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The Effect of Students' Socioeconomic Background on Their Achievements in Matriculation Examinations*

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There may be differences between our findings and those in other studies due to differences in definitions and the fact that the analysis was carried out on a sample of about one half of the Grade 12 student population.
A glossary of terms and definitions can be found in Appendix A.

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Abstract

This study examines the differences between the achievement in matriculation examinations of Israeli students in different education streams and from various socioeconomic backgrounds over the schooling years 1992/93 through 2004/05. It was found that the gaps between the achievement of students from weak socioeconomic backgrounds and those from strong backgrounds narrowed during the period, while some of the gaps in indicators of excellence widened. The increase in the share of the Jewish ultra-orthodox and Arab students moderated the improvement in overall achievements over the period. On the other hand, the advancement in students' socio-economic background within the education streams enhanced their achievements. All in all, there was a non-negligible improvement in the Israeli students' achievement in matriculation examinations (without calibration of examinations' difficulty over time).

ההרכב החברתי-כלכלי של התלמידים והשפעתו על הישגיהם בבחינות הבגרות

נעם זוסמן ושי צור

תקציר

המחקר בוחן את ההבדלים בהישגים בבחינות הבגרות בין תלמידים מזרמי חינוך שונים ומרקע חברתי-כלכלי מגוון, ואת התפתחותם במהלך שנות הלימודים 1992/93 עד 2004/05. הפערים בהישגים הבסיסיים בבחינות הבגרות לרעת תלמידים מרקע חברתי-כלכלי חלש בהשוואה לתלמידים מרקע חזק הצטמצמו במהלך התקופה, בד בבד עם התרחבות חלק מהפערים בהישגים המעידים על מצוינות. העלייה במשקלם של זרמי החינוך החרדי והערבי מיתנה את קצב העלייה בהישגים לאורך זמן; כנגד זאת, שיפור בתכונות החברתיות-כלכליות של התלמידים בתוך זרמי החינוך תמך בעליית ההישגים. בסך הכול נרשם שיפור לא מבוטל בהישגים בבחינות הבגרות (ללא תיקון בגין דרגת הקושי שלהן).

A. Introduction

Many education systems worldwide are under increasing public pressure as a result of what is perceived as an insufficient level of achievement. In an era when investment in education has become critically important in determining an individual's socioeconomic status and increasing competition between the developed economies in creating relative advantages based on human capital, it is no surprise that the performance of education systems is coming under increasingly close scrutiny.

These phenomena have not passed Israel by. For many years, the Israeli education system has been the target of considerable criticism and a number of proposals for far-reaching reform have been put forward. Recent examples include: the National Education Plan (the Dovrat Report, January 2005); the recent signing of wage agreements with the teachers unions and the approval of a plan to reduce the number of students per classroom.

The critics of the Israeli education system base themselves in part on the low achievements of Israeli students on international examinations and the downward trend in those achievements over time. Moreover, the gap between students of different socioeconomic backgrounds is among the largest in the developed world and there is a high proportion of poorly performing students. The inequality in Israeli students achievement has far-reaching consequences on the socioeconomic polarization in Israel, which is far more acute than in Western countries.

The trend in the performance of Israeli students over time and between different population groups—both on international examinations and on local examinations such as Meitzav (Hebrew acronym for the School Efficiency and Growth Index) and the matriculation examinations—reflects to a large degree the nature of Israeli society and the changes it has undergone. Over the years, we have been witness to significant changes in the composition of the school population. These include: an increase in the proportion of students in the ultra-Orthodox and Arab education streams;[1] mass immigration from the Former Soviet Union and impoverished countries such as Ethiopia; an increase in the proportion of one-parent families; and an increase in poverty, particularly among children. These developments, together with the continuing reduction in public expenditure on education per student and the apparent

[1] The analysis did not include East Jerusalem Arabs who learn according to the Jordanian curriculum.

decline in the quality of teachers,[2] have made it difficult for the education system to improve student performance at a desired pace.

Previous studies have examined the effect of family background variables on completion of high school and achievements on matriculation examinations and have focused on differences in origin and sector. Friedlander et al. (2002), based on a comparison of the Population and Housing Census for 1983 and 1995, found that between the 1950s and 1980s, differences had narrowed in the rate of eligibility for a matriculation certificate between students of Asian-African origin (Sephardic) and those of European-American origin—primarily due to the increase in parents' level of education in the former group—and that there had been a relative improvement in the achievements of Christian Arab and Druse students. Dahan et al. (2002) found that for the same population, differences in the rate of eligibility for a matriculation certificate had narrowed among girls of various origins (although among boys they remained unchanged) and that the main factor explaining success in school is the education level of parents. Friedlander et al. (2006), using data on matriculation examinations for the period 1991–9 which were merged with data from the 1983 Census, found that during the 1990s, the lower scores of the Sephardic students remained unchanged, despite the improvement in their socioeconomic status, and that there had been an improvement in performance in the Arab education stream, primarily due to the increase in parents' level of education, although their position relative to the Hebrew education stream remained unchanged.

Shavit and Ayalon (2004), based on the 1995 Census and administrative data from the Ministry of Education, showed that in the period 1992–6, during which a reform had been implemented in vocational education and leniencies were introduced in the matriculation examinations for certain students (see below), the rate of eligibility for a matriculation certificate among older students increased to a greater extent among those from a weak socioeconomic background, but at the same time the gaps in the quality of a matriculation certificate (as measured by the fulfillment of criteria for university admission) for this group widened.

The current study focuses on the analysis of trends in matriculation examination achievement among Grade 12 students during the period between the 1992/93 and

[2] Although the level of education among teachers has risen, the quality of those studying in teachers colleges (as measured by scores on the matriculation and psychometric examinations) has apparently declined until recently. See Adler et al. (2001).

2004/05 school years.[3] The changes in matriculation examination achievement will be disaggregated and quantified, for the first time, according to their sources. These include: changes in the proportions of students by education stream; changes in the socioeconomic composition of students within each education stream; and an array of factors related to the education system as a whole (investment of public resources, quality of teaching staff and teaching methods, the level of difficulty on examinations, etc.) whose effects are not analyzed individually. Particular attention will be given to comparing the trends in achievement of the various education streams and socioeconomic groups, in view of the wide-ranging effects of inequality in education.

The analysis is incomplete in several aspects: First, it focuses only on the education system's main measurable product in high school and does not deal with its contribution to shaping the student's values and beliefs, his behavior, his cultural experiences, etc., whose importance is no less than that of matriculation examinations achievement. Second, due to the unavailability of data, the analysis does not separately identify the effect of resources available to the education system as a whole—including public expenditure, teacher quality and teaching methods—on matriculation examination achievement. Third, performance is measured only for Grade 12 students and therefore it was not possible, for technical reasons, to look at high school dropout rates or to take into account that some Grade 12 students complete their matriculation certificates at a later stage.[4]

An additional constraint was the lack of calibration of matriculation examinations over time. During the period under study, changes were introduced into the matriculation examinations that reduced the quantity of material included and made the examinations easier. These included: the "lottery of compulsory subjects" (introduced in 1995) and the "focus system" that replaced it (in 1998), which reduced the scope of the examinations to about four-sevenths of the material taught in each of the compulsory subjects; the introduction of a second sitting in which a student can only improve his score (introduced in 2001), as well as an "accumulation system" in English and math (introduced in 2002);[5] and additional leniencies for students with

[3] Two other school years were also examined: 1997/98 and 2001/02. No data were available for years prior to 1992/93.

[4] Thus, for example, the overall rate of eligibility for a matriculation certificate rose from 63 percent among those being tested in 1998 to 76 percent in 2006 (Central Bureau of Statistics, press release 217/2007).

[5] According to the "accumulation system", an examination is composed of three questionnaires, where the last questionnaire for a certain number of study units (for example, three units) is also the first for

learning disabilities (for more details, see Amir, 2007 and the State Comptroller, 2008). In the absence of calibration between matriculation examination scores, the study focuses on the relative changes between groups of students over time.[6]

The database for the study was created by merging student data, matriculation examination data, the Population Registry and data on parents' labor income (for both salaried and self-employed workers).

The rest of the study is organized as follows: Section B will describe the socioeconomic characteristics of Grade 12 students. Section C will present students' matriculation achievements according to education stream, family background and individual characteristics. Section D will estimate the return to socioeconomic characteristics in terms of scholastic achievement. In Section E, changes in scholastic achievement will be broken down according to source, i.e. changes in the distribution of students according to education stream and socioeconomic characteristics. Section F will conclude.

B. The socioeconomic characteristics of Grade 12 students

Changes in the distribution of Grade 12 students according to education stream and socioeconomic characteristics within each stream constitute the main factor in explaining long-term trends in achievement on matriculation examinations.

During the period between the 1992/93 and 2004/05 school years, the proportion of students in the Arab and ultra-Orthodox education streams increased significantly, alongside an 8 percentage point drop in the proportion of students in the Hebrew State education stream (see Figure 1a). In the Arab education stream, the proportion of students in the Arab-Moslem and Bedouin streams increased (see Figure 1b).

The increase in the proportions of Arab and ultra-Orthodox students is first and foremost a result of the relatively high fertility rates in those streams since the vast majority of the immigrants from the Former Soviet Union and Ethiopia entered the Hebrew State and State Religious education streams, respectively.

An additional factor that tended to increase the proportion of Arabs among Grade 12 students is the relative decline in their dropout rate. Thus, during the period under

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the next level of the examination (for example, four units). Furthermore, the questions on the first and most basic questionnaire on each level are taken from a small bank of questions that is published by the Ministry of Education.

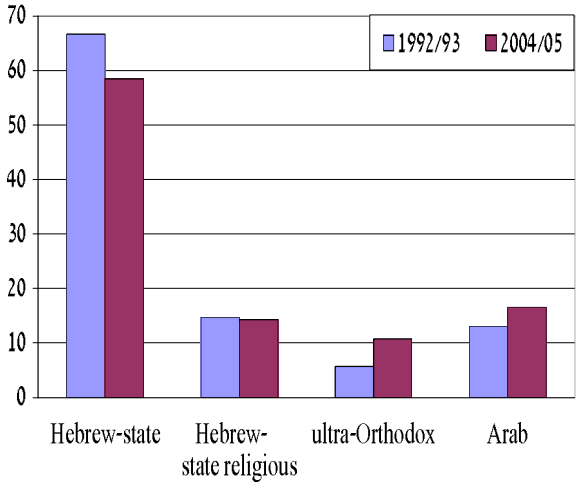
[6] This analysis is also subject to problems of calibration since the students who have already reached high levels of achievement are limited in their ability to improve their grades; however, this is a secondary problem.

study, the average annual dropout rate in Grades 9–12 declined significantly from 10.5 to 7.4 percent in the Arab education stream, and from 6.0 to 4.8 percent in the Hebrew education stream. The improvement in the Arab education stream was achieved in part as a result of the increase in the proportion of girls in high school since their dropout rate is much lower than that of boys. The dropout rate in the Hebrew education stream declined at a more moderate rate due partly to the integration of immigrants who are characterized by dropout rates double that of native children.

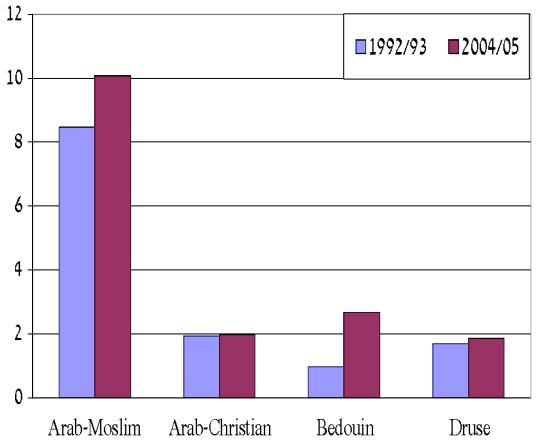
The proportion of ultra-Orthodox students rose from about 6 percent in the 1992/93 school year to about 10 percent in the 2004/05 school year. The ultra-Orthodox students constituted 6.7 of Grade 1 students in the base year which grew to 16.2 percent by the end of the period. From this it can be inferred that an additional and significant increase can be expected in the proportion of ultra-Orthodox students in Grade 12 within about a decade, which may have far-reaching effects on both the economy and society, as well as on matriculation examination achievement in Israel.

Figure 1: Distribution of Grade 12 students by education stream (percent)

a. Total



b. Arab education stream
(out of the total student population)



Source: Central Bureau of Statistics and calculations by the authors.

Over the years, there has been a decline in the proportion of students in vocational schools within the Hebrew education stream to 36 percent in 2004/05. The opposite trend has characterized the Arab education stream, with the proportion of Arab students in vocational schools rising to 41 percent. Possible reasons include: the decline in the dropout rate among Arab students, which increased the number of

weaker students in the system, who have a greater tendency to study vocational subjects, and high rates of unemployment among Arabs with a post secondary education, which has reinforced the tendency of Arab students to study vocational subjects.

There are significant differences in socioeconomic characteristics between students in the various education streams (see Table 1). Students in the Hebrew State and State Religious education streams are on average from stronger socioeconomic backgrounds. Following them are, in descending order, the Arab-Christian, ultra-Orthodox and Druse education streams and finally, Arab-Moslem and Bedouin students who have the lowest average socioeconomic level among all the streams. During the period 1992/93–2004/05 school years, changes occurred in the socioeconomic characteristics of students in each of the education streams, which were characterized by mixed trends in the differences between them.

Girls constitute just over half of the total Grade 12 student population. Over the years, their proportion in the Hebrew education stream has declined somewhat while it has increased in the Arab education stream, particularly among the Bedouin, as a result of the relatively large decline in the dropout rate of female students.

The proportion of immigrants among Grade 12 students in the Hebrew education stream has increased significantly as a result of the integration of Former Soviet Union immigrants in the Hebrew State education stream and the integration of Ethiopian olim within the State Religious education stream. The proportion of students from one-parent families has increased, particularly in the Hebrew State education stream (from about 10 to about 14 percent) with the entry of students from the Former Soviet Union into the education system.[7]

The average number of siblings among Grade 12 students is particularly high in the ultra-Orthodox and Bedouin education streams. Over the years, this figure has grown for all the education streams and particularly the ultra-Orthodox and Bedouin streams as a result of their high fertility rate. An additional explanation of the growing number of siblings is the decline in dropout rates, particularly in the Arab education stream, which has led to increased numbers of socioeconomically weak students, who are generally from large families.

[7] A high proportion of students in the Bedouin education stream are from one-parent families, which is the result of the method of registering families that circumvents the problems arising from polygamous relationships.

During the period, the average years of schooling of mothers grew by one year in the Hebrew State education stream and two years in the Arab education stream. However, the gap in the number of years of schooling between the mothers in the Hebrew and Arab streams still remained high at 3.7 in 2004/05. There were similar developments with respect to the father's years of schooling though with somewhat less intensity.

Family income (from salaries and child allowances) per capita in 1992/93 in the Hebrew State education stream was double that in the Arab education stream. It was significantly lower among the ultra-Orthodox and among the Bedouin. About 19 percent of students in the Hebrew education stream are in the lower centile of income per capita, while in the Arab education stream about 28 percent of students are in the lowest centile and about 44 percent are in the second-to-lowest. The situation was unchanged in 2004/05. Similar findings were found in an analysis of the socioeconomic ranking of the students' place of residence: a relatively high proportion of ultra-Orthodox and Arab students live in socioeconomically weak municipalities while a relatively high proportion of students in the Hebrew State and State Religious education streams lived in strong ones. Many of the students in the State Religious education stream live in development towns.

In summary, the proportion of ultra-Orthodox and Arab students increased significantly between the 1992/93 and 2004/05 school years. The socioeconomic ranking of students, according to stream, is as follows (in descending order): Hebrew State and State Religious, Arab-Christian, ultra-Orthodox, Druse, Arab-Moslem and Bedouin. During the period under study, the proportion of students from one-parent families increased, as did the average number of a student's siblings. There was little change in per capita family income while parents' years of schooling increased, particularly among Arab mothers.

Table 1: The socioeconomic characteristics of Grade 12 students according to stream

1992/93

		Total	Hebrew education stream				Arab education stream				
			Total	State	State Religious	Ultra-Orthodox	Total	Moslem	Christian	Bedouin	Druse
Distribution of students (%)		100.0	87.0	66.6	14.7	5.7	13.0	8.5	1.9	1.0	1.7
Vocational tracks (%)		44.1	47.0	50.5	45.1	11.9	24.7	24.8	24.4	28.9	22.3
Female students (%)		52.4	52.4	52.3	52.1	55.1	51.9	52.5	56.6	42.2	48.9
Immigrants (%)	Total		9.7	9.3	13.0	5.8					
	FSU		4.3	4.9	2.7	1.6					
	Ethiopia		2.5	1.5	11.0	0.0					
One-parent families (%)		8.2	8.9	9.7	7.0	4.1	4.1	3.5	3.0	12.7	3.7
Number of siblings (including the student himself)		3.4	3.1	2.9	3.8	4.5	4.9	5.0	4.0	5.1	5.3
Mother's years of schooling		11.6	12.1	12.2	11.7	12.1	7.5	7.1	9.5	6.4	6.5
Monthly family income per capita[1]		2,103	2,274	2,418	1,989	1,336	976	936	1,165	828	1,044
Distribution of family income per capita, by centile (%)	1 (lowest)	20.0	18.8	18.5	18.9	22.5	27.7	27.5	27.9	33.2	24.8
	2	20.0	16.4	14.4	19.4	31.7	43.5	45.2	36.7	44.0	42.9
	3	20.0	19.9	18.6	23.5	25.6	20.8	21.0	20.7	16.1	22.2
	4	20.0	22.1	22.7	22.1	14.3	6.4	5.1	10.2	6.2	8.9
	5 (highest)	20.0	22.8	25.8	16.2	5.9	1.6	1.1	4.4	0.5	1.3
Residence in a development town (%)			5.4	4.6	8.8	5.5					
Distribution by socioeconomic ranking of municipality (%)	1-2	5.3	2.8	2.1	5.8	4.4	22.0	22.5	11.0	87.2	17.6
	3-4	29.7	23.9	20.7	31.1	42.1	69.1	73.5	62.2	12.8	69.0
	5-6	21.8	24.3	21.5	31.3	38.6	4.7	1.1	14.2	0.0	13.2
	7-8	40.0	45.4	51.4	30.0	14.3	4.1	2.9	12.5	0.0	0.2
	9-10	3.1	3.6	4.3	1.7	0.5	0.0	0.0	0.0	0.0	0.0

2004/05

		Total	Hebrew education stream				Arab education stream				
			Total	State	State Religious	Ultra-Orthodox	Total	Moslem	Christian	Bedouin	Druse
Distribution of students (%)		100.0	83.5	58.5	14.3	10.7	16.6	10.1	2.0	2.7	1.9
Vocational tracks (%)		36.9	36.0	38.5	28.6	32.2	41.0	42.9	46.7	33.7	34.7
Female students (%)		50.8	50.2	49.1	51.5	54.0	54.3	55.4	55.1	50.0	54.0
Immigrants (%)	Total		15.9	18.1	14.8	5.2					
	FSU		12.0	15.5	5.2	2.0					
	Ethiopia		2.5	1.5	8.6	0.1					
One-parent families (%)		10.1	11.6	14.1	8.1	2.9	2.1	1.2	1.5	7.2	0.4
Number of siblings (including the student himself)		4.3	4.1	3.3	4.7	7.3	5.5	5.2	4.0	8.0	5.2
Mother's years of schooling		12.6	13.1	13.1	13.2	12.9	9.4	9.5	11.4	6.4	8.1
Monthly family income per capita[1]		2,054	2,276	2,553	1,998	1,208	1,004	951	1,441	784	1,162
Distribution of family income per capita, by centile (%)	1 (lowest)	20.0	16.2	16.7	17.1	12.9	32.9	35.6	34.9	22.5	30.4
	2	20.0	18.2	12.6	20.0	44.7	33.5	32.8	15.7	54.8	25.7
	3	20.0	19.9	18.5	21.2	25.9	20.4	20.0	21.7	18.3	24.2
	4	20.0	22.2	23.8	22.3	13.4	9.6	8.6	16.4	3.7	16.7
	5 (highest)	20.0	23.5	28.4	19.4	3.1	3.6	3.0	11.3	0.7	2.9
Residence in a development town (%)			6.0	5.5	8.8	5.2					
Distribution by socioeconomic ranking of municipality (%)	1-2	10.5	4.6	0.4	2.4	29.4	40.4	43.8	6.8	93.7	3.4
	3-4	28.7	23.7	17.1	32.9	46.4	54.1	51.7	73.2	5.0	96.6
	5-6	26.3	31.0	33.4	37.0	11.4	2.1	1.6	7.5	1.3	0.0
	7-8	33.3	39.2	47.2	27.4	12.6	3.4	2.8	12.4	0.1	0.0
	9-10	1.1	1.4	1.8	0.3	0.2	0.0	0.0	0.0	0.0	0.0

Source: The Central Bureau of Statistics and calculations by the authors.
(1) NIS, 2000 prices.

C. Achievement on matriculation examinations

The rate of eligibility for a matriculation certificate among Grade 12 students rose by 9 percentage points during the period between the 1992/93 and 2004/05 school years while the proportion of matriculated individuals who meet the criteria for admission into university[8]—one of the measures of the quality of a matriculation certificate—increased by about 4 percentage points (see Table 2 and Figure 2). However, the gaps between the various education streams remained high and in some cases even widened. While in the Hebrew State and State Religious streams the rate of eligibility stood at about 62 percent in 2004/05, following an increase of about 13 percentage points during the period under study, the rate in the ultra-Orthodox stream remained particularly low. This was primarily due to the lack of emphasis placed on the core subjects and the low participation rates in tracks leading to a matriculation certificate in this stream.

In the Arab education stream, the rate of eligibility for a matriculation certificate was only 48 percent in 2004/05 and had grown by 11 percentage points during the period under study. The achievements of Arab-Christian students are the highest in Arab education stream and today are close to those of students in the Hebrew State and State Religious streams. Following them, in descending order, are the achievements of Druse, Moslem and Bedouin students. The rate of eligibility for a matriculation certificate among Bedouin students was only 42 percent in 2004/05, following an impressive increase of about 23 percentage points during the period under study.

The superior achievements of students in the Hebrew State and State Religious streams relative to students in the Arab stream, as well as the ranking of streams within the Arab education stream, are consistent with the students' socioeconomic status (see Section B).

Students in the Arab education stream also lagged in indicators of excellence, such as the proportion of matriculated students meeting the criteria for admission to university and the proportion of students achieving high marks in school in the core subjects, such as English and math (see Figure 3). However, there was a significant increase in the Arab education stream in the proportion of those meeting the criteria for admission to university and in the proportion of students writing matriculation

[8] Criteria for admission to university: eligibility for a matriculation certificate, a passing mark in three units of math, four units of English and four units in another advanced subject.

examinations of four or five study units in English and math, which is an indicator of the improvement in the quality of matriculation certificates. The proportion of students in the Arab education stream writing the English matriculation examination in 2004/05 was much lower than in the Hebrew education stream while the proportion writing the math examination was similar.[9]

The limited success in English among students in the Arab stream is partly the result of it being a third language for them (after Arabic and Hebrew). Furthermore, their exposure to the "global village" (for example, through the Internet) is more limited than that of Hebrew students, which reduces their opportunities for learning English.

Table 2

Achievements of Grade 12 students on the matriculation examinations by education stream (percent)

		Rate of eligibility for a matriculation certificate			Proportion of matriculated students who met criteria for admission to university		
		1992/93	2004/05	Diff.[1]	1992/93	2004/05	Diff.[1]
Total		45.2	54.2	9.0	81.2	84.9	3.6
Hebrew stream		46.4	55.4	9.0	83.8	86.6	2.8
of which	State	49.7	62.2	12.5	85.3	88.6	3.3
	State Religious	47.6	62.0	14.4	77.9	83.2	5.3
	Ultra-Orthodox	4.1	9.5	5.4	47.1	45.5	-1.5
Arab stream		37.3	48.0	10.7	59.9	74.8	14.9
of which	Moslem	34.1	46.8	12.7	55.7	75.1	19.4
	Christian	58.7	59.5	0.8	77.8	91.8	14.1
	Bedouin	18.4	41.9	23.4	29.2	60.4	31.1
	Druse	39.3	50.8	11.4	55.8	69.1	13.3

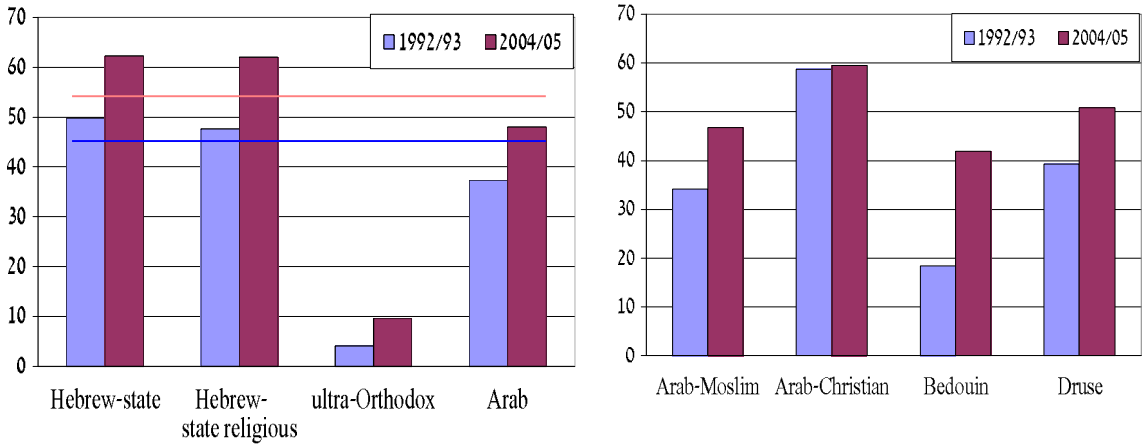
Source: The Central Bureau of Statistics and calculations by the authors.
(1) 2004/05 less 1992/93 (percentage points).

[9] The number of study units in all the subjects taken together was stable in both the Hebrew and Arab streams. The distribution of study units in the academic track between the humanities and the sciences also remained almost unchanged from 1992/93 to 2004/05 in both streams.

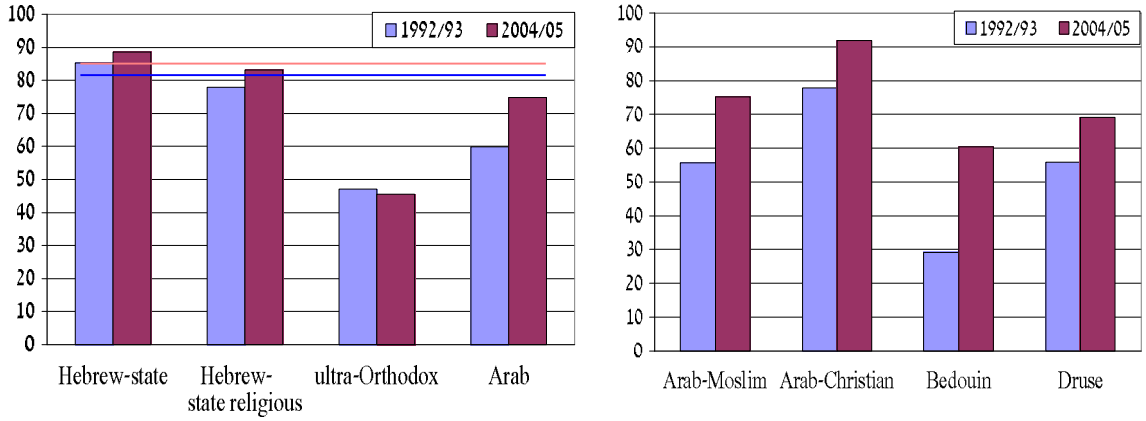
Figure 2: Achievements of Grade 12 students on matriculation exams according to education stream (percent)

Total Arab education stream

a. Rate of eligibility among Grade 12 students for a matriculation certificate



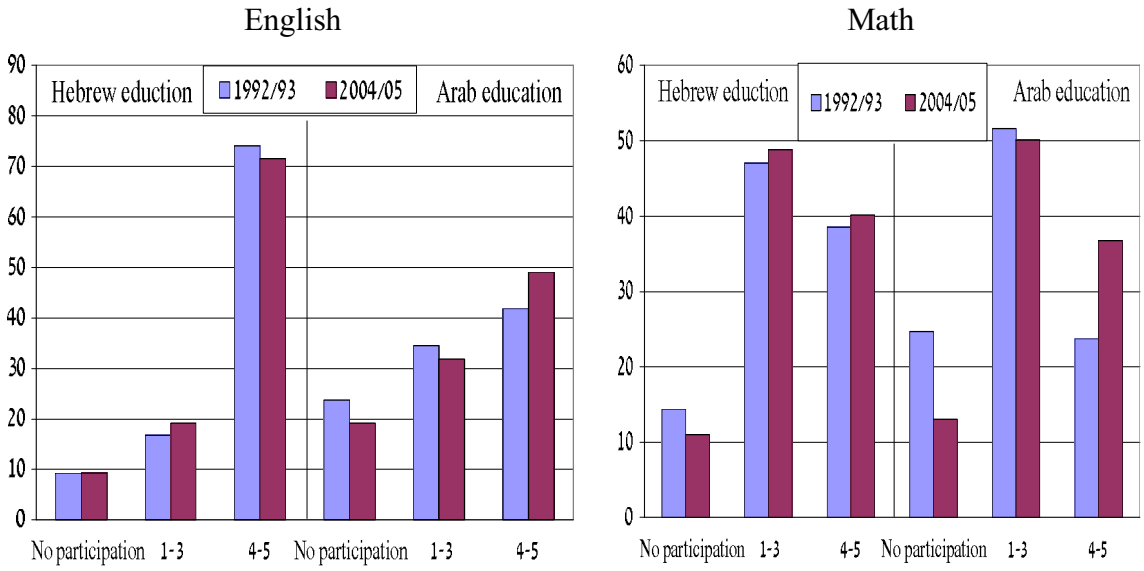
b. Proportion of matriculated students who meet the criteria for university admission



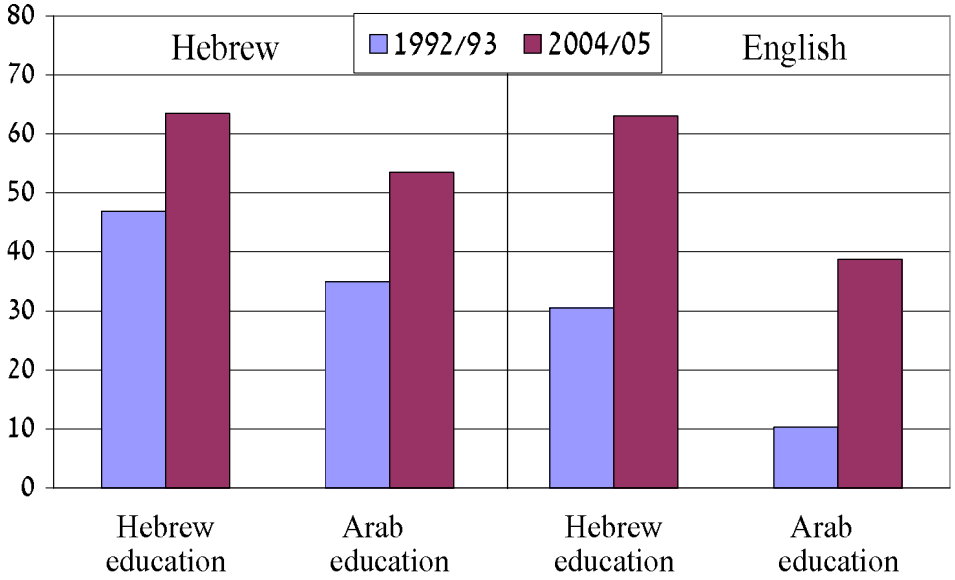
Source: Central Bureau of Statistics and calculations by the authors.

Figure 3: Distribution of students by number of study units in math and English[1] and the proportion of students with a mark above 80,[2] by education stream (percent)

a. Distribution of number of study units



b. Proportion of students with a mark above 80



Source: Central Bureau of Statistics and calculations by the authors.
(1) Of those who participated the matriculation exams.
(2) Weighted by the number of study units.

The differences in achievement on the matriculation examinations between student from different socioeconomic background are also evident within each education stream (see Figure 3). The rate of eligibility for a matriculation certificate and the

proportion meeting university admission criteria were significantly higher in 2004/05 among students in the Hebrew State education stream whose mothers have post-secondary education than among students with mothers having up to secondary education. A similar picture is obtained from a comparison of these indicators between students from families in the upper centile of disposable family income per standard individual and students from families in the bottom centile and between students living in municipalities with a high socioeconomic ranking and those with a low ranking. Differences in achievement based on socioeconomic background were also found in the Arab education stream.

With regard to trends, while students in the Hebrew State education stream from weak socioeconomic backgrounds improved their rate of eligibility for a matriculation certificate to a much greater extent than students with strong backgrounds,[10] the gaps in indicators of excellence, i.e. meeting the criteria for admission to university and high marks in math (Figure 4), narrowed only somewhat or even widened. The trends in achievement in the Arab education stream were mixed.

An additional measure of excellence in school is the proportion of students receiving a mark of 80 or higher in five study units of English or math. According to this indicator, there were significant differences in rates of excellence between students from different socioeconomic backgrounds, particularly in English, both in the Hebrew State stream and the Arab stream. Over the years, these gaps became significantly wider.

The overall gaps in achievement between students in the Arab stream and those in the Hebrew State stream were high in 1992/93, as mentioned above, which was in part due to the weaker socioeconomic background of Arab students on average. The achievements of weak socioeconomic Arab students were much lower than Hebrew students with a similar background, while the differences between students with a strong socioeconomic background were smaller or non-existent (see Table 3). Between the 1992/93 and 2004/05 school years, there was a major improvement in the achievements of Arab students, particularly among those with a weak socioeconomic background. Thus, the gap in achievement between Arab students with weak socioeconomic backgrounds and their Hebrew counterparts narrowed.

[10] One of the explanations for this moderate increase in the rate of eligibility for a matriculation certificate among students with educated mothers is the lower rate of eligibility among immigrants who have more highly educated mothers.

The proportion of outstanding students from a weak socioeconomic background in the Arab stream was lower in 1992/93 than among similar students in the Hebrew State education stream, while among students with a strong socioeconomic background the gap was smaller and in some cases Arab students had superior achievements. The gap between the achievements of outstanding Hebrew students and those of outstanding Arab ones, whether from weak or strong socioeconomic backgrounds, widened in English, but narrowed in math.

In summary, achievement on the matriculation examinations, according to stream, is in the following descending order: Hebrew State and State Religious, Arab-Christian, Druse, Arab-Moslem, Bedouin and ultra-Orthodox. During the period between the 1992/93 and 2004/05 school years, there was overall improvement in matriculation examination scores (ignoring changes in level of difficulty). There are also significant differences in achievement according to socioeconomic background and although the gaps in basic achievement narrowed significantly, the gaps in indicators of excellence widened in most cases.

Table 3

Achievement on matriculation examinations among Grade 12 students according to stream and socioeconomic status (percent)

		Rate of eligibility for a matriculation certificate			Proportion of matriculated students who meet criteria for admission to university		
		1992/93	2004/05	Diff.[1]	1992/93	2004/05	Diff.[1]
		Hebrew State education stream					
Years of mother's schooling	Up to 12	41.3	55.5	14.2	81.1	83.2	2.1
	+16	78.3	80.6	2.3	92.6	96.0	3.4
Centiles according to family income per capita	1	38.9	51.0	12.1	82.0	82.3	0.3
	2	39.7	51.5	11.8	79.2	79.6	0.4
	3	41.7	58.2	16.5	80.9	86.2	5.3
	4	49.1	65.8	16.7	85.5	89.1	3.6
	5	67.7	77.6	9.9	91.4	94.1	2.7
Development town		34.9	54.5	19.6	78.5	78.4	-0.1
Tel Aviv area		52.3	64.4	12.1	86.7	90.1	3.4
Socioeconomic ranking of place of residence	1-2	36.8	52.5	15.7	77.4	86.8	9.4
	3-4	36.4	55.6	19.2	76.1	81.4	5.3
	5-6	49.3	58.4	9.1	82.9	86.5	3.6
	7-8	54.7	67	12.3	87.7	91.9	4.2
	9-10	64.5	72.9	8.4	94.8	95.9	1.1
		Arab education stream					
Years of mother's schooling	Up to 12	36.2	48.4	12.2	58.3	75.3	17.0
	+16	75.0	82.1	7.1	88.9	96.6	7.7
Centiles according to family income per capita	1	36.9	43.8	6.9	61.8	73.9	12.1
	2	34.3	39.5	5.2	57.8	65.8	8.0
	3	42.4	54.3	11.9	63.7	76.1	12.4
	4	52.3	67.7	15.4	74.1	84.9	10.8
	5	55.3	82.6	27.3	76.2	95.4	19.2
Socioeconomic ranking of place of residence	1-2	33.7	46.2	12.5	52.7	69.8	17.1
	3-4	38.5	49.5	11	62.1	78.2	16.1
	5-6	52.8	54.4	1.6	61.5	75.8	14.3
	7-8	58.6	54.2	-4.4	75.5	88.3	12.8
	9-10						

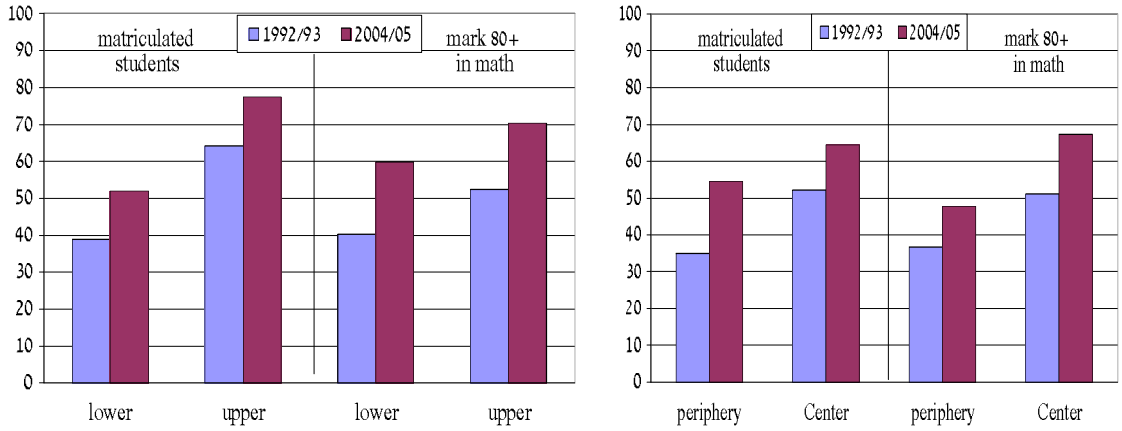
Source: The Central Bureau of Statistics and calculations by the authors.

(1) 2004/05 less 1992/93 (percentage points).

Figure 4: Achievements of Grade 12 students on matriculation exams in the Hebrew State education stream according to income and residence in the periphery

a. Centiles according to family income per capita

b. Center vs. periphery



Source: Central Bureau of Statistics and calculations of the authors.

Table 4: Proportion of Grade 12 students who excelled[1] on the matriculation examinations in English and math according to stream and socioeconomic characteristics (percent)

		English			Math		
		1992/93	2004/05	Diff.[2]	1992/93	2004/05	Diff.[2]
		Hebrew State education stream					
Total		13.1	31.1	18.0	6.6	11.9	5.3
Years of mother's schooling	Up to 12	7.6	19.9	12.3	3.8	7.0	3.2
	+16	36.3	59.1	22.8	18.4	24.7	6.3
Centiles according to family income per capita	1	9.6	22.8	13.2	4.0	7.3	3.3
	2	7.4	17.4	10.0	3.5	4.4	0.9
	3	8.4	24.5	16.1	4.4	8.4	4.0
	4	11.3	30.5	19.2	5.8	10.9	5.1
	5	24.4	49.0	24.6	12.8	20.4	7.6
Development town		4.0	13.9	9.9	2.6	5.8	3.2
Tel Aviv area		16.0	37.1	21.1	7.2	13.9	6.7
Socioeconomic ranking of place of residence	1-2	4.4	19.8	15.4	2.2	9.9	7.7
	3-4	4.3	21.5	17.2	3.5	7.5	4.0
	5-6	12.8	24.4	11.6	5.2	9.4	4.2
	7-8	16.1	39.1	23.0	8.5	14.9	6.4
	9-10	26.5	49.1	22.6	11.6	20.4	8.8
		Arab education stream					
Total		1.5	6.6	5.1	3.3	10.6	7.3
Years of mother's schooling	Up to 12	1.1	5.3	4.2	2.9	9.7	6.8
	+16	29.2	45.5	16.3	25.0	45.5	20.5
Centiles according to family income per capita	1	0.6	3.7	3.1	2.4	8.2	5.8
	2	0.6	2.7	2.1	2.4	5.1	2.7
	3	1.8	6.2	4.4	3.4	10.3	6.9
	4	4.5	14.2	9.7	9.0	23.2	14.2
	5	15.8	41.7	25.9	15.8	50.0	34.2
Socioeconomic ranking of place of residence	1-2	0.3	3.3	3.0	1.9	8.9	7.0
	3-4	1.7	8.5	6.8	3.8	12.0	8.2
	5-6	2.0	9.5	7.5	5.6	12.0	6.4
	7-8	8.6	19.4	10.8	6.3	16.6	10.3
	9-10						

Source: The Central Bureau of Statistics and calculations by the authors.
(1) Mark of 80 or higher for five study units.
(2) 2004/04 less 1992/93 (percentage points).

D. The return to socioeconomic characteristics in terms of scholastic achievement

The return to socioeconomic characteristics was obtained from least squares multivariate estimation, in which the dependent variable was the rate of eligibility for a matriculation certificate and the independent variables included the socioeconomic characteristics.[11] The estimates reflect the direct influence of the characteristic (such as parents' education) and the indirect influence of unobservable variables that are correlated with that characteristic (such as the innate abilities of the parents and the children and the importance attributed to education by the parents). Therefore, the estimates and the indicated causality should be treated with caution.

Note that the Index of Deprivation that is used in the differential allocation of teaching hours (in elementary and junior high schools in Israel) includes some of the characteristics that appear in the estimation (see Appendix B). Therefore, the estimates are important in assessing the contribution of observable characteristics to achievement in school even if the causality originates in other characteristics that the government does not have information on.

During the period between the 1992/93 and 2004/05 school years, the data reveal changes in the contribution of socioeconomic background to achievement on the matriculation examinations (see Table 5 and Figure 5). It is worth mentioning that given background characteristics, the rate of eligibility for a matriculation certificate is relatively high in the Arab-Christian and Druse streams, followed by the State Religious stream, the Hebrew State stream, the Arab-Moslem stream and finally the Bedouin and ultra-Orthodox streams.

The eligibility rates among students in the vocational track were much lower than those of similar students in the academic track. This gap narrowed over time in all the streams as a result of the reform of the vocational track carried out in the early 1990s, in which academic subjects that are beneficial in obtaining a matriculation certificate were given greater emphasis.

Female students are more successful on matriculation examinations than male students. During the period between the 1992/93 and 2004/05 school years, this gap widened significantly, particularly in the Arab education stream, where it reached 13 percentage points. A possible explanation of the phenomenon is the increase in the rate of employment of women and the creation of greater opportunity for their

[11] Non-linear estimation methods (such as logit and probit) yield similar results to the least squares method.

employment in jobs requiring a higher education, which encouraged the acquisition of a higher education and created a greater incentive to succeed in school. However, the causality may in fact be the reverse, such that part of the increase in the labor force participation rate of women is the result of the improvement in their achievements in school. Other possible explanations for the widening of gaps in matriculation examination achievement are the weakening of gender stereotypes and the smaller decline among girls in time spent on extracurricular activities, which apparently contribute to success in school.[12] In any case, this issue requires an in-depth analysis.

Students in the Hebrew State and State Religious streams who were born to young mothers were less successful on the matriculation examinations than students with older mothers; the age of the mother at birth for which a student's achievements are maximized is 35. The low achievements of students born to relatively young mothers reflects unobservable characteristics such as a lack of experience in childrearing, relatively limited social capital and the acquisition of higher education by the mother only after the birth of a child and the first few years of his development. Another factor may also be a greater preference for the present over the future, which is reflected both in early marriage and childbearing and in a relatively small investment of resources in children's education, a hypothesis that deserves a separate research study. At the same time, studies have shown (see, for example, Black, Devereux and Salvanas, 2005) that scholastic and other types of achievement among children of high birth order (for example, children born late in their parents' lives) are lower than those among children of low birth order (for example, firstborns). Since most children born to mothers at a relatively late age are of higher birth order, they would be expected to have lower achievements at school, other things being equal.

Number of siblings has a negative influence on the eligibility for a matriculation certificate, as also seen in the findings of empirical studies in other countries of the education system's "production function". This is explained in part by the competition between siblings for family resources (including parents' time). However, recent studies (see, for example, Angrist, Lavy and Schlosser, 2006 and Black, Devereux and

[12] The comparison of time use among youth between 2004 (Mash et al. 2004) and 1991/92 (Central Bureau of Statistics, 1995) indicates that there was a greater decline in allocation of time to hobbies and sports among boys than among girls. In addition, it appears that boys in high school use the Internet 1-2 hours more than girls (Mash 2006) and during the period under study there was a significant increase in the use of the Internet. For further discussion of gender differences in the education system, see Ben Sasson-Firstenberg (2001).

Salvanas, 2005) did not find a *causal* relationship between family size and children's achievements.

A major phenomenon in the Arab education stream is the growth in the negative contribution of number of siblings to the rate of eligibility. A possible explanation is that the increase in the standard of living in the Arab stream and the process of modernization it is undergoing, together with the drop in fertility rates, have made the number of children in the family the main indicator differentiating between traditional and/or socioeconomically weak families and progressive and/or socioeconomically strong families, and family background has an influence on achievement in school. Another possible explanation is that the decline in dropout rates in the Arab stream has led to an increased number of students in the education system from large families, which are usually from a weak socioeconomic background.

The success at school of children with working mothers is similar to or greater than that of children with non-working mothers, other things (including family income) being equal. Most studies have shown that the fact that a mother works does not apparently have an effect on the achievement of youth in school or on their behavior (for a survey of the literature, see Ruhm, 2004). Thus, the scores of 15-year old students on PISA examinations were not significantly affected if the mother worked fulltime, while working part-time made a positive contribution to achievement in school in some countries (Fertig, 2003; Robert, 2008). Therefore, the findings of this study are likely to be the result of the mother's employment being an indicator of positive cognitive and non-cognitive abilities, that have been passed on to her children (and that we do not control for) and which contribute to their success in school.

The achievements of students whose parents were born in Asia-Africa were less than those of students with native parents and the achievement of students of European-American origin were not significantly different from those of native Israelis.[13] During the period, the gap in the rate of eligibility for a matriculation certificate between students of Asian-African origin and those of European-American origin narrowed and by the 2004/05 school year it stood at about 2 percentage points and was not significant.[14]

[13] It should be remembered that many of the students' parents are native-born Israelis whose parents were born abroad and that we do not possess information on the country of origin of the students' grandparents. The problem of identifying students' origin becomes more acute in later school years.

[14] Friedlander et al. (2006) discussed in detail the issue of gaps in achievement in school according to origin and found, among other things, that gaps in the quality of matriculation examination choices

Since the beginning of the 1990s, there has been a significant rise in the proportion of students from one-parent families in the Hebrew State education stream and the estimation results indicate a major decline in the rate of eligibility for a matriculation certificate among students from one-parent families in comparison to students from two-parent families, other factors being equal. A possible explanation for the widening of gaps in achievement on matriculation examinations between these two groups is likely to be the weakening over time in unobservable characteristics of one-parent families relative to nuclear families. However, an examination of the Income Survey produce ambiguous results.[15]

In the Hebrew State education stream, each additional year of a mother's schooling raises the rate of eligibility for a matriculation certificate by 1.5-2.0 percentage points. The contribution of a father's education is less than that of the mother's and this gap widened during the period under study. In the Arab education stream, there was an uninterrupted decline in the contribution of the father's education and an increase in that of the mother's and currently the contribution of the latter is higher. In any case, the contribution of parents' education in the 2004/05 school year was similar in the Hebrew and Arab education streams. The increase in the contribution of the mother's education relative to that of the father's can be attributed to the following factors: non-linearity in the contribution of parents' education to their children's achievements on the matriculation examinations (which is a result of the fact that the average number of years of schooling among women was lower than that among men at the outset and rose during the period, combined with the declining marginal effect of parents' education on students' achievements);[16] the major increase in mothers' years

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(advanced study of math and English), the rate of eligibility and grades between students of Asian-African origin and those of European-American origin remained unchanged in the 1990s. This finding was in contrast to the 1980s during which gaps narrowed.

[15] The relative decline in achievement among students from one-parent families stands in contradiction to the apparent downward trend in the number of years that children live with divorced parents, which was the result of an increase in the divorce rate (Central Bureau of Statistics, 2007a) and thus an increased inflow into the population of divorced parents. The hypothesized downward trend in the number of years that children live with divorced parents is supported by the fact that there was no significant change in the age distribution of divorcing parents with children.

It should be mentioned that the widening of gaps in achievement on matriculation exams among students from one-parent families relative to nuclear families also occurred in the Hebrew stream among native students and therefore this finding cannot be attributed to the omission of family background variables for immigrants, who are characterized by a higher rate of one-parent families than native students.

[16] This can be seen from the fact that when the number of years of schooling of each of the parents was replaced by groupings (0–10, 13–15 and 16+ years of schooling and the base group of 10–12 years was omitted), it was found that the estimates rose at a declining rate with the increase in the level of

of schooling; and the fewer difficulties faced by educated women in the labor market, which apparently led to their absorption within higher-status professions and therefore had a positive influence on their children's achievement in school (see also Kalmijn, 1994). On the other hand, the rise in the labor force participation rate among mothers and the increase in their work hours significantly reduced the time they were able to devote to their children, which is not fully expressed in the working-mother explanatory variable. Therefore, a reduction in the contribution of parents' education to their children's success on the matriculation examinations was expected.

The private expenditure on education contributes to children's success in school and as a result of the relatively large expenditure by more well-off population groups (Central Bureau of Statistics, 2007b) and the widening inequality of income among households, significant gaps have been created in achievement in school, which in turn affect the socioeconomic status of education system graduates in the long term. An increase of 10 percent in per capita family income raises the rate of eligibility by about 0.4 percentage points on average. Finally, the rate of eligibility for a matriculation certificate among students living in socioeconomically strong municipalities is higher than that among students living in weak locations.[17]

The estimates presented here do not include a dummy variable for immigrants since no differences were found in achievement on matriculation examinations between immigrants, most of whom were from the Former Soviet Union, and native Israelis, other factors being equal (and controlling for immigrants' years in Israel). This finding is partly the result of relatively high dropout rates among immigrant students and leniencies granted to them on matriculation examinations during their first years in Israel. Levin et al. (2003), based on tests in Hebrew and math they gave to a sample of Grade 11 students, found that the lag in achievements among immigrants from the Former Soviet Union was closed after about 9 years in the country; in contrast, they found no differences between the two populations on the matriculation examinations, as was the case in our study.[18]

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education. A similar result can be derived from the estimation in which the number of years of schooling squared was added to the equation, in addition to the number of years of schooling.

[17] Estimates of dummy variables for development towns (for students in the Hebrew education system) were not significant and therefore were omitted from the estimations.

[18] Fogel (2007) found that among immigrants from the Former Soviet Union, there is a significant degree of variance in educational achievement. Thus, students from the more Westernized republics have a very high level of achievement in school, students from the Asiatic republics, as well as Georgia and Armenia, form an intermediate group and students from the Caucasus region have the lowest level of achievement.

Table 5

Estimates of the rate of eligibility for a matriculation certificate[1]

		1992/93			2004/05		
		Total	Hebrew: State and State Religious	Arab: Moslem and Christian	Total	Hebrew: State and State Religious	Arab: Moslem and Christian
Hebrew:[2]	State Religious	**0.025	**0.023		0.009	0.003	
	Ultra-Orthodox	***-0.553			***-0.448		
Arab:[2]	Moslem	0.030		***-0.188	***0.045		-0.028
	Christian	***0.221			***0.073		
	Bedouin	**-0.134			***0.119		
	Druse	***0.120			***0.074		
Academic track		***0.274	***0.279	***0.231	***0.121	***0.135	***0.109
Female student		***0.041	***0.036	0.030	***0.108	***0.104	***0.131
Age of mother		*0.016	0.015	0.024	**0.020	**0.025	-0.037
Age of mother squared		0.000	0.000	0.000	**0.0002	**-0.0002	*0.0004
Asian-African origin[3]		***-0.031	***-0.039		0.000	-0.003	
European-American origin[3]		0.014	0.011		-0.011	-0.001	
One-parent family		***-0.071	***-0.070	*-0.178	***-0.101	***-0.104	-0.092
Number of siblings		0.000	0.003	-0.002	***-0.017	***-0.016	***-0.028
Working mother		**0.022	**0.021	0.043	-0.007	-0.012	***0.079
Mother's years of schooling		***0.021	***0.021	*0.012	***0.024	***0.021	***0.023
Father's years of schooling		***0.015	***0.017	***0.026	***0.008	***0.014	***0.016
Family income[4]		***0.035	***0.038	-0.005	***0.047	***0.044	***0.040
Socioeconomic ranking		***0.019	***0.018	**0.023	***0.013	***0.011	***-0.028
Constant		***-0.754	***-0.779	-0.579	***-0.554	***-0.728	0.863
Number of observations		14,089	11,736	1,323	19,738	14,416	2,679
Adjusted R^2		0.248	0.228	0.143	0.206	0.228	0.116

Source: Central Bureau of Statistics and calculations by the authors.

(1) *, **, *** – Significant at 10, 5 and 1 percent levels of confidence, respectively.

(2) Base group – Hebrew State education stream.

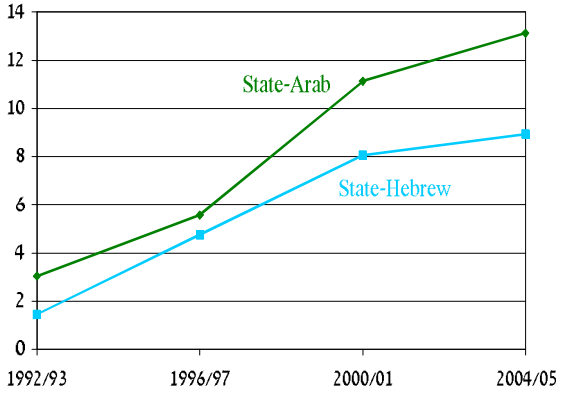
(3) Origin of father. Base group – Israel-Israel.

(4) Log of family income (in thousands of shekels in 2000 prices).

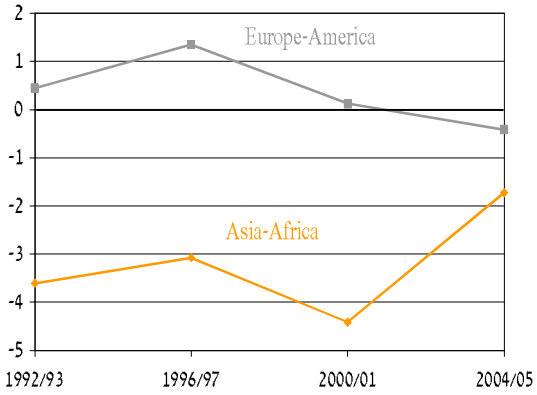
Figure 5: Contribution of socioeconomic characteristics to eligibility for a matriculation certificate (percentage points)

Hebrew State education stream

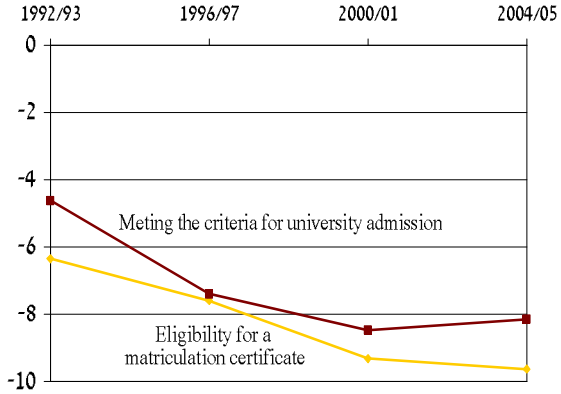
a. Female vs. male students



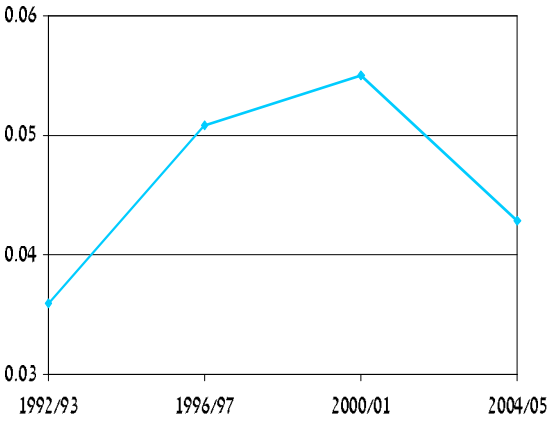
b. Father's origin (relative to native-born father)



c. One-parent family relative to two-parent family

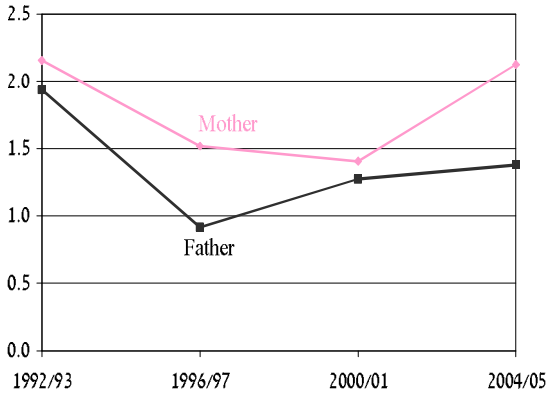


d. Disposable family income per capita[1]

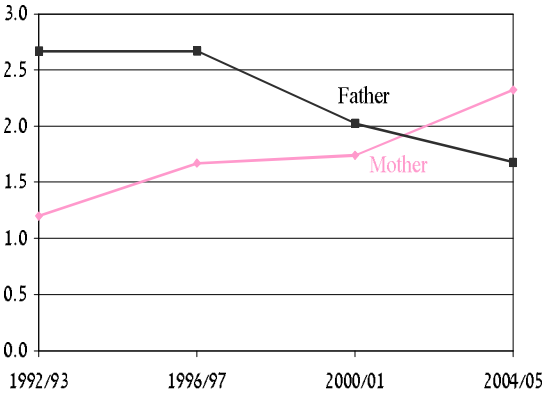


e. Parents' years of schooling

Hebrew State education stream



Arab State education stream



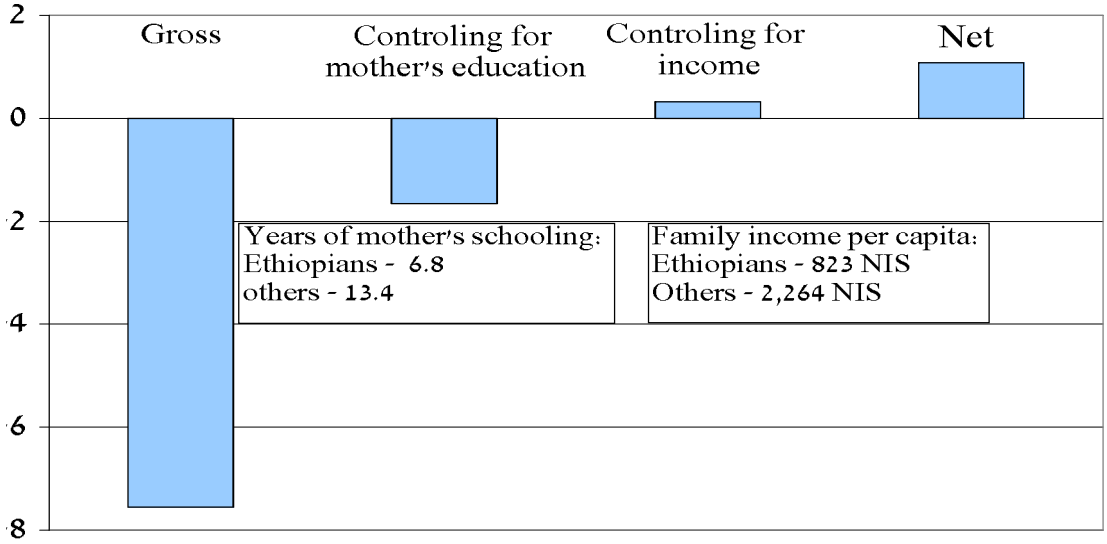
Source: Central Bureau of Statistics and calculations by the authors.

(1) An increase of one percent in income increases the rate of eligibility for a matriculation certificate by the value on the vertical axis (in percentage points).

Figure 6 presents a breakdown of the contribution of socioeconomic characteristics of students of Ethiopian origin in the State Religious stream (as an example of students with a weak socioeconomic background) to explaining their average score on the matriculation examinations in comparison to the rest of the students in the State Religious stream. The overall score of Ethiopian students is lower by close to 8 percentage points than that of the other students.[19] Once the mother's years of schooling (which are much lower among Ethiopians) are controlled for, the gap narrows considerably. The lower income of Ethiopian families also contributes to the explanation of the relatively low score of Ethiopian students to some extent. In the final analysis, once account is taken of the weak socioeconomic status of Ethiopian students in comparison to their classmates, their average score on the matriculation examinations is no lower than that of other groups. Recent and parallel studies of other indicators of achievement and for other periods—including studies of students in the Arab education stream in comparison to other groups—also show that once account is taken of the mother's level of education and family income, gaps among socioeconomically weak population groups in achievement on matriculation examinations narrow and in some cases even disappear.

[19] The dropout rate among Ethiopian high school students is higher than that among the rest of the students. Therefore, the Ethiopian students who write the matriculation examinations apparently have a higher level of educational skills than other Ethiopian students. The selection process works to reduce the gap in achievement on the matriculation examinations between Ethiopian students and other students in the State Religious stream.

Figure 6: The gap in average matriculation examination score between students of Ethiopian origin and others[1], before and after taking socioeconomic characteristics into account, 2004/05



Source: Central Bureau of Statistics and calculations by the authors.
(1) In the State Religious education stream, which accounts for most of the students of Ethiopian origin.

E. Disaggregation of the change in achievements on the matriculation examinations

The changes in matriculation examination achievements that took place between the 1992/93 and 2004/05 school years were the result of three possible factors: a) changes in the proportion of students in each of the education streams; b) changes in the socioeconomic status of students within each education stream; and c) an array of factors related to the education system as a whole, such as the public resources devoted to education, the quality of the teaching staff and teaching methods, the level of difficulty of matriculation examinations, etc., whose effects are not analyzed individually.[20]

In order to characterize the sources of change in matriculation examination achievements, we will first present the average score on the matriculation examinations for all students in a particular year as a product of the characteristics and their return for each of the education streams. We will then sum up the products for

[20] It is worth mentioning that some of the changes in the education system affect the return to students' characteristics. Thus, for example, the reduction in public expenditure on education per student is likely to increase the return on parents' income, on the assumption that private expenditure on education improves achievement in school.

each of the education streams according to their weights. Equation (1) presents the average actual matriculation examination score for 1992/93:

$$(1) \qquad Y_{92} = \sum_{Z_{92}} Q'_{92} P_{92}$$

where Y_{92} represents the achievement in the matriculation examinations in the 1992/93 school year, Z is the education stream, Q is a vector of socioeconomic characteristics in a particular education stream and P is a vector of returns on those characteristics.

Equation (2) presents the product of the characteristics and their returns as in Equation (1) except that the summation of the products is done according to the weights of the education streams in the 2004/05 school year:

$$(2) \qquad \tilde{Y}_{92} = \sum_{Z_{04}} Q'_{92} P_{92}$$

The result $\tilde{Y}_{92}$ in Equation (2) only includes the influence of the changes in the distribution of education streams on achievements in matriculation examinations. In Equation (3), the socioeconomic characteristics within each education stream were also replaced by those for 2004/05:

$$(3) \qquad \tilde{\tilde{Y}}_{92} = \sum_{Z_{04}} Q'_{04} P_{92}$$

Thus, the result $\tilde{\tilde{Y}}_{92}$ in Equation (3) includes, in addition to the effect of the change in the distribution of education streams over the years, the effect of the change in socioeconomic characteristics within each education stream. Therefore, the remaining differences between the average achievements in 1992/93 and 2004/05 are the result of changes in the returns to socioeconomic characteristics, which represent, among other things, the changes in the characteristics of the education system as a whole (such as pedagogic methods and the level of difficulty of the matriculation

examinations). Equation (4) uses the returns for 2004/05 so that Y_{04} is the average actual achievement for the 2004/05 school year:

$$(4) \qquad Y_{04} = \sum_{Z_{04}} Q'_{04} P_{04}$$

The change in the rate of eligibility for a matriculation certificate was broken down according to the same method as above. The proportion of Grade 12 students eligible for a matriculation certificate in the 1992/93 school year stood at 46 percent (see Figure 7a, Column 1). By leaving the rate of eligibility in each education stream as is but using the distribution of students by education stream in the 2004/05 school year in the weighting for the national rate of eligibility, we obtain a decline of about 2 percentage points in the rate of eligibility (Column 2). This is a direct result of the growth in the proportion of ultra-Orthodox and Arab students whose rates of eligibility are much lower than those of students in the Hebrew State and State Religious streams. When account is taken not only of the distribution of education streams in the present but also the socioeconomic characteristics of students in the 2004/05 school year within each education stream, we obtain an increase of about 4 percentage points in the rate of eligibility for a matriculation certificate, which even exceeds that in 1992/93 (Column 3). The rise in the level of parents' education, particularly that of the mother (and particularly in the Arab education stream) was a significant factor in this increase (see Figure 8 above). Therefore, on the assumption that the level of difficulty of the matriculation examinations has not increased since 1992/93, the maximum cumulative increase in the rate of eligibility for a matriculation certificate among Grade 12 students reached about 7 percent points in the 2004/05 school year (the transition from Column 3 to Column 4 in Figure 7a).[21] This increase is primarily the result of an array of factors related to the education system as a whole.

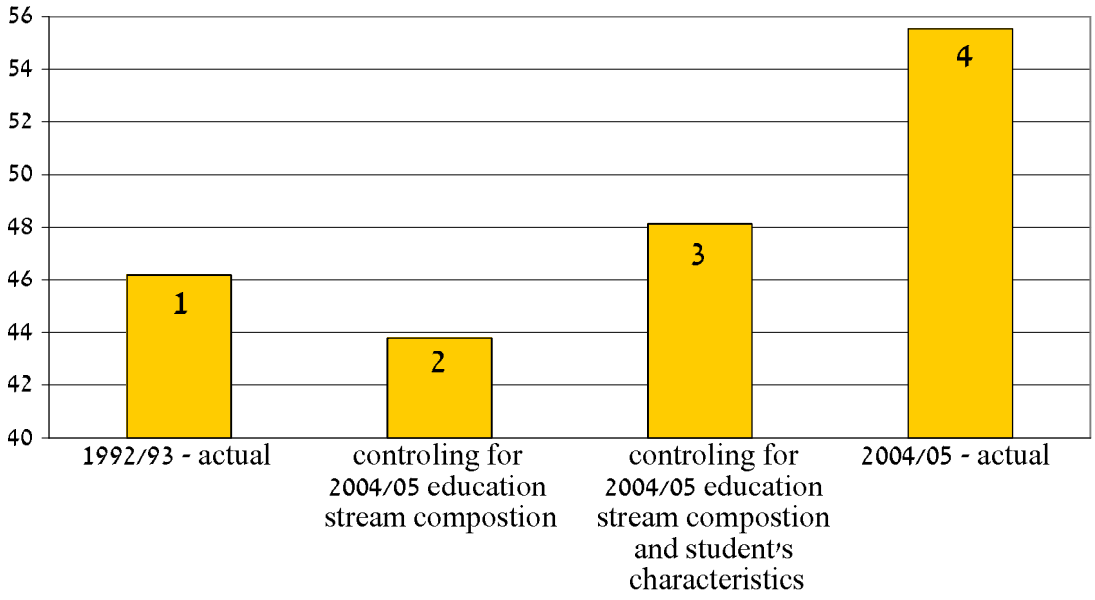
[21] Reversal of the order of disaggregating the sources of change in the rate of eligibility for a matriculation certificate between the 1992/93 and 2004/05 school years, such that during the first stage the socioeconomic characteristics are changed and in the second stage the distribution of the education streams is changed, indicates that there is no real difference in the contribution of each of the two changes to the rate of eligibility in comparison to their contribution in the original disaggregation. Alternatively, when the base year for the calculation of the original disaggregation is 2004/05 instead of 1992/93, similar results are obtained.

A similar disaggregation was performed on the proportion of Grade 12 students who met the criteria for university admission (Figure 7b). The results are similar to those obtained for the disaggregation of the rate of eligibility for a matriculation certificate although the negative contribution of changes in the distribution of education streams to achievement and the positive contribution of the improvement in students' socioeconomic background characteristics within each education stream are of greater magnitude since the eligibility for a matriculation certificate is more sensitive to the students' background characteristics.

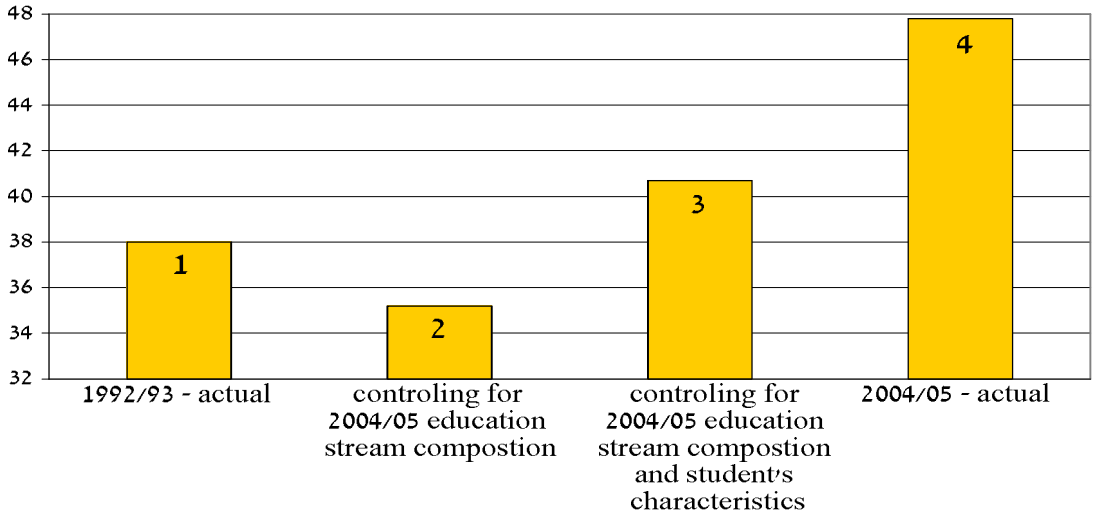
In summary, the increased weights of the education streams in which students suffer from educational deficiencies and do not study the core subjects has constrained the rate of increase in achievement over time. On the other hand, the improvement in students' socioeconomic characteristics within each education stream has contributed to the improvement in achievement. Overall, there has been a significant improvement in achievement on the matriculation examinations (ignoring changes in their degree of difficulty).

Figure 7: The proportion of students eligible for a matriculation certificate and the proportion of students who meet university admission criteria: 2004/5 compared to 1992/93 (percent)

a. Proportion of matriculated students

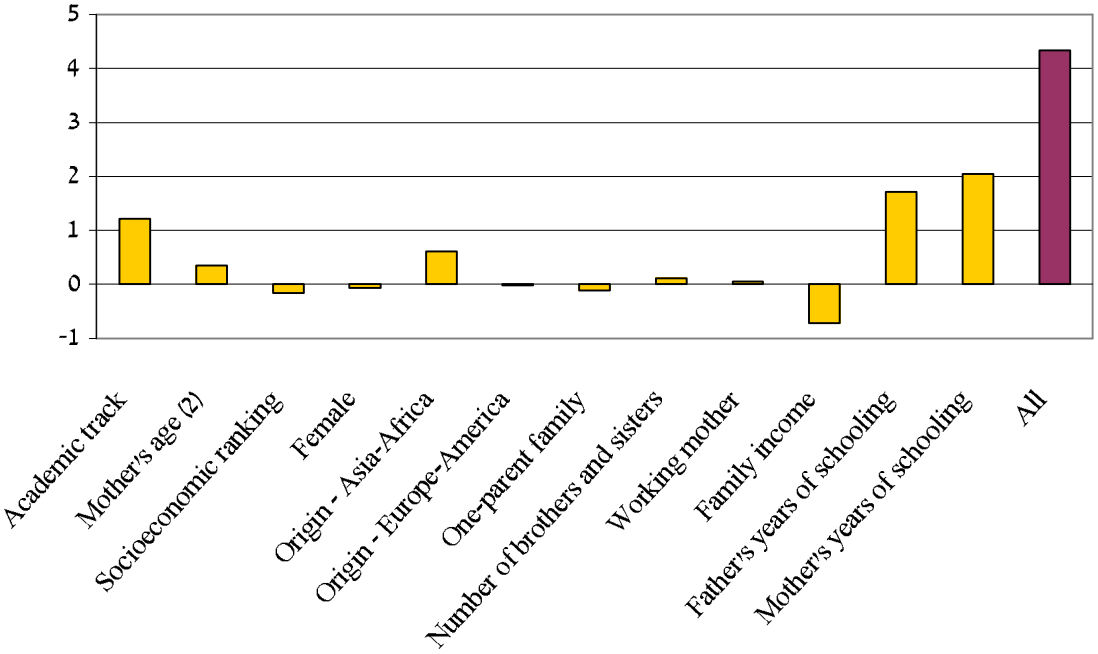


b. Proportion of Grade 12 students who meet university admission criteria



Source: Central Bureau of Statistics and calculations by the authors

Figure 8: Contribution of changes in students' socioeconomic characteristics to the increase in the rate of eligibility for a matriculation certificate during the period 1992/93 and 2004/05 school years[1] (percentage points)



Source: Central Bureau of Statistics and calculations by the authors.

(1) The marginal contribution was calculated by changing the average value of a socioeconomic characteristic within the education streams from its value in the 1992/93 school year to its value in the 2004/05 school year in the equations for the 1992/93 school year for rate of eligibility for a matriculation certificate in the education streams; and the weighting of the national rate of eligibility according to the distribution of education streams in the 2004/05 school year.

(2) Including the square of the mother's age.

F. Conclusion

The Israeli education system has for a long time now been the target of criticism from both the general public and decision makers as a result of poor achievement (including low scores on international examinations) and the significant differences in achievement due to socioeconomic status. The increased importance of education in improving individual welfare makes it critical to examine the background factors that affect students' achievements and the inequality in education.

The trends in students' achievements in Israel over time and between various population groups reflects to a large extent the changes that have occurred in Israeli society, which include, among others, the increased proportion of students in the ultra-Orthodox and Arab education streams, the major influx of immigrants and the increase in the extent of poverty among children. These developments, together with the continuing reduction in public expenditure on education per student and the apparent decline in the quality of teachers, have made it difficult for the education system to improve students' achievements as desired.

This study examines the differences in achievement on matriculation examinations between students from the various education streams and from a variety of socioeconomic backgrounds and how these differences changed during the period between the 1992/93 and 2004/05 school years. The gaps in basic achievement on the matriculation examinations due to differences in socioeconomic background have narrowed during this period though some of the gaps in achievements related to excellence have widened. The increase in the weights of the ultra-Orthodox and Arab education streams have limited the rate of improvement in achievements over time; on the other hand, the improvement in students' socioeconomic characteristics within each education stream has contributed to the improvement in achievement. Overall, there has been a significant improvement in achievement on the matriculation examinations (ignoring differences in degree of difficulty).

The findings indicate that students' observable socioeconomic characteristics explain a considerable proportion of the differences in achievements on matriculation examinations and confirm the need for a policy of affirmative action in the allocation of public resources to education in favor of high school students from weak socioeconomic backgrounds. This policy should be based on observable characteristics, such as those used in the Index of Deprivation calculated for elementary schools, in contrast to the almost uniform allocation that is currently

implemented in post-elementary education. The extension of the Index of Deprivation to post-elementary education has been recommended in the past by the National Education Plan (the Dovrat Report, January 2005).

Finally, the study has indicated the need for calibration of achievements on matriculation examinations with different levels of difficulty in order to properly understand developments over time. In addition, the calibration of achievements will facilitate the creation of a uniform base for the assessment of students who complete high school in different years for purposes of admission to university, selection from among job applicants, etc.

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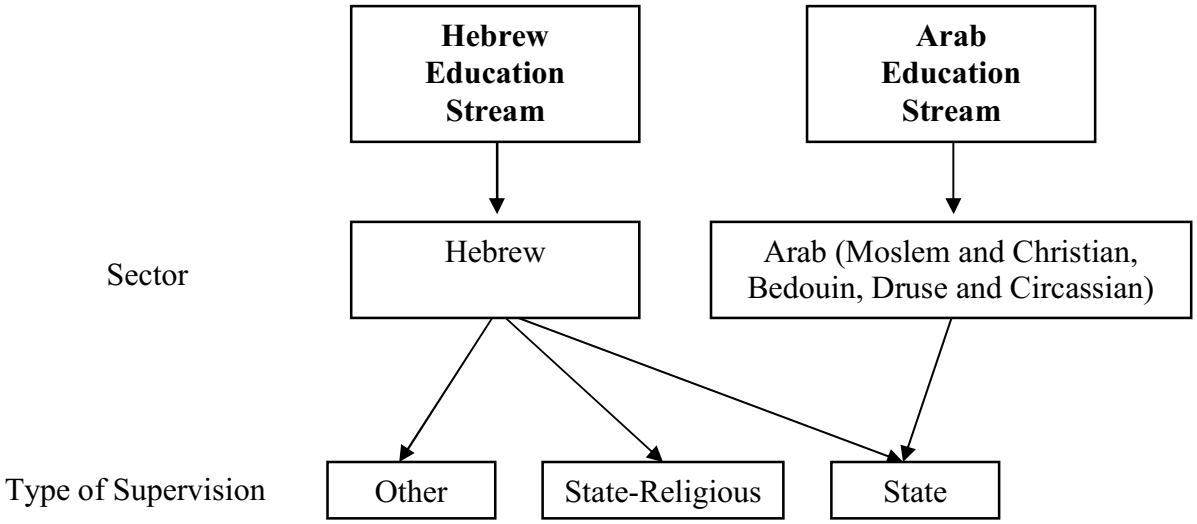
Appendix A: Terms and Definitions

Socioeconomic Definitions	
Siblings	A student's siblings up to the age of 18 on his mother's side (including the student himself).
Socioeconomic ranking of place of residence	The socioeconomic ranking of municipalities and local authorities in 1995, 2000 and 2003. The ranking is on a scale of 1 (the lowest value) to 10 (the highest value).
Family income	Parents' net annual income from the following sources: net wages and net self-employed income (gross income less calculated direct taxes) and imputed child allowances. Does not include other labor and capital income or other transfer payments. Income was calculated for 1992, 1997, 2000 and 2004. For 1992 and 1997, there was no information on self-employed income.
Single-parent family	A student with an unmarried mother or whose mother has died and his father has not re-married.
Immigrant	A student who has immigrated to Israel. For Ethiopian immigrants, this also includes a student with at least one parent from Ethiopia (and neighboring countries).
Development towns	Arad, Bet She'an, Dimona, Hazor Haglilit, Ma'alot-Tarshiha, Migdal Haemeq, Mizpe Ramon, Netivot, Ofaqim, Qiryat Gat, Qiryat Mal'akhi, Qiryat Shemona, Sderot, Shelomi and Yeroham.
Father's/mother's years of schooling	According to the figures reported by the student to the Ministry of Education.
Education System Definitions (see the chart)	
State education stream	Schools in the Hebrew and Arab education streams that are not religious.
State Religious education stream	Hebrew schools that belong to the Religious-Zionist sector. Most of the schools are official.
Stream	Classification by religion/nationality: Hebrew, Arab, Bedouin and Druse (Circassian).
Other schools (ultra-Orthodox)	A school that does not belong to the State or State Religious streams. Most are Hebrew unofficial schools of the ultra-Orthodox stream.
[type] Supervision	Education stream to which a school belongs: State, State Religious and other.

The education system structure



Appendix B: Weights of the Index of Deprivation in elementary and junior high schools

(percent)

Elementary schools – Straus Index (on the level of the individual student)		Junior high school (on the level of the school)			
			Jews	Arabs and Bedouin	Druse
Decile of family income per capita	20	Proportion of low-income families[1]	25	25	25
Mother's education Father's education	40 (the higher of the two parents)	Proportion of fathers with low education[2]	25	25	25
Number of siblings		Proportion of large families[3]	15	12.5	12.5
Immigrant[4] Immigrant from impoverished country[4]	20	Proportion of immigrants[5]	15		
Distant from the Center of the country[6] (periphery)	20	Distant from the Center of the country[7]	20		
		Small town[8]		12.5	37.5
		Proportion of students in unrecognized settlements		12.5	
		Mixed city[9]		12.5	

Source: Ministry of Education.

(1) Annual income per standard individual up to 15,000 shekels (as of 2003). Family income includes gross income of parents from wages and self-employed income as well as child allowances, birth allowance, reserve duty compensation, unemployment benefits and workers' compensation.
(2) Education of the father up to 9 years of schooling.
(3) Number of children on the mother's side: Hebrew – 5, non-Hebrew – 6.
(4) Points from 0–4: one point for each parent and one for a student born abroad and an additional point if one of them was born in an impoverished country.
(5) Immigrated up to 10 years prior to the beginning of the school year.
(6) Weighting of the minimum distance of the location from the three largest cities (Jerusalem, Tel Aviv and Haifa) by 2/3 and the size of the area's population by 1/3.
(7) The distance between the area in which the school is located and the closest of the three largest cities (Jerusalem, Tel Aviv and Haifa).
(8) The number of residents in the town in which the school is located does not exceed 2,000.
(9) The city in which the school is located.