Analysis of the Selectiveness of the Hungarian Educational System in International Context

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Abstract

International assessment programs have been indicating that Hungary is among those countries where between-school differences of students' achievements are very high. This selectiveness is one of the most crucial problems of Hungary's education system today, and changing the unfavorable tendencies requires a better understanding of this phenomenon. The main purpose of this paper is to study the selectiveness of the Hungarian education system in a historical perspective and in an international context. For the analysis, the IEA data bases offer the best sources, since the differences can be studied in several age groups, over a long time, and over different domains of achievement. In this paper, between-school differences of several IEA studies are compared. They are also compared to that of some other countries that may be considered as points of reference for Hungary. The results in general show that (1) the between-school differences are relatively stable over time; (2) there are larger differences when older age-groups are considered; (3) the differences are greater when other than curriculum-related knowledge and skills are assessed; and finally, (4) these phenomena are not present in the same manner in all countries examined.

Keywords: *between-school differences, selective education, system monitoring*

Objectives of the study

Since the early 1990s, Hungarian economy and society have been going through a rapid restructuring process. One of the most visible signs of the changes is a differentiation in a number of areas, first of all, the growing economic differences between families and societal groups.

Recent studies have been indicating large differences in Hungary between the achievements of students in different schools and, within schools, their classes as well. Although Hungary has a uniform, non-tracking primary school (grade 1 to grade 8) system, and the official education

policy promotes equity and equality, there are some hidden and some more or less known mechanisms for selecting students and grouping them into more homogenous classes. Large-scale national assessments have indicated that there are 2 to 3 years of difference in intellectual development between class means (e. g. as measured by an inductive reasoning test, see Csapo, 2003a), even in the primary school cohorts. After grade 8, students may choose between three types of secondary schools. The traditional grammar schools (*gimnázium*) and technical schools (*szakközépiskola*) lead to the same examination upon completion (*érettségi*, "maturation examination"), and students graduating from these schools may enter higher education. The third type is the vocational school (*szakiskola*). Obviously, there are differences between the achievements of students in different school types, but the magnitude of the differences in basic literacy and numeracy skills may be too large. In order to establish whether these differences are unusually large, we have to place our data into an international context and compare Hungary to other countries, especially to those that are known of their high achieving education systems.

In international contexts, it was the PISA 2000 study that first called attention to the great between-school differences (OECD, 2001). Hungary was among those countries where the largest between-school differences were experienced. Subsequent PISA studies systematically report between-school differences which indicates that the phenomenon is consistent (OECD, 2004, 2007). Table 1 presents between-school differences found in PISA studies for those countries where these differences were the highest. As the figures show, the variance between schools expressed as a percentage of the total variance within the country was the highest for Hungary in each literacy domain in 2006.

[Take in Table 1 about here]

Comparative analytic studies have also highlighted the problems of tracking and other means of differentiation between students. Haahr, Nielsen, Hansen, and Jakobsen (2005) list Hungary among countries facing such separation of students, and conclude that "Policy makers in these countries should consider whether there are unrealized potentials in developing education systems towards more comprehensive systems with a lower degree of institutional differentiation among students" (p. 8).

Further analyses have shown that the selection process is mostly based on students' social background (Csapo, 2003a), and international reports confirmed that, compared to other countries, the impact of students' social status is extremely high. In PISA 2006, Hungary was

the country where the largest proportion of between-school variance was explained by cultural and economic factors (OECD, 2007). Today, this selectiveness is considered as one of the major problems of the Hungarian educational system, one that limits the productivity of the entire system and jeopardizes social cohesion.

However, PISA studies are limited to 15-year-olds, and provide no data to describe the situation before 2000. Therefore, on the basis of PISA data, two important questions cannot be answered. (1) Is selectiveness a relatively new trait of the Hungarian education system, or does it have a longer history? (2) Are the large between-school differences characteristic of the upper grades only, or are they typical in the lower grades (grade 1-4) as well? With data from the mid-1990s, and regarding younger students as well, the IEA data bases offer excellent possibilities to search answers for these questions. Furthermore, their available data cover a broader range of variables. Some analyses of Hungarian data (not IEA data; e.g. Csapo, 2003b) have shown that the degree of between-school differences depends on the type of variables considered. PISA analyses also indicated a variation in Hungary's ranking as regards between-school differences. Given the larger variety of fields of assessments, the IEA data allows the examination of this issue as well.

In sum, this paper puts the selectiveness of the Hungarian education system into an international context and, by using IEA data, compares between-school differences for several countries, variables and age groups.

Educational and Academic Significance

International studies have revealed that among the high achieving educational systems there are selective and non-selective ones alike, but there is a tendency for high performance among the non-selective ones. Thus, one way to improve performance in a relatively low-achieving and selective education system (like the Hungarian) is to control the selection processes and reduce between-school differences. Comparative data may provide evidence for policy decisions.

As for the academic significance of such of analyses, there are different views on the nature of international educational assessment studies. On one hand, some analysts (e.g. Rindermann, 2007) call attention to the high correlation of the results of several achievement measures at the country level, claiming that international educational assessment projects measure more or less the same general ability. Other researchers (some of the respondents to Rindermann's

paper in the same issue) point to the differences between the instruments and argue for the importance of using a number of different tests in international educational assessments. This paper examines the question from a different perspective, the selection mechanisms of education systems. Our analyses indicate that different assessment instruments reveal different aspects of selection processes on the one hand, and confirm the arguments for using a broad array of tests in international comparative studies on the other.

Methodology and Data Sources

All available data of the IEA studies (IEA, 1997, 2001, 2003, 2004, 2005, 2008) have been utilized in the present analyses.

The selectiveness of educational systems is represented by the ratio of between-school and within-school variance (F values), which assumes a linear relationship between independent and dependent variables. Between-school variance shows the deviation of the school means around the sample mean, while within-school variance shows the deviation of the students' mean around their own school mean. The ratio of these variances is a good indicator for describing the selective mechanism of students' school choice. If this selection takes part in a random manner, there is no difference between the mean achievements at the school level, and the F values are low, close to 1 and 2. But the stronger the students' selection based on their achievements, the more homogenous the schools are (decreasing within-school variance) and the higher the differences between school means (increasing between-school variance).

Beside F values, eta squared values were also computed, which do not assume a linear relationship between independent and dependent variables, and indicates the percentage of the total variation in the dependent variable that can be accounted for by the independent variable.

In addition to the Hungarian, data for other countries were involved in the analyses as well. The countries were chosen because of their achievements on the IEA and OECD PISA surveys. All of the countries (Korea, Finland, Japan, Sweden and Norway) which have been chosen as reference points in the present analyses have above average achievements both in the IEA and the OECD PISA assessments. As the set of countries participating in the IEA studies varied from time to time, it was not possible to use the same group of reference countries in each analysis.

The IEA and OECD PISA assessments are based on different theoretical backgrounds.

Comparing the frameworks and items, there are both differences and similarities. The type of knowledge measured in both surveys is literacy, but the definitions of this socially valuable and broadly applicable knowledge are quite different.

In the IEA studies there is a stronger emphasis on curriculum-related, declarative knowledge, which is closer to expertise in the sense that it is maintained and developed by continuous practice of a special curriculum area. The OECD PISA frameworks reinterpreted the concept of useful and applicable knowledge. The meaning of literacy was broadened and interpreted as skills which are maintained by continuous interaction with the social environment. Abilities and knowledge assessed in the PISA studies are defined with less reference to the curricula. Both organizations defined knowledge that has to emerge as an outcome of schooling, but from different perspectives (Csapo, 2004).

The different theoretical frameworks have generated different questions. Consequently, task taxonomies that were generated to frame the items, tasks and texts on the assessments were also very different. The IEA items are akin to the tasks used in schools; the OECD PISA items are more problem-based, more complex, semantically rich, ill-structured and intransparent, similarly to real life problems.

Findings and Discussion

The results of the analyses are summarized in Tables 2 to 6. Beyond Hungary, data for some other countries are indicated in the tables as well.

[Take in Tables 2, 3, 4, 5 and 6 about here]

Between-school differences in Hungary have not changed in the last ten years, and the tendencies are stable. In the beginning of schooling, between-school differences are smaller and independent of the measured area of knowledge, nevertheless, they are already present (F values are above two for Hungary on each of Tables 2 to 6). One of the reasons is that Hungary belongs to the countries where the first selection point in the education system is at its entrance, at the age of 7. The second selection point is after primary school (grade 8), and it increases the mean achievement differences in every domain between schools; and these differences vary by type and areas of knowledge.

In mathematics, there are three times higher differences between the mean achievements of Hungarian schools than in the best achieving countries, where, as shown by the low F-values, there are no differences between mathematics mean achievements at the school level (Table 2). School level differences in Hungary are increasing when older age-groups are considered; by more then tenfold at the end of primary school. Eta squared values confirm the results above. At the end of primary school, 30% of the variability in mathematics mean achievement can be explained by school level selection. The class level eta squared values reveal that not only a selection between schools is measurable. There is an additional, class level selection within the more homogenous schools. Eta squared values for Hungary are higher not only at the school, but at the classroom level, too.

In the field of science in Hungary, the tendencies are similar, although the differences between the mean achievements in grade eight are smaller in science subjects than in mathematics (Table 4). However, if scientific literacy and reasoning are measured, which cover not curriculum-related knowledge, the differences are getting higher in older age groups (Table 3). In secondary school, there are more than 22 times higher mean achievement differences between schools than within schools. The eta squared values show that 40-50% of the variability in scientific literacy mean achievement can be explained by school level selection.

It is reading literacy which proves to be the most differentiating factor in the selection in early primary school. According to the Reading Literacy Study 2001, the mean achievement differences between Hungarian primary schools are more then seven times higher than what is found within Hungarian schools (Table 5). More than 20% of the variability in reading literacy mean achievement in grades 3 and 4 can be explained by school level selection. Eta-squared values in reading are the same at the school and the class level. The differences remain the same over time.

Figure 1 and 2 compare the selectiveness of the Hungarian and other school systems (of the best achieving countries) graphically, over time and through the progression of grades as found in the IEA studies (the indicator is the F value). In every grade and field, the Hungarian between-school differences prove to be relative stable over time. In the beginning of primary school, the F-values are around 5 and this increases to 25 by the end of secondary school. If a trend line were positioned over the data, it would be an exponential curve. The differences between Hungarian schools are increasing in higher grades, because the Hungarian school system does not compensate the differences, rather, it enlarges them (Figure 1). These phenomena are not present in the other countries involved in the present study to the same degree, moreover, in none of the best achieving countries can similar

tendencies be observed.

The F values in the best achieving countries (Figure 2) are increasing over time as well, but the maximum values at the end of compulsory schooling are only as high as those at the entrance to schooling in Hungary.

[Take in Figures 1 and 2 about here]

The results in general show that (1) between-school differences are relatively stable over time, (2) there are larger differences when older age-groups are considered, (3) there are larger differences when other than curriculum-related knowledge is assessed, and finally, (4) these phenomena are not present equally in all countries examined. Therefore, analyzing the dominant practices in other school systems may contribute to a better understanding of the Hungarian situation.

Conclusion and Implications

Between-school differences in Hungary have not changed in the last two decades, the tendencies are the same. The differences in the beginning of schooling here are as high as those at the end of schooling in the best achieving countries (F-values are about 5). At the end of schooling, when older age-groups are considered, between-school differences are five times higher than in the beginning of schooling (F-values are about 25). The differences are greater when other than curriculum-related knowledge is assessed.

Findings of the present paper do not support the claim that the extreme selectiveness of the Hungarian educational system would be a new phenomenon. Therefore changing it may be more difficult than it is assumed. On one hand, international comparative studies may provide the most convincing arguments for policy decisions, and, on the other hand, ways for reversing the processes that hinders the effectiveness of the education system may be identified by scrutinizing the practices of some other countries. Naturally, any practice should be carefully analyzed before it could be considered as a model for improvement in another system.

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Table 1: Between-school differences in PISA countries: Hungary and the most selective systems

Measured area	Year of the PISA survey	Country	Total variance in student performance between schools	Total variance in student performance within schools	Total variance between schools expressed as a percentage of the total variance within the country	Country ranking
Science	2006	Hungary	60.5	38.5	70.4	1
		Slovenia	64.8	42.8	60.4	2
	2003	Austria	51.6	44.8	56.1	1
		Netherlands	52.5	43.6	55.8	2
		Hungary	36.4	52.8	41.2	8
	2000	Austria	56.4	49.1	57.8	1
		Belgium	65.0	64.2	52.3	2
		Hungary	52.5	58.1	46.6	5
Reading	2006	Slovenia	68.4	25.5	85.9	1
		Hungary	74.0	34.6	81.2	2
	2003	Austria	65.3	51.2	59.4	1
		Netherlands	40.4	35.0	54.8	2
		Hungary	42.8	47.1	48.1	6
	2000	Poland	67.3	40.7	63.1	1
		Austria	63.5	49.2	62.9	2
		Hungary	51.8	36.2	58.2	6
Mathematics	2006	Hungary	74.0	39.7	74.8	1
		Germany	74.0	47.9	63.7	2
	2003	Netherlands	54.5	39.5	59.3	1
		Austria	55.4	49.5	56.4	2
		Hungary	49.0	47.3	51.4	7
	2000	Austria	57.5	53.9	56.1	1
		Poland	63.2	53.3	53.7	2
		Hungary	54.0	54.7	49.6	6

Table 2: Ratio of between-school and within-school variance with eta squared in the mathematics studies

Study	Sample	Country	F	η2 (at school level)	η2 (at class level)
TIMSS 95	3rd-4th grades	Hungary	3.711	0.086	0.176
TIMSS 95	3rd-4th grades	Korea	1.035	0.028	0.060
TIMSS 95	7th-8th grades	Hungary	10.045	0.204	0.279
TIMSS 95	7th-8th grades	Korea	4.133	0.098	0.133
TIMSS 99	8th grade	Hungary	11.096	0.348	
TIMSS 99	7th grade	Finland	3.147	0.153	
TIMSS 03	4th grade	Hungary	6.305	0.237	
TIMSS 03	4th grade	Japan	2.171	0.069	
TIMSS 03	8th grade	Hungary	10.649	0.343	
TIMSS 03	8th grade	Japan	4.688	0.126	

Table 3: Ratio of between-school and within-school variance with eta squared in the scientific literacy and reasoning and social utility studies

Study	Sample	Country	F	η2
TIMSS 95	17-19-year–olds	Hungary	22.161	0.479
TIMSS 95	19-year-olds	Sweden	2.177	0.097
TIMSS 95	17-19–year-olds	Hungary	15.521	0.392
TIMSS 95	19-year-olds	Sweden	5.024	0.198

Table 4: Ratio of between-school and within-school variance with eta squared in the science studies

Study	Sample	Country	F	η2 (at school level)	η2 (at class level)
TIMSS 95	3rd-4th grades	Hungary	3.248	0.076	0.162
TIMSS 95	3rd-4th grades	Korea	0.715	0.019	0.046
TIMSS 95	7th-8th grades	Hungary	7.525	0.161	0.230
TIMSS 95	7th-8th grades	Korea	3.346	0.081	0.122
TIMSS 99	8th grade	Hungary	7.671	0.269	
TIMSS 99	7th grade	Finland	2.612	0.130	
TIMSS 03	4th grade	Hungary	5.229	0.205	
TIMSS 03	4th grade	Japan	1.782	0.057	
TIMSS 03	8th grade	Hungary	7.914	0.279	
TIMSS 03	8th grade	Japan	4.443	0.120	

Table 5: Ratio of between-school and within-school variance with eta squared in the reading literacy studies

Study	Sample	Country	F	η2 (at school level)	η2 (at classroom level)
Reading Literacy Study 1991	4th grade	Hungary	4.905	0.226	0.226
Reading Literacy Study 1991	4th grade	Sweden	3.717	0.098	0.133
Reading Literacy Study 2001	3rd grade	Hungary	7.449	0.263	0.263
Reading Literacy Study 2001	3rd grade	Sweden	4.599	0.115	0.167
PIRLS 2001	9 year olds	Hungary	5.222	0.201	0.201
PIRLS 2001	9 year olds	Sweden	5.789	0.125	0.176
PIRLS 2001	9 year olds	Norway	3.111	0.112	0.132
PIRLS 2006	4th grade	Hungary	6.060	0.200	0.252
PIRLS 2006	4th grade	Sweden	3.684	0.112	0.144

Table 6: Ratio of between-school and within-school variance with eta squared in the civic education study

Study	Sample	Country	F	η^2
Civic Education Study 1999	8th grade	Hungary	8.784	0.297
Civic Education Study 1999	8th grade	Finland	2.776	0.133

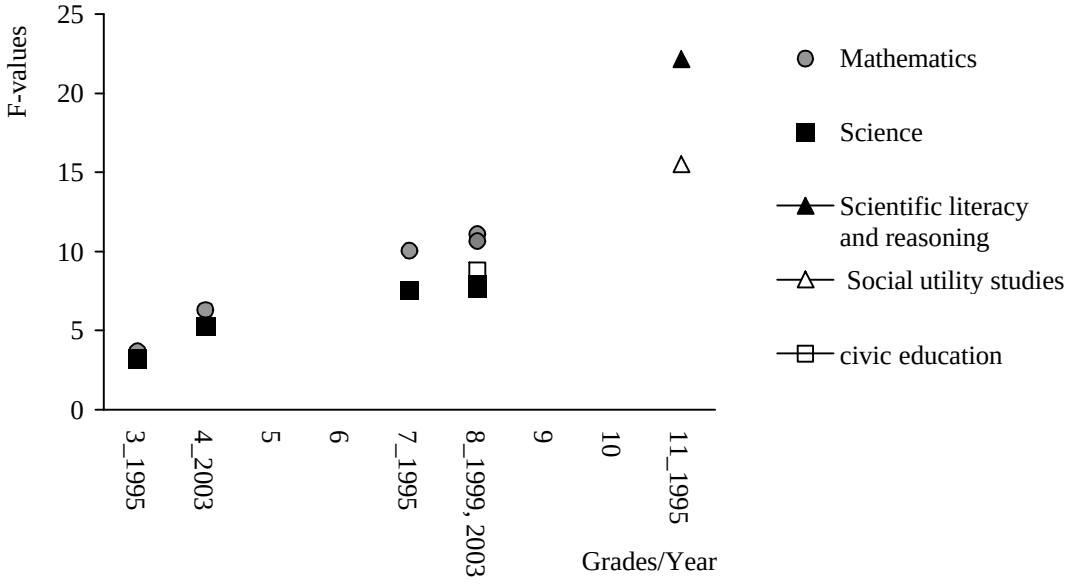

Fig.1: The selectiveness of the Hungarian school system over time and grade according the IEA studies (the indicator is the F value)

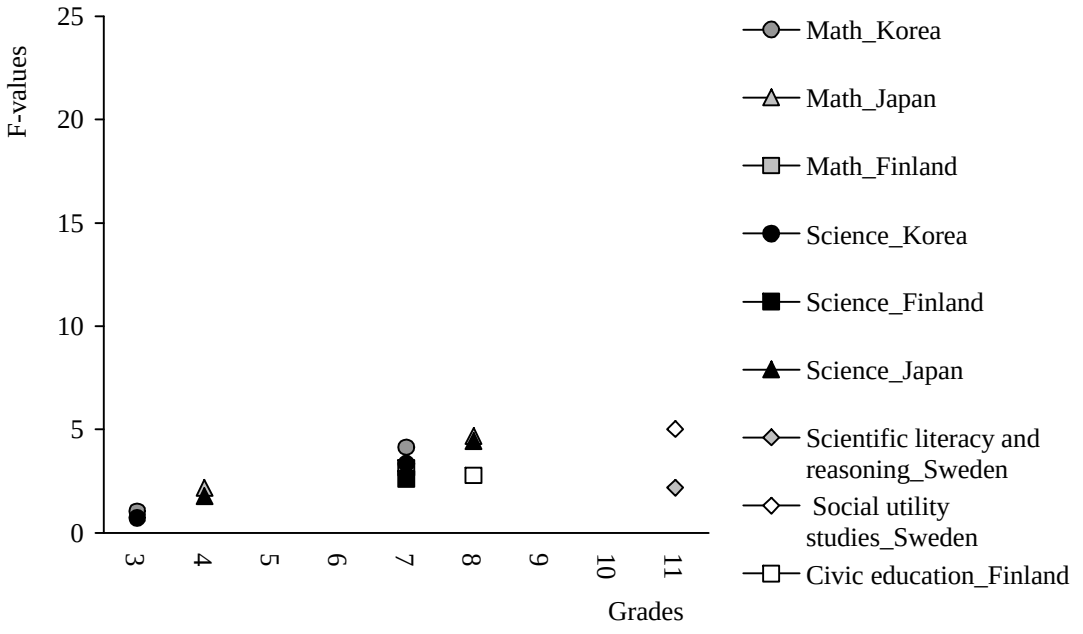

Fig.2: The selectiveness of the best achieving countries over time and through grades in the IEA studies (the indicator is the F value)