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Staying in School Longer, Dropping Out Less:

Trends in the High School Dropout Phenomenon

Guy Yanay, Hadas Fuchs, and Nachum Blass

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Introduction

The current criterion for evaluating the education system in Israel (on the national, municipal, and even school level), and, in particular for evaluating the secondary school system, is the bagrut (matriculation) rate, whether as a percentage of the relevant age group (12th grade students) or of all those taking the exams. There is a general consensus that this is an important indicator, since successful attainment of the bagrut certificate is very difficult for large segments of the Israeli society and is the necessary qualification for continuing on to post-secondary and higher education and, thus, is a key to social mobility. However, the almost exclusive focus on the bagrut exams and certificate ignores another very important criterion — the dropout rate from the education system. One measure of the system's performance is its ability to ensure that every student able to do so will matriculate, while another is the determination and the success in ensuring that every student completes 12 years of schooling, no matter how difficult this may be.

This research focuses on a comparison of high school dropout rates between cohorts of students who completed high school between 2003 and 2017 (that is, those who started 10th grade between 2001 and 2015).[1] The analysis is based on the available dataset of students and schools from the Virtual Research Room of the Ministry of Education. This dataset identifies students registered for 10th grade for each class for each year and allows a

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1 We relate to the year of high school completion. For example, students in the 2017 cohort began 10th grade in 2015 and completed 12th grade in 2017.

comparison to those who do not appear in the registry as 12th grade students three years later.[2]

In this work, the discussion focuses on changes in dropout rates: for the system as a whole; differences in trends between the technological education system and the academic education system; between the Arab and Hebrew education systems; between genders; between schools with different scores on the Nurture Index; and between schools in different geographic districts.[3] The first part of the study focuses on the extent of the dropout phenomenon according to a number of variables, while the second is devoted to a statistical analysis of the decline in dropout rates among various population groups. The final section provides a summary and conclusions.

Dropping out of high school

The overall dropout rate in the system

The most important feature of the dropout rate is its decline from 9.9 percent in the 2003 cohort to 7.6 percent in the 2017 cohort (Figure 1). Although a decline of 2.3 percentage points may not at first glance appear to be that significant, it represents a 23 percent reduction in the phenomenon, which occurred primarily among the weakest students in the system. Also, since the 2012 cohort, the decline has been continuous: between 2006 and 2012, there were slight fluctuations, and in 2008, the dropout rate reached 10.1 percent, such that in practical terms the reduction since then has been

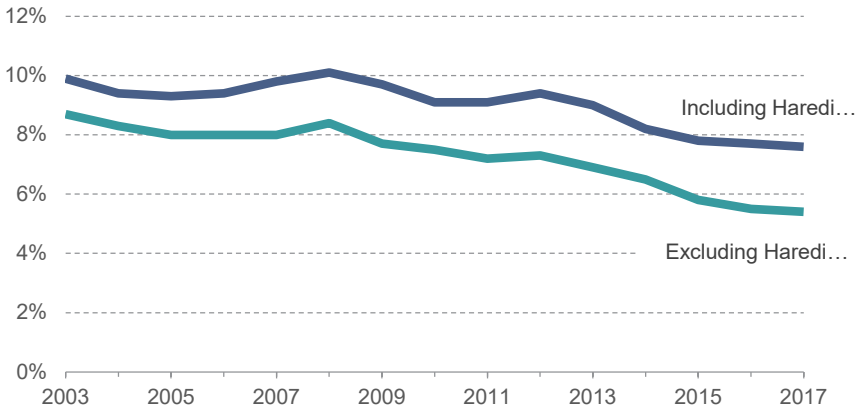
2 This is in order to also identify students who remained behind a year. It should be mentioned that among students that dropped out, there are also those who continued their studies in frameworks offered by the Ministry of Labor and Welfare or in Haredi institutions (*yeshivot ktanot*). The former is a relatively small group and the effect of the latter will be discussed.

3 The Hebrew and Arab education systems are based on the supervisory authority and language of instruction. The Hebrew education sector includes Hebrew State, State-religious, and Haredi schools. In the Hebrew education sector, we do not relate to the type of supervision, apart from the Haredi supervision, since differences between State schools and State-religious schools are not significant in the current context. The Arab education system includes Arab, Druze, Bedouin, and Circassian sectors; it is not differentiated by religion like the Hebrew education system, although there are Christian, Muslim, and Druze schools. For the sake of brevity and convenience, we will simply refer to the Arab education system in what follows.

The majority of students in Hebrew education can be assumed to be Jewish, and the majority of students in the Arab sector can be assumed to Arab Israelis. Nevertheless, the division by the Central Bureau of Statistics is based on the language of instruction and not the religion or sector of the students.

even greater. It is important to note that these data relate to all students who began 10th grade, including Haredi (ultra-Orthodox Jewish) students, although the data for Haredi boys are not very reliable. Thus, a significant share of those in the Ministry of Education database who appear as starting 10th grade but not continuing on to 11th or 12th grade did not, in fact, drop out but rather transferred to other educational frameworks that do not report to the Ministry of Education (see the Spotlight that follows).

Figure 1. Dropout rates over time



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass | Data: Ministry of Education

Due to the unreliability of the data on Haredi dropout versus transfer, this research focuses on non-Haredi schools, which, overall, show a more positive trend. Among these schools, the dropout rate for the 2003 cohort was 8.7 percent while for the 2017 cohort it was only 5.4 percent, a reduction of more one-third. As the rate of high school enrollment approaches 100 percent, each percentage point of reduction in the dropout rate becomes even more significant. Nonetheless, a dropout rate of 5.4 percent among students who started 10th grade is still quite high and further improvement is needed.

As mentioned, the dropout rate from Haredi schools is much higher than from other schools and the data on those schools is problematic. Therefore, the research will focus on the data for non-Haredi schools and the discussion of Haredi schools will be restricted to the following Spotlight.

Dropout rates from Haredi schools

Within the Haredi sector, there is a large gap in dropout rates between girls and boys. Dropout rates among Haredi girls are low and are similar to those among girls in the rest of the Hebrew education sector, while the dropout rate among Haredi boys is very high and has not shown a notable decline over time. Thus, the share of Haredi boys who do not make it to 12th grade was 35 percent in 2003 and 34 percent in 2017.

Although this dropout rate is exceptionally high relative to other sectors, dropouts from the Haredi sector — as opposed to the other sectors — are in part explained by their transfer to studies in higher yeshivas (*yeshivot gedolot*). The data do not track students who leave institutions under the supervision of the Ministry of Education and yeshivas are not under Ministry supervision. However, the data of the Central Bureau of Statistics (hereafter: CBS) include students attending higher yeshivas from among Haredi dropouts and they show that about one-half of them (i.e., about 17 percent of the Haredi male cohort) transfer to higher yeshivas under the supervision of the Ministry of Religious Services. It is unlikely that more than 15 percent of the students in Haredi education drop out of school and do not enter a higher yeshiva.[4] Although it is reasonable to assume that some of the students appearing as dropouts in fact attend non-recognized institutions (Horowitz, 2016), it is estimated that dropout rates in the Haredi sector are still relatively high (Weisblai, 2019). Further research is needed in order to gain a greater understanding of the Haredi educational trajectory after boys leave the supervised school system.

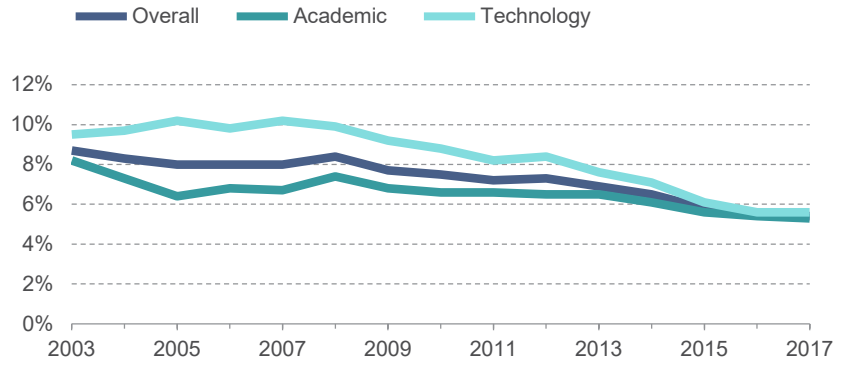
4 According to the CBS *Labor Force Survey*, the average years of schooling for Haredi men is relatively high. In other words, there is no indication that they drop out of all educational frameworks.

Dropout rates across educational tracks and within technological education

The picture with respect to dropout rates in the academic and technological school systems (Figure 2) is interesting.[5] It appears that while in the academic school system (not including Haredi schools) the dropout rate declined from 8.2 percent to 5.3 percent between 2003 and 2017, in the technological school system there was a much larger decline during that same period — from 9.5 percent in the 2003 cohort and a peak of 10.2 percent in the 2007 cohort to 5.6 percent in the 2017 cohort. The dropout rate in the technological school system has declined by almost one-half within a decade. These figures are also consistent with the success rates of students in the technological tracks, which are currently equal to those of students in the academic track (Fuchs, Yanay, & Blass, 2018). Thus, the dropout rates from technological education have now converged to those of academic education, namely at around 5.5 percent. This is a genuinely important development and the second part of this work focuses on some of the reasons for this. Technological education was in the past considered to be for weaker students; today, it is nearly equivalent to the academic track and is distinguished from it primarily in terms of meeting student preferences and is no longer viewed as restricting future opportunities and professional development.

Figure 2. Dropout rates from academic and technology education tracks

Excluding Haredi schools



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass | Data: Ministry of Education

5 The classification of students into educational tracks is according to their track in 10th grade.

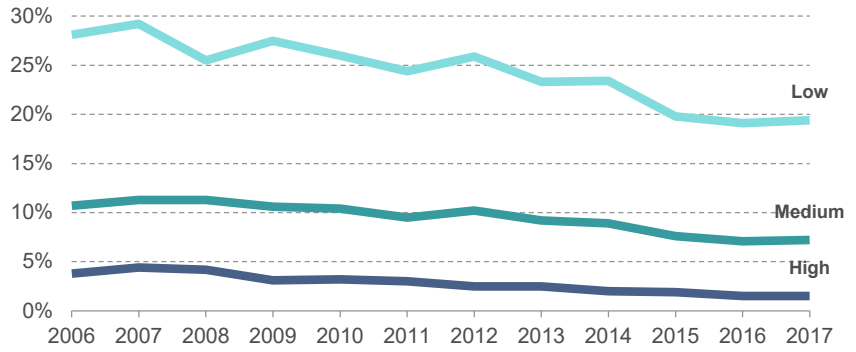
Technological education is divided into three tracks — high, medium, and low — as suggested and described by Fuchs, Yanay & Blass (2018). Just as these tracks are differentiated by their students' bagrut rates, they are also distinguished by their dropout rates. Figure 3 shows that the dropout rate among students in the high technology track has fallen from a peak of 4.4 percent in the 2006 cohort to only 1.5 percent in the 2017 cohort.[6] Essentially it is much lower than in academic track education (5.3 percent), even though this track has increased its share of the entire high school system from 10.5. percent in 2006 to 14.7 percent in 2017. This outcome emphasizes the characterization of the high technology track as one for high-achieving students. During this same period, there was also an impressive decline in dropout rates from the medium technology track —from 11 percent to 7 percent, which is two percentage points more than the dropout rate in academic education. The largest drop — and perhaps the most substantial — occurred among students in the low technology track which faces a challenge keeping its students in the system. While this track accounts for only 3 percent of the total students, its dropout rate fell from 28 percent to 19 percent.

The decline in dropout rates in technological education as a whole, and particularly in the high technology track, might have been explained by the change in the mix of its students, i.e., a shift of high-achieving students from academic education to high technology education. However, the fact that the decline in the dropout rate occurred in all the tracks simultaneously, as well as in academic education, indicates that this is a broader phenomenon.[7]

6 In contrast to other data which has been available since 2001 (relevant for the 2003 cohort), the division into technological tracks (high, medium, and low) has existed only since 2004 (which is relevant for the 2006 cohort) when the reform in technological education was carried out.

7 These data, though interesting and encouraging, also indicate that the division proposed by Fuchs, Yanay & Blass (2018) into high, medium, and low technology, which was unrelated to dropout rates, describes the differences between these tracks quite accurately.

Figure 3. Dropout rates by technology track level
Excluding Haredi schools



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

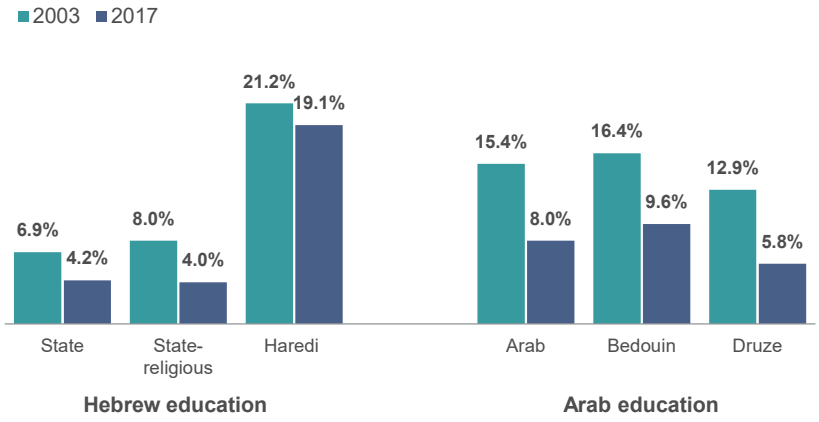
Dropout rates across sectors

As in past descriptions of academic achievements in the Arab education sector over the last decade (Blass, 2017; Fuchs, 2017; Fuchs, Yanay & Blass, 2018), the decline in the dropout rate among these students — both relatively and absolutely — is larger than the decline among students in the Hebrew education sector (Figure 4). While in the Hebrew sector[8] (without the Haredi schools) the dropout rate fell from 7.1 percent in 2003 to 4.2 percent in 2017, among the Arab-speaking population it fell from 15.3 percent to 8.1 percent during the same period. Within the Arab education system, the achievements of Druze students are especially notable and their dropout rate is very close to that of Hebrew education students (non-Haredi). In the Bedouin sector, the dropout rate has fallen from 16.4 percent to 9.6 percent. Although this rate is more than double that of the non-Haredi Jewish sector, it is important to take into account the background characteristics of the Bedouin students and the opportunities that the education system offers them.[9] Overall, the Hebrew education system in Israel is close to full attendance rates while in Arab education there is room for further improvement.

8 Students in the Hebrew education system, which includes a very small number of Arab-speaking students.

9 Nonetheless, it is possible that Bedouin students drop out before 10th grade, and thus, the dropout rate of those who do not reach 12th grade is even higher.

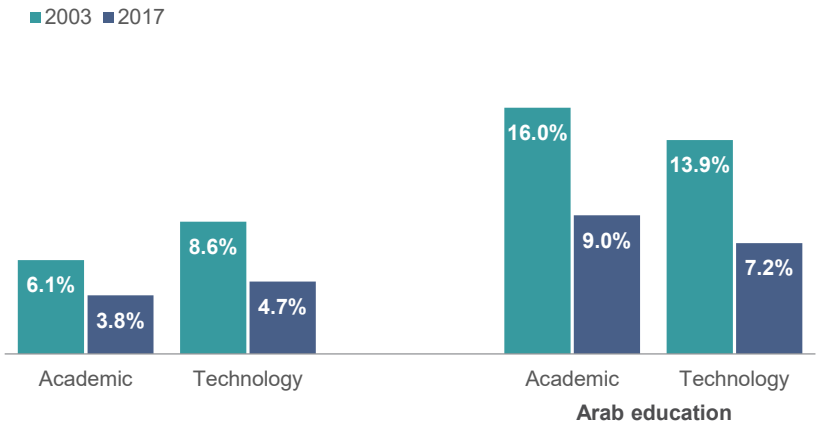
Figure 4. Dropout rates by education sector



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

An examination of the differences between the sectors in technological education and those in academic education reveals that students in Hebrew academic education drop out at consistently lower rates while there is the opposite trend in the Arab education sector; that is, Arab students in technological education drop out at lower rates (Figure 5). The dropout rate in Arab academic education is higher than in the Jewish sector and for the 2017 cohort it was double. Meanwhile, the overall gap between the Hebrew and Arab education dropout rates is, in contrast, much less (7.2 percent among Arabic-speakers vs 4.7 percent among Hebrew-speakers in the 2017 cohort).

Figure 5. Dropout rates by education sector and track
Excluding Haredi schools



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Although the decline in the dropout rate among students in the Arab education system and in technological education combined to produce the significant decline in the dropout rate in technological education in this sector, it can be seen that these trends did not occur simultaneously. The large decline in dropout rates in the Arab sector occurred in the early 2000s (from 15.3 percent for the 2003 cohort to 11.4 percent for the 2005 cohort), and in Arab academic education the dropout rate stabilized around the 11 percent level up until 2013. In contrast, the decline in the drop rate in technological education as a whole began only in 2009, and from 2003 to 2008 it ranged from 9.7 to 10.4 percent (see Appendix Figure 1). The second segment of the decline can be attributed, at least in part, to the reform in technological education. This reform — which began in 2004 and was completed in 2006 — increased flexibility in the technology tracks and opened them up to high-achieving students as well (Fuchs, Yanay & Blass, 2018).

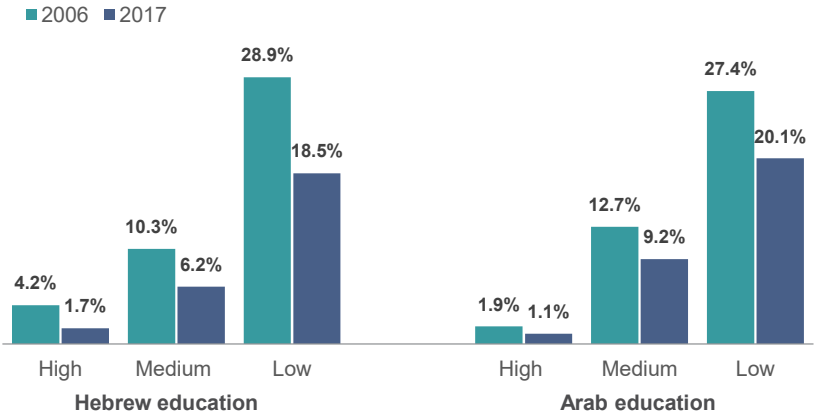
The main success achieved in technological education in Arab society occurred in the high technology track. In this track, the dropout rate in Arab education is particularly low for the 2017 cohort, at only about 1 percent (Figure 6). Furthermore, the high technology tracks are the only ones in which the dropout rate in Arab education is lower than that in Hebrew education. Some of these tracks have expanded significantly in the Arab education sector during the last 15 years (Fuchs, Yanay & Blass, 2018), and

this fact contributed to the overall decline in the dropout rate in the Arab education sector.

As will be shown, multivariate analyses of the dropout rates show that the most important factor in the decline in the Arab education sector is in fact the student's family background, rather than the shift between tracks. The effect of studying in the high technology track on the chances of dropping out are no different for a Hebrew and an Arab student, as a cursory examination might have indicated.

Figure 6. Dropout rates by education sector and technology track level

Excluding Haredi schools

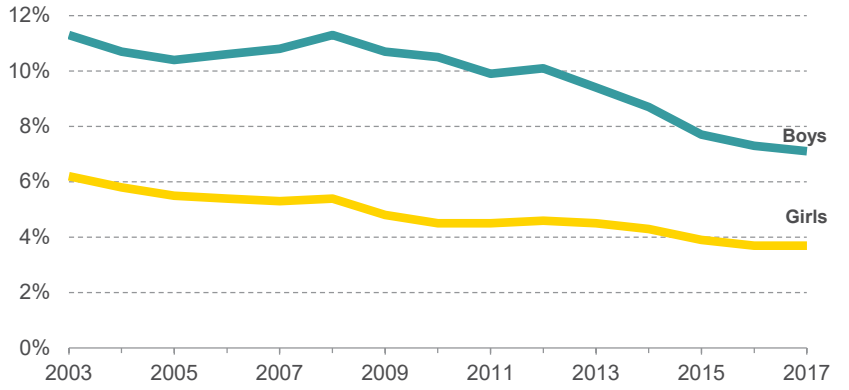


Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Dropout rates between boys and girls

Dropout rates differ substantially between the genders. As in the case of gaps in bagrut qualification rates, the dropout rate among girls is lower than among boys. Among boys, dropout rates fell from a peak of 11.3 percent in the 2003 and 2008 cohorts to 7.1 percent in the 2017 cohort. Among girls, there was a consistent decline during the entire period, which brought the dropout rate down from 6.2 percent in the 2003 cohort to 3.7 percent in the 2017 cohort. For both genders, the total decline is about 40 percent since the beginning of the 2000s (Figure 7).

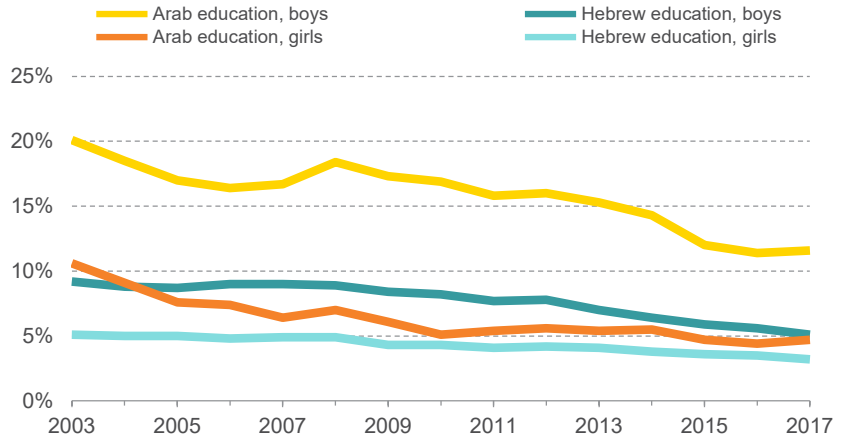
Figure 7. Dropout rates from the school system by gender
Excluding Haredim



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Dropout rates of boys and girls in the Hebrew education sector are respectively lower than those of boys and girls in the Arab education sector, although the gap between sectors is lower in the case of girls (Figure 8). The dropout rate for Arab girls in the 2017 cohort was 4.7 percent as compared to 3.2 percent among girls in the Hebrew sector. The dropout rate among Arabic-speaking boys remained high at 11.6 percent for the 2017 cohort (as compared to 5.1 percent among Hebrew-speaking boys). The difference between the genders is similar across the various groups in Arab education — Arabs, Druze, and Bedouin. Over the years, the differences in dropout rates between the genders has narrowed in both the Hebrew and Arab education systems.

Figure 8. Dropout rates by gender and education sector
Excluding Haredi schools



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Dropout rates across schools based on the school Nurture Index

Not surprisingly, the dropout rate in most cases rises with a school's Nurture Index (which is an indicator of low socioeconomic status) both in the Hebrew and Arab sectors.[10] What is surprising — although it is consistent with the findings for the success rate on the bagrut exams for Arabic-speaking students, which lag only a little behind those of students in the non-Haredi Hebrew education sector[11] — is that schools with similar Nurture Index rankings in the Hebrew and Arab education systems have different rates of high school completion.[12] Figure 9 and Appendix Table 1 present the dropout rates and average Nurture Index ranking according to quintiles (in other words, one-fifth of all schools in each sector) in the Hebrew and

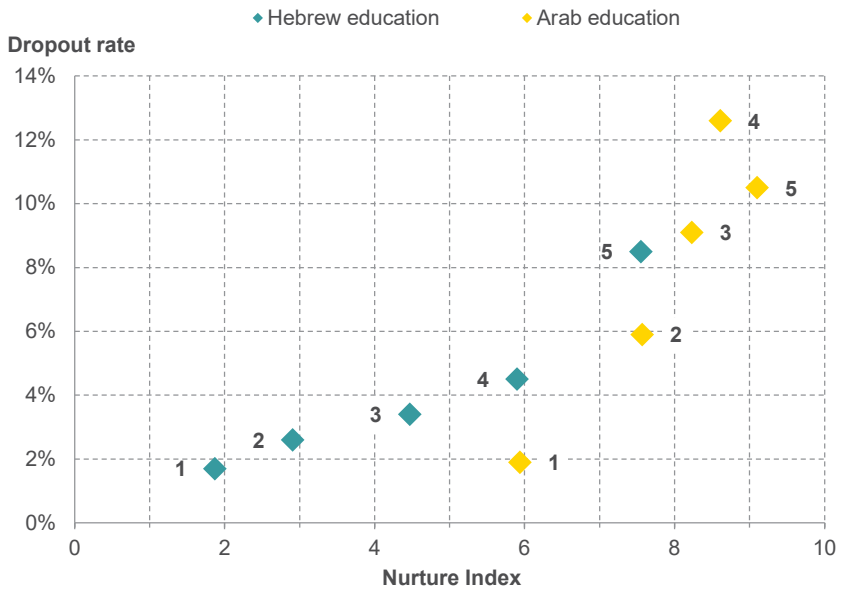
10 The Nurture Index recording system changed in 2008 and therefore the data are presented only for the 2008 and 2015 cohorts. The Nurture Index runs from 1 to 10, where 10 is the lowest socioeconomic ranking and 1 is the highest.

11 See Blass, 2017; Fuchs, 2017; Fuchs, Yanay & Blass, 2018; and also Appendix Table 1.

12 It is worth mentioning that the Nurture Index is calculated for each student and on the basis of this calculation the Nurture Index of the school is calculated; however, the data that were available for this research only included the school Nurture Index.

Arab education sectors for the 2017 cohort. The quintiles were calculated separately for the Hebrew and Arab education systems. The average Nurture Index according to quintile in Arabic-speaking schools is lower than that for the quintiles in Hebrew-speaking schools, which is an indication that Arabic-speaking students are characterized by a lower socioeconomic status. At the same time, and somewhat more unexpectedly, it appears that when comparing schools with similar Nurture Index rankings, the dropout rates in Arab schools are lower than in State and State-religious schools, as can be seen in Figure 9.

Figure 9. Dropout rates by education sector and school Nurture Index, 2017 cohort



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Thus, for example, the dropout rate for students in the 20 percent of the Arab schools characterized by the lowest Nurture Index, i.e., 5.9 on average (which corresponds to a stronger socioeconomic status), is only 1.9 percent. In contrast, the dropout rate is 4.5 percent among students in Hebrew schools with a similar average Nurture Index, i.e., those in the fourth

quintile of the Hebrew non-Haredi sector. In the second quintile of the Arab student population and the corresponding quintile of the Nurture Index in the Hebrew system (the lowest quintile), the dropout rates are 7.6 percent in Arab education and 8.5 percent in Hebrew education. This finding points to the fact that Arabic-speaking secondary schools with a Nurture Index similar to Hebrew-speaking schools have a greater ability to keep their students in school.

There is also a noteworthy decline, from about 15 to 10 percent, in dropout rates since 2010 in Arabic-speaking schools with the lowest socioeconomic status. This improvement is also expressed in the increase in bagrut rates — from 31 percent in 2008 to 40 percent in 2017 (see Appendix Tables 1 and 2).

Dropout rates across geographic districts

Dropout rates in the Hebrew education sector according to geographic district clearly show that, as in the case of the analysis according to the other variables, rates have fallen during the study period (Appendix Table 3).[13] Furthermore, dropping out, in general, is low in all the geographic districts and in 2017 ranged from 3 percent to no more than 5 percent.

In the Arab education system, there are large differences in dropout rates across geographic districts, and in all of them, except Haifa, they are higher than in the Hebrew sector (the dropout rate in Hebrew schools in Haifa is 4.9 percent as compared to 4.2 percent in the Arab schools). In Tel Aviv-Yafo, the dropout rate in Arab schools has not declined and has even risen somewhat over the years, although this involves only a small number of students (less than 300). About 17 percent of Arab high school students in the Tel Aviv district drop out of school. It is worth mentioning that these data do not relate to Arab Israeli students who attend Hebrew schools.

A multivariate analysis presented in this study will show the contribution of socioeconomic variables to the differences across geographic districts. After controlling for these variables, the remaining differences in dropout rates across districts are very small, including in the Arab sector (except in the Tel Aviv district).

Dropping out among immigrants

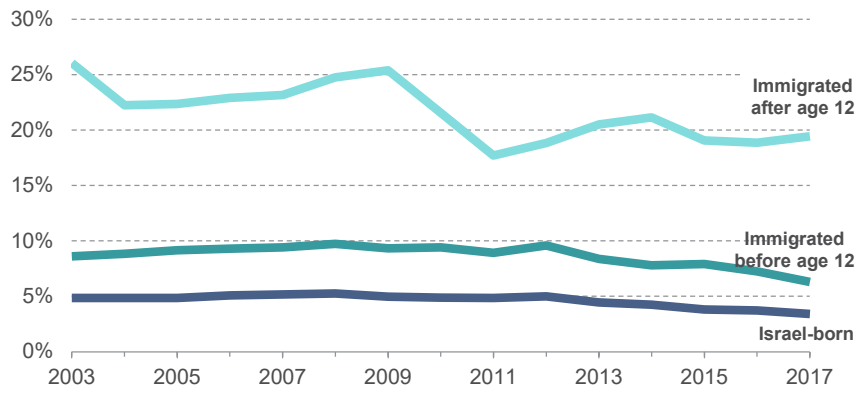
Despite the decline in their share in the student population, immigrants still constitute about 9 percent of the relevant cohorts in the Hebrew State and State-religious schools. The dropout rate among immigrants is high and stood at 9.2 percent in the 2017 cohort, which is more than 2.5 times

13 The school districts correspond to the Ministry of Education districts.

that of Israel-born students in Hebrew schools (whose dropout rate was 3.4 percent). Focusing on immigrants who arrived after the age of 12 (who it is assumed did not attend primary school in Israel), this rate rises several fold and, despite the downward trend, stood at 19.4 percent in the 2017 cohort. A high dropout rate among immigrants who arrived at a late age is not a new phenomenon and has been described in many places, including in the Central Bureau of Statistics annual abstracts, publications of the Knesset Information and Research Center (Appel, 2000), publications of the Taub Center (Sever, 2002) and a study by Cohen-Goldner & Epstein (2014). This phenomenon is also observed in other countries (Corak, 2011; Beck, Corak & Tienda, 2012).

The dropout rate for immigrants who arrived at a young age has been characterized by a downward trend in recent years (from 9.7 percent in the 2008 cohort to 6.3 percent in the 2017 cohort); however, the high dropout rate among immigrants who arrived at a late age is an enduring trait of the immigrant population and has been near the 20 percent level since the 2011 cohort (Figure 10). Nonetheless, the number of immigrants arriving at high school age is declining and stood at only 1,150 in the 2017 cohort as compared to 3,751 in the 2003 cohort, so that, the absolute number of dropouts is quite small.

Figure 10. Dropout rates by immigration status



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Although the data show a particularly high dropout rate among immigrant students who arrived after the age of 12, it should be kept in mind that the Ministry of Education database does not include data from the Population Registry. It may be that these high dropout rates are the result of a return to the country of origin or a move to a different country altogether and, therefore, the data should be treated with caution. In addition, the immigrant population database, and particularly data for immigrants arriving at an older age, is subject to information and reporting deficiencies. For example, there is no data on parents' level of education and date of arrival for many of the immigrants.[14] Nonetheless, the findings are presented here, since this is an issue that deserves attention and is in need of further study.

As mentioned, one of the main potential reasons for a high dropout rate among students who arrived after the age of 12 is their leaving Israel at some point after immigration: in 2017, the Ministry of Immigration and Absorption estimated that about 17 percent of immigrants leave Israel.[15] However, even if the immigrants are dropping out because they return to their country of origin or move to a different country, it is still important to determine whether there is reverse causation, namely whether returning to their country of origin or migration to a different country is influenced by difficulties in acclimatization experienced by the immigrants during adolescence. Another possible factor might be disappointment or difficulties with the education system and a preference for other educational frameworks in Israel (Haisraeli, 2019).

Although this phenomenon is well-known and despite the gravity of the problem, there seems to be little research into the reasons for it, and policy proposals to deal with it. Therefore, a more thorough examination of the issue is needed, which — in addition to an analysis of administrative data — will be based on interviews with officials responsible for the integration of immigrants in Israel in general and within the education system in particular, with teachers who have experience in working with immigrant students and with the students and their parents. Following such a study, it will be possible to carry out an in-depth analysis of the integration policy of immigrant students in secondary education.

14 Another issue to be considered in the context of immigrants who arrived at an older age is the identification variable that is used for tracking the student. Upon arrival, many immigrants register according to their passport number and the shift to the identity number makes it difficult to track them over the years. In this study, we overcame the problem by using internal data of the Ministry of Education which made it possible to match passport number to identity number. We wish to thank Eliad Tepler from the Research Room for his support in this effort.

15 See the Knesset press release on June 7, 2017 https://tinyurl.comy4m3kl6p

2. Multivariate analysis

The previous section presented a theoretical analysis of dropout rates based on selected cross-sections of the student population. A regression analysis was conducted to estimate the power of the relationship between dropping out according to these cross-sections while controlling for cross-effects.

The regressions were run separately for the Arab and Hebrew education systems for the 2006 to 2017 cohorts. For each student, the following variables were included in the regression: gender, track (academic/high, medium or low technology), school district (the reference district is the Center), socioeconomic status with a proxy of parents' years of schooling and number of siblings, immigrant status (for Jewish students), school supervisory authority (for Hebrew schools), and a cohort fixed effect. Due to the complexity of the Arab education system in the Jerusalem district, it was omitted from the analysis. Additional regressions were run that supported statistically significant differences between the Hebrew and Arab student populations in all of the variables. For the sake of simplicity, the results for the two sectors are presented separately in Appendix Table 4. Columns (1) and (2) present coefficients of linear regressions for the two sectors while Columns (3) and (4) present the marginal impacts obtained from logistic regressions. The directions of the results are identical in both.

Most of the results are consistent with the theoretical analysis in both the direction and the statistical significance of the coefficients. The dropout rate among girls is lower than the rate for boys (a difference of 3 percentage points among Hebrew students and 7 percentage points among Arab students); immigrants drop out at a rate of about 5 to 5.5 percentage points more than native-born students; and students from a low socioeconomic background drop out more than those from a high socioeconomic background, where each additional year of parents' schooling is associated with a decrease of 0.5 percentage points in the dropout rate (1.1 percent for Arabs). In high technology education, the dropout rate is lower than in academic education, such that the gap is 2 percentage points in the Hebrew system and 4 or 6 percentage points in Arab education. In the medium and low technology tracks, the gap is higher (2 to 3 percentage points in the medium technology track and 10 to 15 percentage points in the low technology track).

With respect to geographic district, the analysis of dropout rates in State and State-religious schools shows that a significant share of the differences between districts is due to factors that are not purely geographic. Thus, it appears that the emphasis in public discourse on the geographical periphery

is overstated.[16] Controlling for the background variables of the students and their study track shows that in the Hebrew education sector there are only small differences in dropout rates across geographic districts. The lowest dropout rate when taking into account socioeconomic background is in the Center district. The differences across the various districts range from 0.5 percent to 1 percent and the highest dropout rate after taking account of other variables is in fact in the large cities, namely Jerusalem and Tel Aviv.

In the Arab education system, the analysis shows that, here, again, geographic factors are not the only ones that influence the dropout rate. Schools in the Center district (the reference group), are found to have the lowest relative dropout rates (as is the case of schools in the Hebrew education system). The gap between most of the districts with an Arab student population is somewhat higher, but is not greater than 2 percentage points. The Tel Aviv district is an outlier, such that even after taking into account socioeconomic factors the dropout rate is higher by about 8.5 percentage points than that in the Center district.

An Oaxaca decomposition was conducted for the education system as a whole in order to determine the extent to which the decline in the dropout rate in each sector is the result of changes in the composition of the population (changes that are the result of an improvement in the student's socioeconomic background, a change in the relative number of students in the different study tracks, etc.) as opposed to a change in the size of the estimators (the unexplained part). The decomposition compares between the 2006 and 2017 cohorts. The results are presented in Appendix Table 5.

The decomposition for the Hebrew education system shows that most of the decline in the dropout rate (73 percent) cannot be explained by changes in the composition of the students. In the Arab education system, about one-half of the decline is explained by changes in the composition of students. The most important factor in the decline in dropout rates in the Arab education system is the student's family background, as measured by parents' years of education and number of siblings. Of the 3.6 percentage point decline in dropout rates between the 2006 cohorts and the 2017 cohorts, only 1.4 percentage points are explained by the change in the composition of the observed variables. Of this effect, changes in family background are responsible for 1.2 percentage points while changes in the relative sizes of the tracks are responsible for only 0.4 percentage points. Gender and geographic district have negative effects.

16 See, for example, the session of the Knesset Science and Technology Committee on February 14, 2017, https://tinyurl.com/y2uxe2sp.

Summary

The public discourse on academic achievement in secondary schools usually focuses on bagrut rates, which in the best case currently is 60 percent of the age cohort.[17] Nonetheless, even today, about 8 percent of students in an age cohort drop out from their studies and do not complete 12th grade. This group is the focus of this study; most of its members come from weaker socioeconomic backgrounds. It is important to remember that part of this group is composed of Haredi boys who transfer to yeshiva in order to continue their religious education.

The data on dropping out can be viewed from two angles. The first is optimistic and emphasizes the large improvement in recent years. The second is more pessimistic and points to the continuing existence of the drop-out phenomenon and its concentration in certain population groups.

A positive development is the continuous decline in dropout rates in Hebrew non-Haredi schools — from 8.7 percent in 2003 to 5.4 percent in 2017. The highest dropout rates are among the weakest population groups and dropout rates are lower among girls in all the groups.

Another positive development is the long-term decline in dropout rates in the various tracks of the technological education system. This development is an indication that technological education has reached a more equal status relative to academic education with regard to the future opportunities that it provides to the students. Moreover, the high technology track may, in fact, provide even more future educational and employment opportunities and its contribution is particularly significant in the Arabic-speaking sector.

The third positive development is seen in the narrowing of gaps in the dropout rate between the Hebrew and the Arabic-speaking sector. Taking into account the school's socioeconomic background, the dropout rates in Arabic-speaking schools are lower — and sometimes considerably lower — than those in Hebrew-speaking schools. This can be viewed as a major achievement by the Arabic-speaking schools, which are successfully dealing with their student body which is drawn from weaker socioeconomic background.

A somewhat surprising finding is the lack of difference — or the existence of only a small gap — in dropout rates between geographic districts, at least in the Hebrew education sector. This finding is an indication that, if

17 For example, in 2016, about 90 percent of the age cohort attended 12th grade and about 63 percent of them matriculated. Therefore, 57 percent of the age cohort matriculated (CBS, 2018; Table 8.19). In this context, we would mention that about 6 percent of 12th grade students who did not matriculate did so at a later stage (ibid., Table 8.23).

socioeconomic factors are taken into account, the achievements in schools located in the geographic periphery are not lower than those of schools in the Center with respect to dropout rates.

It is, nonetheless, important to continue efforts to reduce dropout rates, particularly among boys in the Bedouin sector and among immigrants who arrived after the age of 12. To accomplish this, methods for locating dropouts from the system should be improved. Currently, locating these students is done by comparing student lists from year to year. It is important to locate these students throughout the year by cross-referencing the relevant age cohort lists from the population census bureau with student enrollment lists. It would also be useful to track Haredi students who drop out of frameworks; while many go on to higher yeshivas to continue their Torah studies, there is also the possibility that a significant number of boys drop out and that this issue is not dealt with.

In order to reduce dropout rates further, it would be desirable to improve the existing educational frameworks and to encourage initiatives for the development of innovative frameworks that can deal with dropouts. With respect to specific populations, such as immigrant students who arrive in Israel after the age of 12, consideration should be given to the development of designated frameworks that will operate in conjunction with youth institutions or with other types of institutions (such as mother-tongue cultural centers, immigrant *garins* (literally, a kernel — a small group of people) in the schools, boarding schools, or pre-military academies).

Finally, consideration should be given to the possibility of providing financial compensation on the school level, such as additional budget for each dropout who is returned to the system. This option should be implemented with caution since public policy literature presents numerous examples of unexpected and undesirable consequences resulting from this type of compensation. Nonetheless, financial compensation has considerable power, both on the individual and institutional level.

Indeed, even if the achievement of a decline in dropout rates is impressive, the words of Bialik are appropriate: **"There is still a long way to go, there are still a lot of wars to fight"** (*Rise up Wanderers in the Desert*, Haim Nahman Bialik).

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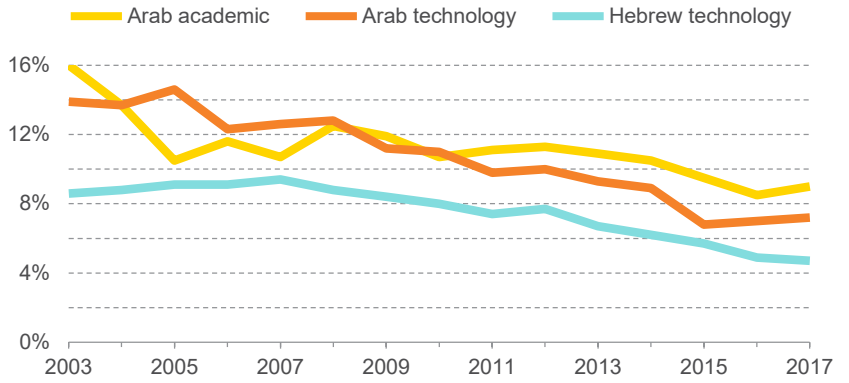
Appendix Figure 1. Trends in dropout rates in technological education and Arab education



Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Appendix Table 1. Characteristics of the Nurture Index quintiles, 2017 school year (Nurture Index from 2015)

Education sector	Quintile	Size	Maximum Index score	Minimum Index score	Mean Index score	Dropout rate	Bagrut rate
Hebrew	1	14,213	2.34	1.20	1.87	0.0172	0.8927
	2	14,294	3.67	2.34	2.91	0.0264	0.8595
	3	14,256	5.31	3.69	4.47	0.0335	0.7949
	4	14,363	6.44	5.36	5.90	0.0447	0.7377
	5	14,301	9.66	6.49	7.55	0.0852	0.6236
Arab	1	6,195	6.94	3.85	5.94	0.0189	0.6952
	2	6,265	8.00	6.94	7.57	0.0589	0.5982
	3	6,003	8.38	8.03	8.23	0.0915	0.4554
	4	6,367	8.83	8.39	8.61	0.1260	0.4176
	5	6,370	9.88	8.83	9.10	0.1052	0.4011

Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Appendix Table 2. Characteristics of the Nurture Index quintiles, 2010 school year (Nurture Index from 2008)

Education sector	Quintile	Size	Maximum Index score	Minimum Index score	Mean Index score	Dropout rate	Bagrut rate
Hebrew	1	13,840	2.45	1.00	1.97	0.0264	0.8147
	2	14,428	3.85	2.46	3.14	0.059	0.7470
	3	14,120	5.60	3.86	4.75	0.0568	0.6330
	4	14,132	7.11	5.61	6.32	0.0838	0.5294
	5	14,334	9.78	7.11	8.05	0.1091	0.4981
Arab	1	5,103	7.12	3.37	5.95	0.0302	0.5503
	2	5,078	7,80	7.16	7.56	0.0731	0.3974
	3	4,856	8.17	7.82	7.98	0.1503	0.3066
	4	5,549	8.77	8.22	8.42	0.1303	0.3269
	5	4,207	9.83	8.78	9.25	0.1590	0.3105

Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Appendix Table 3. Dropout rates by geographic districts

	Hebrew education, excluding Haredi schools		Arab education	
	2003	2017	2003	2017
Jerusalem	6.70%	4.00%		
North	8.30%	5.00%	13.40%	5.40%
Haifa	7.60%	4.90%	9.90%	4.20%
Center	6.20%	3.40%	11.80%	4.00%
Tel Aviv	6.90%	4.40%	16.80%	17.10%
South	8.00%	4.90%	15.40%	10.80%
Judea/Samaria	7.60%	3.20%		

Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center | Data: Ministry of Education

Appendix Table 4. Regression results, school dropouts, 2006-2017

	Dependent variable			
	Linear estimators		Logistic marginal effects	
	Jews	Arab Israelis	Jews	Arab Israelis
Sex	-0.033***	-0.072***	-0.032***	-0.073***
	(-0.001)	(-0.001)	(-0.001)	(-0.001)
High tech	-0.022***	-0.037***	-0.024***	-0.061***
	(-0.001)	(-0.001)	(-0.001)	(-0.001)
Low tech	0.153***	0.142***	0.126***	0.095
	(-0.004)	(-0.004)	(-0.004)	(-0.003)
Medium tech	0.032***	0.020***	0.028***	0.019***
	(-0.001)	(-0.001)	(-0.001)	(-0.001)
District				
Jerusalem	0.011***		0.015***	
	(-0.001)		(-0.001)	
North	0.004***	0.020***	0.006***	0.023***
	(-0.001)	(-0.001)	(-0.001)	(-0.002)
Haifa	0.006***	0.025***	0.007***	0.033***
	(-0.001)	(-0.001)	(-0.001)	(-0.003)
Tel Aviv	0.012***	0.084***	0.014***	0.099***
	(-0.001)	(-0.001)	(-0.001)	(-0.008)
South	0.006***	0.035***	0.009***	0.035**
	(-0.001)	(-0.001)	(-0.001)	(-0.003)
Judea/Samaria	0.003**		0.004**	
	(-0.001)		(-0.002)	
Parents years of schooling	-0.006***	-0.011***	-0.005***	-0.011***
	(-0.0001)	(-0.0001)	(0)	(0)
No. of siblings	0.003***	0.005***	0.002***	0.004***
	(-0.0002)	(-0.0002)	(0)	(0)
Immigrant	0.056***		0.049***	
	(-0.001)		(-0.001)	
Constant (2016)	0.109***	0.175***		
	(0.002)	(0.002)		

Appendix Table 4 (continued). Regression results, school dropouts, 2006-2017

	Dependent variable			
	Linear estimators		Logistic marginal effects	
	Jews	Arab Israelis	Jews	Arab Israelis
Year (fixed effects)	Yes	Yes	Yes	Yes
Observations	693,085	232,991	293,085	232,991
Log likelihood			-122,826.3	-54,6509.21
Akaike Inf. Crit.			245,702.6	109,262.4
R^2	0.037	0.072		
Adjusted R^2	0.037	0.072		
Residual std. error	0.210 (df=693,060)	0.256 (df=232,969)		
F statistic	1,103.221*** (df=24; 693,060)	864.386*** (df=21; 232,969)		

Note: * p < 0.10; ** p < 0.05; *** p < 0.01.
Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center

Appendix Table 5. Results of Oaxaca decomposition analysis

	Jews		Arab Israelis	
	Coefficient	se	Coefficient	se
Overall	0.028235		0.036389	
Endowment	0.007600	0.000083	0.014329	0.000563
Coefficient	0.015642	0.000512	0.016536	0.002213
Interaction	0.004994	0.000490	0.005523	0.001454
Endowment				
(Intercept)	0.000000	0.000000	0.000000	0.000000
Sex	-0.000153	0.000048	-0.000870	0.000240
start track High	0.000784	0.000038	0.002610	0.000280
start track Low	0.000290	0.000054	0.002260	0.000250
start track Medium	0.000228	0.000009	-0.001240	0.000160
Jerusalem	0.000154	0.000025		
start North district	0.000044	0.000008	0.000440	0.000180
start Haifa district	0.000290	0.000009	-0.000100	0.000030
start Tel Aviv district	0.000004	0.000019	-0.000120	0.000080
start South district	0.000061	0.000013	-0.000790	0.000240
Judea/Samaria	-0.000018	0.000028		
Education	0.001636	0.000041	0.008550	0.000470
Siblings	0.002033	0.000156	0.003590	0.000810
Immigrant	0.002509	0.000207		
Coefficient				
(Intercept)	0.059987	0.005483	0.064810	0.010390
Sex	-0.011150	0.000766	-0.012860	0.002140
start track High	-0.000371	0.000387	-0.004080	0.001020
start track Low	0.001192	0.000110	0.003450	0.000170
start track Medium	0.003699	0.000277	0.004070	0.001090
Jerusalem	0.000983	0.000066		
start North district	-0.000592	0.000149	-0.000770	0.001490
start Haifa district	0.000403	0.000227	0.001020	0.000230

Appendix Table 5 (continued). Results of Oaxaca decomposition analysis

	Jews		Arab Israelis	
	Coefficient	se	Coefficient	se
start Tel Aviv district	0.000003	0.000386	0.000040	0.000430
start South district	-0.000462	0.000718	-0.002540	0.000470
Judea/Samaria	0.000239	0.000373		
Education	-0.037115	0.004468	-0.036910	0.007350
Siblings	-0.005104	0.000542	0.000300	0.001620
Immigrant	0.003930	0.000248		
Interaction				
(Intercept)	0.000000	0.000000	0.000000	0.000000
Sex	-0.000162	0.000036	-0.000440	0.000030
start track High	0.000080	0.000085	0.001680	0.000410
start track Low	0.000191	0.000028	0.001500	0.000110
start track Medium	0.000201	0.000015	-0.000970	0.000230
Jerusalem	0.000229	0.000022		
start North district	-0.000026	0.000006	-0.000050	0.000090
start Haifa district	0.000014	0.000006	-0.000100	0.000020
start Tel Aviv district	0.000000	0.000003	-0.000010	0.000050
start South district	-0.000020	0.000020	0.000480	0.000060
Judea/Samaria	-0.000038	0.000053		
Education	0.001134	0.000138	0.003270	0.000610
Siblings	-0.002300	0.000234	0.000150	0.000850
Immigrant	0.005691	0.000483		

Note: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.
Source: Guy Yanay, Hadas Fuchs, and Nachum Blass, Taub Center