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THE ESTABLISHMENT OF MIDDLE SCHOOLS AND SOCIOECONOMIC MOBILITY[1]

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Abstract

The establishment of middle schools in the early 1970s was one of the largest reforms in the Israeli education system. The main goal of the reform was to improve scholastic achievements, especially of pupils from weak socioeconomic backgrounds—mainly of Asian-African origin—to reduce their relative disparities in educational attainment and to increase their social and economic integration. All of this was by creating a schooling level for pupils in early adolescence, where integration between pupils from different backgrounds would occur, and by enhancing teaching quality.

This study uses a unique database and the gradual rollout of middle schools over time and place to identify the reform's effects on middle school pupils in the first decade of implementation and on their offspring.

We find that the reform had no short- or long-term effects on educational attainment, employment, wages, marriage and childbirth patterns, or degree of religiosity of pupils who had access to middle school education compared to others. Nor did the reform affect the educational achievements of their offspring. This result is likely due to the limited integration generated by the reform.

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1. INTRODUCTION

Researchers and education policymakers across the world extensively study the resources and outcomes of education systems. Pupils' socioeconomic background is predetermined, with limited capacity for change, and the costs of school resources such as teaching hours are high and their effectiveness is not always clear. In contrast, organizational changes, such as structural changes in the stages of education, may be introduced to improve scholastic achievements and reduce disparities. This study focuses on a large-scale reform in the structure of Israel's education system, which first introduced middle schools—an educational stage that begins in early adolescence—primarily in the 1970s.

Middle schools exist in most advanced economies, and vary by the age of entrance and number of school years they cover (European Commission 2019; OECD, 2019). The research literature that investigated the effectiveness of middle schools is limited, and typically focused their effect on short-term scholastic achievements. Moreover, the majority of studies did not support inferences of a causal association between middle schools and achievements, as they failed to address the selection bias due to pupils' choices of middle schools. The studies that explored the effects of Israel's middle school reform were broad in scope, but concentrated solely on academic achievements. Additionally, these studies were based on methodologies that were unable to establish causality and are now considered outdated.

In the 1960s, the scholastic achievements of Israeli pupils of Asian-African origin were poor, and the socioeconomic disparities between them and pupils of European-American origin were significant. The ethnic and class differences, combined with concerns regarding consequent political implications, led to the middle school reform – the official goals of which were to improve the quality of teaching and scholastic achievements in all stages of education, to reduce disparities in educational attainment, to increase social and economic integration, and to create encounters for children of all origins and social groups in common educational settings (Knesset, 1971).

The keystone of the reform, which was the most comprehensive reform of the education system to date, was a transition from a two-stage school system comprising 8-year elementary schools and 4-year secondary schools, to a three-stage system of 6-year elementary schools followed by 3-year middle schools (lower-secondary) and 3-year high schools (upper-secondary). The foundational idea was to create integrative supra-regional middle schools that would improve the scholastic achievements of pupils from weak socioeconomic backgrounds, most of whom are from Asian-African origin, increase their chances of continuing to high school, studying in prestigious study tracks, and earning a matriculation certificate. The decision to establish middle schools aligned well with the increase in the number of compulsory years of schooling from eighth grade to ninth grade and tenth grade, which also occurred in the 1970s (see Section 2.4). The geographic rollout of middle schools commenced in the 1969/70 school year, and by the early 1980s 300 middle schools had already been established nationwide, and were attended by more than two-fifths of the

country's seventh-grade pupils. Today, almost 90 percent of all pupils in the Hebrew education system (excluding the Haredi [ultra-Orthodox] system) attend middle schools.

The current study is the first to investigate, based on contemporary statistical methods, the causal association between the establishment of middle schools and pupils' outcomes—educational attainment, employment, wages, household income, patterns of marriage and childbirth, level of religiosity—and intergenerational effects on the scholastic achievements of the pupils' offspring.

The data of this study is based on diverse sources that include population and housing censuses since 1972, the population registry, administrative records of the education system (pupils, schools, and results of matriculation exams), and income data of employed and self-employed individuals. These make it possible to identify the place of residence of individuals who were in seventh grade between the 1966/67 and the 1981/82 school years (the research period), define their access to a middle school each year, and find out the demographic and socioeconomic status of these individuals, their parents, their partners, and their children over time. Identification of the geographic distribution of middle schools in the first decade of the reform's implementation—which is a precondition of the research—was based mainly on historical publications of governmental institutions.

The study uses the gradual geographic rollout of middle schools in the Hebrew education system in urban localities to identify the reform's effects on the outcomes using the Difference-in-Differences method (DiD), by comparing the outcomes of seventh-grade pupils who had access to a middle school in their place of residence with those of pupils with no such access.

The study finds that the establishment of middle schools did not contribute to socioeconomic mobility, as reflected in multiple outcomes: The subsequent educational attainment and participation in the labor market of pupils who had access to a middle school in their locality were no different from those of pupils in localities with no available middle school. This is also true for patterns of marriage, childbirth, and religiosity. The exception is the lower employment rates and wages of pupils whose mothers were Mizrahi (Jews of Asian-African origin) and had limited education. No differences were found in the scholastic achievements of the offspring of pupils who had access to a middle school compare to others. The results of the estimations are not sensitive to various robustness tests. The study also finds that the change in integration level in the transition from elementary to middle school—measured in terms of ethnic origin or mothers' education—accounted for a small portion, if any, of the effects of middle school availability on the examined outcomes.

The debate over middle schools' role in the Israeli education system is ongoing, also due to deep-seated changes occurring in Israeli society (Svirsky and Dagan-Buzaglo, 2009; Addie-Raccah et al., 2015), including aspirations of communalism, pluralism, and multiculturalism, which may be realized in neighborhood-based and other relatively homogeneous schools, which ran counter to the belief in middle schools' contribution to increased social integration.

This recent debate prompted several proposals on the future of middle schools, including their closure and reinstatement of a two-stage six-year structure (Oplatka and Tuvin, 2008; Resh, 2008; Vurgan, 2010; Addie-Raccah et al., 2011).[2] Two public committees recommended the two-stage structure that would eliminate middle schools: The National Task Force for Promoting Education in Israel ("The Dovrat Report" 2005) and the Advisory Committee to the Director General of the Ministry of Education (Ministry of Education, 2006), which also proposed to refrain from establishing new middle schools. The doubts regarding the future of middle schools stem from their numerous shortcomings (compared to six-year secondary schools): an additional transition between educational stages creates problems and breaks in the social and educational continuum. Organizational disadvantages include the absence of economies of scale (in the case of independent middle schools) and the fact that both the institutions and the teachers are affiliated with two organizational units.[3] However, middle schools have several advantages, especially the fact that they offer a school setting specifically for adolescents, which reduces friction with older pupils; middle schools allow teachers to specialize; and middle schools facilitate pupils' transition to high school when the middle school is adjacent to the high school.

The study proceeds as follows: Chapter 2 describes the middle school reform. Chapter 3 reviews the studies on the reform in Israel and the literature abroad on the effect of middle schools compared to 8-year elementary schools. Chapter 4 introduces the database, the research population, and descriptive statistics. Chapter 5 focuses on methodology: the identification strategy—addressing selection bias in the geographic distribution of middle

[2] A return to the pre-reform school system structure—8-year elementary schools and 4-year high schools—has been discussed in the following literature, and some advocates exist, but implementation would be difficult and entail enormous one-off investments. Nonetheless, we mention the benefits and shortcomings of 8-year elementary schools compared to middle schools (Oplatka and Tuvin, 2008): Advantages—reduction on the number of transitions between schools, which enhances the educational continuum, with schools having a smaller number of classes that facilitates personal attention; Shortcomings—selection and tracking would be advanced by one year, and it would be more difficult to deliver a unique pedagogical response for adolescents.

[3] Middle schools adjacent to high schools have two "owners": the middle schools are under the Ministry of Education while the high schools are owned by local government or educational chains, and teachers affiliated with two teacher associations are employed in the same middle school. In addition, the division of authority between the middle school and the high school in such cases is not well defined.

schools and parents' school choices—and the estimated equation specification. Chapter 6 presents the results of the estimations. Chapter 7 presents robustness tests—changes in the definition of middle school availability, and placebo estimations—and reviews the effects of factors related to the reform (classroom heterogeneity, grade and school density and size, changes in pedagogy and the transition to high school). The study concludes with a summary and discussion.

2. THE MIDDLE SCHOOL REFORM

2.1 Background

The widespread socioeconomic disparities in the Jewish sector, including differences in educational attainment, against individuals of Asian-African origin, have been on the public agenda since the State of Israel's establishment. Nonetheless, a policy to promote educational integration (based on continent of origin, socioeconomic status, etc.) was not high on the education system's agenda in the early days of statehood due to the system's urgent need to absorb masses of immigrant children.

Since the late 1950s, steps have been taken to help pupils from weak backgrounds, including a long school day, special curricula and tutoring for new immigrant children, school lunches, exemption from tuition in kindergarten and a graded tuition scheme in secondary education (based on parents' income and other factors), and an expansion of vocational education and the establishment of comprehensive secondary schools that combine academic and vocational tracks (Levy, 1999). Despite these steps, and even though many of the pupils in the more disadvantaged groups were already Israeli-born, the anticipated decline in educational disparities did not occur at the desired pace.

Representation of Mizrahi Jews in secondary education in general, and specifically in academic tracks, and among matriculation certificate recipients, was much lower than their share in the Jewish population: In the late 1960s, only 41 percent of Jews of Asian-African origin had attended a secondary school compared to 76 percent of Jews of European-American origin (Ashkenazim), only 14 percent had attended an academic secondary school compared to 44 percent, and only 41 percent attended school at the age of 17 compared to 76 percent, respectively (Central Bureau of Statistics, various years).[4] Socioeconomic gaps between Mizrahi and Ashkenazi Jews were also quite wide, feeding persistent concerns that gaps would widen and create a class-stratified society.

For years, policymakers in the governing parties were concerned about the widening gaps, as well as their political implications. Policymakers were also influenced by the echoes of

[4] In that period, only 4 percent of 17-year-old Mizrahi pupils earned a matriculation certificate, compared to 24 percent of Ashkenazi pupils (Adler, 1985). Only 1.6 percent of individuals of Asian-African origin attended a university in 1970, compared to 9.8 percent of individuals of European-American origin (Adler, 1999).

the Coleman Report (Coleman et al., 1966) that reverberated worldwide. The report pointed to the composition of pupils as the most important school-related factor in determining scholastic achievements and stressed that the achievements of pupils from a weak background improve when their classmates are from a strong background. With the encouragement of Minister of Education and Culture Zalman Aran, for the first time in the history of the Knesset a parliamentary committee was established and studied the structure of elementary and secondary education.[5] When the Knesset approved the committee's recommendations in 1968, integration became a guiding principle for education policy.

2.2 The Principles of the Reform

According to the parliamentary committee, the middle school reform had three main goals: (a) to raise the standard of teaching and the scholastic achievements in all educational stages; (b) to reduce disparities in educational attainment and improve the prospects of social and economic integration; and (c) to provide encounters among children of all population groups and countries of origin within common educational settings (Knesset, 1971, p. 236).

The keystone of the reform, which was the most comprehensive reform in the history of the country's education system, was a transition from a two-stage structure comprising 8-year elementary schools and 4-year secondary schools, to a three-stage structure: six-year elementary schools, three-year middle schools (or lower-secondary schools, grades 7–9), and three-year high schools (or upper-secondary schools).[6]

According to the guidelines of the Ministry of Education and Culture (1971b), all six-grade graduates (excluding graduates of special education) were required to attend middle school in the relevant school district in a local government (districts were defined separately for each educational stream—State and State Religious in the Hebrew education system—and each heterogeneous district contained several diverse ethnically and socioeconomically elementary school registration areas).[7,8] Admission to middle schools would be non-selective,

[5] Headed by MK Rimalt. The committee was preceded by another parliamentary committee, the Prawer Committee, whose recommendations included a one-year extension of compulsory education and school reform: transition from a two-stage structure comprising elementary and secondary schools, to a three-stage structure that also included middle schools. Opponents to the latter recommendation included the Teachers Association, whose representatives did not attend the committee's hearings. The Association's objections led to the establishment of the committee headed by MK Rimalt.

[6] The committee recommended two additional measures: cancellation of the Seker exams that were conducted in grade 8 (which meant that all 8th grade pupils could continue to an academic track in secondary education), and extension of compulsory education up to age 16 (grade 10). On the implementation of this recommendation, see below.

[7] Local governments with fewer than four classes in each grade from 7 to 9 would establish a middle school jointly with a second local government.

[8] The High Court of Justice (152/71) denied an appeal filed by affluent Jewish parents of grade 6 graduates in the State stream in Jerusalem against the municipality's intention to

and homeroom classes would be heterogeneous (except advanced/slow classes; see details below). To match teaching level to pupils' abilities, the Ministry of Education and Culture ordered that seventh-grade classes in basic subjects (in the Hebrew education system: Hebrew, Math, and a foreign language) would be taught in up to three ability groupings; in eighth grade, ability groups would be added in Science, and in the ninth grade, two-thirds of all study hours would be in study tracks (including vocational tracks) in which pupils would be placed according to their achievements.

The Ministry of Education and Culture's guidelines also addressed school size: Each middle school would have between 4 and 7 classes in each of the grades 7–9, and a second middle school would be established in localities with more than 8 classes per grade. It was recommended to place the middle schools adjacent to high schools (to create geographic proximity and functional links between them), with a preference for comprehensive high schools. This indeed happened in most cases. Finally, it was determined that middle school teachers would be required to have an academic degree or appropriate training—a requirement that exceeded those of elementary school teachers—and new curricula were instituted. The teachers' elevated training requirements and the implementation of new curricula also applied to schools that were not included in the reform.

The main idea behind the reform was to create integrative regional middle schools for pupils from weak and strong socioeconomic backgrounds, under the assumption that integration would increase the chances of the pupils from a weak background to enter high school, study in prestigious tracks, and earn a matriculation certificate, thanks to peer effects of their classmates from a stronger background, while the negative impact on pupils from a stronger background would be small, if any. A second assumption was that the mixture of pupils from different sectors might encourage the adoption of more positive outgroup attitudes due to social ties, reduce the sense of discrimination that caused polarization, and increase cohesion in Israel's multisectoral Jewish society (Ben-Ari et al., 1985). Still, it was taken into account that integration might trigger pedagogical challenges, especially due to class heterogeneity, which burdens both teachers and pupils.

Several arrangements were implemented to address the complexity of heterogeneity: classes were taught at different levels of difficulty (ability groups), and pupils with special needs were transferred to remedial classes in regular middle schools or special education schools. Occasionally, contrary to guidelines, a selection process was applied by middle schools to low-achieving sixth-grade graduates: Some were referred to special education, and in those cases that the middle school was adjacent to a selective high school, some were referred to a less prestigious middle school in the same district, and in some cases outside the district (Chen et al., 1978). Another mechanism to reduce heterogeneity in middle schools was to encourage, or at least refrain from preventing, low-achieving middle school pupils from dropping out, especially in the transition between eighth and ninth grade (before ninth

assign their children to a new integrative comprehensive secondary school, which made it possible to implement an integration policy through the establishment of middle schools.

grade became compulsory). In all these arrangements, Mizrahi pupils had a relatively high representation in the less prestigious educational groups (e.g., low-ability groups, slow/remedial classes, and middle schools of a lower standard). The absence of detailed information on these arrangements limits our ability to identify the reform's effects, especially its effects on integration and its implications.

2.3 Gradual Implementation of the Reform and the Socioeconomic Profiles of Middle Schools District

The reform was planned to be implemented over six years, during which 300–350 middle schools would be established (Ministry of Education and Culture, 1971b). In 1974, the target completion date was deferred to the end of the decade and the number of planned middle schools was increased to 460 (Ministry of Education and Culture, 1975). As a result of challenges that arose in the implementation phase, including opposition to the reform and integration in the State-Religious education stream and the Kibbutz Movement, the reform's implementation continued over several decades.

Other key challenges that led to delays in the establishment of middle schools were: (a) the Ministry of Education and Culture's policy not to compel local governments to open middle schools. Several local governments hesitated to do so given the lack of support from their residents and the high costs, especially for construction. For this reason, the reform was initially implemented mainly in the major cities and development towns; (b) a shortage of teachers with an academic degree, and the long training period for middle school teachers; (c) a shortage of buildings and equipment (State Comptroller, 1975); (d) The construction and maintenance costs of middle schools were higher than projected, and funding challenges were exacerbated by the economic crisis that followed the October 1973 War.[9]

Figure 1 and Figures A-1 through A-3 in the Appendix present data on the geographic distribution of middle schools over time, by standardized per capita household income, and ethnicity in the vicinity of the middle school.[10] Despite the aforementioned problems in implementing the reform, middle schools were established in the Hebrew education system in the period under investigation at a quite rapid pace: In the early 1980s, 250 middle schools

[9] It is extremely difficult to assess the cost of the reform (Ministry of Education and Culture, 1979). According to the State Comptroller (State Comptroller, 1975), in February 1974 the Ministry of Education and Culture estimated that the cost of constructing an additional 250 middle schools to be 960 million Lira, which is approximately 0.9 percent of the GDP. In the 1973/74 school year, there were 187 middle schools (Central Bureau of Statistics, various years). Recall that part of the aforementioned cost is the result of the increase in pupil population.

[10] In the 1968/69 school year, 8 middle schools were operated on an experimental basis within comprehensive schools. These middle schools had no more than two grades (grades 7 and 8) and had only 1,271 pupils in grade 7 (Ministry of Education and Culture, 1973). These middle schools are not included in the descriptive statistics presented here, unless noted otherwise.

were in operation and were attended by one-half of all seventh-grade pupils (Figure 1). The pace declined thereafter, and in the early 2000s close to three-quarters of all seventh-graders attended a middle school.[11] The rapid deployment of middle schools in urban localities in the 1970s occurred nationwide, and in the early 1980s only a few localities (most of which were in the Tel-Aviv metropolitan area and Be'er Sheva) remained without middle schools (Figures A-1 and A-2).

When we examine the distribution of middle schools in urban localities by household income (households with school-aged children residing in the vicinity of the middle school), the following picture emerges (Figure A-3): Although the reform was mainly designed to help pupils from a weak socioeconomic background, most of whom who were of Mizrahi origin, data do not support an especially high representation of middle schools in low-income statistical areas (neighborhoods) in the early 1970s and throughout this decade.

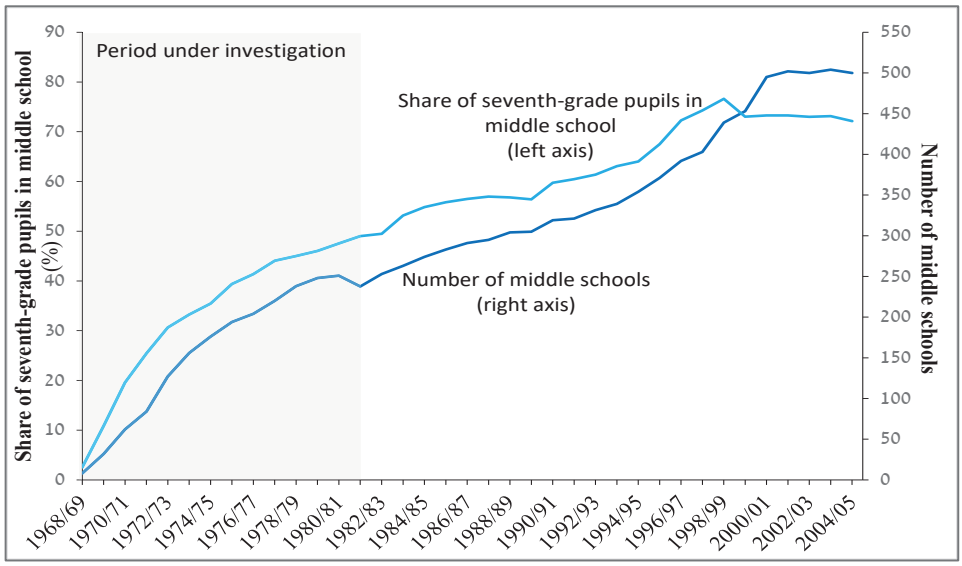
Because the reform was designed to improve scholastic achievements, especially of Mizrahi pupils, it is surprising that the proportion of seventh-grade Mizrahi pupils (based on the father's country of birth) who attended a middle school in the early 1970s was similar to the proportion of Israeli-born seventh graders or Ashkenazi seventh graders in middle schools, but Mizrahi pupils' proportion later declined (Figure A-3). One explanation for the relatively limited representation of Mizrahi pupils in middle schools is that many of them belonged to the State-Religious stream, where middle schools were established at a slower pace.

Despite the challenges noted above, studies indicate that the reform led to an increase in ethnic integration at the school and classroom level, at least in the State stream (Chen et al., 1978). Heterogeneity in middle schools was also reflected in a higher classroom variance in parents' socioeconomic ranking (based on the father's education and prestige of occupation), and pupils' grades on the Seker exam, compared to the variance in exam results in 8-year elementary schools (Chen et al., 1978).

Finally, educational integration—which was first and foremost designed to assist pupils from weak socioeconomic backgrounds, the vast majority of whom were Mizrahi—was negligibly implemented in other stages of the education system, including institutions of higher education, which did not apply affirmative action based on socioeconomic background, country of origin, and other characteristics.

[11] Processing of Ministry of Education data indicates that in the 2020/21 school year, 67.5 percent of pupils in grade 7 in the Hebrew education system attended a middle school. This figure represents a significant decline compared to the beginning of the millennium and is explained by the increase in the proportion of Haredi pupils, almost all of whom study in Talmud Torah schools from grade 1 to grade 8. Controlling for Haredi pupils, 88.5 percent of pupils in grade 7 in the Hebrew education system attended middle school.

Figure 1
Middle schools in the Hebrew education system and the share of seventh-grade pupils in them, 1969–2005[1]



Source: Central Bureau of Statistics (various years) and authors' calculations.

(1) Including eight middle schools that were operated experimentally in the 1968/69 school year.

2.4 Extending Compulsory Education to Grades Nine and Ten

In the period under investigation, amendments introduced into the Compulsory Education Law, 5709-1949, led to the gradual increase in compulsory education from eighth grade to tenth grade (Krief, 2009) to elevate the educational level of the population, especially of immigrant children from Islamic countries. The establishment of middle schools supports the compulsory education increase to ninth and tenth grades.

From the 1969/70 to the 1972/73 school years, there was an increase in the number of localities whose pupils were subject to compulsory education until ninth grade, but the process was not completed: In the 1972/73 school year, some localities gradually implemented compulsory education until tenth grade and only in the 1978/79 school year was compulsory education until tenth grade instituted nationwide; It was also decided that education would be free until the end of twelfth grade (replacing a gradual tuition scheme previously used in grades 10 to 12, based on parental income).

A correlation between the gradual implementation of compulsory education in grades 9 and 10 and the gradual deployment of middle schools,[12] might bias the estimated effects of the middle school reform on outcomes. Therefore, the estimations presented in Chapter 5 below include variables that control for the timing of these legislative changes at the locality level.

3. LITERATURE REVIEW

3.1 In Israel

Numerous longitudinal studies commenced immediately upon the implementation of the middle school reform, focusing on scholastic achievements up to high school graduation. Many of these studies were descriptive while others were based on non-causal statistical methods that focused on short-term effects. The Middle School Study by Chen et al. (1978) is the most comprehensive among these, and its database was used by numerous researchers.[13] The authors show that the proportion of sixth-grade pupils who continued to grades 9 and 10 from a middle school was 2 and 3 percentage points greater than the proportion of sixth-grade pupils who entered grades 9 and 10 from an 8-year elementary school (95 percent vs. 93 percent, and 88 percent vs. 85 percent, respectively). However, a larger proportion of middle school pupils turned to vocational (nonacademic) tracks in high school.

Chen and Kfir (1981) confirm these findings and show that the proportion of pupils who attended middle school and graduated from grade 12 was 2 percentage points higher compared to pupils who graduated from grade 12 after attending an 8-year elementary school (69.1 percent vs. 66.8 percent). Moreover, the middle school increased the number of school years mainly for pupils who achieved low-to-moderate grades on the Seker exam conducted at the end of grade 8. Although attending a middle school was associated with a smaller chance of entering an academic track in high school (50.0 percent vs. 52.2 percent), middle school graduates who entered an academic track in grade 10 had a greater chance of reaching grade 12, and this was even more strongly the case for middle school graduates who entered a vocational track in grade 10. Pupils who attended middle school also showed a greater (and statistically significant) improvement in their grades in Hebrew, English, and Math between grades 4 and 12—approximately 0.4 standard deviations (approximately one-half of the

[12] The correlation between the year of middle school establishment in the place of residence (see definition below) and the year on which compulsory education was extended from grade 8 to grade 9 (and grade 10) in that place was only 0.003 (0.009).

[13] This is a longitudinal study that tracked pupils in grade 7 in the Hebrew education system in the 1971/72 school year until they reached the age of grade 10 – some pupils attended middle school (approximately 3,200 pupils in 19 middle schools) while others attended 8-year elementary school (approximately 1,800 pupils in 19 schools).

average annual increase in grades)[14]—yet Mizrahi and Ashkenazi pupils showed similar rates of improvement. The explanation for the relative grade improvement of middle school graduates is apparently that they attended more years in school because no differences in grade improvement were found among pupils in grade 12 (Levy et al., 1979).

As noted earlier, the establishment of middle schools was also intended to increase the integration of pupils from weak and strong backgrounds and to improve the former's scholastic achievements. One of the main mechanisms that potentially undermined integration was the practice of allocating pupils to homeroom classes and other classes based on ability. A summary of the study on middle schools (Dar, 1988) indicates that pupils from a weak background who studied in an integrative setting (that is, in heterogeneous classes) reached better achievements than their peers who studied in homogeneous low-ability classes (also see Dar and Resh, 1985; Resh and Dar, 2000). A study by Cahan et al. (1995) offers support to the increasing discrepancies in scholastic achievements resulting from academic segregation (ability groups) in middle schools. This study shows that the variance in grades on a math exam conducted at the end of the first year of middle school in schools that adopted academic segregation was much greater (by approximately 0.9 standard deviations) than the variance in grades on an earlier math exam, and this gap increased as the number of years of schooling in academically segregated settings increased (Cahan and Linchevski, 1996). Moreover, middle school pupils in low-ability classes had a much lower chance of entering a prestigious high school track such as the academic track (Yogev, 1981; Yogev and Kfir, 1981) – especially for Mizrachi pupils and pupils in the State-Religious education stream (Resh, 1989); Their chances of earning a matriculation certificate were also lower (Shavit, 1984). Finally, Chen et al. (1978) show that the grades of pupils in low-ability classes increased between grades 7 and 9 at a much slower rate than pupils in the high-ability classes, resulting in greater gaps between these groups.

3.2 Abroad

Two studies properly address the issue of selection bias due to pupils' choices to attend middle school rather than an 8-year elementary school and found no significant difference in outcomes between the two. Hong et al. (2018) used the reorganization of the school system in a US school district, during which many middle schools were closed and catchment areas were modified. Following these steps, the number of 8-year elementary schools increased and some of the pupils who were expected to transit to a middle school continued to attend an elementary school until the end of grade 8. The authors compared pupils from both sides of the boundaries of a catchment area who had started school in the same elementary school but were tracked to different school levels as a result of the reorganization (using a regression discontinuity design). The authors found that attending a middle school had a negative impact

[14] Chen et al. (1978) found no substantial differences between the grades of pupils in grade 8/9 who attended middle school and the grades of pupils who attended 8-year elementary school, after controlling for their previous grades.

on grades in Math and English in the first year of middle school (grade 6), but this effect subsequently disappeared, and middle school pupils' grades in English in grade 8 were even higher than their counterparts in 8-year elementary schools, especially for pupils who received low grades in third grade, but less so among poor pupils.

The study most similar to the current study was conducted by Holmlund and Böhlmark (2019), who examined the implications of a gradual elimination of middle schools in Sweden in the 1990s, as a result of which some pupils remained in elementary school until grade 9. Based on a DiD method and administrative data, the researchers found that the reform did not affect test scores in grade 9, the chances of reaching grade 12, studying in an academic high school, or continuing to tertiary education. No differential effects were found by gender, parents' education, or migration status. The reform led to a reduction in grade size—which, according to several studies, has a positive effect on scholastic achievements (see Section 7.2 below)—and an increase in classroom homogeneity, but also led to a decline in the number of properly qualified teachers and their years of experience, which potentially have a negative impact on scholastic achievements.

4. THE DATABASE, THE RESEARCH POPULATION, AND DESCRIPTIVE STATISTICS

4.1 The Database

The database includes all Jews born between 1954 and 1969 (see details below)—a random sample of approximately one-fifth of Israeli residents age 15 and over—who completed, or at least of one their parents completed, the full questionnaire in the 1972 and/or 1983 population census. The database contains information on this population from the following datasets:

- Population Registry – demographic information on individuals, their parents, their partners, and their offspring, including gender, year and month of birth, and school year in which the individual reached the age of grade 7[15], country of birth and year of immigration, number of siblings and children, marital status, locality of residence, and year of death.
- Population Censuses of 1972, 1983, 1995, and 2008 – socioeconomic and demographic information on the individuals (age 15 and over), their parents, their

[15] Individuals born between the first day of the month of Tevet (December\January in the Jewish Calendar) 13 years prior to the grade 7 school year and the 30th day of the month of Kislev (November\December in the Jewish Calendar) 12 years prior to the grade 7 school year. Given the absence of pupil records for the period under investigation, it is impossible to determine the date on which each individual actually entered grade 7. An examination of the 1972 Census data indicates that approximately three-quarters of pupils in middle school were of the appropriate age.

partners and offspring, including the aforementioned demographic information, the statistical area of residence, educational attainment, mastery of languages, labor market participation, occupation, economic sector, income from work and benefits, and homeownership.

- Education Registry – number of years of schooling, highest degree or diploma earned by the individual, their parents, their partner, and their offspring, collected by the Central Bureau of Statistics, mainly from administrative sources.
- Religiosity Registry – degree of religiosity (Haredi/religious/secular) of the individuals, their parents, their partner, and their offspring, calculated by the Central Bureau of Statistics from administrative sources.
- Offspring's Scholastic Achievements – records of pupils in grade 1 (available from 1996 and onward), grade 7, and grade 12 (available from 1991 and onward); educational stream, track (academic/vocational), high school track/major, and information on parents' number of years of schooling (individuals and their partners); matriculation exams (available from 1991 onward): number of units studied in each subject, grade, and eligibility for a matriculation certificate.
- Earned Income – gross annual income from salaried employment and number of months of employment (from 1983 and onward), and gross income from self-employment (from 1999 and onward) of the individuals, their parents, their partner, and their offspring when they were 30, 40, and 50 years old. This information also includes the economic sector. The source of the data is Israel Tax Authority records of salaried and self-employed individuals.

Table A-1 in the Appendix details the sources of the data on pupils' background characteristics and outcomes.

Key variables for econometric identification in this study are the timing of middle schools' establishment and their location relative to the pupil's residential area when the pupil reached the age of grade 7, as we compared the outcomes of individuals at the age of grade 7 who had a middle school available in their residential area to those who did not have such a school.

The dates of middle schools' establishment and their locations are based on several sources: internal publications of the Central Bureau of Statistics and the Ministry of Education and Culture for each local government in Israel and the list of schools within them; a corresponding publication that contains the number of schools and pupils by education level in each local government; a list of schools for the 1991/92 school year – the first year for which such a file is available; a historical multiannual file of lists of schools, which includes all the schools that ever existed; Reports of the Central Reform Execution Committee that include lists of middle schools by year of establishment. For further information see Appendix A in Zussman et al. (2022).

Integrating these sources makes it possible to identify at a very high degree of certainty the year of establishment of each middle school in the Hebrew education system, its stream (State or State-Religious), and its address. Addresses were linked to statistical areas of the

1972 and 1983 censuses using GIS software with the assistance of the Central Bureau of Statistics (1984).

Place of residence (statistical area) of individuals at the age of grade 7 was determined according to the Censuses from 1972 onward, and almost in all cases based on the 1972 and 1983 censuses (for additional information, see Appendix B in Zussman et al., 2022). In summary, we identified the place of residence of 89,805 individuals at the age of grade 7, who constitute 32 percent of all Jewish individuals at the age of grade 7 in the period under investigation.

Middle school availability was defined as follows (for additional information see Appendix C in Zussman et al., 2022): At the age of grade 7, the individual lived in an urban locality in which the number of pupils in the Hebrew education system in grade 7 exceeded 160 in the 1969/70 school year and the locality's population did not exceed 20,000 in early 1970 and had a middle school in the stream that the individual attended, or the individual lived in a larger locality (excluding the four major cities—Tel Aviv - Yafo, Jerusalem, Haifa, and Petah Tiqwa—for which we have information on middle school registration areas) and the aerial distance from that middle school to the individual's place of residence did not exceed 3 km, or the individual lived in one of the four major cities of the time and the statistical area of their place of residence is in the registration area of a middle school in the individual's educational stream. In Section 7.1 we perform a sensitivity test on the definition of middle school availability. The smaller urban localities and the statistical areas in the larger urban localities (including the four major cities) are hereinafter labeled as "places."[16]

4.2 Research Population and Descriptive Statistics

The database includes Jews born between 1954 and 1969 who, or at least one of their parents, completed the questionnaire in at least one of the 1972 or 1983 Censuses.

The reason for focusing on Jews—pupils in the Hebrew education system—while omitting Arabs is that the reform's main goal was to create integration between pupils from weak and strong backgrounds. Almost all the pupils in Arab elementary schools in the late 1960s were from a very weak socioeconomic background, and fewer than three-quarters of them reached grade 6 (Central Bureau of Statistics, various years). Therefore, the goals of the middle school reform were less relevant for the pupils in the Arab education system.

Middle schools were first established, in a non-experimental format, in the 1969/70 school year, and we only have information on the geographic rollout of middle schools until the 1981/82 school year. Therefore, the research population was restricted to Jews born between 1954 and 1960, in other words, those who reached the age of grade 7 in or after the 1966/67 school year – 5 years before the 1972 Census (the determining date is May 21, 1972) that collected information on locality of residence and statistical area from 1967 to the

[16] Middle school availability was defined separately for the State and State-Religious stream. Pupils were attributed to a stream according to their own or their family members' degree of religiosity.

1981/82 school year, which is the last school year for which we have information on the geographic distribution of middle schools and information on place of residence, which is taken from the 1983 census.

The research population was also restricted to individuals who lived in urban localities when they reached the age of grade 7 (approximately 90 percent of Jews of this age in the 1969/70 school year). At that time, as today, pupils in rural localities were largely bused to regional council schools, and in the absence of information on middle school registration areas in the period under investigation it is difficult to link a pupil's locality of residence to a regional middle school. Moreover, some regional councils had separate middle schools for pupils from kibbutzim and moshavim, which makes it even more difficult to identify available middle schools.

According to Ministry of Education and Culture guidelines (Ministry of Education and Culture, 1971a), Jewish local governments that might have fewer than 4 classes in each grade between 7 and 9 at State or State-Religious schools were required to establish a middle school jointly with a second local government. We have no information on the local governments that did so, and therefore middle school availability in those places is unknown. Therefore, the study population was restricted to urban localities that had more than 160 pupils in grade 7 in the Hebrew education system in the 1969/70 school year.[17]

Because attributing of middle school availability for individuals at the age of grade 7 is a precondition for inclusion in the research population, as noted in Section 4.1, we excluded pupils whose locality of residence or statistical area of residence is unknown. As a result, approximately 1.8 percent of all Jews at the age of grade 7 were excluded. Also were excluded almost 1,000 individuals (approximately 1.1 percent of pupils in grade 7 in the study localities in the period under investigation) whose degree of religiosity is unknown and there is no overlap between availability (or non-availability) of a middle school in the State and State-Religious stream in their place of residence at the age of grade 7 (For additional information see Appendix D in Zussman et al., 2022).

Individuals whose month of birth was unknown were also excluded from the research population because we could not determine the school year in which the individual reached the age of grade 7. This restriction led to the omission of 3.1 percent of Jews aged 13 who resided in urban localities in the 1969/70 school year. Individuals residing in Haredi neighborhoods were also omitted (approximately 0.3 percent of Jews residing in urban

[17] 30 pupils per classroom (the mean number of pupils per classroom in the period under investigation was 26.5 – approximately 32 at the beginning of the period and approximately 25 at the end – and a safety margin was taken) multiplied by four grade 7 classes, and divided by the proportion of pupils in middle school in the State stream in the early 1970s (approximately 75 percent). In Jewish urban localities with approximately 160 pupils in grade 7 in the State stream in 1970, the mean population was approximately 9,000. Only 4 percent of Jews at the age of grade 7 in the beginning of the period under investigation resided in small urban localities that were excluded from the current study.

localities at the age of grade 7). Finally, individuals who died between the age of grade 7 and the age of 50 were excluded – the period used to define the outcomes. This restriction led to the omission of 2.6 percent of Jews at the age of grade 7 who resided in urban localities in the period under investigation.

In total, the research population included 85,632 Jews who were born between 1954 and 1969 who, at the time they reached the age of grade 7 (in school years from 1966/67 to 1981/82), resided in the urban localities included in the study (excluding Haredi statistical area), and their parents, partners, and offspring. These individuals constitute approximately 29.8 percent of all Jews at the age of grade 7 in the period under investigation. Of these, a middle school was established in the place of residence of 26,462 individuals. The large number of individuals in the research population and the large proportion of those for whom a middle school was available in their place of residence lends statistical power to the estimations.

Table A-2 presents the research population's descriptive statistics separately for individuals for whom a middle school was or was not available at the age of grade 7. A middle school was available for 30.9 percent of the youth. Middle school availability for children of Asian-African origin was slightly lower, and as a result, the profiles of the parents of pupils for whom a middle school was available were slightly stronger, as were the outcomes of these pupils and their offspring.

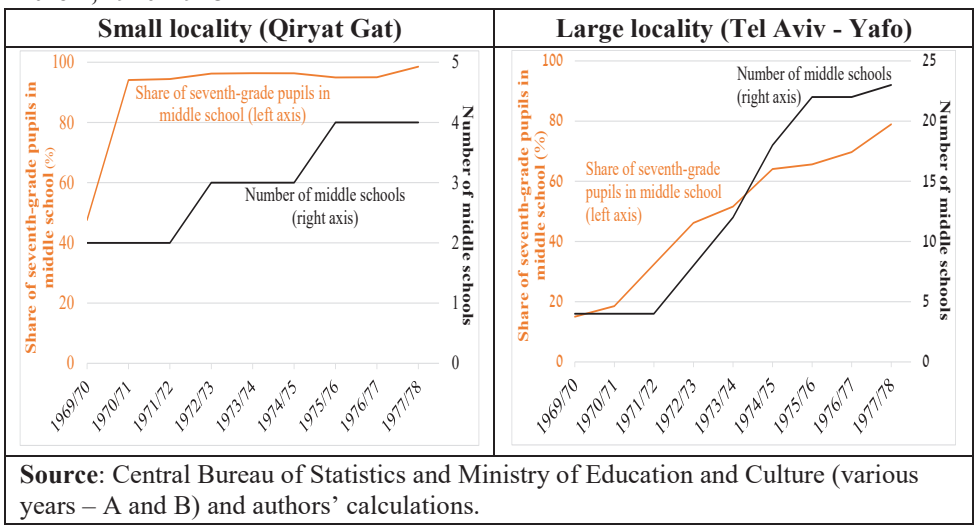
5. METHODOLOGY

5.1 Identification Strategy – Gradual Rollout of Middle Schools

During the reform implementation, middle schools were gradually established nationwide, beginning from the 1969/70 school year. At the end of the period under investigation (the 1981/82 school year), only one-half of all pupils in grade 7 in the Hebrew education system attended a middle school (see Figure 1).

Not only did the timing of the first middle school establishment in each locality differ, but the rate at which subsequent middle schools were opened also varied. Figure 2 illustrates this phenomenon in a small urban locality (Qiryat Gat), and a large urban locality (Tel Aviv -Yafo). In the small urban locality, immediately after the first middle school opened, almost all pupils in grade 7 in the locality attended a middle school. In contrast, in Tel Aviv - Yafo, the proportion of pupils in grade 7 who attended middle schools increased gradually, as the number of new middle schools in the city increased.

Figure 2
Middle schools in the Hebrew education system and the share of seventh-grade pupils in them, 1970–1978



Source: Central Bureau of Statistics and Ministry of Education and Culture (various years – A and B) and authors' calculations.

5.2 Dealing with Selection Bias

The rollout of middle schools in urban localities was not necessarily random and may have been influenced by pupil's background characteristics in each place as well as other factors. In such a case, the estimated effects of the reform on outcomes may be biased.

Selectivity in the timing of middle schools establishment may be examined using the following equation for the year of establishment of the first middle school in a place as a function of the pre-reform profile of the residents:

(1) $year_l = \alpha_0 + \overline{X_{l1967-1972}}'\beta_1 + \varepsilon_l$

Where:

$year_l$ - First middle school establishment year in place *l*.

$\overline{X_{l1967-1972}}'$ - Average background characteristics of pupils at the age of grade 7 who resided in place *l* between 1967 and 1972[18]: Proportion of pupils of Asian-African origin, the number of maternal siblings (when the

[18] The choice of the years 1967–1972, rather than any single year (e.g., 1969, which was the last year before middle schools were established) is due to the need for a reasonable number of observations in order to calculate the mean background characteristics in each place. Note that in 1972 the reform was in a very early stage of implementation (Figure 1 above).

pupils were aged 12), years of schooling of the parents, and the percentile of standardized per capita household income of all sources.

ϵ_l - Random error.

The estimations were conducted for middle schools in the State education stream and secular pupils only, due to the small number of religious pupils, which makes it difficult to reach a reliable calculation of their average background characteristics in the place. If β_1 estimates are not statistically significant, this suggests that the timing of middle school establishment in a specific place in the period under investigation was not correlated with the residents' observed pre-reform characteristics. Table A-3 indicates that this is the case.

Table A-2 presents the results of balancing tests of the demographic and socioeconomic background characteristics of individuals who had a middle school available when they were at the age of grade 7 versus the others. The table indicates that some characteristics are stronger for individuals who had access to a middle school, mainly due to a slightly higher proportion of Israeli-born individuals or individuals of European-American origin in this group.

Up to this point, we addressed the selectivity bias in middle schools rollout. However, parents may prefer to send their children to a middle school over an 8-year elementary school,[19] where such preference could even lead to a change in place of residence. If many parents relocated, there is a high probability that the average (pre-determined) background characteristics of the pupils at the age of grade 7 in a given geographic area changed, and may bias the estimated effects of the reform (for example, through peer effects).

First, the proportion of parents of children (in the research population) at the age of grade 6 who relocated in the following year of all the parents whose children had an available middle school at the age of grade 7 is similar to the proportion of parents who relocated and whose children did not have access to a middle school (in a given year), and the proportions were also similar to those of children who transitioned from the age of grade 5(7) to the age of grade 6(8).[20]

Second, the estimations of the average background characteristics of pupils living in a place each year as a function of middle school availability in that place and in that year show that availability did not affect the characteristics (not shown). Consequently, the socioeconomic composition of a place did not change in response to the establishment of a middle school.

[19] Given the absence of teacher's records for the period under investigation, it is not possible to examine selection bias in teachers' transitions between schools as a result of the reform (also see Section 7.2 below).

[20] The examination was conducted for the year 1978 (5 years prior to the 1983 Census) and for individuals who resided in a small urban locality at that time, because in those localities the identification of available middle schools is almost certain.

Although we did not identify a pattern of relocation due to parental preferences regarding their children's attendance in a middle school, and we found no change in the socioeconomic-demographic profiles of places of residence following the establishment of middle schools, it may still be possible that parents influenced the type of school their children attended when they reached the age of grade 7. According to the guidelines of the Ministry of Education and Culture (1971b), all graduates of grade 6 (excluding pupils in special education) residing in the same elementary school registration area were required to enter the same middle school whose registration area included that elementary school registration area, if a middle school existed. Therefore, prima facie, no school selection bias should emerge.

No pupil records are available for those years and therefore it is difficult to examine this hypothesis. The 1983 census allows us to examine it, as the census respondents (aged 15 and over) were asked: "What is the type of the last school you attended or are now attending?" Therefore, among the census respondents at the age of grade 9, we can distinguish between individuals who studied or study in a middle school and those who studied in 8-year elementary schools and continued to a secondary school, and others. To examine for differences in the socioeconomic-demographic profiles of the pupils in both educational paths who reside in the same statistical region (that is, they presumably had the same access to a middle school in their education stream), we used a Linear Probability Model (LPM) to estimate the probability that a secular pupil attended a middle school in the State stream. This estimation was performed for Jews who met the above conditions and who resided in the urban localities included in the study. The estimated equation is:

$$(2)\ MS_{il} = \beta_0 + X'_{il}\beta_1 + \delta_l + \varepsilon_{il}$$

Where:

- MS_{il} - Dummy variable that obtains the value 1 if individual *i* resided in place *l* on the date of the 1983 census attends a middle school in the year the individual was supposed to be in grade 9, and 0 otherwise.
- X'_{il} - Vector of pupil's background characteristics: female, new immigrant, interaction term of new immigrant and years in Israel and years in Israel squared, of Asian-African origin, of European-American origin, Hebrew is the mother's primary spoken language (an indication of the mother's degree of absorption), the mother is married (when the pupil was 12), interaction term of married mother and mother's age of first marriage, number of maternal siblings; years of schooling of mother and father, percentile of standardized per capita household income from all sources, housing density (number of individuals per room), and homeownership.
- δ_l - Fixed effect for place of residence.
- ϵ_{il} - Random error.

The left-hand column in Table 1 presents the estimated values of β_1. None reach statistical significance, and therefore, based on the observed variables, there was no selection bias in parents' decisions to send their children to a middle school. This finding suggests that parents had no choice because grades 7 and 8 in elementary schools had closed, or because they complied with instructions (possibly due to the enforcement of middle school registration areas).

The right-hand column in Table 1 presents the results of the estimation of Eq. (2), excluding fixed effects for place of residence, and including a dummy variable for middle school availability at the age of grade 7 (that is, two years before the 1983 census). Middle school availability increases the probability of attending a middle school by approximately 45 percentage points, holding other variables constant, and this finding is consistent with Figure 2.

A precondition of using the DiD method is that the outcomes show common trends in the treatment and comparison groups in the pretreatment period. We, therefore, examined the trends in the outcomes for Jews at the age of grade 7 who resided in places in which a middle school was established for the first time (treatment), compared to the trends in the outcomes of their counterparts who resided in places in which a middle school was not established for the first time at that time (comparison) but the probability of establishing a middle school was similar.[21] Figure 3 in Section 6.3 below indicates common trends in the period preceding the establishment of middle schools. Figure A-8 in Zussman et al. (2022) shows a common trends in the outcomes in the raw data as well.

In conclusion, these tests show that the timing of the establishment of middle schools was not affected by the average demographic and socioeconomic profiles of pupils in places where middle schools were established, and that some background characteristics of the children at the age of grade 7 who had an available middle school were stronger than the background variables of children who did not have an available middle school, yet the outcomes showed common trends in the period preceding middle school establishment. Furthermore, middle school availability significantly increased the probability of attending a middle school, and there was no selection bias in the transition to middle school for pupils who lived in the same place. Therefore, the preconditions for using the DiD method to estimate the effects of middle schools establishment on the outcomes were satisfied (see Section 5.3 below).

[21] The selected comparison group is the group whose probability of middle school availability is the most similar to the probability of the treatment group, based on the nearest neighbor matching method (including repetitions). The following average demographic and socioeconomic characteristics in the place of residence were used to identify the "nearest neighbor" (among pupils at the age of grade 7 and their parents, based on 1972 Census data): the proportion of new immigrants from Asia-Africa, the proportion of new immigrants from Europe-America, the proportion of individuals of Asian-African origin, the proportion of individuals of European-American origin, number of maternal siblings, mother's years of schooling, father's years of schooling, percentile of standardized per capita household income from all sources, and the locality population size group.

Table 1
Estimated Probability of Attending a Middle School[1] by Children at the Age of Grade 9 on the Date of the 1983 Census

Explanatory variable	Including fixed effects for place of residence[2]	Excluding fixed effects for place of residence[2]
Female	0.027 (0.042)	0.011 (0.027)
Immigrant	-0.023 (0.281)	-0.175 (0.124)
Immigrant × years in the country	-0.045 (0.068)	-0.012 (0.032)
Immigrant × years in the country squared	0.003 (0.004)	0.002 (0.002)
Asian-African origin[3]	0.002 (0.056)	-0.032 (0.039)
European-American origin[3]	0.044 (0.063)	0.082** (0.037)
Mother's primary spoken language is Hebrew	-0.073 (0.083)	-0.061 (0.044)
Mother is married[4]	-0.460 (0.644)	-0.332 (0.285)
Mother is married[4] × age of first marriage	0.005 (0.005)	-0.001 (0.003)
Number of siblings	-0.009 (0.014)	0.004 (0.009)
Mother's years of schooling	0.005 (0.006)	0.002 (0.004)
Father's years of schooling	0.003 (0.005)	0.003 (0.003)
Percentile of standardized per capita household income[5]	-0.000 (0.000)	0.000 (0.001)
Housing density (individuals per room)	-0.006 (0.029)	-0.027 (0.017)
Homeownership	0.027 (0.065)	-0.039 (0.036)
Middle school availability[6]		0.447*** (0.024)
Number of observations	1,328	1,328
Of which: attended or attend middle school	527	527
Adjusted R^2	0.674	0.021
Percentage attending middle school (percent)	39.7	

Source: 1983 Population and Housing Census (Central Bureau of Statistics), Ministry of Education and Culture, and authors' calculations.

*, **, *** statistically significant at the 10%, 5%, and 1% level, respectively.

Standard deviations are clustered by place of residence at the age of grade 7 and are in parentheses.

(1) The estimated of $\beta 1$ in Eq. (2) for secular pupils who participated in the 1983 census. Estimations included only pupils who resided in the same place (a small urban locality or statistical area in a larger urban locality) at the ages of grade 7 and 9.

(2) Small urban locality or statistical area in a larger urban locality.

(3) Asian-African origin: the pupil or at least one parent was born in Asia-Africa (excluding South Africa and Rhodesia). European-American origin: the pupil or at least one parent was born in Europe-America (including South Africa, Rhodesia, and Oceania region). The base groups – born in Israel with two Israeli-born parents.

(4) Mother married when the pupil was 12 years old.

(5) Percentile of standardized per capita household income from all sources. The percentile was calculated separately for the following father age groups (mother age groups, in the absence of a father): 5-year age groups from 30–34 to 55–59, and age 60 and above.

(6) Resided in a small urban locality or a larger locality (excluding the four major cities) with a middle school in the pupil's stream located at a distance of no more than 3 km from their place of residence (the statistical area centroid); or if in the four major cities – located in the pupil's middle school registration area.

5.3 Estimation Method

The effects of the middle school reform between the 1969/70 and the 1981/82 school years on the various outcome of Jewish pupils (who resided in urban localities) were estimated using the following DiD equation:

$$(3)\ Y_{ilt} = \beta_0 + \beta_1(\boldsymbol{Post} \times \boldsymbol{Treatment})_{\boldsymbol{lt}} + X_i'\beta_2 + \beta_3 C9_{l,t+2} + \beta_4 C10_{l,t+3} + \delta_l + \lambda_{dt} + \varepsilon_{ilt}$$

Where:

Y_{ilt} - Outcome variable of individual *i* residing in place *l* in year *t* at the age of grade 7.

Outcome variables, by category, are:

Educational attainment – years of schooling between 1st grade and 12th grade, 12 years of schooling, attended an academic high school, matriculation certificate or higher,[22] academic degree, and overall years of schooling;

[22] In the 1983, 1995, and 2008 censuses, respondents were asked about the highest certificate attained and therefore we cannot identify the attainment of a matriculation certificate among respondents who reported a higher certificate.

Employment and wages (at age 40) and household income – employed (salaried employee or self-employed),[23] employed in a high-ranking occupation,[24] gross annual wages, and percentile of standardized per capita household income from all sources;[25]

Demographics and religiosity – ever married (before age 50), age of first marriage, inter-ethnic first marriage (between individuals of Asian-African and European-American origin[26]), number of children at age 50, religious or Haredi in 2017.

(Post × Treatment)$_{lt}$ - Interaction term that equals 1 if a middle school (in the pupil's stream) was available in the pupil's place of residence at the age of grade 7, and 0 otherwise.

X_i' - Background characteristics (including dummy variables) – female, immigrant, interaction terms of immigrant and years in Israel and immigrant and years in Israel squared, Asian-African origin, European-American origin, married mother when the individual was 12 years old, number of maternal siblings, years of schooling of mother and father.[27,28]

$C9_{l,t+2}$ Dummy variable that equals 1 if the pupil at the age of grade 9 resided in a locality where grade 9 was compulsory, and 0 otherwise.

[23] Was employed at least one month in the year as a salaried employee or had income from self-employment.

[24] High-ranking occupations (based on the Uniform Classification of Occupations 1994): academic occupations (Level 0), professionals and technical occupations (Level 1), and managers (Level 2). Occupations at the time of the 1995 and 2008 Censuses.

[25] Percentile of income by age group of the individual (of the man in the case of two individuals from the same family in the research population) on the date of the 2008 Census: up to 44, 44–49, 50–54, 55–59.

[26] Asian-African origin: the individual or their mother or father was born in Asia-Africa (excluding South Africa and Rhodesia). European-American origin: the individual or their mother or father was born in Europe-America (including South Africa, Rhodesia, and Oceania region).

[27] On the dates of the 1972/1983 Censuses.

[28] To control for household income we tested the option of adding the explanatory variable "percentile of standardized per capita household income from all sources" (whose source is in the 1972/1983 censuses). We found that this variable was missing for one-fifth of the observations, and in any case its inclusion had almost no effect on β_1 estimator, and was therefore not added to the estimations.

$C10_{l,t+3}$ - Dummy variable that equals 1 if the pupil at the age of grade 10 resided in a locality where grade 10 was compulsory, and 0 otherwise.

δ_l - Fixed effects of the pupil's place of residence at the age of grade 7.

λ_{dt} - Time trend effect by district d (interaction term of the dummy variable for the year in which the individual was at the age of grade 7 and the dummy variable for the Ministry of Education district).[29] Note that this variable also reflects the impact of implementing compulsory education in kindergarten nationwide from 1979 onward.

ϵ_{ilt} - Random error.

Dummy variables for compulsory education in grades 9/10 in the pupil's place of residence were included in the estimations because the law was not applied to all localities in Israel simultaneously (Section 2.4 above). Dates of implementing compulsory education in grades 9 and 10 were taken from circulars of the Director General of the Ministry of Education and Culture and other publications.[30] Note that the exclusion or omission of the dummy variables for compulsory education in grades 9 and 10 did not affect the estimates of middle school availability.

The estimated value of $\beta 1$ reflects the effects of middle school availability at the age of grade 7 on the outcomes. Therefore, the estimated values should be interpreted as an intent-to-treat (ITT) effect in the place of residence. Standard deviations are clustered by place of residence at the age of grade 7.[31]

The main estimations were performed for the "extended group" – places where middle schools were established at any time in the period under investigation (1969/70 – 1981/82 school years) and places where no middle schools were established in the period under investigation. Supplementary estimations address the "limited group" – only places where middle schools were established during the period under investigation. The "extended group"

[29] Note that the establishment of middle schools did not modify the administrative structure of the Ministry of Education and Culture, including the Ministry's division into districts. Supervision and responsibility for the middle schools was assigned to the professional/regional supervisor who was also responsible for schools at other levels in the region (e.g., 8-year elementary schools).

[30] The Ministry of Education and Culture (1969, 1970, 1971a, 1972, 1974) and State of Israel (1969, 1970, 1973a, 1973b, 1974). We extend our thanks to Tomer Krief for making these circulars and publications available.

[31] Estimations in which the standard deviations were clustered by the statistical area of the place of residence at the age of grade 7 yield results of a similar degree of statistical significance to those in the original estimations.

estimations include 77.3 thousand observations and the "limited group" 53.5 thousand observations.

Estimations for siblings (including sisters, of the same parents or the same mother if the father is unknown) used Eq. (3) as the basic specification, to which dummy variables for families were added, while excluding family background characteristics that were constant over time.[32] Siblings share many personal traits (including those unobserved by us) and the same environment,[33] and therefore the family dummy variable controls for them better than the background characteristics included in Eq. (3). Furthermore, this also significantly reduces the potential for selection bias based on parents' decisions to send their children to middle school or to 8-year elementary school (Section 5.2 above).[34] In the estimations for siblings, it is possible to identify the effect of middle school availability on outcome only in the cases where the family had at least one child for whom a middle school was available and at least one child for whom a middle school was not available. Therefore, the estimations for siblings were limited to these families.

There were approximately 4,600 families (in the "limited group") with two or more siblings, in which a middle school was not available for at least one sibling. Of the approximately 11,800 children in these families, approximately 48 percent had a middle school available.

We also examined the intergenerational effects of middle school establishment on individuals' offspring outcomes. As the study focuses on middle schools established between the 1969/70 and 1981/81 school years and on individuals at the age of grade 7 in that period (that is, individuals born between 1954 and 1969), assuming that their offspring were born when the individuals were between the ages of 20 and 40, the offspring were between the ages of 10 and 45 in 2019, which is the last year for which administrative data are available to us. Consequently, offspring outcomes were limited to educational attainment in school. We carried out estimations similar to Eq. (3), using the explanatory variables for the mother and father from that equation, in addition to the offspring's gender and year of birth. For further information on the equation estimated for the individuals' offspring, see Appendix E in Zussman et al. (2022).

[32] Holmlund and Böhlmark (2019) also added to similar estimations dummy variables for siblings' birth order (twins were assigned the same value) because the literature indicates that birth order may affect a range of outcomes (see e.g., Black et al., 2005, 2018). This was not necessary in the estimations performed here because the explanatory variable of the age in which the individual was at the age of grade 7 reflects the birth order of the individuals.

[33] The research literature indicates that the correlation between siblings' cognitive abilities is around 0.5, while the correlation between their non-cognitive abilities is 0.2–0.5 (Anger and Schnitzlein, 2017).

[34] The estimations for siblings cannot take into account unobserved family-related factors such as differences between siblings (e.g., differences in abilities) or in parents' attitudes toward siblings.

6. RESULTS

6.1 Main Results

In the main estimations, the outcomes were classified by category: educational attainment; occupation, wages and household income; and demographics. We also performed estimations that examine the intergenerational effects of middle school availability on the scholastic achievements of the individuals' offspring.

Effects on the individuals themselves

Tables 2A–2C present the estimated effects of middle school availability on the outcomes of the individuals in the "extended group". The general picture that emerges from these tables is an absence of any substantial effect. Middle school availability did not increase the probability of remaining in school for more years and earning a matriculation or higher certificate, including an academic degree (Table 2A): The probability of studying in an academic track in high school increased by approximately 2.5 percentage points (statistically significant at approximately 11 percent), which corresponds to a 6 percent increase. Middle school availability left no impact on the probability of employment at age 40 or employment in a high-ranking occupation. It did lead to a 3.6 percent decline in annual wages—which was no longer significant in the estimations for siblings (not shown)—and did not affect standardized per capita household income (Table 2B).

Concerning the effects of middle school availability on marriage and childbirth patterns (Table 2C), middle school availability did not affect women's probability of marriage, age of marriage, number of children, or degree of religiosity (Part A, Table 2C). Men's probability of marriage before the age of 50 increased by 1.3 percentage points (approximately 1.5 percent) and the number of their children increased by less than 0.1(Part B, Table 2C). It was conceivable to expect that the middle school reform would increase the proportion of inter-ethnic marriages because middle schools are more ethnically heterogeneous and therefore increased the probability of inter-ethnic social interactions, which might lead to marriage in some cases (see Section 7.2 below). Nonetheless, the estimations show that middle school availability did not increase the probability of inter-ethnic marriage (Table 2C).

The correlations between the control variables and selected outcomes are in the expected direction (not shown): Women, individuals of European-American origin, Israeli-born individuals, and individuals whose parents are educated and have a small number of children acquired more education and also integrated more successfully in the labor market. In general, individuals' background characteristics were not strongly correlated with marriage or childbirth patterns or with the degree of religiosity for men or women. (For correlations between all control variables and outcomes, see Tables A-4A and A-4B in Zussman et al., 2022).

The estimations for the "limited group" (which includes only places in which middle schools were established in the period under investigation), and the estimations for siblings only, were performed separately for small urban localities (up to 20,000 residents in 1970) and large urban localities, and the results were very similar to those presented above for the "extended group" (not shown).

Effects on individuals' offspring

The availability of middle school for individuals at the age of grade 7 did not affect their children's track in high school or achievements on matriculation exams (not shown). These findings should not surprise us, as the establishment of middle schools did not have any substantial impact on their parents' outcomes.

Table 2A
Effect of Middle School Availability on Educational Attainment[1]

	Number of years in school[2]	12 years in school[2]	Attended an academic high school[2]	Earned a matriculation certificate or higher[3]	Earned an academic degree[3]	Years of schooling[3]
At age:	18+	18+	15+	18+	25+	25+
Estimate	0.016	-0.001	0.025	-0.004	-0.002	-0.027
	(0.045)	(0.015)	(0.015)	(0.007)	(0.007)	(0.040)
observations	11,201	11,201	13,774	73,117	73,117	71,407
Adjusted R^2	0.227	0.249	0.205	0.206	0.188	0.219
Mean	11.478	0.769	0.372	0.489	0.306	13.062

Source: Central Bureau of Statistics, Ministry of Education and Culture, and authors' calculations.

*, **, *** statistically significant at the 10%, 5%, and 1% level, respectively.

Standard deviations are clustered by place of residence at the age of grade 7 and presented in parentheses.

(1) The estimated value of β_1 in Eq. (3).

(2) Based on the 1995 Census.

(3) According to the Education Registry.

Table 2B
Effect of Middle School Availability on Employment, Wages, and Household Income[1]

	Employed[2]	High-ranking occupation[3]	Gross annual wages (log)[4]	Household income percentile[5]
At age:	40	+30	40	+30
Estimate	0.004	0.006	-0.036*	0.608
	(0.007)	(0.013)	(0.019)	(1.191)
observations	77,119	17,849	50,964	9,922
Adjusted R^2	0.065	0.180	0.178	0.208
Mean	0.699	0.360	11.078	52.692

Source: Central Bureau of Statistics, Ministry of Education and Culture, and authors' calculations.

*, **, *** statistically significant at the 10%, 5%, and 1% level, respectively.

Standard deviations are clustered by place of residence at the age of grade 7 and presented in parentheses.

(1) The estimated value of β_1 in Eq. (3).

(2) Employment of at least one month as a salaried employee or had income from self-employment.

(3) High-ranking occupations (based on the Standard Classification of Occupations 1994): academic professionals (0), associate professionals and technicians (1), managers (2). Occupation on the dates of the 1995 and 2008 censuses.

(4) Salaried employees with positive wages only.

(5) Percentile of standardized per capita household income from all sources on the dates of the 1995 and 2008 Censuses. The percentile was calculated separately for individuals in the five-year intervals from 30–34 to 50–54.

Table 2C
Effect of Middle School Availability on Marriage Patterns, Childbirth, and Religosity[1]

A. Women

	Ever married	Age of first marriage	Inter-ethnic marriage[2]	Number of children	Religious or Haredi[3]
At age:	50	50	50	50	
Estimate	-0.003	-0.009	0.001	0.004	0.000
	(0.007)	(0.128)	(0.005)	(0.038)	(0.012)
observations	36,050	29,129	32,712	36,539	36,539
Adjusted R^2	0.046	0.090	0.088	0.098	0.117
Mean	0.909	24.067	0.082	2.824	0.135

B. Men

	Ever married	Age of first marriage	Inter-ethnic marriage[2]	Number of children	Religious or Haredi[3]
At age:	50	50	50	50	
Estimate	0.013*	0.150	-0.006	0.067*	0.016
	(0.008)	(0.124)	(0.005)	(0.038)	(0.011)
observations	36,949	29,884	32,713	37,789	37,789
Adjusted R^2	0.043	0.073	0.086	0.078	0.107
Mean	0.887	27.550	0.081	2.718	0.141

Source: Central Bureau of Statistics, Ministry of Education and Culture, and authors' calculations.
*, **, *** Statistically significant at the 10%, 5%, and 1% level, respectively.
Standard deviations are clustered by place of residence at the age of grade 7 and presented in parentheses.
(1) The estimated value of β_1 in Eq. (3).
(2) First marriage of individuals of Asian-African origin with individuals of European-American origin. Asian-African origin: the individual or their mother or father was born in Asia-Africa (excluding South Africa and Rhodesia). European-American origin: the individual or their mother or father was born in Europe-America (including South Africa, Rhodesia, and Oceania region).
(3) In 2017.

6.2 Heterogeneity Tests

We assessed the heterogeneity effects of middle school establishment on outcome by gender, origin (Asian-African vs. European-American[35]), and mother's education (up to 8 years of schooling, which was the median, vs. over 8 years). We performed separate estimations of Eq. (3) for each group (e.g., separately for men and women), and also performed a joint estimation that included both groups in each pair, to calculate the difference in middle school availability's effects across groups—which is measured by the three-way interaction term Group × (Post × Treatment)$_{lt}$—and its statistical significance.[36]

Table A-4A presents the results of these estimations. In general, in some cases, middle school availability had a very small positive effect on employment, wages, and demographics (but not on education) for men, individuals of European-American origin, and individuals whose mothers had relatively high educational attainment, while the effect in other groups was in some cases negative: For example, pupils whose mothers had low educational attainment showed a significant decline in annual wages and in the probability of being employed in a high-ranking occupation. Table A-4B examines the heterogeneity of middle schools' effect in each group of origin by mother's years of schooling. The picture that emerges is generally similar to that described above: In each origin group, pupils with educated mothers benefited from the reform, especially in terms of employment and wage, more than did pupils with less educated mothers.

6.3 The Implementation Process

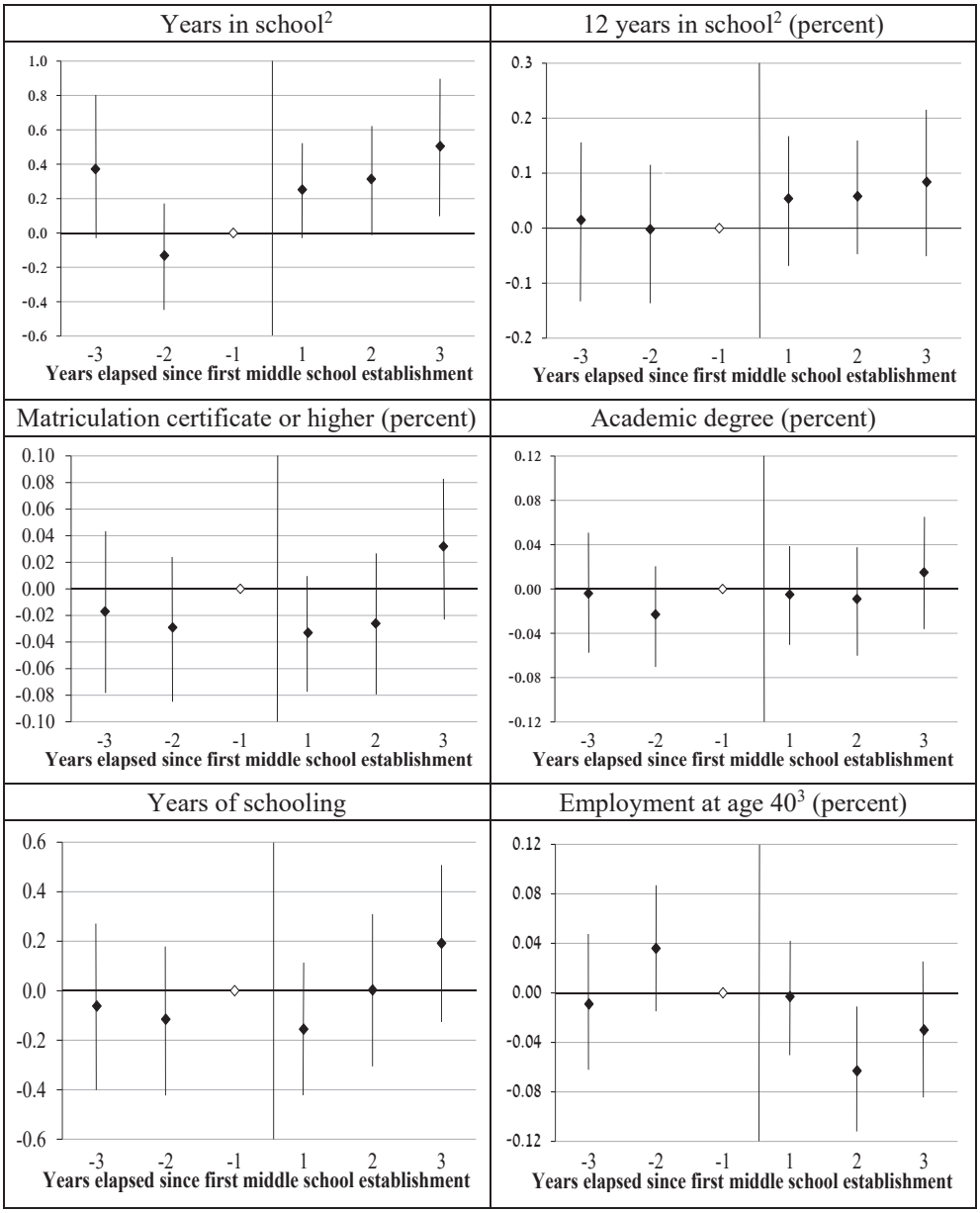
The broad scope of the middle school reform was unprecedented. The reform required recruitment of teachers, construction of schools, pedagogical changes, and other actions. Thus, time was required for the reform to be fully assimilated in the middle schools themselves. We, therefore, performed estimations that omitted the individuals in grade 7 during the first year of middle school in a place. Findings show that this omission had no significant impact on the estimated results presented in Tables 2A through 2C above (not shown).

Additional estimations were performed to examine the effect of middle school availability as a function of the number of years elapsed since their opening. We added to Eq. (3) dummy variables for each of the three years before and after the year in which the middle school opened, and their interactions with $Treatment_{lt}$ (the interaction with the year preceding the year of opening was omitted), which replaced the interaction term $Post \times Treatment_{lt}$. Figure 3 shows that in the period after the middle schools opened, the estimated outcomes show no difference compared to the preceding period, and the estimated values are almost always non-significant.

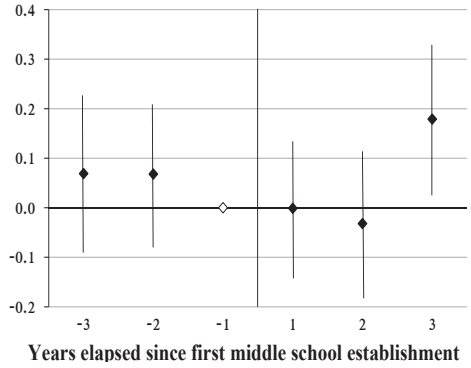
[35] Longstanding residents in Israel accounted for a mere 4 percent (see Appendix, Table A-2).

[36] The estimations also included interactions of each group with all the control variables.

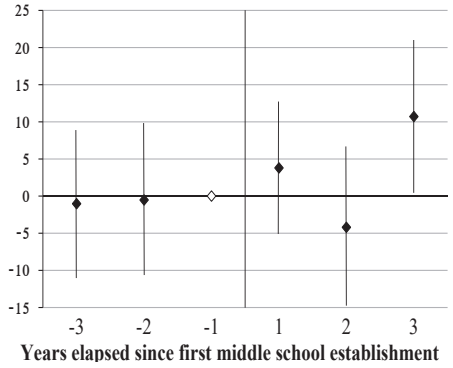
Figure 3
Effect of Middle School Availability on Selected Outcomes as a Function of Years Elapsed Since the Opening of the First Middle School in the Place of Residence[1]



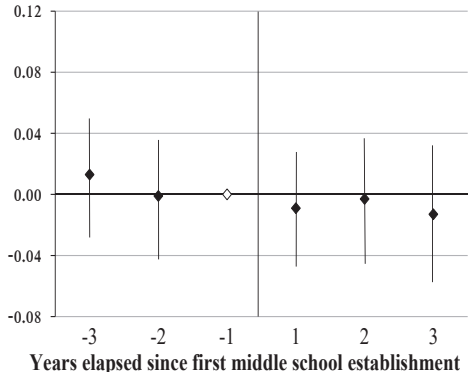
(log) Gross annual salary at age 40[4]



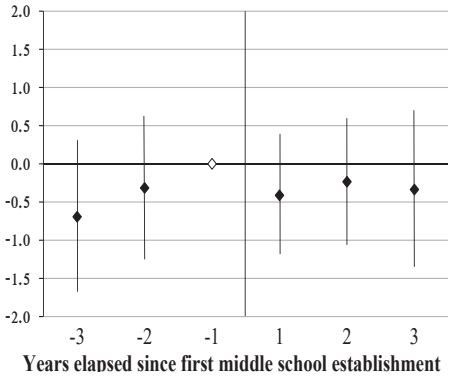
Percentile of standardized per capita household income[5]



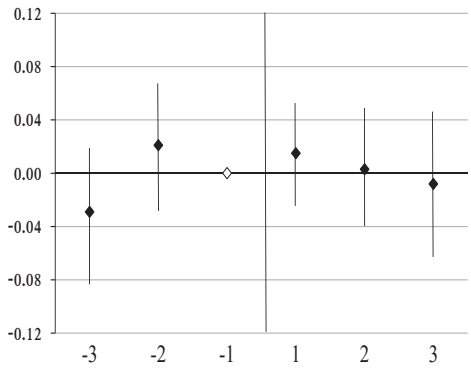
Women ever married (percent)



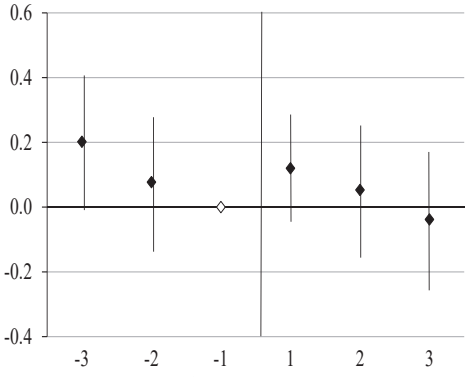
Age of women's first marriage (years)



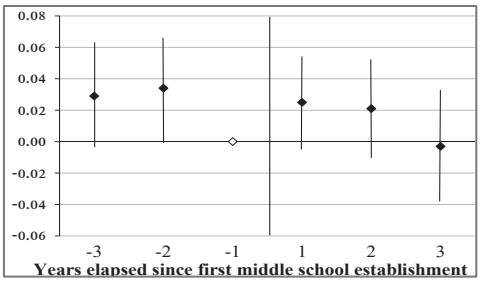
First marriage for women is inter-ethnic[6] (percent)



Number of children at age 50 for women



Religious or ultra-Orthodox (percent)



Source: Central Bureau of Statistics, Ministry of Education and Culture, and authors' calculations.

Vertical lines represent a 95 percent confidence interval.

(1) Treatment group – places of residence in which the first middle school opened between the 1969/70 and the 1979/80 school year.

Comparison group – places of residence in the treatment group in which the first middle school was opened at a relatively late date or in which no middle school was opened in the period under investigation.

Based on Eq. (3), and also includes dummy variables for each of the three years preceding and following the opening of the first middle school in the place of residence, and their interaction terms with Treatment_{lt} (excluding the interaction term for the year prior to the opening of the middle school), which replaced $Post \times Treatment_{lt}$. The fictitious opening year of the middle school in the comparison group was selected using the "nearest neighbor" approach (Section 5.2 above). "Neighbors" did not include those with a difference of fewer than 3 years between the actual year of opening of the middle school in the comparison group and the year in the treatment group (to ensure that the period following the fictitious opening year of the middle school in the comparison group does not include part of the period following the actual year of opening).

(2) Based on the 1995 Census.

(3) Employment of at least one month as a salaried employee and/or had income from self-employment.

(4) Salaried employees with a positive salary only.

(5) Percentile of standardized per capita household income from all sources on the 1995 and 2008 Censuses (individuals over age 30). Percentile was calculated separately for 5-year age groups from 30–34 to 50–54.

(6) Marriage of an individual of Asian-African origin to an individual of European-American origin. Individuals of Asian-African origin: the individual or their father or mother was born in Asia-Africa (Africa does not include South Africa or Rhodesia). Individuals of European-American origin: the individual is not of Asian-African origin and the individual or their mother or father was born in Europe-America (including South Africa, Rhodesia, and Oceania region).

7. ROBUSTNESS TESTS AND MECHANISM

To address potential biases in the foregoing estimations, we conducted four robustness tests. The first test addressed the definition of middle school availability, the second addressed a possible bias in the estimated values stemming from the gradual rollout of middle schools where the treatment effect is potentially heterogeneous by cohort, and the third included placebo tests in which the year of the opening of the first middle school was fictitiously advanced or delayed by three years. In the fourth test we omitted the dummy variables of compulsory education in grades 9 and 10 in the pupil's place of residence at those ages, due to the concern that these variables may be correlated with middle school availability in the place of residence at the age of grade 7.

According to its proponents, the main mechanisms through which the middle school reform would have a positive effect on pupils, and specifically on pupils from a weak background, were increased integration in grades 9 and 10 between pupils from different backgrounds—which we examine below—and deferral of the tracking age from grade 8 to grade 9. Both mechanisms were designed to help pupils from weak backgrounds enter high school, reduce drop-out rates, and create opportunities for them to study in prestigious study tracks. It is, possible, however, that the reform's effects may be attributed to additional coincidental factors, such as an increase in classroom size and in the number of pupils per grade and per school, pedagogical changes, and pupils' transition to upper-secondary education. In the absence of data, we are unable to empirically examine these factors, but we describe the changes that occurred in them.

7.1 Robustness Tests[37]

Pupil records are not available for the period under investigation, and information on the middle school education districts is available only for the four major cities. We, therefore, defined middle school availability in the Hebrew education system for Jewish pupils at the age of grade 7 as follows (see Section 4.1 above): At the beginning of 1970, the individual resided in a small urban locality that had more than 160 pupils in grade 7 in the Hebrew education system (this number is equivalent to four classes in the State stream in a typical locality), fewer than 20,000 residents, and a middle school in the individual's education stream; or the individual resided in a larger locality (excluding the four major cities) with such a middle school at a distance of up to 3 km from the individual's place of residence (the statistical area centroid); or the individual resided in one of the four major cities in the middle school registration area of the individual's education stream. Therefore, the following two robustness tests were performed: (a) a small urban locality was defined as a locality with more than 200 pupils in grade 7 in the Hebrew education system in early 1970 (equivalent to

[37] Results are available from the authors.

5 classes) and fewer than 25,000 residents,[38] (b) middle school availability in a large urban locality (excluding the four major cities) was defined as residence at a distance of up to 2 km from the middle school, instead of 3 km.

The estimates of middle school availability when small urban localities are defined as having fewer than 25,000 residents (instead of fewer than 20,000) are similar to the estimates shown above. This is also the case when middle school availability is defined using the distance of 2 km instead of 3 km.

Staggered DiD estimates, where treatment occurs in different periods, for example, due to the gradual rollout of the middle school reform, may be subject to bias (Chaisemartin and D'Haultfoeuille, 2002 and 2023; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021) because the treatment effect may be heterogeneous, as a function of the number of years elapsed since the treatment commenced (or the years elapsed between treated units). Therefore, we also performed estimations that correct for such potential bias.[39] The results are similar to those presented in Tables 2A–2C and Figure 3.

Unobserved differential changes, independent of the reform itself, may have occurred during the period under investigation in places in which middle schools were opened and in other places (for example, the introduction of other interventions in the education system, changes in the municipal school administration or the socioeconomic situation in the locality). Such changes may have affected the outcomes. We, therefore, performed placebo tests by fictitiously advancing or deferring by three years the opening of the first middle school in each place, and we included in our estimations only the three years before and the three years after the fictitious opening year to ensure that the period before/after the fictitious opening year will not overlap the period before/after the actual opening date. The placebo tests show that the estimated effects of middle school availability on various outcomes (those presented in Tables 2A–2C) are not statistically significant.

Finally, the omission of the dummy variables for compulsory education in grades 9 and 10 in the individual's place of residence at these ages had no substantial effect on the size or statistical significance of the estimates of middle school availability. This result is consistent with the very low correlation between the years in which compulsory education was instituted in a place of residence and the opening year of the first middle school in that place of residence (see footnote 12 above).

[38] As a result, the number of localities that met the definition of a small locality increased from 26 to 34, and the number of pupils in grade 7 who resided in small localities in 1970 increased from 18,000 to 33,200.

[39] The correction was made using the csdid package in Stata.

7.2 Mechanisms

The composition of pupils in middle schools compared to elementary schools

One of the declared main goals of the middle school reform was to increase integration by having pupils from a weak background—who typically attended a neighborhood elementary school with pupils of a similar background—move to a heterogeneous regional middle school in grade 7, where they would study with pupils from a strong background,[40] and where peer effects would improve their scholastic achievements while adverse effects on the pupils from a strong background were expected to be small, if any. Effects of heterogeneity on achievements depend on the direction and size of the peer effects on weak and strong pupils.

An examination of the differential effects of middle schools on scholastic achievements by middle school heterogeneity is problematic because no information on the composition of pupils in each middle school is available. As a substitute, we might calculate the heterogeneity of pupils in each middle school registration area (school district), although this information is available only for the four major cities.

Computing the heterogeneity level is not problematic in small urban localities where the middle school presumably serves all the pupils in the locality who belong to that education stream, or in the four major cities for which we have information on middle school registration areas. In the case of large urban localities (that are not one of the four major cities), a school district was defined as follows: For the statistical area (centroid) in which the individual resides, we identified the closest middle school, and if the middle school is less than 3 km from the place of residence and belongs to the pupil's education stream, it is defined as available. All the statistical areas for which that middle school was defined as available were associated with the pupil's school district.

Because our focus is on identifying the effect of the change in pupil composition resulting from the transition to middle school compared to continued schooling in an 8-year elementary school, and given that elementary schools are typically neighborhood schools, we calculated for Jewish children at the age of grade 7 the differences between the share of Jewish pupils of Asian-African origin, or average mothers' years of schooling, in their middle school district, and the corresponding values in the statistical area of residence (Δ_l). We then estimated Eq. (3), to which we added the interaction term $Post \times Treatment_{lt} \times \Delta_l$.

The results of these estimations (not shown)[41] indicate that the difference in the share of pupils of Asian-African origin or average mothers' years of schooling, between the middle school's presumed school district and the place of residence made little contribution to the

[40] Chen et al. (1978) shows that when the proportion of Mizrahi pupils in a middle school was moderate (rather than low or high), middle school classrooms were, as expected, more heterogeneous both in terms of pupils' ethnicity and their cognitive aptitudes.

[41] Shown in Table A-7 in Zussman et al. (2022).

effect of middle school availability on outcomes variables, either for pupils of Asian-African origin or for pupils of European-American origin.

Changes in classroom size and number of pupils per grade and school

Our examination indicates that in the first half of the 1970s, middle school classroom size was higher than in corresponding elementary school classrooms (2–3 more pupils per classroom) due to the difficulties in recruiting teachers and the shortage of classrooms during the reform implementation period, but these disparities in density were subsequently almost eliminated. The number of pupils per middle school increased considerably after incorporating grades 8 and 9 and increasing grade size, but the number of pupils per middle school later stabilized at a slightly lower level compared to elementary schools. In the period under investigation, middle school grade size was almost twice the size of elementary school grade size.

Studies in Israel yielded inconsistent results regarding the effects of classroom size on scholastic achievements. Angrist and Lavy (1999) found that pupils' test scores in Hebrew and Math in less dense fourth and fifth-grade classrooms in 1992[42] were much higher than in denser classrooms, especially for pupils from a weak socioeconomic background. The same method did not, however, show any effect of classroom size on pupils' test score on the Meitzav exam (administered in grade 5) in the years 2002–2011 (Angrist et al., 2019). Shafrir et al. (2017) similarly found that classroom density in eighth grade made no contribution to Meitzav exam test scores in 2009.

Small schools may lead to higher scholastic achievements as a result of improved monitoring (and prevention of anti-social behavior), increased familiarity, personal relations, sense of belonging, and collaboration between pupils and teachers and among pupils. In contrast, large schools may benefit from economies of scale (e.g., specialization of teachers and, of course, economic efficiencies). Studies that show a causal relationship between school size and scholastic achievements are few and their findings are mixed (Humlum and Smith, 2015; de Haan et al., 2016; Beuchert et al., 2018) and there is a broad consensus that large schools increase absenteeism, violence, and attrition, and reduce parental involvement.

Pedagogical changes

The middle school reform was accompanied by changes in school arrangements, teacher training programs, and curricula for grades 7–9.

School arrangements

To address pupil heterogeneity at the middle school level, middle schools implemented three arrangements that reduce heterogeneity: (a) ability grouping (up to three levels) in

[42] A reduction in classroom size from 30 to 20 would increase test scores by approximately 1/3 standard deviation.

Math, English, and Language in grade 7 and ability grouping in additional subjects in higher grades;[43] (b) establishment of classes for struggling pupils – homeroom classes with a small number of pupils; (c) transfer of pupils with special needs to special education settings (special classes in ordinary middle schools[44] or special education schools). The studies reviewed in Section 3.1 found a negative correlation between academic segregation and the scholastic achievements of pupils from a weak background.

Concerning pupil-teacher relationships, teachers' specialization in middle school (see below) led to a decline in the number of hours that homeroom teachers teach their homeroom classes, which may reduce pupils' ties with their homeroom teachers. However, specialization is beneficial when it fits the scholastic and emotional needs of middle school pupils, who are all in adolescence. Nonetheless, the transition to middle schools impedes teachers' efforts to monitor their pupils' achievements over multiple years, and multiannual curricula are less harmonized due to the need for coordination between elementary schools and middle schools.

Teacher training

During the middle school reform, there was an intention to raise teachers' required qualifications so that many teachers would be university graduates rather than graduates of teacher training colleges. Indeed, 44 percent of middle school teachers had an academic degree compared to 25 percent of teachers of grades 7 and 8 in elementary schools (Chen et al., 1978).[45] However, middle school teachers were much less experienced (33 percent had up to 5 years of experience compared to 22 percent in elementary schools), which was the result of the large number of new teachers who joined the system, most of whom were university graduates. Early global literature did not unequivocally indicate that teachers' education and experience contribute to their pupils' scholastic achievements (for a review see Hanushek, 2003), but more recent studies show that teaching experience of fewer than five years adversely affects achievements (Burgess, 2015).

[43] In effect, there were typically ability groups in three subjects in grade 7, which accounted for approximately 1/3 of the total classroom hours in all subjects. In grade 9, ability groups were maintained in 5 of 6 subjects, accounting for approximately 2/3 of the total classroom hours (Chen et al., 1978).

[44] Special classes are similar to remedial classes but have fewer pupils (14 vs. 20). They have their own curricula and the teachers completed special training. Slightly over one-tenth of all pupils were assigned to a special or remedial class (Chen et al., 1978).

[45] No prominent differences were found between the proportion of middle school teachers with an academic degree by the proportion of Mizrahi pupils in the middle school, other than a lower/higher proportion of Mizrahi pupils in middle schools where the proportion of teachers with an academic degree was very low/high.

Curricula

The establishment of middle schools was accompanied by the development of new curricula and textbooks, but their effect on pupils' achievements is not conclusive (Chen et al., 1978). In any case, teacher's academization and the introduction of new curricula also took place in other schools that were not included in the reform.

Transition to high school (upper-secondary) and continuity of social ties

An education system that includes middle schools comprises three rather than two education levels. Each transition from one school to another is challenging. Steinberg (2020) summarized the literature on this topic, which indicates that the transition from one school to another in adolescence has a negative effect on self-image and learning motivation, causes behavioral disorders and a decline in scholastic achievements (at least in the short-term), especially for pupils from a weak background. Other studies found a decline in pupils' scholastic achievements when the transition is involuntary, especially in the transition year (Hanushek et al., 2004; Grigg, 2012; Schwartz et al., 2017). Research shows that the specific grade in which the transition occurs plays a significant role in these effects. For example, Schwartz et al. (2011) showed that a transition to middle school at a relatively older age (grade 6 or 7) negatively affects scholastic achievements more strongly compared to transitions at a younger age (grade 5).

The middle school reform also deferred the transition to high school from grade 8 to grade 9, allowing pupils to make a more considered decision regarding their choice of high school study track. The deferred transition was also intended to reduce tracking to specific programs. Studies show that if tracking does occur, it should occur at a relatively older age (e.g., Hanushek and Woessmann, 2006). While a high proportion of middle school pupils transitioned to grade 10 with many of their classmates, also because they transitioned to the high school adjacent to their middle school, only a small proportion of 8-year elementary school pupils transitioned to grade 9 with many of their elementary school classmates, and this is especially true of pupils in "weaker" elementary schools[46] (Chen et al., 1978). For example, 58 percent of pupils in grade 10 studied with more than 10 of their former middle school classmates compared to 41 percent of pupils in grade 9 who entered secondary school after an 8-year elementary school. Studies show that transitioning with a larger number of friends improves scholastic achievements and behavior (for the Israeli case, see Lavy and Sand, 2019).

[46] Schools whose pupils have low scholastic achievements and a high proportion of pupils of Asian-African origin.

8. SUMMARY AND DISCUSSION

Historical events occasionally create a unique opportunity to study subjects that continue to capture public interest for many years. This paper examined the short- and long-term effects of a large-scale reform in the structure of educational levels in the school system in Israel: the establishment of middle schools for pupils in grades 7–9 (replacing 8-year elementary schools and 4-year secondary schools that begin in grade 9).

The reform, which was for the main part implemented in the 1970s, had two goals: (a) to expand and deepen integration through encounters between pupils from weak and strong socioeconomic backgrounds, specifically between Ashkenazi and Mizrahi Jews, and (b) to improve education standards by focusing on a homogeneous age group, elevating teachers' skills, and introducing new curricula. Reform proponents hoped that by doing so, the reform would increase the scholastic and social opportunities available to pupils from weak backgrounds, increase their chances of entering high school, studying in prestigious study tracks, and graduating with success, and ultimately increase their socioeconomic mobility. The concurrent expansion of compulsory education from grade 8 to grades 9 and 10 was designed, in part, to support the achievement of these goals.

The nationwide rollout of middle schools in the 1970s—which occurred gradually over time and geographic area—facilitates an examination of the reform's effects on pupils' demographic and socioeconomic characteristics in their youth and adulthood, and on the scholastic achievements of their offspring. The databases used in this study are based on censuses conducted in 1972 and afterward and on diverse administrative data including publications on the distribution of schools (including middle schools) in the 1970s. The study included approximately 86,000 Jewish pupils who reached the age of grade 7 in a school year between 1966/67 and 1981/82 and who resided in urban localities, and their family members.

The study shows that the establishment of middle schools did not have a discernable impact on the socioeconomic mobility of pupils who had access to a middle school in the first decade of the reform's implementation, and specifically on the following outcomes: acquisition of education, integration in the labor market, patterns of marriage and childbirth, and degree of religiosity. An exception is the negative effect on employment and wages of pupils whose Mizrahi mothers had limited education. No intergenerational effects were found on the scholastic achievements of the pupils' offspring. Moreover, the change in integration (in terms of ethnic group or mothers' education) due to the transition from elementary schools to middle schools played a very small role, if any, in the effects of middle school availability on the examined outcomes.

To the best of our knowledge, the only two studies that examined the effects of studying in a middle school compared to an 8-year elementary school and addressed selection bias issues—Hong et al. (2019) regarding a district in the US, and Holmlund and Böhldmark (2019) regarding Sweden—found no effect on scholastic achievements or acquisition of academic education, and no studies examined other outcomes.

The main mechanism of the reform intended to improve the scholastic achievements of pupils from a weak socioeconomic background, most of whom were of Mizrahi origin, was to create encounters in middle school with pupils from a strong background – in contrast to neighborhood elementary schools that had a homogeneous population. Although integration in middle schools did increase, at the same time middle schools instituted segregation in the form of ability groups in core subjects and separate classes for struggling pupils. This practice may explain the reform's lack of effect, especially on pupils whose mothers' education was below the median. Studies from the US that examined the effects of desegregation in various stages in schools found strong positive short- and long-term effects on Black pupils on a range of outcomes (Guryan, 2004; Ashenfelter et al., 2006; Reber, 2010; Johnson, 2011; Reardon and Owens, 2014; Bergman, 2018; Tuttle, 2019; Antman and Cortes, 2023). A possible explanation for the differences in findings is the considerable increase in integration in the US, which was also accompanied by a significant increase in budgets that benefited Black pupils.

The current study is limited in its ability to shed light on the current role of middle schools and their contribution to integration, due to the significant changes that occurred in the education system, society, and the economy in Israel since the 1970s. Moreover, the establishment of middle schools was accompanied by additional changes, including a temporary increase in classroom size, an upgrade to teachers' educational requirements, and pedagogical changes, whose effect cannot be isolated from the effects of the reform alone in the absence of additional data. Furthermore, due to the incomplete information available on middle school registration areas, our results may underestimate the effects of the reform. Finally, the attribution of pupils to an educational stream (State or State-Religious) is not certain, and may affect the definition of middle school availability.

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APPENDICES

Table A-1
Sources of the Data on Background Characteristics and Outcomes

	1972 census	1983 census	1995 census	2008 census	Population Registry[1] (1995, 2000–2019)	Other
Individual background characteristics						
Date of birth (year and month)	V	V			V	
Gender	V	V			V	
Country of birth	V	V			V	
Year of immigration	V	V			V	
Mother's marital status when individual was 12 years old	V	V			V	
Number of siblings (maternal)	V	V			V	
Mother's primary spoken language	V	V				
Mother's years of schooling	V	V				
Father's years of schooling	V	V				
Household income from all sources	V	V				
Housing density	V	V				
Homeownership	V	V				
Place of residence (locality and statistical area)	V	V	V	V		
Individual's outcomes						
Age (born 1957–1969):	3–18	14–29	26–41	39–54	50–65	
Years in school (at age 18 and over)			V			
12 years in school (at age 18 and over)			V			
Academic high school (at age 15 and over)			V			
Matriculation certificate or higher (at age 18 and over)						Education Registry[2]
Academic degree (at age 25 and over)						Education Registry[2]
Years of schooling (at age 25 and over)						Education Registry[2]

Employment and gross annual wages (at age 40)						Salaried Employees Datasets (1983 and thereafter) and Self-Employed Datasets (1999 and thereafter)
High-ranking occupation (age 30 and over)			V	V		
Percentile of standardized per capita household income from all sources (at age 30 and over)			V	V		
Ever married (at age 50)				V		
Age of first marriage (at age 50)				V		
First marriage is inter-ethnic (at age 50)				V		
Number of children (at age 50)				V		
Religious/Haredi						Religiosity Registry (2017)
Offspring's outcomes						
Educational stream in grade 1						Pupil Datasets (1995/96 school year and thereafter)
Attends school in grade 12						Pupil Datasets (1990/91 school year and thereafter)
Track in grade 12						
Matriculation results						Pupil Datasets (1991/92 school year and thereafter)

Source: Central Bureau of Statistics.

(1) No information is available before 1995.

(2) Censuses and administrative data (years of schooling in tertiary institutions and degrees): universities – 1980/81 school year and thereafter; academic colleges – 1995/96 school year and thereafter; teaching colleges – 1994/95 school year and thereafter.

Table A-2
Demographic and Socioeconomic Characteristics of the Research Population, by Middle School Availability at the Age of Grade 7, 1967 to 1982

	Middle school[1] available	Middle school unavailable	Difference	Standardized difference for age of grade 7[2] (SD)
Individuals (in 000s)	26,463	59,169		
Individuals (percent)	30.9	69.1		
Background variables				
Demographics				
Female (percent)	50.4	48.8	1.6*** (0.4)	0.2 (0.4)
New immigrants (percent)	12.8	17.5	-4.7*** (0.3)	0.6** (0.3)
Asian-African origin[3] (percent)	60.6	64.3	-3.7*** (0.4)	-4.1*** (0.4)
European-American origin[3] (percent)	31.9	33.0	-1.1*** (0.3)	1.4*** (0.4)
Mother married when the individual was 12 (percent)	94.2	93.1	1.1*** (0.2)	-0.2 (0.2)
Mother's age at first marriage (years)	21.1	21.1	0.0 (0.1)	0.1 (0.1)
Siblings (maternal, including the individual)	3.7	3.7	-0.1*** (0.0)	0.0 (0.0)
Education				
Mother's primary spoken language is Hebrew[4] (percent)	81.6	76.2	5.4*** (0.3)	-0.6* (0.4)
Mother's years of schooling[4]	9.2	7.8	1.4*** (0.0)	0.3*** (0.0)
Father's years of schooling[4]	10.2	9.3	0.8*** (0.0)	0.2*** (0.1)
Employment and living standard				
Father is employed[4,5] (percent)	84.9	84.6	0.3 (0.3)	0.0 (0.3)
Mother is employed[4,5] (percent)	38.6	28.7	9.9*** (0.4)	3.5*** (0.4)
Percentile of standardized per capita household income from all sources[6]	48.0	46.8	1.2*** (0.2)	1.4*** (0.3)

Individual outcomes				
Education				
Years in school[7]	11.6	11.4	0.2*** (0.0)	0.0 (0.0)
12 years in school[7] (percent)	83.4	74.2	9.2*** (0.8)	-0.4 (0.9)
Attended an academic high school[7] (percent)	41.1	35.6	5.6*** (0.9)	3.3*** (1.0)
Matriculation certificate or higher[8] (percent)	52.9	47.0	5.9*** (0.3)	2.2*** (0.4)
Academic degree[8] (percent)	34.0	28.2	5.8*** (0.3)	2.7*** (0.4)
Years of schooling[8]	13.2	13.0	0.3*** (0.0)	0.1*** (0.0)
Employment, occupation, wages, and household income				
Employed at age 40[9] (percent)	74.5	67.9	6.6*** (0.3)	0.1 (0.4)
High-ranking occupation[10] (percent)	37.4	35.4	2.0*** (0.7)	2.0** (0.8)
Percentile of gross annual wages at age 40[11]	56.5	49.4	7.1*** (0.3)	-0.2 (0.3)
Percentile of standardized per capita household income from all sources[12]	55.4	51.6	3.8*** (0.6)	0.4 (0.7)
Demographics				
Married at least once (percent)	89.2	90.0	-0.8*** (0.2)	0.2 (0.3)
Age of first marriage (years)	26.1	25.7	0.4*** (0.0)	0.1 (0.1)
Inter-ethnic marriage[13] (percent)	7.9	8.2	-0.3 (0.2)	-0.5** (0.3)
Number of children at age 50	2.7	2.8	0.0*** (0.0)	0.0* (0.0)
Religious[14] (percent)	9.6	9.4	0.1 (0.2)	0.3 (0.3)
Haredi[14] (percent)	4.3	4.4	0.0 (0.2)	0.1 (0.2)

Source: Ministry of Education and Culture, Central Bureau of Statistics, and authors' calculations.

*, **, *** statistically significant at 10%, 5%, 1%, respectively.

(1) Middle school availability – for the definition see Section 4.1. Similar results are obtained when availability is defined using a distance of up to 2 km (not shown).

(2) Based on the estimate of the dummy variable for middle school availability in estimation of the characteristic that appears in each row as a function of the dummy variable for availability and the dummy variable for the year at which the individual reached the age of grade 7.

(3) Asian-African origin: the individual or at least one parent was born in Asia-Africa (excluding South Africa and Rhodesia). European-American origin: the individual or at least one parent was born in Europe-America (including South Africa, Rhodesia, and Oceania region).

(4) On the date of the 1972 or 1983 census, the earlier of the two.

(5) Was employed at least six months (27 weeks) in the past 12 months.

(6) Percentile was calculated separately for the following age groups of the fathers (or mothers, in the absence of a father): 5-year intervals from 30–34 to 55–59, and 60 and over, separately for the 1972 census and the 1983 census.

(7) Based on the 1995 census. In the census, respondents complete the number of years of schooling at each school level.

(8) Based on the Education Registry of the Central Bureau of Statistics.

(9) Was employed for at least one month as a salaried employee or had income from self-employment.

(10) High-ranking occupations (based on the Standard Classification of Occupations 1994): academic professionals (0), associate professionals and technicians (1), managers (2). Occupation on the dates of the 1995 and 2008 censuses (individuals aged 30 or over).

(11) Percentile was calculated for salaried employees at the stated age in the salary year, separately for men and women.

(12) Percentile of standardized per capita household income from all sources on the 1995 and 2008 census (for individuals aged 30 and over). The percentile was calculated separately for the age group of the individual in 5-year intervals from 30–34 to 50–54.

(13) First marriage between an individual of Asian-African origin and an individual of European-American origin.

(14) The definition of religiosity is based on the Religiosity Registry of the Central Bureau of Statistics for 2017. Religious – religious or religious up to ultra-Orthodox; Haredi – ultra-Orthodox.

Table A-3
Correlates of First Middle School Establishment Year in the Place of Residence[1]

Explanatory variable[2]	Estimate
Asian-African origin[3] (percent)	3.451 (4.125)
Number of siblings	-1.022 (0.711)
Mother's years of schooling	0.180 (0.412)
Father's years of schooling	-0.251 (0.331)
Percentile of standardized per capita household income[4]	-0.009 (0.069)
Observations	124
Adjusted R^2	0.022

Source: Ministry of Education and Culture, Central Bureau of Statistics, and authors' calculations.

*, **, *** statistically significant at 10%, 5%, 1%, respectively.

Standard deviations are clustered by place of residence at the age of grade 7 and are shown in parentheses.

(1) The estimate of β_1 in Eq. (1). Estimations were calculated for pupils in the State education stream only.

(2) Mean background characteristics of pupils at the age of grade 7 who resided between 1967 and 1972 in a place in which a middle school was established in the period under investigation.

(3) Asian-African origin – the individual, or their father, or their mother is of Asian-African origin (South Africa and Rhodesia are not included in Africa).

(4) Percentile of standardized per capita household income from all sources, calculated separately for the following age groups of fathers (or mothers, in the absence of a father): 5-year intervals from 30–34 to 55–59, and 60 and over.

Table A-4A
Heterogeneity Effects of Middle School Availability on Outcomes, by Gender, Ethnic Origin, and Mother's Years of schooling[1]

Outcomes[2]	Gender			Ethnic Origin			Mother's years of schooling		
	Women	Men	Difference[3] ((2)-(1))	Asia-Africa	Europe-America	Difference[3] ((5)-(4))	Up to 8 years of schooling	More than 8 years of schooling	Difference[3] ((8)-(7))
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Education								
Years in school	-0.042	0.092	-0.134	0.021	0.055	-0.034	0.040	-0.012	0.053
	(0.053)	(0.079)	(0.094)	(0.069)	(0.063)	(0.104)	(0.078)	(0.047)	(0.093)
12 years in school	-0.010	0.005	-0.015	0.001	0.008	-0.007	0.001	-0.017	0.018
	(0.020)	(0.025)	(0.032)	(0.023)	(0.024)	(0.036)	(0.026)	(0.018)	(0.032)
Attended an academic high school	0.019	0.037	-0.017	0.017	0.009	0.008	0.025	0.021	0.003
	(0.025)	(0.023)	(0.035)	(0.019)	(0.033)	(0.041)	(0.021)	(0.025)	(0.033)
Matriculation certificate or higher	-0.009	0.001	-0.011	-0.009	0.013	-0.023	-0.008	-0.004	-0.004
	(0.011)	(0.009)	(0.014)	(0.009)	(0.011)	(0.015)	(0.010)	(0.009)	(0.013)
Academic degree	-0.004	0.000	-0.005	-0.010	0.000	-0.011	-0.007	0.002	-0.009
	(0.010)	(0.008)	(0.013)	(0.007)	(0.013)	(0.016)	(0.007)	(0.011)	(0.014)
Years of schooling	-0.106*	0.056	-0.162**	-0.070	0.056	-0.126	-0.032	-0.010	-0.022
	(0.056)	(0.055)	(0.078)	(0.048)	(0.075)	(0.093)	(0.052)	(0.063)	(0.083)
	Employment, Occupation, Wages, and Household Income								
Employed	0.000	0.011	-0.012	-0.005	0.015	-0.020	-0.018**	0.034***	-0.052***
	(0.010)	(0.010)	(0.013)	(0.009)	(0.014)	(0.016)	(0.009)	(0.011)	(0.013)
High-status occupation	-0.010	0.015	-0.025	-0.025	0.053*	-0.078**	-0.044**	0.054**	-0.098***
	(0.020)	(0.020)	(0.029)	(0.017)	(0.030)	(0.037)	(0.018)	(0.022)	(0.030)
Gross annual wages (log)	-0.068**	0.001	-0.069	-0.052**	-0.008	-0.044	-0.081***	-0.001	-0.080*
	(0.029)	(0.028)	(0.043)	(0.026)	(0.034)	(0.047)	(0.027)	(0.029)	(0.042)
Percentile of standardized per capita household income	0.948	1.227	-0.279	-1.945	5.508**	-7.453**	2.551	1.435	1.115
	(1.698)	(1.853)	(2.514)	(1.483)	(2.446)	(3.175)	(1.766)	(1.941)	(2.676)

	Demographics								
	Women								
Ever married				-0.010	0.013	-0.023	-0.021**	0.014	-0.035**
				(0.009)	(0.014)	(0.017)	(0.010)	(0.011)	(0.014)
Age of first marriage				0.017	0.114	-0.097	0.217	-0.231	0.448*
				(0.167)	(0.232)	(0.291)	(0.186)	(0.173)	(0.253)
Inter-ethnic marriage				-0.002	0.003	-0.005	0.002	0.006	-0.004
				(0.007)	(0.014)	(0.016)	(0.007)	(0.009)	(0.012)
Number of children				-0.065	0.051	-0.115	-0.056	0.053	-0.109
				(0.047)	(0.065)	(0.086)	(0.056)	(0.054)	(0.079)
Religious or Haredi				-0.018	-0.007	-0.010	-0.011	-0.012	0.001
				(0.015)	(0.016)	(0.022)	(0.017)	(0.013)	(0.020)
	Men								
Ever married				0.006	0.042***	-0.036**	0.008	0.030**	-0.022
				(0.009)	(0.014)	(0.018)	(0.009)	(0.013)	(0.016)
Age of first marriage				0.203	0.068	0.136	0.143	0.133	0.010
				(0.167)	(0.216)	(0.293)	(0.180)	(0.177)	(0.254)
Inter-ethnic marriage				-0.005	0.000	-0.005	-0.009	-0.001	-0.007
				(0.007)	(0.014)	(0.017)	(0.008)	(0.009)	(0.012)
Number of children				0.014	0.089	-0.075	0.030	0.120**	-0.090
				(0.049)	(0.071)	(0.096)	(0.050)	(0.057)	(0.076)
Religious or Haredi				0.007	-0.018	0.025	0.031*	-0.025**	0.056***
				(0.015)	(0.015)	(0.021)	(0.016)	(0.012)	(0.019)

Source: Ministry of Education and Culture, Central Bureau of Statistics, and authors' calculations.

*, **, *** statistically significant at 10%, 5%, 1%, respectively.

Standard deviations are clustered by place of residence at the age of grade 7 and are shown in parentheses.

(1) The estimate of β_1 in Eq. (3).

(2) See Table 2 for the definitions of the outcomes.

(3) Difference and standard deviation were calculated based on the estimate of middle school availability × group (e.g., women) in estimation that also included the interaction terms of all explanatory variables × group.

Table A-4B
Heterogeneity Effects of Middle School Availability on Outcomes, by Ethnic Origin and Mother's Years of schooling[1]

Outcomes[2]	**Asian-African origin**			**European-American origin**		
	Mother has up to 8 years of schooling	Mother has more than 8 years of schooling	Difference[3] ((2)-(1))	Mother has up to 8 years of schooling	Mother has more than 8 years of schooling	Difference[3] ((5)-(4))
	(1)	(2)	(3)	(4)	(5)	(6)
	Education					
Years in school	0.062	0.022	0.040		-0.001	
	(0.096)	(0.119)	(0.147)		(0.070)	
12 years in school	-0.004	0.020	-0.025		-0.008	
	(0.031)	(0.038)	(0.049)		(0.025)	
Attended an academic high school	0.026	-0.003	0.030		0.056	
	(0.022)	(0.047)	(0.052)		(0.044)	
Matriculation certificate or higher	-0.007	-0.028	0.021	0.008	0.013	-0.004
	(0.010)	(0.018)	(0.021)	(0.024)	(0.013)	(0.028)
Academic degree	-0.006	-0.028*	0.021	-0.002	0.006	-0.008
	(0.008)	(0.017)	(0.019)	(0.024)	(0.016)	(0.029)
Years of schooling	-0.024	-0.184*	0.160	-0.008	0.073	-0.081
	(0.056)	(0.104)	(0.121)	(0.137)	(0.090)	(0.162)
	Employment, Occupation, Wages, and Household Income					
Employed	-0.023**	0.038**	-0.060**	-0.017	0.033**	-0.050*
	(0.010)	(0.015)	(0.018)	(0.024)	(0.016)	(0.028)
High-status occupation	-0.057**	0.050	-0.106**	-0.014	0.077**	-0.091
	(0.020)	(0.036)	(0.042)	(0.061)	(0.037)	(0.070)
Gross annual salary (log)	-0.087**	0.013	-0.099**	-0.094	0.029	-0.123
	(0.031)	(0.045)	(0.057)	(0.066)	(0.043)	(0.077)
Percentile of standardized per capita household income	0.166	-5.100	5.266		3.883	
	(1.991)	(3.728)	(4.193)		(3.120)	

	Demographics					
	Women					
Ever married	-0.017*	0.011	-0.028	0.021	0.022	-0.001
	(0.010)	(0.017)	(0.020)	(0.028)	(0.016)	(0.032)
Age of first marriage	0.063	-0.364	0.427	-0.036	-0.064	0.028
	(0.202)	(0.281)	(0.359)	(0.468)	(0.263)	(0.537)
Inter-ethnic marriage	0.000	-0.005	0.005	0.001	0.007	-0.007
	(0.007)	(0.016)	(0.019)	(0.030)	(0.016)	(0.033)
Number of children	-0.080	0.048	-0.128	0.129	0.089	0.041
	(0.063)	(0.077)	(0.107)	(0.122)	(0.079)	(0.144)
Religious or Haredi	-0.009	0.007	-0.017	0.006	0.005	0.001
	(0.019)	(0.021)	(0.028)	(0.026)	(0.019)	(0.030)
	Men					
Ever married	0.004	0.021	-0.017	0.031	0.041**	-0.010
	(0.011)	(0.018)	(0.021)	(0.024)	(0.018)	(0.030)
Age of first marriage	0.225	0.447	-0.222	0.002	0.062	-0.060
	(0.207)	(0.289)	(0.364)	(0.447)	(0.262)	(0.519)
Inter-ethnic marriage	-0.013	-0.001	-0.013	0.000	0.003	-0.004
	(0.008)	(0.015)	(0.018)	(0.031)	(0.016)	(0.035)
Number of children	-0.001	0.090	-0.091	0.002	0.146*	-0.144
	(0.057)	(0.085)	(0.101)	(0.133)	(0.087)	(0.159)
Religious or Haredi	0.036**	-0.028	0.064***	0.015	-0.016	0.031
	(0.018)	(0.018)	(0.024)	(0.029)	(0.017)	(0.032)

Source: Ministry of Education and Culture, Central Bureau of Statistics, and authors' calculations.

*, **, *** statistically significant at 10%, 5%, 1%, respectively.

Standard deviations are clustered by place of residence at the age of grade 7 and are shown in parentheses.

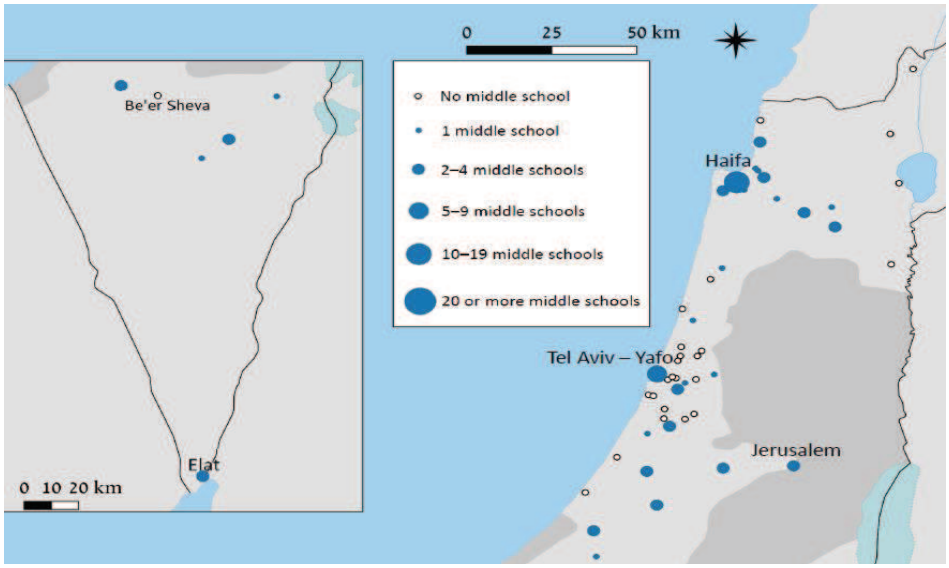
(1) The estimate of β_1 in Eq. (3). Estimates are not shown when the number of observations is less than 1,500. The number of observations for the estimates shown is much higher.

(2) For the definitions of the outcomes, see Table 2.

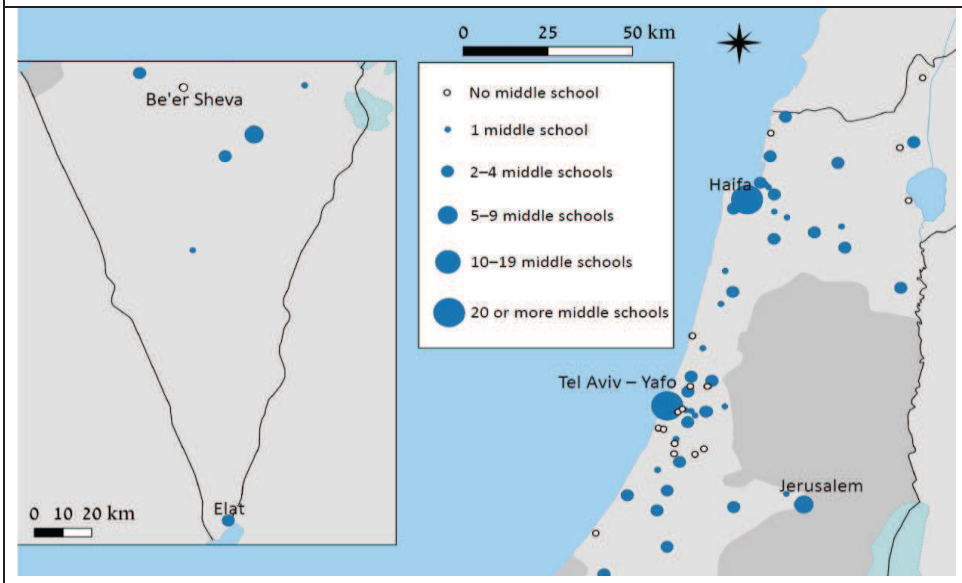
(3) Difference and standard deviation were calculated based on the estimate of middle school availability × group (e.g., women) in estimation that also included the interaction terms of all explanatory variables × group.

Figure A-1
Geographic Distribution of Middle Schools in the Hebrew Education System in Urban Localities:[1] 1972, 1977, and 1982

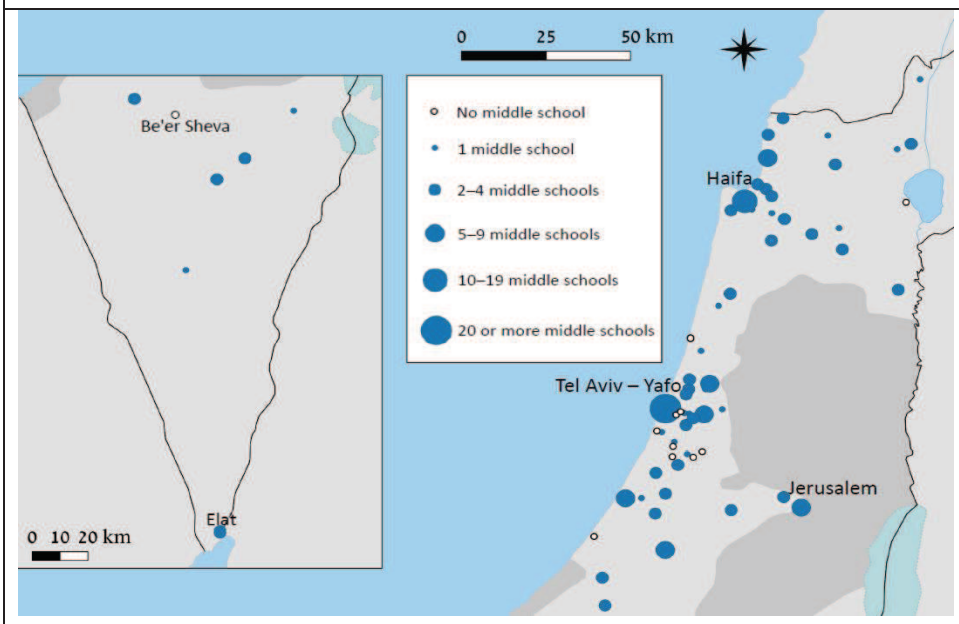
1972



1977



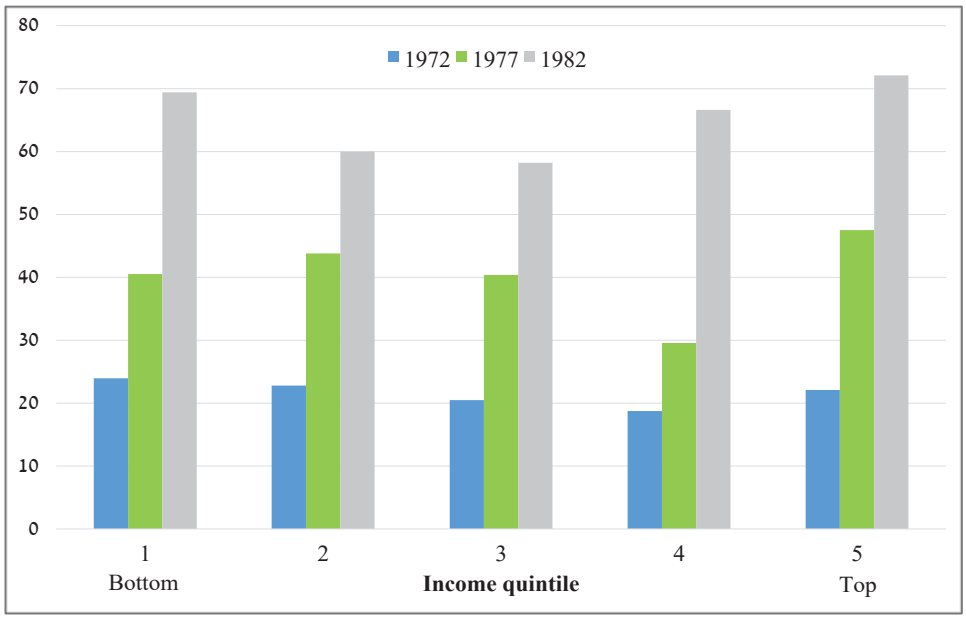
1982



Source: Ministry of Education and Culture and authors' calculations.

(1) Jewish and mixed urban localities at the beginning of 1970. No urban localities existed in Judea, Samaria, the Gaza Strip, or the Golan Heights, at that time.

Figure A-2
Share of Pupils in Grade 7 in the Hebrew Education System in Urban Localities[1] Who Have a Middle School in the Statistical Area of their Place of Residence, by Quintile of Standardized Per Capita Household Income in the Area:[2] 1972, 1977, and 1978 (percent)

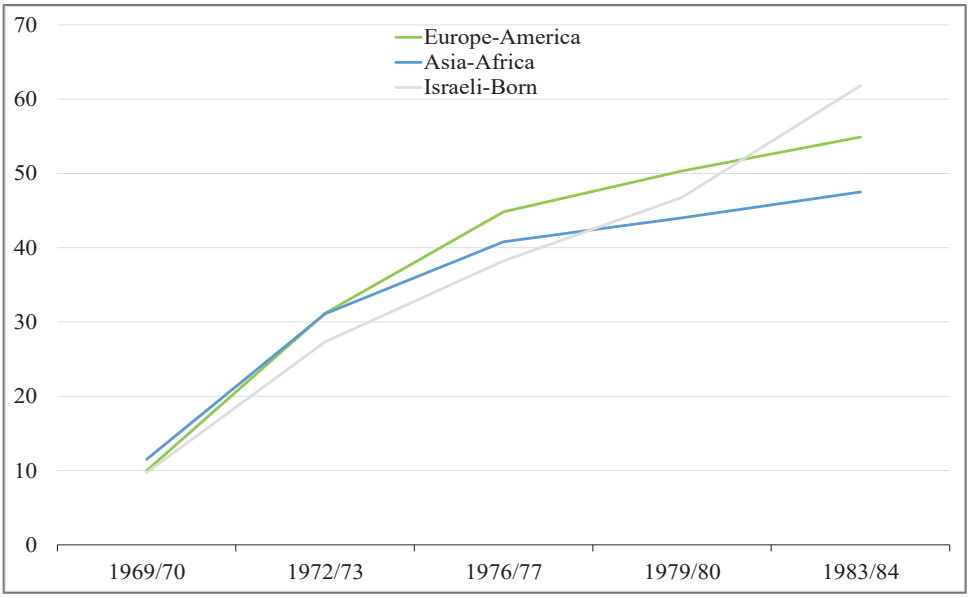


Source: Ministry of Education and Culture, 1972 Census (Central Bureau of Statistics), and authors' calculations.

(1) Jewish and mixed urban localities at the beginning of 1970.

(2) For each Jewish statistical area (that is, where the majority of pupils at the age of grade 7 are Jewish) in all urban Jewish and mixed localities, the mean standardized per capita household income was calculated from the 1972 census for Jewish families with children between the ages of grade 7 and grade 9, and these means were used to calculate the quintiles.

Figure A-3
Share of Pupils in Grade 7 in the Hebrew Education System Enrolled in Middle School, by Ethnic Origin[1], 1970–1984 (percent)



Source: Central Bureau of Statistics (various years) and authors' calculations.
(1) The origin of Israeli-born pupils is determined by the father's continent of birth.
(2) Data are available only for the years shown above.