

LOCAL AUTHORITIES' INVOLVEMENT IN FUNDING
PRIMARY SCHOOL INSTRUCTION HOURS AND ITS EFFECT ON
AFFIRMATIVE ACTION IN THE STATE EDUCATION SYSTEM[♣]

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Abstract

This paper examines the extent of local authorities' involvement in funding instruction hours in Israel's regular official primary education system, and its effect on the extent of affirmative action in the number of hours available to students from a weak socioeconomic background. Between 2001 and 2009, local authorities' share was approximately 1.7 weekly hours per class, representing about 3 percent of total hours and about 30 percent of hours not provided by the Ministry of Education. The Ministry provides students from a weak socioeconomic background approximately 26 percent more hours than to students from a strong background, but funding from the local authorities reduces the gap to approximately 21 percent.

In the State Secular Jewish system, the allocation of hours provided by the Ministry of Education for students from a weak socioeconomic background is about 32 percent higher than that for students from a strong background. Local authorities' funding reduced the gap to about 27 percent—because financially strong ones allocated much greater resources to the primary schools than weak authorities did, despite a markedly affirmative action policy of the former in favor of schools with students from a weak socioeconomic background: 2–3 weekly hours per class more than to schools with students from a strong socioeconomic background. We also found that the extent of affirmative action conducted by the local authorities in their jurisdiction strengthened the higher their revenues per resident were, and the lower their debt per resident was.

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1. INTRODUCTION

This paper examines the inequality in education funding that derives from the involvement of the local authorities. It presents, for the first time in Israel, an analysis of the education system budgeting by the local authorities, using data on the funding of educators' instruction hours at the school level. These unique data were collected for monitoring of the sources and their uses (the "standard audit"—see explanation below). The analysis at the school level makes it possible to examine not just the funding of hours among the authorities, but also, for the first time in Israel, within each local authority, by the socioeconomic level of each school.

In Israel, very few papers have been published on local authorities' expenditures on education and on their development over time. Exceptions are Lavy and Tirosh (2003), Ben-Bassat and Dahan (2009), Pollack (2012) and Justman (2014). These researchers found, as expected, that authorities that are strong from a socioeconomic perspective spend a much higher amount of their own funds on students at school (at all levels of education together) than do weaker authorities. In 2006, for example, the strong authorities financed about a third of the total expenditure per student while the weaker ones financed about one-tenth, so that the authorities' expenditure per student in the former was more than double the expenditure by the latter.

The authors of those papers relied on the financial reports filed by the local authorities upon request of the Ministry of the Interior. Our use of school level data is preferable to the local authorities' financial reports. The Central Bureau of Statistics and the Ministry of Interior (2011) note clearly that it is not recommended to use those data in order to calculate the expenditure on education per student: Their Authorities' budgets include the expenditure on kindergartens, while the number of students does not include kindergartens. The Central Bureau of Statistics also notes that there are probably differences in the definition of the components of the expenditure included in the local authorities' budgets. In addition, the expenditures also include salaries of teachers in high schools that are budgeted through the local authority and are not from the authorities' sources. Nonetheless, the papers' findings merited public attention¹ and have taken hold in public opinion, and in effect the impression was even given that the scope of resources allocated by the strong authorities to the education system overturned the affirmative action policy of the Ministry of Education. This paper will show that it is not the case.

The current research focuses on official regular primary schools (that is, excluding ultra-Orthodox and remedial education), in the school years 2000/2001 through 2008/2009, excluding 2004/2005 in which the standard audit was not conducted. The analysis at the school level will focus on the State Secular Jewish education, as the standard audit includes

¹ See, for example, Swirski and Dagan-Buzaglo (2009) and Arlosoroff (2012).

only a few schools from other education systems; in addition, the Arab authorities are poor and therefore virtually do not fund educators' instruction hours.²

Accordingly, this research deals with three main topics:

1. A description of the extent of instruction hours³ funded by the local authorities, focusing on the gaps among authorities in various socioeconomic rankings.
2. An analysis of affirmative-action policies within the local authorities: do local authorities allocate more hours per class to schools attended by students from weak socioeconomic backgrounds than they do to strong schools in their jurisdictions, and what factors impact that?
3. A determination of the extent to which local-authority involvement in funding instruction hours expands or contracts affirmative-action measures by the central government in resource allocation for State Secular Jewish primary schools among and within local authorities.

The research is based on the comprehensive data collected, as noted, as part of the standard audit—an examination conducted almost every year for the Ministry of Education with the goal of monitoring the extent of educators' instruction hours (in terms of hours, not cost)⁴ that is financed by the Ministry of Education, the local authorities, nonprofit organizations, parents, and others, and whether the hours are utilized in accordance with the rules. The monitoring is based on a sample that includes about a fifth of official, regular primary and middle (junior high) schools. The sampling layers are districts, type of education system and the socioeconomic rating of the schools (see Blass et al., 2010). An examination carried out (Blass et al., 2010) indicates that the standard audit sample is in fact a representative sample of the official schools. It should be emphasized that the standard audit is the only comprehensive and reliable source of information on the involvement of local authorities, nonprofit organizations, and parents in the financing of instruction hours, as currently there are no relevant administrative data. The standard audit does not include information on financing auxiliary services, activities outside the school program, procurement, construction, etc.⁵ The analysis focuses only on financing instruction hours

² The primary school system in Israel is divided by various characteristics: by sector—Jewish, Arab, Bedouin, and Druze; by type of oversight—State, State Religious Jewish, and ultra-Orthodox; legal status—official, recognized, and exempt; and by type of education—regular and special. For an expanded discussion, see Blass et al. (2010).

³ Not including ancillary services (secretarial, janitorial, etc.).

⁴ The differences among schools in the cost per instruction hour in official regular State Secular Jewish primary education are small (authors' calculations for the 5772 (2011/2012) school year—the only year with available data—using the following data source: Ministry of Education, Economic and Budget Administration, Budget Transparency in the Education System, <http://ic.education.gov.il/shkifut/startprod.htm>). This result derives from lack of notable differences in the observed personal characteristics of teachers, setting their wages. See also footnote 23.

⁵ These are dealt with, for example, in Central Bureau of Statistics (2001).

due to data limitations. However, the instruction hours are the central core of the education, and wage expenses are the lion's share of total education expenditure.

The main findings of the research are that the financially strong authorities allocated to primary schools in their jurisdiction many more resources than weak authorities did. While schools from the bottom third of the socioeconomic background distribution received 26 percent more instruction hours financed by the Ministry of Education than schools from the upper third—reflecting the affirmative action by the Ministry—the gap declined to 21 percent after including local authorities' financing. At the State Secular Jewish education system, the numbers were about 32 and 27 percent, respectively. The reduction of the gap reflects a higher allocation of hours by strong authorities, and despite these authorities conducting significant affirmative action measures in their jurisdiction.

This paper is related to the literature that deals with the involvement of nongovernmental entities in the financing and provision of services, including education (for example, Katz et al., 2009). Social, economic, and political processes in Israel led to increased competition among the local authorities on the composition and quality of services supplied to residents, primarily in order to attract strong populations to their jurisdiction. Part of the competition focuses on education services (Blank, 2004). The division of the education-funding burden between the central government, the local authority, households, and other players, led to a vigorous public discussion around the world⁶ and in Israel. One of its aspects includes inequality in education.

Similar to the current study, the literature worldwide differentiates between two aspects of the impact of financing education by the local authorities on inequality. First, it is generally common to assume that the financial status of local authorities⁷ and their order of priorities are expressed in the scope of resources they provide to the education system. Authorities that are strong from a fiscal perspective are likely to allocate many more resources to improving the education system in their jurisdiction than would weak authorities.⁸ These activities widen the inequality in education. Yet at the same time, the central government is interested in reducing gaps between populations and geographical regions, and accordingly most governments carry out affirmative action in education budgeting, in favor of students from a weak background and from the periphery, which contributes to the reduction of inequality among the authorities (see United States General Accounting Office, 1998; Blass et al. 2010; Klinov, 2010; Zhang et al. 2011, and Department of Education, 2012a, b).

Murray et al. (1998) reviewed the ramifications of socioeconomic gaps between “education districts” in the US on budgeting gaps between them over the years. Budgeting

⁶ See, for example, the discussion that arose about education system funding in California regarding a strike in the system: <https://www.theguardian.com/education/2019/jan/19/california-school-funding-los-angeles-strike-what-went-wrong>.

⁷ Or authorities that cover larger geographical areas, such as states or “education districts” in the US.

⁸ Brender (2003) found that this raises the probability of the choice of head of the authority.

gaps remained high, despite court rulings requiring them to be reduced and that led to increased resources to schools with students from a weak background.

Second, the local authorities could finance the schools in their jurisdiction in an uneven manner. They could benefit schools with populations that have socioeconomic and political strength (Roscigno, 1995; Schwartz and Stiefel, 2004). In contrast, they could provide greater funding to schools with students from a weak background (Rubenstein et al. 2007), thus reducing inequality in education.

Papers that focused on the distribution of the education budget within “education districts” in the US reached mixed results. Iatarola and Stiefel (2003) found that schools with students from a strong background receive larger budgets for construction and equipment and that there is no real affirmative action in teaching inputs, certainly not enough to increase the equality of opportunity. They also found that there is a particular shortage of equality of opportunity in primary schools. In contrast, Rubenstein et al. (2007) found that schools with students from a weak background benefit from more teaching inputs but that the quality of the teaching staff and the pedagogical level are lower.

As the strong local authorities allocate many more resources to the education system in their jurisdiction than do weak authorities, while the authorities sometimes adopt affirmative action policies in their jurisdiction, their contribution to country-wide inequality in education is not unequivocal. Thus, in the US, Ginsburg et al. (1981) found that the wealthier counties in New York State provide more resources than weaker ones do, but every school district carries out affirmative action in its jurisdiction. Burke (1999) found that in several US states, both the allocation of resources among school districts and the allocation within them expand the inequality. Our current research finds, as noted, that the allocation of instruction hours among authorities is regressive—meaning, authorities whose residents are from a strong background allocate more instruction hours than do authorities whose residents are from a weak background. In contrast to Burke (1999), we also find that the allocation within each authority is progressive though it offsets only part of the regressive effect noted above.

The rest of this paper is arranged as follows: Section 2 provides descriptive statistics, Section 3 describes the results of the estimations, and Section 4 concludes.

2. DESCRIPTIVE STATISTICS

In 2001–09, local authorities funded around 1.7 weekly instruction hours per class, on average, in the regular official education system, and about 2 hours in the State Jewish education system—approximately 3 percent of hours in the State system and 3.5 percent of hours in the State Jewish education system. For the State system and for the State Jewish system, the hours funded by the local authorities made up about 30 percent of total hours funded from non-Ministry of Education sources. (See also Klinov, 2010, and Bank of Israel, 2011.) Notably, local authorities funded, on average, 6 percent of current national

expenditure on primary education (not including depreciation) during this period⁹—NIS 1.2 billion in current prices in 2008 (Central Bureau of Statistics, 2013a, 2013b).

Local authorities that had schools in the State Jewish education system, and particularly those that belonged to relatively high socioeconomic clusters, funded more hours than did authorities with schools in the Arab education system and those in low clusters, which are heavily represented in the Arab sector (Table 1 and Figure 1). As a direct result, schools whose students were from a strong socioeconomic background had many more hours financed by the authorities than did schools that were from a weak background—the gap was 1.7 hours in state schools in the study, and 1.4 hours in the State Secular Jewish system only (Table 2). Consequently, the extent of affirmative action in the Ministry of Education's allocation of hours to schools attended by weak-background students narrowed from 27 percent (32 percent in the State Secular Jewish system) to 20 percent (27 percent). The regressive nature of authorities' funding traces to a positive correlation between the socioeconomic background of these local authorities' inhabitants, and, in turn, their wealth, and the level of local-authority resource allocation to the education system (see Section 3). The extent of the affirmative action carried out by the Ministry of Education for the benefit of Arab schools whose students were from a weak background in the Arab education system was lower in the sample period (2001–09). Proof of this can be seen in the Ministry of Education granting Arab schools from a weak socioeconomic background 46.7 weekly hours, only 7 percent more than to schools from a strong socioeconomic background in the State Jewish education system (43.5). This is a small gap, compared with the gap of 26 percent between schools from a weak socioeconomic background and schools from a strong socioeconomic background in the state system. Moreover, the involvement of local authorities reduced that gap from 7 percent to 3 percent. Note that taking into account funding from nonprofit organizations and parents flips the situation, yielding a difference of one hour in favor of State Jewish schools from a strong socioeconomic background compared with Arab schools from a weak socioeconomic background.

These findings are in line with Brender (2004), who showed that raising funds in Arab local authorities from their own resources is considerably lower than accepted in the Jewish authorities—even when netting out the differences in income, property, and composition of the population among the authorities. Therefore, the Arab authorities struggle to provide services, including education, to their residents.

⁹ This calculation of municipal expenditure includes, among other things, wages of education administration ancillary personnel and staff, procurements, and the like. As stated, these components are not part of instruction hours, which lie at the center of this study.

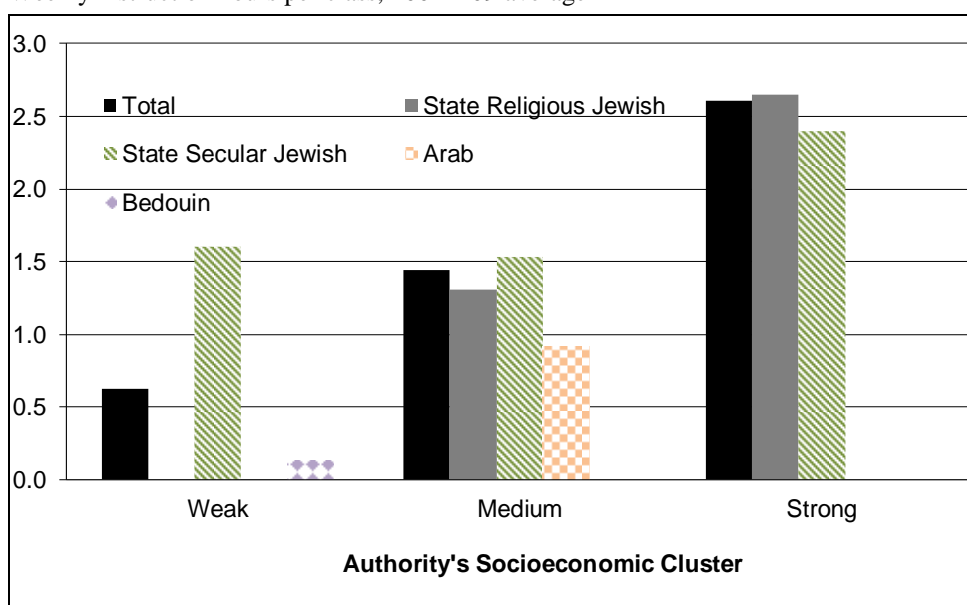
Table 1
Instruction hours in primary schools¹ by funding source, students' socioeconomic background,² and education system

Weekly instruction hours per class, 2001—09 average³

Funding source	Students' socioeconomic background		
	Weak	Medium	Strong
State Secular Jewish system			
Local authorities	0.9	1.9	2.4
Nonprofit organizations	4.5	3.8	2.0
Parents	0.0	0.5	1.9
Ministry of Education	56.2	48.7	42.5
Total	61.6	54.7	48.8
(Number of schools)	113	653	330
State-Religious Jewish system			
Local authorities	1.4	2.1	2.9
Nonprofit organizations	4.3	4.0	2.9
Parents	0.1	1.1	1.9
Ministry of Education	72.2	60.1	49.9
Total	78.0	67.4	57.7
(Number of schools)	82	338	50
Total State Jewish			
Local authorities	1.1	2.0	2.4
Nonprofit organizations	4.4	3.8	2.2
Parents	0.0	0.7	1.9
Ministry of Education	62.9	52.4	43.5
Total	68.5	59.0	50.0
(Number of schools)	195	991	380
Arab system (incl. Druze and Circassian)			
Local authorities	0.5	0.5	
Nonprofit organizations	1.8	1.0	
Parents	0.0	0.0	
Ministry of Education	46.7	46.9	
Total	48.9	48.4	
(Number of schools)	141	215	
Bedouin			
Local authorities	0.2	0.2	
Nonprofit organizations	0.9	0.0	
Parents	0.0	0.0	
Ministry of Education	48.3	46.2	
Total	49.3	46.2	
(Number of schools)	70	6	
Total Arab			
Local authorities	0.4	0.5	
Nonprofit organizations	1.5	1.0	
Parents	0.0	0.0	
Ministry of Education	47.2	46.8	
Total	49.1	48.3	
(Number of schools)	211	221	
Grand total			
Local authorities	0.7	1.7	2.4
Nonprofit organizations	2.9	3.3	2.2
Parents	0.0	0.6	1.9
Ministry of Education	54.7	51.4	43.5
Total	58.4	57.1	50.0
(Number of schools)	406	1,212	380

- 1) Regular official primary schools that teach grades 1–6 only.
 - 2) Weak background—deciles 8–10 on the Nurture Index; medium background—deciles 4–7; strong background—deciles 1–3. The values in the table are slightly different from those derived from Blass et al. (2010, Appendix Table 4), because the data in this study were not weighted according to the composition of classes in the total population. When a comparison with Blass et al. is performed, it may be seen that the results obtained in both cases are essentially the same. The total hours allocated is not the sum of hours of each segment of the system separately due to different weights of the population of schools in each system.
 - 3) The year 2005 is not included in the analysis because the standard audit was not performed that year.
- SOURCE: Based on Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education).

Figure 1
Instruction Hours in Primary Schools¹ Funded by Local Authorities,
by Education System and Local Authority's Socioeconomic Cluster²
 Weekly instruction hours per class, 2001–09 average³



- 1) Regular official primary schools that teach grades 1–6 only.
 - 2) Socioeconomic cluster of the local authority in 2006: weak cluster—deciles 1–3; medium cluster—deciles 4–7; strong cluster—deciles 8–10. There are few State Jewish schools in the weak cluster; Arab local Authorities in the weak cluster financed 0 instruction hours and the standard audit does not include strong cluster authorities with Arab/Bedouin schools. Thus, their cases are not shown in the figure.
 - 3) The year 2005 is not included since the standard audit was not conducted in that year.
- SOURCE: Based on Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education), and Central Bureau of Statistics (2009).

Table 2
Differences in the allocation of instruction hours to State Secular Jewish primary schools,¹ by funding source and students' socioeconomic background²

Weekly instruction hours per class, 2001–09 average³

Funding source	Difference between:		
	Weak and strong background	Weak and medium background	Medium and strong background
Local authorities	-1.4	-1.0	-0.4
Nonprofit organizations	2.5	0.7	1.7
Parents	-1.9	-0.5	-1.3
Ministry of Education	13.7	7.7	6.0
Total	12.8	6.9	5.9

- 1) Regular official primary schools that teach grades 1–6 only.
- 2) Socioeconomic cluster of the local authority in 2006: weak cluster—deciles 1–3; medium cluster—deciles 4–7; strong cluster—deciles 8–10.
- 3) The year 2005 is not included in the analysis because the standard audit was not performed that year.

SOURCE: Based on Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education).

Table 1 presented the financing of weekly instruction hours per class, by the socioeconomic background of official regular primary school students in 2001–09. Table 3 focuses on the schools in the State Secular Jewish education system,¹⁰ and presents the allocation of the hours by their funding source, the socioeconomic cluster of the local authority, and the socioeconomic background of the schools in each cluster. Table 3 indicates clearly that the wealthier authorities finance more hours from their own accounts than do authorities at a middle ranking.¹¹ This phenomenon is also seen when comparing schools from the same socioeconomic background in strong authorities and in other authorities. A similar picture is conveyed with regard to the share of the authorities in total sources—about 10 percent in strong authorities and about 2 percent in weak ones.

Strong local authorities apply affirmative action policies in their areas of jurisdiction, meaning that schools attended by students of medium socioeconomic background receive more funding than do schools that cater to students of strong backgrounds. Authorities that rank in the middle do not have clear affirmative action policies in place and fund relatively few hours in any case. In absolute terms, local authorities adopt less affirmative action than

¹⁰ The State Secular Jewish system was chosen for several reasons: (a) Within a given authority too few schools are affiliated with the other systems to allow easy examination of the authority's affirmative action; (b) most Arab authorities and schools have weak socioeconomic rankings and no Arab authority is in a strong socioeconomic cluster; therefore, affirmative-action policies among and within Arab local authorities cannot be examined. Appendix Table 1 in Blass et al. (2016) shows how many schools in the State Secular Jewish system were sampled in the standard audit procedure for each local authority during the research period and specifies each authority's socioeconomic ranking.

¹¹ The standard audit includes few State Secular Jewish schools that are in weak local authorities; therefore, these schools were omitted from the analysis.

does the Ministry of Education. As a case in point, strong local authorities allocate 4 more hours per week, on a per-class basis, to schools with student enrollments of medium socioeconomic background, than to schools where the students have strong backgrounds. The Ministry of Education, in turn, allocates 8 hours more; and in middle-ranking authorities, as stated, no clear-cut policy of affirmative action is discernible, whereas in the case of the Ministry of Education it is perceptible. In relative terms, however (that is, relative to total hours that they allocate), local authorities sustain a higher level of affirmative action.

Overall, local authorities have lowered the level of affirmative action in resource allocation for education (Table 2 above) because strong authorities allocate to State Secular Jewish primary schools in their jurisdiction many more resources than weak authorities do, and because strong authorities apply only a low level of affirmative action.

Table 3

Weekly instruction hours in State Secular Jewish primary schools,¹ by funding source, authorities' socioeconomic background,² and students' socioeconomic background³

Weekly instruction hours per class, 2001–09 average⁴

Source of funding	Socioeconomic background of local authority				
	Medium			Strong	
Students' background:	Weak	Medium	Strong	Medium	Strong
Local authorities	0.9	1.5	1.0	7.9	4.4
Nonprofit organizations	4.5	3.9	2.5	3.3	1.8
Parents	0.0	0.5	1.8	1.1	2.1
Ministry of Education	56.2	48.4	42.7	50.4	42.4
Total	61.6	54.3	48.0	62.7	50.6

1) Regular official primary schools that teach grades 1–6 only.

2) Socioeconomic cluster of the local authority in 2006: weak cluster—deciles 1–3; medium cluster—deciles 4–7; strong cluster—deciles 8–10. In weak-cluster authorities, there are few schools affiliated with the State Secular Jewish system so the values are not shown on the table.

3) Weak background—deciles 8–10 on the Nurture Index; medium background—deciles 4–7; strong background—deciles 1–3.

4) The year 2005 is not included in the analysis because the standard audit was not performed that year.

SOURCE: Based on Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education), and Central Bureau of Statistics (2009).

To measure inequality in instruction hours in official regular State Secular Jewish primary schools that are funded by local authorities,¹² use was made of the Gini index, which yields values ranging from 0 (a hypothetical state of full equality, in which all classes receive the same number of hours) and 1 (total inequality, one class receiving all the hours and the others getting none). It was found that the index stands at 0.744—a value that, while high,

¹² The measurement was done only for local authorities in which at least 4 different State Secular Jewish primary schools were affiliated with this system in 2001–09. This is due to the additional goal of examining the extent of affirmative action within a given local authority.

indicates only that the distribution of local-authority-funded hours per class is not unitary; one cannot adduce from it how progressive the allocation is.

Next, the Gini index of inequality was deconstructed into two segments: inequality among schools in different local authorities and inequality among schools within one authority (Lerman and Yitzhaki, 1984; Fogel, 2011). The conclusion is that 95 percent of the inequality originates in inequality between authorities—an indication of the regressivity of the local authorities' contribution, given that strong authorities allocate many more instruction hours than do weak ones. In contrast, differences in allocation among schools within authorities are rather small.

Figure 2 presents the Lorenz curve (cumulative distribution function) of local authorities' involvement in funding instruction hours.¹³ The diagonal (black line) represents absolute equality, a hypothetical situation in which an equal number of hours per class is allocated to all classes countrywide (including those in the given local authority). The Gini index is equal to the ratio of the trapped area between the diagonal and the curve to the entire area below the diagonal. The larger the former area is, the greater is the inequality in allocation of hours. The figure shows that when one shifts from the curve that represents a local authority's average funding of hours per class to the curve showing the average funding per class at the school (irrespective of the local authority to which the school belongs), the trapped area increases somewhat because most of the total inequality originates in inequality among local authorities—a result also obtained in the foregoing deconstruction of the Gini index.

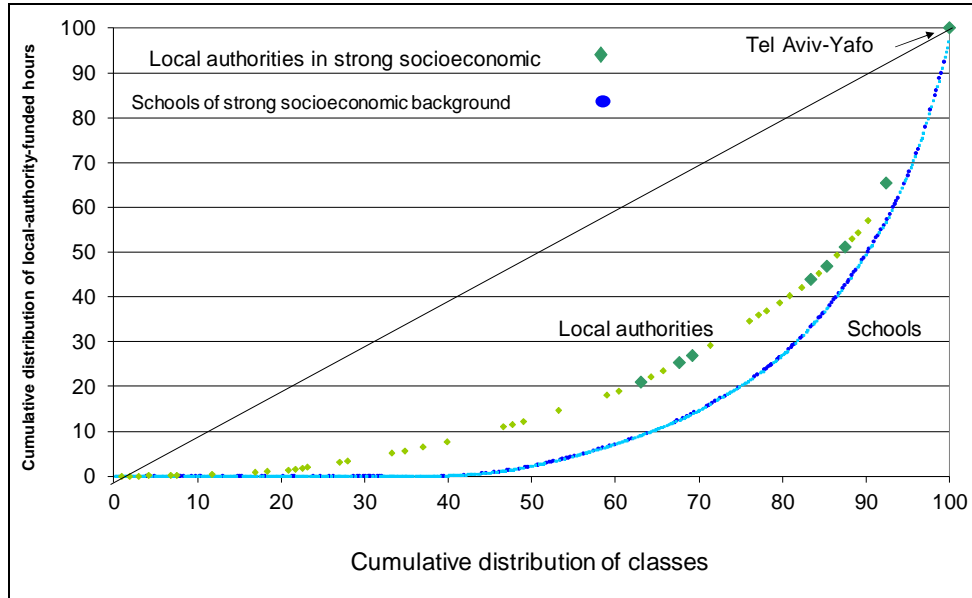
Another observation elicited by the local authorities curve is that authorities in strong socioeconomic clusters (marked with a thick green diamond) are usually found on the right-hand segment of the curve. Namely, they fund large numbers of hours per class, with Tel Aviv–Yafo as a notable example. Similarly, on the schools curve, it is found that most strong ones (marked with a dark blue diamond) are positioned on the right-hand side of the curve, since wealthy local authorities—in which strong schools are relatively common—fund on average a larger share of primary education than do weak authorities. The incidence of authorities from strong clusters in the right-hand section of the curve is more prominent than the incidence of strong schools in that section of the curve, which may indicate affirmative action within the authorities. We shall examine more explicitly the existence of affirmative action within each authority in the next section.

The figure also shows that instruction hours receive no municipal funding whatsoever in more than 40 percent of classes. (Note the segment of the school curve that runs along the horizontal axis.)

¹³ The Lorenz curve was built in the following way: schools (or local authorities) were ranked in ascending order according to the average number of local-authority-funded hours at the school (or by the local authority). The x-axis shows the cumulative proportion of classes at the school (local authority) so that 100 percent denotes all classes, and the y-axis shows the cumulative share of local-authority-funded hours. Each dot on the schools curve represents a school; each dot on the curve of local authorities represents an authority.

Figure 2**Lorenz Curve: Local-authority¹ Funded Instruction Hours in State Secular Jewish Primary Schools,² by Schools' and Local Authorities' Socioeconomic Background³**

2001–09



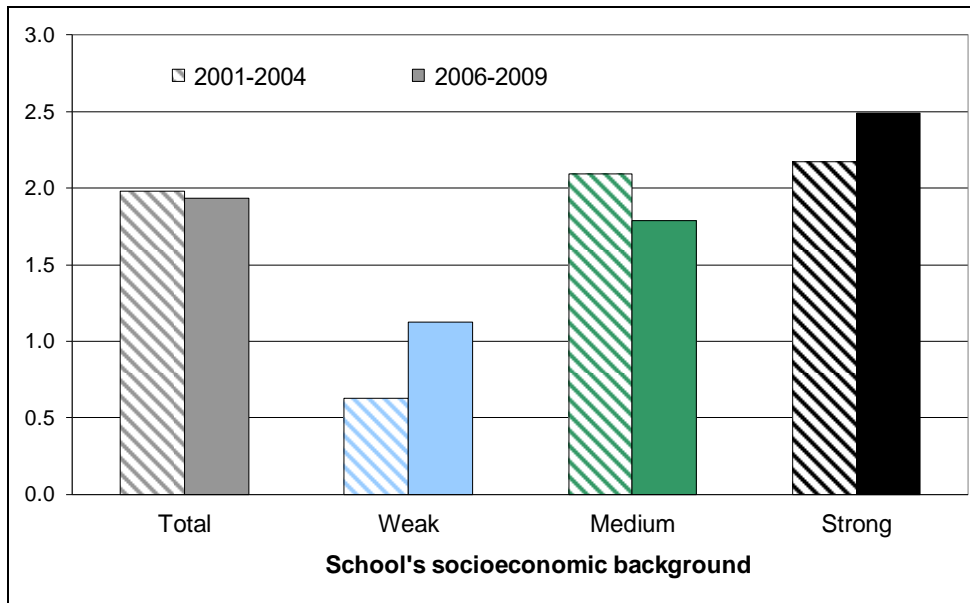
- 1) In local authorities that had at least 4 different State Secular Jewish schools in 2001–09. The year 2005 is not included since the standard audit was not conducted in that year.
- 2) Regular official primary schools that teach grades 1–6 only.
- 3) Strong school background—deciles 1–3 on the Nurture Index. Socioeconomic cluster of the local authority in 2006: strong cluster—deciles 8–10. Strong school background—deciles 1–3 on the Nurture Index.

SOURCE: Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education), and Central Bureau of Statistics (2009).

Examining the funding of hours on the basis of socioeconomic background—of students at the school and of the local authority—over time, it is found that the extent of local-authority-funded hours has hardly changed over the years (Figures 4 and 5). Such is the case even though implementation of the "Shoshani" report, expanding affirmative action in the Ministry of Education's budgeting of standard classroom hours (Blass et al. 2010), began in the 2003/2004 school year. This expansion could have prompted strong local authorities to increase their funding of hours because students in such jurisdictions received fewer hours from the Ministry of Education after the implementation of the report began. However, the findings do not indicate that such an increase occurred: as a rule, the authorities did not fund more instruction hours during the later period, nor did they add hours for students from a strong background (Figure 3). A similar examination, presented in Figure 4, in a breakdown

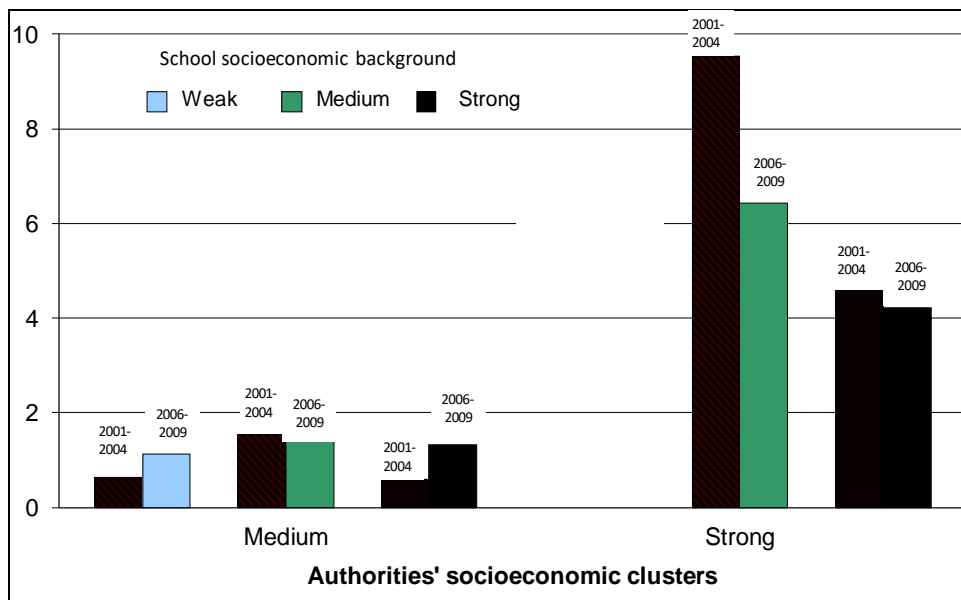
of local authorities into clusters (medium and strong), indicates that authorities from the medium cluster slightly increased the hours for schools that have students from a weak background and students from a strong background, and in authorities from the strong cluster there was actually a decline in the scope of hours to schools that have students from a medium background and students from a strong background.

Figure 3
Instruction Hours in State Secular Jewish Schools,¹ Funded by Local Authorities, by Socioeconomic Background of Student Enrollment²
 Weekly instruction hours per class, 2006–09 vs. 2001–04



1) Regular official primary schools that teach grades 1–6 only.
 2) Weak background—deciles 8–10 on the Nurture Index; medium background—deciles 4–7; strong background—deciles 1–3.
 SOURCE: Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education.

Figure 4
Instruction Hours in State Secular Jewish Schools,¹ Funded by Local Authorities,
by Socioeconomic Background of Local Authority² and Student Enrollment³
 Weekly instruction hours per class, 2006–09 vs. 2001–04



- 1) Regular official primary schools that teach grades 1–6 only.
- 2) Socioeconomic cluster of the local authority in 2006: weak cluster—deciles 1–3; medium cluster—deciles 4–7; strong cluster—deciles 8–10. In weak-cluster authorities, only a few schools are affiliated with the State Secular Jewish system.
- 3) Weak background—deciles 8–10 on the Nurture Index; medium background—deciles 4–7; strong background—deciles 1–3.

SOURCE: Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education), and Central Bureau of Statistics (2009).

3. THE ESTIMATIONS

This chapter describes the results of statistical estimations (OLS) that examine the factors correlated with the number of weekly instruction hours per class funded by the local authorities in 2001–09 in official regular State Secular Jewish primary education (Table 4). These factors include the socioeconomic background of the residents of the local authorities and the students in the schools and the funding sources of hours that are not from the local authorities. The dependent variable in all the estimations is the number of instruction hours allocated to each school by the local authority in which it is located.

a. The estimated equations

The estimations were carried out in two ways—once without Fixed Effects (FE) for the local authority, and a second time including FE.¹⁴ The non-FE estimations were meant to examine the background features that are correlated with the scope of local authorities' financing of the schools in their jurisdiction. The following equation was estimated:

$$(1) \quad \text{municipalhours}_{it} = \alpha + \beta_1 \text{localitySC}_j + \beta_2 \text{schoolNI}_{it} + \beta_3 \text{otherhours}_{it} + \beta_4 \text{fiscal}_{jt} + \beta_5 \text{pupilshare}_{jt} + \beta_6 \text{pupils}_{it} + \varepsilon_{it}$$

Where $\text{municipalhours}_{it}$ is the number of instruction hours in school i financed by the local authority in year t . The main variables of interest in the model are: localitySC_j —the socioeconomic cluster of local authority j in which the school is located (in 2006) and schoolNI_{it} —the Nurture Index of the school. When $\beta_1 > 0$, strong authorities allocate more hours to schools in their jurisdiction compared with weak authorities, and when $\beta_2 < 0$, schools with students from a strong background (a low Nurture Index) benefit on average from more hours compared to schools from a weak background. In addition, the equation includes the following variables: otherhours_{it} —a set of variables representing the hours for schools that are from sources other than the local authorities, meaning nonprofit organizations, parents, the standard hours of the Ministry of Education and non-standard hours of the Ministry of Education; fiscal_{jt} —a set of variables representing the fiscal status of the local authority in which the school is located, including income, deficit, and debt (all three in NIS thousand per resident); pupilshare_{jt} —the share of primary school students in the local authority's population, and pupils_{it} —the number of children in the school. ε_{it} is the random error.

In equation (2) below, we also include FE at the local authority level (fe_j) reflecting the fixed characteristics, including unobserved ones, of the authority. Therefore this model makes it possible to analyze the differences in financing between schools and between years within each authority, all this vis-à-vis the average of hours in each authority during the entire estimation period.¹⁵

$$(2) \quad \text{municipalhours}_{it} = \delta + \theta_1 \text{schoolDNI}_{it} + \theta_2 \text{otherhours}_{it} + \theta_3 \text{fiscal}_{jt} + \theta_4 \text{pupils}_{it} + fe_j + \varepsilon_{it}$$

The key variable of interest in the equation is schoolDNI_{it} , which is the school's Nurture Index, but its meaning in this equation is different than its meaning in equation 1 because of the inclusion of local authority FE in equation 2. The FE reflect the multiyear average of

¹⁴ The Hausman test showed that there is a preference to using a Fixed Effects model rather than a Random Effects model.

¹⁵ Estimations that omitted schools in which the number of weekly instruction hours per class funded by the local authority is an outlier (more than 15 weekly hours) yielded similar results to those presented below.

instruction hours that were financed by the local authority in each school in its jurisdiction; therefore, θ_1 reflects the effect of the Nurture Index of a given school on the gap between hours per school that are financed by the authority and the average financing for all schools in the authority. It thus turns out that θ_1 reflects the affirmative action carried out by local authorities in their jurisdiction. In addition, we also estimate the equation:

$$(3) \quad \text{municipalhours}_{it} = \delta + \theta_1 \text{schoolNI}_{it} + \theta_2 \text{otherhours}_{it} + \theta_3 \text{fiscal}_{jt} + \theta_4 \text{pupils}_{it} + \theta_5 \text{schoolNI}_{it} \times \text{otherhours}_{it} + \theta_6 \text{schoolNI}_{it} \times \text{fiscal}_{jt} + \theta_7 \text{schoolNI}_{it} \times \text{localitySC}_j + fe_j + \varepsilon_{it}$$

Equation 3 makes it possible to examine the factors influencing the affirmative action that each local authority carries out in its jurisdiction utilizing interaction variables of the school's Nurture Index with the hours from other sources ($\text{schoolNI}_{it} \times \text{otherhours}_{it}$), with the fiscal situation of the local authority ($\text{schoolNI}_{it} \times \text{fiscal}_{jt}$), and with the local authority's socioeconomic cluster ($\text{schoolNI}_{it} \times \text{localitySC}_j$). To illustrate, when θ_6 is positive, the authority conducts considerable affirmative action in its jurisdiction in periods in which its fiscal status is improved, and when θ_7 is positive, the affirmative action that the local authority carries out in its jurisdiction is larger if the authority is from a higher socioeconomic cluster.

The estimations are focused, as noted, on the State Secular Jewish education system, in which students are from a relatively strong background compared with all students in the education system. In particular, they come from stronger socioeconomic clusters: 98 percent of schools in the State Secular Jewish system come from clusters 4–10, compared with 81 percent in the overall sample. The observations in the estimations are for a school in a given year, with a total of 876–899 observations, in line with the various specifications. It should be emphasized that this is not a panel that follows the same schools/local authorities, although part of the schools/local authorities could be sampled more than once.

b. Results of estimation without local authority fixed effects (Model 1)

In order to confirm the link that we found in the descriptive statistics between the socioeconomic background of the local authority and of the school and the number of hours financed by the local authorities, we carry out multivariable estimations that control for the background variables. This model does not include fixed effects, as their inclusion would have negated the possibility of analyzing the variance in financing the hours among the authorities based on the socioeconomic cluster for each authority.¹⁶

¹⁶ The socioeconomic cluster (on a 1–10 scale) used in this research is for 2006. During the period studied the cluster did not change in 2/3 of the localities in the sample, and except for two localities, it changed by one unit.

We learn from the estimations that adding one cluster unit in the socioeconomic ranking of the authority (on a 1–10 scale) is accompanied by an increase of about 0.37 hours per class in local authority financing. A model that includes dummy variables for pairs of clusters¹⁷ yielded similar results (not shown), which indicate that the main part of the positive coefficient derives from the difference in hours between clusters 7–8 and clusters 5–6, in which about half the observations in the sample are found.

There is a negative correlation between a school's Nurture Index and the financing of hours by the local authority: schools with students from a weak background have less hours financed by the authority compared with schools whose students are from a strong background, even after controlling for the authority's cluster. This is apparently a direct result of the fact that incorporating the authority's cluster in the estimation is not sufficient to fully cancel out the impact of the socioeconomic background of the authority's students, as reflected in the Nurture Index of the schools in the authority. Therefore, we present below an estimation that includes fixed effects for each authority. Those estimations enables us to examine, as noted, the impact of the school's characteristics on its budgeting as dependent on the local authority's characteristics, net of the effects of the authority's unobserved variables.

As the authority's revenue per resident rises, and as its debt decreases, the scope of hours financed by the local authority increases. This is even when taking into account the authority's socioeconomic cluster. When the average income from the residents (per resident), from all sources, rises by NIS 1,000 (average income per resident was NIS 5,900 in the period studied, in average prices for that period), the number of weekly hours per class financed by the local authority increases by 0.43 (the average number of weekly hours per class financed by the local authority was 2.0). As such, the elasticity of the hours financed by the local authority relative to income per resident (at the average points) was approximately 1.2.¹⁸ When the debt per resident, from all sources, increases by NIS 1,000 (the average debt per resident in the study period was NIS 788, in average prices for that period), the number of weekly hours per class financed by the local authority decreases by approximately 0.91, so that the elasticity of hours financed by the local authority relative to debt per resident (at the means point) was 0.4 (in absolute terms). Finally, the larger the number of students in the school, the less participation there is from the local authority in financing the hours per class¹⁹, possibly due to the economies of scale in financing non-classroom hours.

¹⁷ The ten clusters were divided into 5 groups: 1–2, 3–4, 5–6, 7–8, 9–10.

¹⁸ Elasticity is the size of the percent change of one variable relative to the change by 1 percent of another variable. At issue here is the change in teacher instruction hours relative to change in average revenue or debt per resident.

¹⁹ Although in schools with many students the class density is generally relatively high, which actually requires more hours.

c. Results of estimations include local authority fixed effects (models 2–3)

The estimations including local authority fixed effects take into account all the fixed characteristics of the local authority²⁰ (model 2) and make it possible to examine the effect of the changes in the variables over time and between schools within each local authority (compared with the multiyear average of hours per class in the local authority, reflected, as noted, in the authority's FE). A positive and statistically significant estimate of the school's Nurture Index is obtained. That is, the higher a school's Nurture Index is, relative to the average in a given authority, the higher the budgeting of hours by the authority is. The explanation for this is that the local authorities carry out affirmative action policies in their jurisdiction in favor of schools whose students come from a weak socioeconomic background. To illustrate, the weakest schools receive about 2 hours per class more than do the strongest schools in the same authority.

A positive correlation was found (significant only at the 15 percent level) between Ministry of Education hours that are not standard and the financing of hours by the local authority. It is likely that this result derives from some of the allocation of non-standard hours by the Ministry of Education to a given school depend as well on the participation of the local authority in financing (for example, Keren Karev [ACBP] sometimes conditions its funding on participation by the Ministry of Finance, local authorities, and parents). The estimates of the fiscal variables are not significant, apparently because over the years they change only slightly within the same authority.

In Model 2 we found, as noted, that the local authorities conduct within their jurisdiction affirmative action policy in favor of schools whose student are from a weak socioeconomic background. In Model 3 we examine whether the extent of affirmative action within the local authority depends on the observed characteristics of the authority and of the school. To answer that question, interaction variables between the Nurture Index and those variables were added to the equation.²¹ While the local authority fixed effects reflect differences among the authorities in the average instruction hours allocated to each school in their jurisdiction (reflected in the size of the intercept in the estimation), the interaction variable indicates the correlation between the characteristics of the local authority and the school vs. the differential allocation of hours according to the Nurture Index of the school in the authority. It turns out that affirmative action increased in tandem with the local authority's

²⁰ In contrast to the limited control provided by the socioeconomic cluster of the local authority.

²¹ The factors that correlate with local authorities' affirmative-action policies in funding State Secular Jewish primary schools in their areas of jurisdiction could have been estimated directly by performing an estimation in which the unit of investigation is a local authority. The dependent variable in this estimation is the distance between the multiyear average of weekly hours per class in the above-median portion of the Nurture Index, that were funded by the local authority, and the average among schools in the portion below the median. The independent variables are the averages of the explanatory variables that appear in Table 4. This estimation cannot be performed, however, due to the small number of local authorities in which enough schools were sampled in the standard audit.

socioeconomic ranking, a finding consistent with the presentation in Figure 4 above.²² Affirmative action grows with funding of instruction hours outside the Ministry of Education standard, apparently because local authorities match Ministry of Education funding for weak schools. An increase in per-resident revenue of NIS 1,000 is accompanied by a 0.06-hour increase per class in funding by the authority for each unit increase in the Nurture Index (on a 1–10 scale) of schools in its jurisdiction, and an increase of NIS 1,000 in per-resident debt induces a 0.18-hour decline.

In Model 2 we concluded from the positive estimate of the Nurture Index that as a rule, the local authorities conduct affirmative action in their jurisdiction. The addition of interaction variables in Model 3 turns the Nurture Index estimate negative; however, the sum of the Nurture Index estimate and the estimates of its interactions are what ultimately teach us how the extent of affirmative action in each authority changes when the Nurture Index changes by 1 unit, all else being equal. Figures 5–6 present the change in these sums, for a change in the socioeconomic cluster and a change in the authority's revenue, respectively, with the values of the other variables that have an interaction with the Nurture Index fixed, at the means point. As can be seen in Figure 5, a change of 1 unit in the Nurture Index (toward the schools from a weak socioeconomic background) is positively correlated with the instruction hours finance by the local authorities for the whole range of clusters in the sample (2–10), and the correlation strengthens as the cluster rises. Figure 6 shows us that a change of 1 unit in the Nurture Index (toward the schools from a weak socioeconomic background) is positively correlated with the hours financed by the local authorities for the whole range of income per resident of the local authorities, and the correlation strengthens as the income per resident increases.

²² A parallel model was estimated in which all the interactions with dummy variables for each of the five grouped clusters (see footnote 17) and similar results were obtained. The strongest affirmative action is obtained in clusters 7–8, apparently because those clusters have more heterogeneity among schools.

Table 4
Estimations of weekly instruction hours per class in State Secular Jewish primary¹
Schools funded by local authorities,² 2001–09³

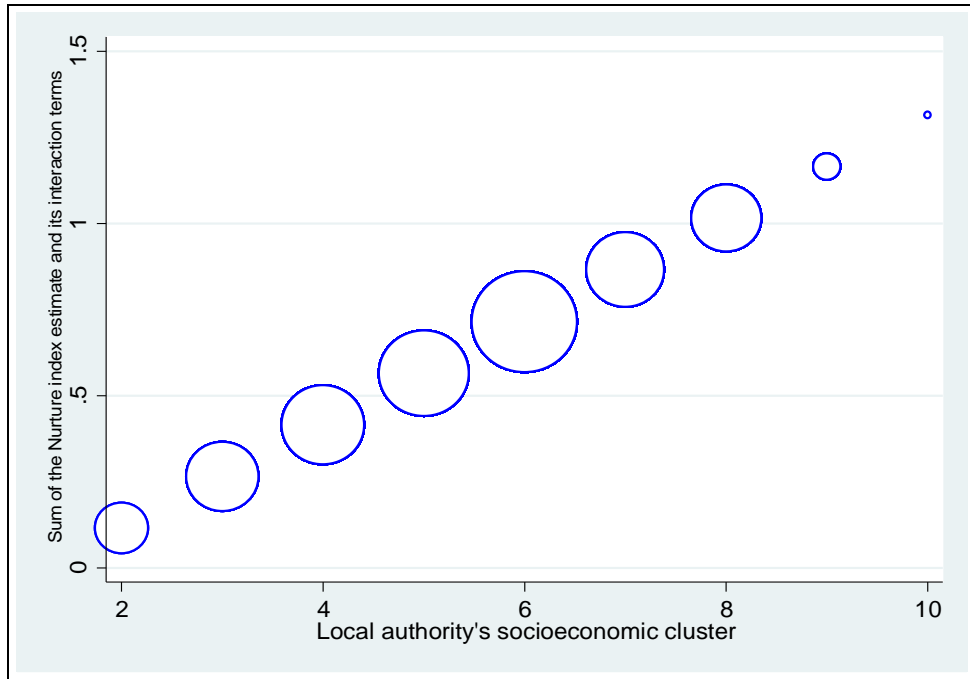
		Excluding local-	Including local-	
		authority FE	authority FE ⁴	
		Model 1	Model 2	Model 3
Socioeconomic cluster of local authority ⁵ (1–lowest; 10–highest)		0.374** (0.177)		
School Nurture Index (1–strong background; 10–weak background)		-0.126 (0.068)	-0.228* (0.125)	0.777* (0.595)
Hours per class from non-local authority sources	Nonprofit organizations	0.001 (0.031)	-0.028 (0.025)	-0.068 (0.043)
	Parents	0.066 (0.070)	-0.053 (0.052)	-0.028 (0.044)
	Ministry of Education standard hours	0.019 (0.027)	-0.003 (0.026)	0.061 (0.069)
	Ministry of Education non-standard hours	0.045 (0.030)	0.037 (0.024)	-0.053 (0.041)
Fiscal condition in previous year (NIS '000/resident) ⁶	Revenue	0.431** (0.195)	0.104 (0.186)	-0.160 (0.233)
	Deficit	0.260 (1.009)	-0.934 (0.381)	-0.981 (2.189)
	Debt	0.916*** (0.256)	0.054 (0.350)	0.862 (0.542)
School Nurture Index × local-authority cluster				0.150*** (0.050)
School Nurture Index × non-standard Ministry of Education hours				0.018** (0.009)
School Nurture Index × per-resident revenue (NIS 000)				0.061* (0.033)
School Nurture Index × per-resident debt (NIS 000)				-0.182** (0.082)
Share of primary-school students in municipal population ⁷ (pct.)		0.005 (0.095)		
School student enrollment (N)		-0.003** (0.001)	-0.001 (0.001)	-0.001 (0.02)
Observations (N)		876	899	877
Local authorities (N)		91	95	95
Adjusted R ²		0.293	0.525	0.559

* Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Standard deviations clustered by municipality in parentheses.

- 1) Schools that teach grades 1–6 only.
- 2) Municipalities and local councils. Only years in which at least 4 primary schools in the State Secular Jewish system were sampled in the standard-audit were included.
- 3) The year 2005 is not included since the standard audit was not conducted in that year.
- 4) The following explanatory variables (interactions with the school Nurture Index) were also included in the estimations: Nurture Index × nonprofit-funded hours; Nurture Index × parent-funded hours; Nurture Index × Ministry of Education-funded hours; Nurture Index × deficit; and Nurture Index × school enrollment. All estimates of these variables are not significant at 10% level.

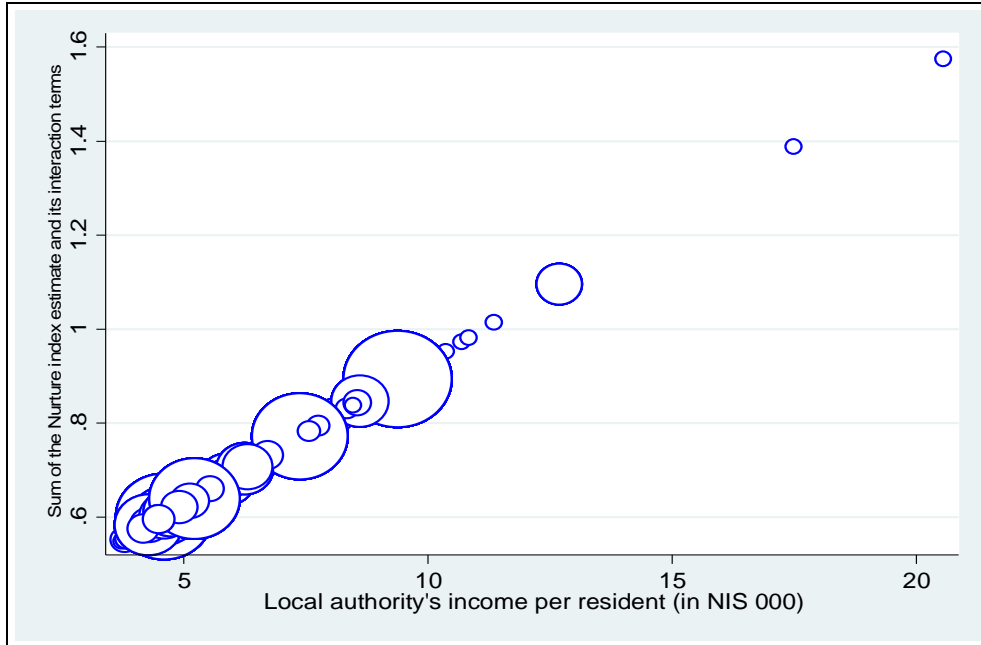
- 5) Socioeconomic cluster of the local authority in 2006. The sample includes authorities from clusters 2—10 but most observations (98%) are from clusters 4—10.
 - 6) The fiscal data are nominal. Deflating them using the CPI leaves the estimates almost unchanged.
 - 7) In 2006.
- SOURCE: Aida Economic Management and Consulting, Ltd. (collected for the Ministry of Education); Central Bureau of Statistics (2009); Central Bureau of Statistics and Ministry of Interior (various years).

Figure 5
The Marginal Effect of School Students' Socioeconomic Background on the Number of Weekly Instruction Hours Per Class in State Secular Jewish Primary Education Financed by the Local Authorities, by Socioeconomic Background of the Local Authorities, 2001–09¹



1) The figure presents the sum of the estimate of the school's Nurture Index and the estimate of the interaction variable "school's Nurture Index × local authority' cluster". The two estimates were taken from Table 4 (Model 3) and are presented under the assumption that the estimates of the interaction variables are multiplied by their value at the means point. The size of the circles is proportional to the number of schools in each local-authority socioeconomic cluster.
 SOURCE: Based on Table 4 (Model 3).

Figure 6
The Marginal Effect of School Students' Socioeconomic Background on the Number of Weekly Instruction Hours Per Class in State Secular Jewish Primary Education Financed by the Local Authorities, by Local Authority's Income Per Resident, 2001–09¹



1) The figure presents the sum of the estimate of the school's Nurture Index and the estimate of the interaction variable "school's Nurture Index \times income per resident". The two estimates were taken from Table 4 (Model 3) and are presented under the assumption that the estimates of the interaction variables are multiplied by their value at the means point.

The size of the circles is proportional to the number of schools at each level of the local authority's per-resident income.

SOURCE: Based on Table 4 (Model 3).

4. CONCLUSION

This research examined the extent of local authorities' involvement in financing instruction hours in official regular primary schools based on a unique and reliable database—the standard audit carried out for the Ministry of Education. The share of local authorities in the financing in 2001–09 was about 1.7 weekly hours per class, making up about 3 percent of total hours and about 30 percent of the hours from sources other than the Ministry of Education. It was found that the authorities' financing reduces the gap in hours in favor of students from a weak background by 5 percentage points: the Ministry of Education provides

students from a weak socioeconomic background about 26 percent more hours than students from a strong background, and financing by authorities reduced the gap in favor of weak students to about 21 percent.

Focusing on the State Secular Jewish education system, for which there is a large sample, raises the following findings: the local authorities financed about 2 weekly hours per class, making up less than 4 percent of total hours and close to a third of the hours whose source is not the Ministry of Education. Financing by the authorities reduced from 32 percent to 27 percent the scope of affirmative action in the allocation of hours that the Ministry of Education conducts in favor of students from a weak socioeconomic background as opposed to a strong one. This is because the financially strong authorities allocated many more resources to primary schools than did the less wealthy authorities, and even though the strong authorities conducted a policy of notable affirmative action in their jurisdiction, in favor of schools with students from a weak socioeconomic background—an addition of 2–3 weekly hours per class relative to the schools whose students come from a strong socioeconomic background.

The estimations of financing instruction hours per class by the local authorities, that controlled for background variables of schools and additional sources of financing the hours, confirmed the above findings. The estimations also revealed a positive correlation between the socioeconomic ranking of the local authority and its fiscal resilience and the financing of hours by the authorities—the elasticity of the instruction hours financed by the authority relative to its average income per resident (from all sources) was about 1.2 (at the means point), and the elasticity relative to debt per resident (in absolute terms) was 0.4. We also found that the affirmative action within the authority is positively correlated with its socioeconomic ranking and with its fiscal resilience.

The research focused, as noted, on the financing of instruction hours, as they are the lion's share of total expenditure on education. It did not deal with differences in teacher quality among local authorities and among schools in their jurisdiction, all according to the socioeconomic background of the residents of the authority and school students. The measurement of teachers' quality is not to be taken lightly—it has considerable ramifications on student achievements. This issue deserves further research.²³

²³ Previous studies (Zussman et al., 2007; Blass et al., 2008; Blass and Romanov, 2010) revealed no material differences in schooling and teaching seniority of teachers who work in primary schools (including those in the State Secular Jewish system) when the schools are examined on the basis of their students' socioeconomic background (using the Nurture Index). This finding may suggest that teachers in different local authorities have similar observed personal characteristics, but this is not enough to reach conclusions on the gaps in teacher quality.

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