this section, we describe the data used and show the differences between MA- and traditional classes in terms of some important covariates.

3.1 Data sources

Our main data source is a representative and stratified panel data set, Student Panel 4, provided by Statistics Sweden[3] where one cohort of students is followed through grade 3 to 9. In the first stage 35 municipalities were selected. In the second stage a random sample of grade 3 classes within these municipalities were selected.[4] Within the selected classes, information from all students in grade 3 was collected. This means that for students in traditional classes, we have information on the whole class, while for students in MA-classes, we only have information on the part of the class that spends their third year in school in 1992. That is usually one half or one third of the class, depending on how the MA-class is constructed.

The sampling of grade 3 classes were done in 1992; hence most students are born 1982 and finish 9th grade in 1998. It is important to note that all students sampled in grade 3 are followed over time, regardless of whether they move or change class; hence, regarding these data there is virtually no attrition. The panel includes approximately 8500 individuals.

This panel data set is combined with additional register data from the data bases RAMS and LOUISE provided by Statistics Sweden. These data include socioeconomic background information such as parental education and immigrant status. Most of this information is measured in 1998. We focus on students who finish 9th grade the expected year 1998 or later.[5]

In addition, we have access to a survey with information on students, parents and teachers and their attitudes towards school-related issues. This information was collected when the students were in grade 6 by the Department of Education at Göteborg University. Parents were asked about their involvement in school issues and if they actively had chosen school or simply accepted the nearest one. Teachers were asked about their work experience, whether they had a formal degree, and their attitude

[3] Participation in the study is voluntarily. About 4 percent of the originally sampled students were not able to or chose not to participate in the study.
[4] For more information about how the data was collected, see Statistics Sweden (1996)
[5] 16 students finished school one year earlier, but due to a changed grading system, we do not include these in our sample.

towards homework. Results from grade 6 cognitive tests of the students were also collected (a description of these tests is given in Appendix).

Due to non-response, survey information is only available for a sub-sample of the original sample. Of the individuals in the original sample, 85 percent have undertaken the grade 6 test, and 54 percent has answered all of the survey questions we use. It is this reduced sample we use for our analyses. Table A 1 in Appendix shows the difference between the raw register data, data with test results available (the basic sample), and data with all survey information available (our survey sample). The differences in means are very small when comparing the raw data and the basic sample. In 6 out of 27 cases there are statistically significant differences at the ten percent level and in these cases the magnitudes of the differences are small. Comparing the raw data with the survey sample, there are some additional differences. The survey sample seems to consist of a slightly more "privileged" group of students than the raw data. For example, students in the survey sample have higher average credits and grade 6 test results, they are more seldom given special help or mother tongue education in grade 3, and their parents are better educated.

3.2 Differences between MA-classes and traditional classes

Table 1 presents descriptive statistics for students in MA- and traditional classes in our survey sample. First of all, we can note that students in MA-classes have lower scores on the grade 6 cognitive tests. This could have two different explanations: one is that MA-classes are detrimental to student achievement; another is that we have negative selection into MA-classes. Regarding parental and student characteristics, the groups are relatively similar with two exceptions. Students in MA-classes have to a less extent mothers with university degree, and are more often given mother tongue education in grade 3.

Regarding teacher and class characteristics, the differences are more striking. MA-classes are usually smaller. The teachers in MA-classes are less experienced, have spent a shorter time in each class, and are more often on leave than teachers in traditional

classes. The teachers' attitudes also differ[6]. Teachers in MA-classes put less emphasis on homework, basic knowledge and formal tests than teachers in traditional classes. MA-class-teachers also believe student influence to be more important than their colleagues in traditional classes. Hence, from these descriptive statistics it seems as if the pedagogical environment for students in MA-classes differs substantially from the environment in traditional classes.

Table 1 Descriptive statistics of students attending an MA-class during grades 4–6 versus others, survey sample

	MA-class in grades 4–6		**Ordinary class in grades 4–6**	
Individual characteristics	*Mean*	*Sd.*	*Mean*	*Sd.*
Grade 9 credits	51.49	28.34	52.67	28.66
Grade 6 test results	46.99	28.23	52.20***	28.80
Female student	0.48	0.50	0.50	0.50
Early start	0.01	0.11	0.01	0.08
Late start	0.03	0.16	0.02	0.15
Birth month	6.11	3.43	6.27	3.35
Help in grade 3	0.16	0.37	0.19	0.39
Mother tongue in grade 3	0.11	0.31	0.08*	0.27
Non-Nordic student	0.07	0.25	0.06	0.24
Mother sec. educ.	0.46	0.50	0.46	0.50
Mother univ. educ.	0.26	0.44	0.33***	0.47
Father sec. educ.	0.37	0.48	0.40	0.49
Father univ. educ.	0.19	0.39	0.22	0.41
Father educ. miss	0.20	0.40	0.22	0.41
Mother educ. miss	0.06	0.23	0.06	0.23
Father non-Nordic	0.09	0.29	0.10	0.31
Mother non-Nordic	0.11	0.31	0.10	0.30
Birth country miss	0.00	0.06	0.00	0.03
Father birth country miss	0.03	0.18	0.03	0.16
Mother birth country miss	0.02	0.12	0.02	0.13
Parent attitude: active school choice	0.15	0.36	0.15	0.36
Parent attitude: parent help	1.87	0.89	1.91	0.95
Parent attitude: parent active	2.39	1.05	2.34	1.03

[6] The attitude variables are measured on a 1-5 scale; the more important a teacher regards the issue, the higher the number. See Appendix for more details.

	MA-class in grades 4–6		Ordinary class in grades 4–6	
Teacher and class characteristics[1]	*Mean*	*Sd.*	*Mean*	*Sd.*
International school	0.0000	0.0000	0.0007	0.0265
Confessional school	0.0032	0.0562	0.0028	0.0530
Special school	0.02	0.14	0.03	0.18
Grade 9 students	101.56	39.25	114.31***	40.42
Few grade 9 students	0.07	0.25	0.01***	0.11
Teacher experience	18.44	10.62	20.12***	9.65
Teacher not qualified	0.04	0.20	0.04	0.20
Class size	18.31	7.19	23.67***	5.91
Small class	0.13	0.33	0.01***	0.11
Large class	0.21	0.41	0.37***	0.48
Share boys	0.55	0.12	0.51***	0.11
Share Swe2 students	0.07	0.13	0.06	0.14
Teacher not full time	0.10	0.30	0.12	0.32
Teacher on leave	0.08	0.26	0.03***	0.17
Teacher year in class	2.56	1.28	2.80***	0.84
Teacher attitude: home works	3.56	0.94	3.83***	0.91
Teacher attitude: tests	2.66	0.77	2.96***	0.94
Teacher attitude: basic knowledge	4.42	0.81	4.67***	0.60
Teacher attitude: student influence	3.96	0.80	3.85**	0.86
Teacher attitude: student responsibility	4.71	0.63	4.77*	0.50
Number of students	317			4,267

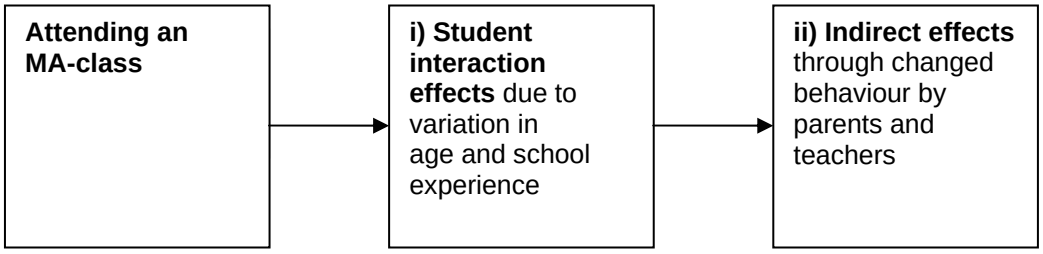
Note: Teacher and class information are collected at the individual level (the teacher has filled in one form for each student) and are treated as individual level information when calculating standard errors. The reason is that we cannot identify class in the data set. *(**,***) denotes that the difference in means is significantly different at 10% (5%, 1%).

4 Estimating the effect

4.1 Identification

The potential effect on cognitive skills of attending an MA-class may stem from two types of factors: (i) the effect of interactions between students of different age and school experience and/or (ii) effects from parent and teacher involvement (see Figure 1). In the literature on MA-classes, most arguments for the beneficial effects of MA-classes focus on the student interaction effects.

Figure 1 The different components of the MA-effect



Our purpose is to estimate the total effect of attending an MA-class, that is, both (i) and (ii). This is most interesting from a policy perspective and this is also what a randomized experiment would capture.[7]

The methodological problem that arises when one is to estimate the total effect using observational data is selection or sorting of students and teachers into MA-classes. There are several possible ways in which selection of students and teachers into class types might arise. First, there may be active choices on behalf of the families. If MA-classes are believed to have positive (negative) effects on students' cognitive or non cognitive development, it might be the case that informed parents actively choose an MA-class (or a conventional class) for their child. This can be achieved in different ways: people can choose schools within their area of living, or they can move to areas with or without MA-classes. Second, there could be active choices on behalf of the school management or teachers. Principals could place better (worse) students and teachers in MA-classes, or certain types of teachers could be overrepresented within MA-classes. Third, it is possible that areas with only MA-classes formed due to demographic necessity differ from areas offering both types of classes; the former is usually smaller municipalities far from larger cities. Fourth, it is also possible that some schools with special profiles, such as confessional or international schools, are forced to teach in

[7]Although it is not the purpose of our paper, measuring the effect of interactions between students of different ages only (i.e. part of effect (i)) is relatively easily achieved. Given birth data on every student within each class, we could simply estimate the effect of age variance within a class on student outcomes. In our data set we only have information on all students within each class for the traditional classes, and our sample size is much too small for a precise estimation of this effect. In spite of that, we find that the point estimate of age variance in traditional classes on student achievement is negative.

a mixed-age fashion due to a limited number of students. These possible selection problems have to be dealt with in order to estimate the effect of MA-classes.

We use regression adjustment to control for the selection and sorting of students and teachers. We believe that this method is valid since we have extremely detailed information not only from register data but also from the survey data on the students, parents and teachers and their self reported attitudes towards different school issues.

However, we can note that the choice of control variables is not completely straightforward, partly because some of our control variables are measured in grade 6 (i.e. at the end of the MA-treatment), partly because the literature on MA-classes is rather vague when it comes to defining the MA-class concept. Although we view our variables to be controls for sorting and selection, it could be the case that some of them also reflect the indirect effect (ii) of attending an MA-class. One example is the variable attempting to measure how involved the parents are in school issues. Active parents may actively choose an MA-class (or traditional class) for their child (in which case the variable becomes an important control for selection) – but it could also be the case that parents in MA-classes (or traditional classes) are forced to become more actively involved in school issues (in which case the variable represents the indirect effect of MA). We will estimate the effect of MA-classes both with and without the control variables considered potentially problematic. In the list of variables in Appendix we have distinguished between these two types of variables.

4.2 Estimation strategy

We estimate the following model using ordinary least squares (OLS):

$$y = \alpha + \beta ma456 + \delta X_1 + \gamma X_2 + m + \varepsilon$$

y denotes student achievement – either percentile ranked results from grade 6 cognitive tests or percentile ranked grade 9 credits. Our key explanatory variable, *ma456*, is a dummy variable for attending an MA-class all years in grades 4 to 6[8]. It is important to note that a class is defined as an MA-class only if it consists of students of both differ-

[8] Using other definitions of the explanatory variable ma456, such as a dummy for attending an MA-class only in grade 4 or at least one year during grades 4–6 or a cumulative variable capturing the number of years spent in an MA-class does not change the results.

ent ages and grades; this is not to be confused with traditional classes where some students happen to be born a different year than the others (for example, students with learning difficulties or especially skilled students). X_1 denotes the covariates used to control for selection bias. These include socioeconomic information such as parental education levels, immigrant status, gender and birth month of the student, and information on whether the student were given special help or mother tongue education in grade 3. For a complete list of all variables, see Appendix. When estimating the effect on grade 9 credits, we also control for the number of students in grade 9 at the school[9]. In addition, we have access to a variable indicating if the student attended an MA-class also during grades 7–9. This variable is included as a control in a separate estimation. X_2 denotes the variables used to control for selection, but where there is some uncertainty about whether or not they instead represent the indirect effects of MA-classes. These variables include the attitudes and behaviour of the teachers and parents. Finally, in all estimations we include municipality fixed effects, m.

We can also note that the two different measures of student outcomes, the grade 6 test results and the grade 9 credits, differ in two respects. Not only do they capture short- versus long run effects of attending an MA-class, they can also reflect slightly different types of skills. While the grade 9 credits are a weighted average of grades in different subjects, and as such could include not only the teachers' assessment of the student's skills but also to some extent the students' behaviour and diligence, the grade 6 tests are simply test results. The correlation between the two measures is also relatively low, with a correlation coefficient of 0.57.

Another thing to note is that we do not have information on whether the student attended an MA-class during grades 1–3. Since MA-class attendance in grades 1–3 is likely to be correlated with MA-class attendance in grades 4–6, it is possible that our dummy variable for MA-class attendance in grades 4–6 also partly captures the long run effects of earlier MA-class attendance.

With the estimation strategy above, we implicitly assume that the effect of attending an MA-class is equal for all groups of students. This may not be true – in fact, many of

[9] We do not have information on the size of the school in grade 6.

the arguments for or against MA-classes are concerned with how they affect different kinds of students. In particular, it is usually argued that attending an MA-class is especially valuable for students who do not perform as well as their peers. In many studies, it is shown that girls outperform boys in school and that immigrant students have lower school achievement than the average student. Hence, to relax the equal-effects assumption, we include interaction terms that allow the MA-effect to vary depending on gender, if the student has a non-Nordic background and if the student was low performing in grade 3 (measured by if the student were given special help in grade 3).

5 Results

How does attending an MA-class affect student performance? In section 5.1 we estimate the average effect, while section 5.2 examine whether the effect varies by observed characteristics.

5.1 Main results

Table 2 and Table 3 show the effect of MA-classes on grade 6 cognitive tests and grade 9 credits, respectively. For the cognitive test results, there is a negative and statistically significant effect of attending an MA-class. The estimated effect on grade 9 credits is not statistically significant, although the point estimate is negative.

The magnitude of the effect is relatively large. Attending an MA-class in grades 4-6 reduces the cognitive test results by around 5 percentile points. This can be compared with the effect of class size reductions. In the Tennessee STAR experiment, reducing class size by one student increased student performance with almost one percentile point (Krueger, 1999).

The negative effect of attending an MA-class on grade 6 test results remains in about the same range regardless of the set of covariates used. A comparison between column 2 and column 3 shows no large differences. Hence, the variables added in column 3, that we view as good controls for selection but that potentially also could capture the indirect MA-effects, do not seem to be important in explaining the difference in achievement between students in MA- and traditional classes. This is interesting since these variables include the parental and teacher attitudes towards school issues. In Section 3

above, we noted that the largest differences between MA- and traditional classes were in terms of these different parental and teacher attitudes. At the same time, they seem unimportant for explaining the negative effect of MA-classes.

Table 2 OLS-estimates of the effect of attending an MA-class during grades 4–6 on percentile ranked grade 6 test results, survey sample

	(1)	(2)	(3)
	Grade 6 test results	Grade 6 test results	Grade 6 test results
MA grades 4–6	-5.681	-4.524	-4.711
	(2.059)***	(1.763)**	(1.805)***
Including X_1	No	Yes	Yes
Including X_2	No	No	Yes
Observations	4584	4584	4584
R-squared	0.05	0.29	0.30
F-test if added parameters jointly equals zero		100.94	3.21
Probability>F		(0.0000)	(0,0026)

Note: All models include municipality dummies, standard errors in parentheses are clustered on schools,
* significant at 10% ** significant at 5%, *** significant at 1%

Table 3 OLS-estimates of the effect of attending an MA-class during grades 4–6 on grade 9 credits, survey sample

	(1)	(2)	(3)	(4)
	Grade 9 credits	*Grade 9 credits*	*Grade 9 credits*	*Grade 9 credits*
MA grades 4–6	-2.579	-0.989	-1.169	-0.915
	(1.742)	(1.317)	(1.315)	(1.336)
Including X^1	No	Yes	Yes	Yes
Including X^2	No	No	Yes	Yes
Including MA grades 7–9	No	No	No	Yes
Observations	4584	4584	4584	4584
R-squared	0.04	0.30	0.30	0.31
F-test if added parameters jointly equals zero		53.76	4.35	23.11
Probability>F		0.0000	0.0019	0.0000

Note: All models include municipality dummies, standard errors in parentheses are clustered on schools,
* significant at 10% ** significant at 5%, *** significant at 1%

5.2 Heterogeneous effects

Table 4 shows the results from the heterogeneous effects estimations. Interestingly, we find no statistically significant differences for any of the subgroups studied. Girls seem to be equally affected as boys, and the same is true for low performing students compared to students without extra help in grade 3, and students with a non-Nordic

background compared to Nordic students. This is in sharp contrast to the arguments commonly used in favour of MA classes – that MA-classes especially should benefit low performing students.[10]

Table 4 OLS-estimates of heterogeneous effects of attending an MA-class during grades 4–6 on percentile ranked grade 6 test results, survey sample

	Grade 6 test results
MA grades 4–6	-2.838
	(1.203)**
Female student	-1.377
	(0.351)***
(MA grades 4–6)* (Female student)	2.326
	(1.602)
Help grade 3	-11.197
	(0.436)***
(MA grades 4–6)* (Help grade 3)	-1.599
	(1.740)
Non-Nordic student	-3.059
	(1.127)***
(MA grades 4–6)* (Non-Nordic student)	2.722
	(2.793)
Including X_1	Yes
Including X_2	Yes
Observations	4584
R-squared	0.31

Note: All models include municipality dummies, standard errors in parentheses are clustered on schools, * significant at 10%** significant at 5%, *** significant at 1%

5.3 Internal validity

In this paper, we use a linear regression model and adjust it with observed covariates to control for potential selection. In the context of returns from schooling, Black and Smith (2004) discuss potential problems with linear regression models. They conclude that the result may be biased if it is driven by comparisons of "non-comparable" individuals, i.e. individuals outside the common support. In order to address this issue we employ a propensity score matching method. First, we estimate a probit regression model for the

[10] We have also studied the same heterogeneous effects on the grade 9 credits but find no statistically significant differences between groups.

probability to enter an MA-class.[11] Second, we match (nearest neighbour without replacement) on these predicted values so that we for each MA-student get one comparable individual who has attended a traditional class. Using this more homogeneous sample we estimate the effect of MA without any covariates, i.e., simply compare the mean values. The results are presented in Table 5. With respect to grade 6 results the point estimate is close to the corresponding estimate received with a regression adjustment approach (see Table 3). With respect to grade 9 credits, the point estimate is somewhat lower but, also with this strategy, statistically insignificant.

Table 5 Matching approach, survey sample

	(1)	**(2)**
	Grade 6 results	*Grade 9 credits*
MA grades 4–6	-4.622	-0.281
	(1.79)	(0.13)
Observations	634	634
R-squared	0.01	0.00

Note: Standard errors in parentheses are clustered on schools, * significant at 10%
** significant at 5%, *** significant at 1%

5.4 External validity

Since our survey sample is a slightly selected group of students, it is relevant to ask how valid our estimates are for the wider population. One way to shed light on this issue is to compare the effect of MA in the survey sample with the effect found in the basic sample (register data with grade 6 test results available). Naturally, we can only utilize register covariates to capture selection and sorting for this comparison.

The results are shown in Table A 2 in Appendix. As is clear from the table, the effect of attending an MA-class is negative for student achievement in both samples, although the coefficient size is slightly larger in the survey sample.

6 Concluding remarks

Despite ambiguous scientific evidence, mixed-age classes are a common phenomenon in schools around the world. In some cases, it is because of demographic necessity; in

[11] In the probit regression we include all X_1 and municipality dummies.

other cases, it is because MA-classes are claimed to enhance student achievement. In Sweden these types of classes have been rapidly re-introduced and nowadays, around one fourth of all children attend an MA-class during grades 4–6.

In this paper, we present evidence that MA-classes have a negative effect on short-term cognitive skills, as measured by the grade 6 cognitive tests. This effect is robust to different definitions of the explanatory variable and it does not change significantly if we only focus on girls, low performing students or students with a non-Nordic background. The effect of attending an MA-class on grade 9 average credits is not statistically significant, although the point estimate is negative.

We have not been able to distinguish between MA-classes introduced out of pedagogical beliefs and MA-classes introduced out of economic and/or demographic necessity. Since the effect of MA-class attendance could differ between these two groups, this would be an interesting topic for future research.

References

Burns, R. B. and Mason, A. DW, (1996), 'Simply No Worse and Simply No Better' May Simply Be Wrong: A Critique of Veenman's Conclusion about Multigrade Classes, Review of Educational research, vol. 66, pp. 307–322.

Edlund, A. C., and Sundell, K. (1999), Åldersintegrerat eller åldersindelat? En jämförande studie av 1 111 elever i årskurs, FoU-rapport 1999:9, Stockholm socialtjänstförvaltning.

Hanushek, E. (1999). Some Findings from an Independent Investigation of the Tennessee STAR Experiment and from Other Investigations of Class Size Effects, Educational Evaluation and Policy Analysis, vol. 21, no. 2, pp. 143-163.

Krueger, A. (1999), Experimental estimates of education production functions, Quarterly Journal of Economics, vol. 114, no. 2, pp. 497–532.

Krueger, A. (2003). Economic considerations and class size, Economic Journal, vol.113, pp. 34-63.

Sandqvist, K. (1994), Åldersintegrerad undervisning: En kunskapsöversikt, HLS, Stockholm.

Statistics Sweden (1996), Elevpanel för longitudinella studier, Elevpanel 4, Statistiska meddelanden U73, SM 9601, Örebro.

Sundell, K. (1995), Åldersindelat eller åldersblandat? Forskning om åldersammansättningens betydelse i förskola och grundskola, Studentlitteratur, Lund.

Sundell, K. (2002), Är åldersblandade klasser bra för eleverna? En jämförande studie av 752 elever i årskurs 2 och 5, FoU-rapport 2002:7, Stockholm socialtjänstförvaltning.

Svensson, A. (1964), Sociala och regionala faktorers samband med över- och underprestation i skolarbetet: Pedagogisk-sociologiska studier jämte en beskrivning av skolstatistikens individualuppgifter, Department of Education, Göteborg university.

Veenman, S. (1995), Cognitive and Non cognitive Effects of Multigrade and Multi-Age Classes: A Best-Evidence Synthesis, Review of Educational Research, vol. 65, pp. 319-381.

Vinterek, M. (2001), Åldersblandning i skolan - Elevers erfarenheter, doctoral thesis, Umeå University.

Vinterek, M. (2003), Åldersblandade klasser. Lärares föreställningar och elevers erfarenheter, Studentlitteratur, Lund.

Appendix

List of variables – Register data

Variable name	*Definition*
Grade 6 test results	Percentile rank of the sum of the scores on the tests in number series and opposites given in grade 6
Grade 9 credits	Percentile rank of a summary measure of the student's 16 best credits in grade 9
MA grades 7–9	A dummy that equals 1 if the students attends an MA-class in any grade between grades 7–9
MA grades 4–6	A dummy that equals 1 if the students attends an MA-class during grades 4-6
Municipality dummies	One dummy for each municipality
Female student	A dummy that equals 1 if the student is female
Early start	A dummy that equals 1 if the student is born after 1982
Late start	A dummy that equals 1 if the student is born before 1982
Birth month	The student's month of birth
Help in grade 3	A dummy that equals 1 if the student has been given any form of special education intended for low performing students ("särundervisning", "anpassad studiegång" or "specialundervisning på annat sätt") in grade 3
Mother tongue in grade 3	A dummy that equals 1 if the student attended mother tongue education in grade 3
International school	A dummy that equals 1 if the school has an international profile
Confessional school	A dummy that equals 1 if the school has a confessional profile
Special school	A dummy that equals 1 if the school is not ordinary, for example schools at hospitals
Grade 9 students	The number of students in grade 9 at the school, collected in grade 9
Few grade 9 students	A dummy that equals 1 if the number of students in grade 9 at the school is smaller than 30
Non –Nordic	A dummy that equals 1 if the student is born in a non-Nordic country (missing values equals 1)
Mother secondary education	A dummy that equals 1 if the mother of the student has secondary education, at most 5 years in addition to compulsory schooling
Mother university education	A dummy that equals 1 if the mother of the student has university education, more than 5 years in addition to compulsory schooling
Father secondary education	A dummy that equals 1 if the father of the student has secondary education, at most 5 years in addition to compulsory schooling

Variable name	*Definition*
Father university education	A dummy that equals 1 if the father of the student has university education, more than 5 years in addition to compulsory schooling
Mother education miss	A dummy that equals 1 if information about the mother's education is missing
Father education miss	A dummy that equals 1 if information about the father's education is missing
Mother non-Nordic	A dummy that equals 1 if the mother of the student is born in a non Nordic country
Father non-Nordic	A dummy that equals 1 if the father of the student is born in a non Nordic country
Birth country missing	A dummy that equals 1 if information about the student's country of birth is missing
Father birth country missing	A dummy that equals 1 if information about the father's country of birth is missing
Mother birth country missing	A dummy that equals 1 if information about the mother's country of birth is missing

List of variables – Survey data collected in grade 6, question to teachers

Variable name	*Question*	*Definition*
Teacher experience	What is your teacher experience in years?	A variable ranging from 1 to 43 (measured in years)
Teacher not qualified	Do you have a certificate qualifying you to teach at this level?	A dummy that equals 1 if the answer is no
Class size	What is the number of girls and boys in the class?	The sum of boys and girls in the class - ranging from 0 to 60
Small class	*Constructed from Class size*	A dummy that equals 1 if the class size is smaller than 10
Large class	*Constructed from Class size*	A dummy that equals 1 if the class size is larger than 25
Share boys	*Constructed from Class size*	The share of boys in the class
Share Swe2 students	What is the number of students in your class that take Swe2? *Constructed from Class size*	The share of students in the class taking a special course in Swedish adapted for students who do not have Swedish as mother tongue
Teacher not full time	Do you work full time?	A dummy that equals 1 if the teacher work part time, 0 if full time
Teacher on leave	Have you been on leave during the last year?	A dummy that equals 1 if the teacher has been on leave full time or part time
Teacher year in class	How many years have you taught this class?	A variable ranging from 1 to 8 (measured in years)
Teacher attitude: home works (belongs to X_2, the extended set of covariates)	How important are home works and oral tests?	A variable ranging from 1 to 5 in the following way: Very important 5

Variable name	*Question*	*Definition*
Teacher attitude: tests (belongs to X_2, the extended set of covariates)	How important are formal tests?	Rather important 4 In between 3 Rather unimportant 2 Not at all important 1
Teacher attitude: basic knowledge (belongs to X_2, the extended set of covariates)	How important is the emphasis of basic skills?	
Teacher attitude: student influence (belongs to X_2, the extended set of covariates)	How important is student influence during planning?	
Teacher attitude: student responsibility (belongs to X_2, the extended set of covariates)	How important is it that the student takes own responsibility?	

List of variables – Survey data collected in grade 6, question to parents

Variable name	*Question*	*Definition*
Parent attitude: active school choice (belongs to X_2, the extended set of covariates)	Have you chosen another than the closest school to your child?	A dummy that equals 1 if the answer is *yes* or *yes we are going to* and 0 if *no or doubtful (probably not)*
Parent attitude: parent help (belongs to X_2, the extended set of covariates)	Do you participate in your child's school work?	A variable ranging from 1 to 5 in the following way: Very often 5 Rather often 4 Sometimes 3 Rarely 2 Almost never 1
Parent attitude: parent active (belongs to X_2, the extended set of covariates)	How much do you participate in school activities?	A variable ranging from 1 to 5 in the following way: Very often 5 Rather often 4 Sometimes 3 Rarely 2 Almost never 1

The cognitive tests from grade 6

There are three test scores from grade 6 available. The tests represent verbal, spatial and reasoning abilities and are called: Opposites (motsatser), Number series (talserier) and Metal folding (platvik). In the test called Opposites, the child is asked to find the opposite of a given word among four choices (40 items, 10 minutes). In the Number series test the child is instead asked to complete number series (40 items, 18 minutes). In the last test, Metal folding, the child is asked to find the three-dimensional object among

four choices that can be made from a flat piece of metal (40 items, 15 minutes).[12] The results on each of these tests are measured on a scale ranging from 0 to 40.

In this paper, we use the percentile ranked sum of two of the tests, Opposites and Number series. The correlation coefficient between each of these tests and the grade 9 credits is 0.51. The third test, Metal folding, involves tasks not regularly practised in schools, and it's correlation coefficient to the grade 9 credits is 0.36.

[12] A more detailed description of the test scores are given by Svensson (1964).

Descriptive statistics

Table A 1 Register data, Basic sample and Survey sample

	Register data			Basic sample			Survey sample		
Variable	*Mean*	*Sd.*	*N*	*Mean*	*Sd.*	*N*	*Mean*	*Sd.*	*N*
Grade 9 credits [1)]	202.17	59.88	8,490	203.93*	58.56	7,234	209.16***	56.77	4,584
Grade 6 test results [2)]	44.24	12.68	7,420	44.32	12.66	7,234	45.13***	12.55	4,584
MA grades 4–6	0.08	0.26	8,531	0.08	0.27	7,234	0.07	0.25	4,584
MA grades 7–9	0.03	0.17	8,531	0.02**	0.15	7,234	0.02***	0.15	4,584
Covariates capturing selection:									
Female student	0.49	0.50	8,515	0.49	0.50	7,234	0.50	0.50	4,584
Early start	0.01	0.09	8,515	0.01	0.09	7,234	0.01	0.09	4,584
Late start	0.03	0.16	8,515	0.02	0.15	7,234	0.02	0.15	4,584
Birth month	6.28	3.36	8,515	6.27	3.36	7,234	6.26	3.35	4,584
Help in grade 3	0.21	0.40	8,531	0.20	0.40	7,234	0.19***	0.39	4,584
Mother tongue in grade 3	0.10	0.30	8,531	0.09	0.29	7,234	0.08***	0.27	4,584
International school	0.0011	0.03	8,360	0.0007	0.0263	7,234	0.0007	0.0256	4,584
Confessional school	0.0054	0.07	8,360	0.0043	0.0653	7,234	0.0028**	0.0532	4,584
Special school	0.04	0.19	8,360	0.04	0.19	7,234	0.03*	0.18	4,584
Grade 9 students	113.80	41.58	8,331	113.52	41.09	7,234	113.42	40.47	4,584
Few grade 9 students	0.03	0.16	8,331	0.02*	0.14	7,234	0.02***	0.13	4,584
Non-Nordic student	0.07	0.26	8,531	0.07	0.25	7,234	0.06**	0.24	4,584
Mother sec. educ.	0.45	0.50	8,531	0.45	0.50	7,234	0.46	0.50	4,584

Table A1 Continued

			Register data			Basic sample			Survey sample
Variable	*Mean*	*Sd.*	*N*	*Variable*	*Mean*	*Sd.*	*N*	*Variable*	*Mean*
Mother univ. educ.	0.30	0.46	8,531	0.30	0.46	7,234	0.32***	0.47	4,584
Father sec. educ.	0.38	0.48	8,531	0.39	0.49	7,234	0.40***	0.49	4,584
Father univ. educ.	0.20	0.40	8,531	0.20	0.40	7,234	0.22**	0.41	4,584
Father educ. miss	0.26	0.44	8,531	0.24*	0.43	7,234	0.22***	0.41	4,584
Mother educ. miss	0.07	0.26	8,531	0.07	0.25	7,234	0.06***	0.23	4,584
Father non-Nordic	0.12	0.33	8,531	0.11*	0.32	7,234	0.10***	0.30	4,584
Mother non-Nordic	0.12	0.32	8,531	0.11*	0.31	7,234	0.10***	0.30	4,584
Birth country miss	0.0014	0.04	8,531	0.0011	0.0332	7,234	0.0011	0.0330	4,584
Father birth country miss	0.03	0.18	8,531	0.03	0.17	7,234	0.03	0.16	4,584
Mother birth country miss	0.02	0.13	8,531	0.02	0.13	7,234	0.02	0.13	4,584
Teacher experience							20.00	9.73	4,584
Teacher not qualified							0.04	0.20	4,584
Class size							23.30	6.16	4,584
Small class							0.02	0.14	4,584
Large class							0.35	0.48	4,584
Share boys							0.51	0.11	4,584
Share Swe2 students							0.06	0.14	4,584
Teacher not full time							0.12	0.32	4,584
Teacher on leave							0.03	0.18	4,584
Teacher year in class							2.78	0.88	4,584
Parent attitude: active school choice							0.15	0.36	4,584

Table A1 Continued

			Register data			Basic sample		Survey sample	
Variable	*Mean*	*Sd.*	*N*	*Variable*	*Mean*	*Sd.*	*N*	*Variable*	*Mean*
Covariates capturing selection and/or indirect MA-effects:									
Teacher attitude: home works							3.82	0.91	4,584
Teacher attitude: test							2.94	0.93	4,584
Teacher attitude: basic knowledge							4.65	0.62	4,584
Teacher attitude: student influence							3.86	0.85	4,584
Teacher attitude: student responsibility							4.76	0.51	4,584
Parent attitude: parent help							1.90	0.95	4,584
Parent attitude: parent active							2.34	1.04	4,584

Note: Statistically significant difference compared to register data: * significant at 10% ** significant at 5%. *** significant at 1%Note: 1) and 2) are not percentile ranked

The MA-effect in the basic sample versus the survey sample

Table A 2 OLS-estimates of the effect of attending an MA-class during grades 4-6 on percentile ranked grade 6 test results, controlling for register covariates only

	(1) Basic sample	***(2) Survey sample***
	Grade 6 test results	*Grade 6 test results*
MA grades 4–6	-1.171	-2.141
	(0.558)**	(0.795)***
Including register covariates	Yes	Yes
Constant	44.518	44.672
	(0.533)***	(0.643)***
Observations	7234	4584
R-squared	0.31	0.30

Note: Standard errors in parentheses are clustered on schools, all models include municipality dummies, *significant at 10%,** significant at 5%, *** significant at 1%

Publication series published by the Institute for Labour Market Policy Evaluation (IFAU) – latest issues

Rapporter/Reports

2008:1 de Luna Xavier, Anders Forslund and Linus Liljeberg ”Effekter av yrkesinriktad arbetsmarknadsutbildning för deltagare under perioden 2002–04”

2008:2 Johansson Per and Sophie Langenskiöld ”Ett alternativt program för äldre långtidsarbetslösa – utvärdering av Arbetstorget för erfarna”

2008:3 Hallberg Daniel ”Hur påverkar konjunktursvängningar förtida tjänstepensionering?”

2008:4 Dahlberg Matz and Eva Mörk ”Valår och den kommunala politiken”

2008:5 Engström Per, Patrik Hesselius, Bertil Holmlund and Patric Tirmén ”Hur fungerar arbetsförmedlingens anvisningar av lediga platser?”

2008:6 Nilsson J Peter “De långsiktiga konsekvenserna av alkoholkonsumtion under graviditeten”

2008:7 Alexius Annika and Bertil Holmlund ”Penningpolitiken och den svenska arbetslösheten”

2008:8 Anderzén Ingrid, Ingrid Demmelmaier, Ann-Sophie Hansson, Per Johansson, Erica Lindahl and Ulrika Winblad ”Samverkan i Resursteam: effekter på organisation, hälsa och sjukskrivning”

2008:9 Lundin Daniela and Linus Liljeberg ”Arbetsförmedlingens arbete med nystartsjobben”

2008:10 Hytti Helka and Laura Hartman ”Integration vs kompensation – välfärdsstrategier kring arbetsoförmåga i Sverige och Finland”

2008:11 Hesselius Patrik, Per Johansson and Johan Vikström ”Påverkas individen av omgivningens sjukfrånvaro?”

2008:12 Fredriksson Peter and Martin Söderström ”Vilken effekt har arbetslöshetsersättningen på regional arbetslöshet?”

2008:13 Lundin Martin ”Kommunerna och arbetsmarknadspolitiken”

2008:14 Dahlberg Matz, Heléne Lundqvist and Eva Mörk ”Hur fördelas ökade generella statsbidrag mellan personal i olika kommunala sektorer?”

2008:15 Hall Caroline ”Påverkades arbetslöshetstiden av sänkningen av de arbetslösas sjuk penning?”

2008:16 Bennmarker Helge, Erik Mellander and Björn Öckert ”Är sänkta arbetsgivaravgifter ett effektivt sätt att öka sysselsättningen?”

2008:17 Forslund Anders ”Den svenska jämviktsarbetslösheten – en översikt”

2008:18 Westregård Annamaria J. ”Arbetsgivarens ökade ansvar för sjuklön och rehabilitering kontra arbetstagarnas integritet – Går det att förena?”

2008:19 Svensson Lars ”Hemmens modernisering och svenska hushålls tidsanvändning 1920–90”

2008:20 Johansson Elly-Ann and Erica Lindahl ”Åldersintegrerade klasser – bra eller dåligt för elevernas studieresultat?”

Working papers

2008:1 Albrecht James, Gerard van den Berg and Susan Vroman “The aggregate labor market effects of the Swedish knowledge lift programme”

2008:2 Hallberg Daniel “Economic fluctuations and retirement of older employees”

2008:3 Dahlberg Matz and Eva Mörk “Is there an election cycle in public employment? Separating time effects from election year effects”

2008:4 Nilsson J Peter ”Does a pint a day affect your child’s pay? The effect of prenatal alcohol exposure on adult outcomes”

2008:5 Alexius Annika and Bertil Holmlund “Monetary policy and Swedish unemployment fluctuations”

2008:6 Costa Dias Monica, Hidehiko Ichimura and Gerard van den Berg ”The matching method for treatment evaluation with selective participation and ineligibles”

2008:7 Richardson Katarina and Gerard J. van den Berg “Duration dependence versus unobserved heterogeneity in treatment effects: Swedish labor market training and the transition rate to employment”

2008:8 Hesselius Patrik, Per Johansson and Johan Vikström “Monitoring and norms in sickness insurance: empirical evidence from a natural experiment”

2008:9 Verho Jouko, “Scars of recession: the long-term costs of the Finnish economic crisis”

2008:10 Andersen Torben M. and Lars Haagen Pedersen “Distribution and labour market incentives in the welfare state – Danish experiences”

2008:11 Waldfogel Jane “Welfare reforms and child well-being in the US and UK”

2008:12 Brewer Mike “Welfare reform in the UK: 1997–2007”

2008:13 Moffitt Robert “Welfare reform: the US experience”

2008:14 Meyer Bruce D. “The US earned income tax credit, its effects, and possible reforms”

2008:15 Fredriksson Peter and Martin Söderström “Do unemployment benefits increase unemployment? New evidence on an old question”

2008:16 van den Berg Gerard J., Gabriele Doblhammer-Reiter and Kaare Christensen ”Being born under adverse economic conditions leads to a higher cardiovascular mortality rate later in life – evidence based on individuals born at different stages of the business cycle”

2008:17 Dahlberg Matz, Heléne Lundqvist and Eva Mörk “Intergovernmental grants and bureaucratic power”

2008:18 Hall Caroline “Do interactions between unemployment insurance and sickness insurance affect transitions to employment?”

2008:19 Bennmarker Helge, Erik Mellander and Björn Öckert “Do regional payroll tax reductions boost employment?”

2008:20 Svensson Lars “Technology, institutions and allocation of time in Swedish households 1920–1990”

2008:21 Johansson Elly-Ann and Erica Lindahl “The effects of mixed-age classes in Sweden”

Dissertation series

2007:1 Lundin Martin “The conditions for multi-level governance: implementation, politics and cooperation in Swedish active labor market policy”

2007:2 Edmark Karin “Interactions among Swedish local governments”

2008:1 Andersson Christian “Teachers and Student outcomes: evidence using Swedish data”