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Geographic Barriers to Education in Disadvantaged Communities: Evidence from High School Openings in Israeli Arab Localities

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Geographic Barriers to Education in Disadvantaged Communities: Evidence from High School Openings in Israeli Arab Localities

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Abstract

Secondary school enrollment has grown substantially over the past century, but there is surprisingly little economic evidence on the effects of geographic access to high schools, particularly for remote and disadvantaged communities. I attempt to fill this gap in the literature by examining the effects of openings of new local high schools for the Arab minority in Israel over two episodes: (1) Historical openings in 1972-1995 for Israeli Arabs (2) Recent openings in 2007-2014 for the poorer Bedouin population of the Negev in southern Israel. For both episodes, I find that the establishment of a high school in a locality increases high school completion rates by about 5-7 percentage points. The effect is higher for localities that were further away from pre-existing schools. For the historical Arab sample, I also examine the long-run effects and find an increase in post-secondary attainment and in women's employment and earnings. Among the Negev Bedouin population, I also observe a decrease in the number of juvenile criminal records. Overall, these findings suggest that the geographic barrier to high school access is important, especially for disadvantaged communities, and that establishing a high school in remote communities can be beneficial in multiple aspects.

חסמים גאוגרפיים להשכלה בקרב אוכלוסיות מוחלשות:
עדויות מפתיחת בתי ספר תיכוניים ביישובים ערבים בישראל

אלעד דה-מלאך

תקציר

ההשכלה התיכונית התרחבה בעשורים האחרונים באופן חסר תקדים, אך ישנן מעט עדויות בספרות הכלכלית על ההשפעה של נגישות גיאוגרפית לבתי ספר תיכוניים, במיוחד בקרב אוכלוסיות מוחלשות. במחקר הנוכחי, אני בוחן את השפעת הקמת בתי ספר תיכוניים חדשים באוכלוסייה הערבית בישראל ב-2 תקופות שונות: (1) בשנים 1972-1995 בקרב מדגם היסטורי של האוכלוסייה הערבית בצפון ובמרכז (2) בשנים 2007-2014 בקרב מדגם עדכני של האוכלוסייה הבדואית בנגב. בשתי האפיזודות הנ"ל אני מוצא כי הקמת בית ספר תיכון ביישוב העלה את ההסתברות לסיים 12 שנות לימוד ב-5-7 נקודות אחוז בקרב בני הנוער שהתגוררו ביישוב. השפעה זו הולכת וגוברת ככל שהיישוב היה מרוחק יותר מבתי ספר אחרים טרם הקמת התיכון המקומי. בקרב המדגם ההיסטורי של הערבים אני מוצא גם השפעות ארוכות טווח על השכלה על תיכונית, ועל תעסוקה והכנסות מעבודה של נשים. בקרב האוכלוסייה הבדואית בנגב, אני מוצא גם עלייה בשיעורי הבגרויות וירידה במספר התיקים הפליליים של בני נוער. ממצאים אלו מצביעים על כך שהחסם הגיאוגרפי להשכלה תיכונית הוא חשוב, במיוחד בקרב אוכלוסיות מוחלשות, ושפתיחת בתי ספר תיכוניים בקרב קהילות מרוחקות גיאוגרפית יכולה להועיל במגוון היבטים.

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Geographic Barriers to Education in Disadvantaged Communities: Evidence from High School Openings in Israeli Arab Localities

1. Introduction

Secondary education has expanded dramatically worldwide in the last century. Compulsory schooling laws became standard in all developed countries, and massive investments were made in the construction of high schools. Still, despite the considerable funding of public education, the percentage of young people (ages 15-17) not attending school remains relatively high worldwide (36% according to UNESCO, 2018), especially in developing and middle-income countries, but also among disadvantaged populations in developed countries.[1] Therefore, it is of great interest for policy makers to understand the causes of school dropout.

One of the potential barriers to secondary-school attendance is the geographic barrier. Remote communities are facing higher transportation costs for schooling. This is particularly true for disadvantaged communities that face higher opportunity costs of schooling due to some additional challenges and constraints.[2] Therefore, for disadvantaged individuals, the lack of a school in the area may be the factor that tips the scales in favor of dropping out. Absence of schooling due to such constrains can be a source of a poverty trap that can inhibit economic growth (Galor and Zeira, 1993; Caucutt and Lochner, 2020). Therefore, it is of great importance to assess the significance of the geographic barrier.

To date, however, very few economic studies have attempted to examine the effects of geographic access to high schools, and no study (to the best of my knowledge) has examined the long-term effects of access to high schools beyond school enrollment and completion or examined its role for disadvantaged communities. Most studies that address geographic barriers focus either on primary schools in developing countries, or post-secondary colleges and universities in developed countries (see detailed literature review in the next section).

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[1] The terms "disadvantaged population" or "disadvantaged group" refers to a segment of the society that holds a lower socioeconomic status compared to the rest of the society.

[2] Such constraints may arise due to greater need for additional household income through youth labor; ill health; limited productive assets to combine human capital; credit constraints in affording the costs of education in places where education is not free (See full discussion in Knight et al., 2009).

An alternative possible step to improve access to education for individuals is to expand the transportation system to schools. To date, I do not have good data on the cost of transportation to schools in Arab society, especially in the historical sample. Therefore, most of this study focuses on estimating the direct benefits of opening local high schools, without a detailed cost-benefit calculation.

It is not trivial to obtain reliable estimates of the effects of schools' accessibility on future outcomes. Although it is straightforward to measure the correlation between distance to a high school and individual outcomes, this correlation is not necessarily causal, because accessibility to a secondary school is not necessarily exogenous and may reflect predetermined characteristics such as community size, economic development, parental preferences for education and various other factors that may independently affect outcomes. I seek to overcome this challenge by exploiting the historical roll-out of upper-secondary schools in Arab localities in Israel since 1972. In this setting, I examine differences between the outcomes of school-age versus older individuals at the time of the high school establishment, comparing them to parallel differences in comparison localities during this period (difference-in-differences). My key identifying assumption is that the timing of high school opening is uncorrelated with differential trends in outcomes across localities. To address potential threats for this assumption I employ various strategies such as controlling for changes in locality's population size and allowing differential trajectories by geographic area, timing of compulsory schooling laws, and socioeconomic and demographic characteristics. I also control for locality-specific linear pre-trends as an additional robustness check. The vast majority of my results are robust to these different specifications. Event-study models also support the validity of my research design as well as new estimation methods drawn from the recent emerging difference-in-differences literature (Callaway and Sant'Anna, 2021; Sun and Abraham, 2021)

I use a detailed administrative dataset on all Arab individuals born between 1950 and 1999. The dataset contains information on year of birth, education level, labor income, marital status, completed fertility, and current and previous place of residence. For younger cohorts, I also have information on juvenile criminal records.

My results show that the geographic barrier to high school education is significant. Opening a high school within a locality leads to a 5-7 percentage point increase in the high school completion rate, which is about 12-13% increase over the baseline rate. These results are remarkably similar for the historical sample of Arabs and for the more recent

Negev Bedouin sample, although they come from very different societies and time periods. Over the long term, I find for the historical Arab sample a modest 1.1 percentage point (6%) increase in post-secondary studies. In the labor market, I find a 4-7% increase in female employment and about an 11% increase in female earnings, but no statistically significant increase in male employment or earnings, except for Druze men.

For the Negev Bedouin sample, there has been an increase in the probability of obtaining matriculation certificate ("Bagrut"). For this sample, I can also observe the effects on juvenile crime and find a significant decrease, especially in property offenses. In summary, the main contribution of this study is to provide solid evidence on the long-term importance of high-school access for disadvantaged communities.

The remainder of the paper is organized as follows. Section 2 provides a literature review and discusses the contribution of this study. Section 3 provides some background information on the Arab education system and the establishment of schools. Section 4 describes the data. Section 5 explains the research design and describes the geographical rollout of Arab high schools in Israel. Section 0 describes the main empirical specifications. Section 7 presents the results, including several falsification and robustness tests. Section 9 concludes.

2. Literature Review and Contribution

There is limited evidence on how secondary school supply affects student achievement. This is quite surprising given the central role of secondary education in public policy. However, there are two important, distinct but related strands of literature examining the effects of accessibility to educational institutions on outcomes.

One strand has focused on examining the impact of *primary* school construction in developing countries. A seminal paper by Duflo (2001) examined the effects of a large primary school construction program in Indonesia in the 1970s that increased the average number of years of schooling by 0.2. Follow-up studies by Akresh et al. (2018) and Mazumder et al. (2021) also found positive effects on employment outcomes, and some spillover effects for next-generation education. Burde and Linden (2013) conduct a randomized evaluation of village-based primary schools in rural Afghanistan, and Kazianga et al. (2013) examine the impact of local “girl-friendly” primary schools in Burkina-Faso. Both studies show significant increases in both child-enrollment and academic test scores.

The second related strand, more relevant to developed countries, estimates the effects of geographic access to *higher educational institutions* on individuals' outcomes in order to calculate the return to post-secondary education. The seminal work of Card (1993) is the first study to use proximity to college as an instrumental variable for education and found a significant return per year of higher education (11.5%). Subsequently, several other studies examined local college supply as an instrument for the monetary returns to higher education (Cameron and Taber, 2004; Carneiro et al., 2011; Nybom, 2017; Mountjoy, 2021). Other studies also used geographic distance to higher education institution to estimate non-monetary returns to higher education such as the health of individuals and their offspring (Currie and Moretti, 2003; Kamhöfer et al., 2018).

There are very few economic studies that examine the effects of local *high school* supply on individual outcomes. Two of these studies focus on the cross-sectional association between distance/travel-time and high school enrollment, conditional on student background characteristics. Dickerson and McIntosh (2010) find that distance to a high school in England is significantly associated with the decision to continue in post-compulsory education (at ages 16-18), particularly when focusing on individuals who are on the margin of participation according to their prior achievement and family background. Falch et al. (2013) assesses the impact on actual travel time between students' homes and schools in Norway. They find that a 30-minute increase in travel time lowers high school graduation rate by about 2 percentage points.

One main limitation of these two studies is the problem of *sorting.* Even when controlling for various covariates for student background, distance to school may still be correlated with unobserved parental preferences and beliefs that may independently affect one's abilities and preferences for obtaining education. One way to overcome this limitation, is to examine changes over time in school supply, i.e., school openings, within a given area. A recent study by Garrouste and Zaiem (2020), examined the effect of high school openings in France on the students in the incumbent nearest schools. They find that the opening of new high schools leads to significant increases in enrollment and graduation.[3]

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[3] Another important strand of the literature is studies that investigate the effect of compulsory schooling. Many studies used changes in compulsory education laws to study the monetary returns to education (Angrist and Krueger, 1992; Oreopoulos, 2006; Devreux and Hart, 2010; Devreux and Fan, 2011; Bhuller et al, 2017), as well as non-monetary benefits (Lochner and Moretti, 2004; Black et al, 2008; Clark and Royer, 2013).

In the local Israeli context, Rubin (MA thesis, 2010, unpublished) uses the 1995 Israeli census to show that opening a local Arab high school increased the share of individuals that completed 9th grade. I examine also this question, but unlike Rubin's study, I rely on an administrative data set, where the sample size is much larger, and the information is much more detailed than the public-use census data; I examine many more relevant outcomes other than completing the 9th grade[4]; I compile a dataset on historical high school openings which is much more accurate than his data; In addition, I rely on the individual's childhood place of residence which is a more accurate proxy than place of residence in adulthood in 1995.

One additional important study, related to the development of the Arab secondary education system is Krief (2009) who examined the effect of the implementation of compulsory school laws in Israel in the 1970s. He found that the compulsory schooling law added 0.4 years of schooling for Arab men and 0.6 years for Arab women. However, the study does not examine whether the impact differs by locality where there was a high school.

My study contributes to the existing literature on high school openings in three key ways. First, it is the first study (to the best of my knowledge) to examine not only the short-term effects of high school accessibility, such as enrollment and graduation, but also the impact on long-term outcomes such as tertiary education, employment and earnings. Therefore, it can provide a more comprehensive picture of the benefits of secondary education. Second, while most previous studies studied the cross-sectional association between local high school supply and outcomes, I try to offer a more solid causal analysis, examining within-locality difference in outcomes before and after the construction of high schools, versus comparison localities (Difference-in-Difference design). Third, while previous studies on high school supply are exclusively from developed countries, my study focuses on the Arab minority, which in the 1970s more closely resembled a middle-income or developing country, with low educational attainment, and an almost complete absence of employed women. For example, high school completion rates in the treated localities in the study were 41% prior to school opening, while 2019 OECD average stood at 80%.[5] Moreover, disadvantaged minorities

[4] 10th-12th grade enrollment, high school graduation, employment, and earnings.
[5] Table B3.3 in OECD (2021).

in developed countries have relatively lower graduation rates than the majority group. For example, in the United States, the percentage of 16–to 24-year-olds who are not enrolled in school and do not have a high school credential, was 8.2% for Hispanics and 6.5% for Black, compared with only 4.3% for White (McFarland et al. 2020). Therefore, this study can provide valuable insights into the role of high school supply both for disadvantaged communities in developed countries as well as for less developed countries.

3. Background: evolution of the Israeli Arab education system and Arab high schools

3.1. Education among the main Arab population

The Arab community makes up 20% of Israel's population. Most Arabs are Muslim (85%), with the remainder being Christian (7%) and Druze (8%).[6] There are significant educational and socioeconomic differences between the Arabs and the Jewish majority (Bank of Israel, 2021). In general, the Arabs are considered a traditional society, especially in terms of gender relations and roles. An important point is that most Arabs (90%) live in segregated localities and the remainder live in mixed or Jewish localities alongside Israeli Jews.[7] The education system is also segregated, and throughout the school years, from primary to high school, Arab and Jewish students attend separate schools.

The educational participation of Arabs has increased dramatically in recent decades. Figure 1 shows the increase in educational participation. Of the cohort born in 1950 (high school age in 1965-1968), only 35% attended 10th grade and only 20% completed high school. Approximately 50 years later, the corresponding percentages for the 1999 cohort are 81% and 78%, respectively. Thus. there has been a sizeable increase, largely since the 1970s.

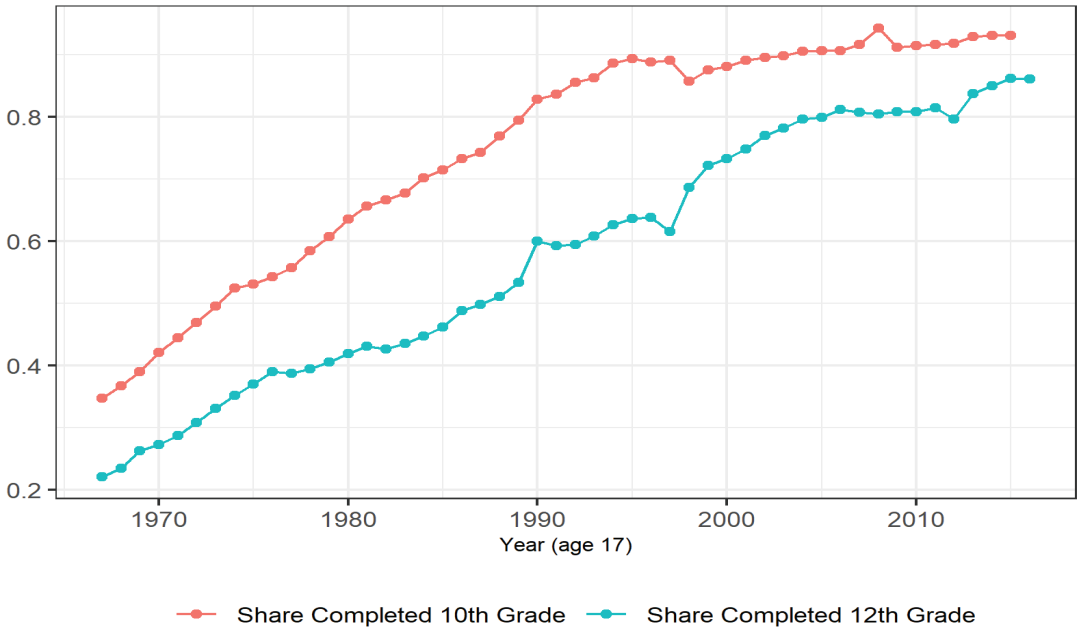
From a global perspective, the improvement of Arab secondary school enrollment was even stronger than the corresponding improvement in the rest of the Arab world. While in 1970, secondary school enrollment rate (high- and middle- schools) of Israeli Arabs (26%) was relatively similar to the Arab world (29%), in 1995 it was already significantly

[6] The Christian Arabs differ from the others in that they have a much higher education level from the rest of the Arabs. The Druze are also a distinct group. Although most of them define themselves as ethnically Arab, they do not identify themselves with the Arab or Palestinian nationalism. In 2012, and most of the Druze young men volunteer for the Israeli army at age 18.

[7] Excluding East Jerusalem. Author's calculations based on Israel Democracy Institute (2022).

larger (67% vs 54%) and the rate in 2019 was 95% vs 72% in the Arab world.[8]

Figure 1: Share of Israeli Arabs Completing 10- and 12- Years of Schooling
(17 Years Old Cohorts at 1967-2017)



Notes: This figure presents the share of individuals which completed 10th and 12th grades by the year in which they were 17 years old based on CBS individual administrative education data.

After the establishment of the State of Israel in 1948, the Arab population were mostly rural and low educated (Al Haj, 1995). In 1950/51, there was only one public Arab secondary school in Nazareth, attended by only about 200 students, all of whom were boys. A rough estimate of the total share of high school students among the children at ages 14-17 during that period was about 2.5%.[9]

In the first two decades of the State of Israel, the main efforts of the new state were directed toward the expansion of primary schools in the compulsory grades at that time(1st through 8th grades). As a result, there were very few high schools in those years, and only

[8] Secondary school enrollment includes middle-schools and high-school, as there is no historical data for the Arab world on upper secondary school enrollment only. Data on Arab secondary enrollment rate in Israel (ages 14-17) is calculated from CBS Statistical Abstract of Israel for various years, while data on the Arab world is taken from UNESCO, series id: SE.SEC.ENRR.

[9] Share of Arabs in public high-schools is about 1.25%. A relatively similar number of students probably attended the Christian mission schools. No data on Christian missionary private schools is available for this period. To obtain a higher bound estimate, I assume that the number of students in Christian schools equals the number in public schools. An article from Davar newspaper (December 30, 1949) reports that the number of Arab students in these institutes is "somewhat lower" than the public students. A 1936 article reports that the number are similar (Ha'aretz, July 1, 1963). The number of Arab students in public high-schools is given by the Ministry of Education in file no. GL-17998/6 in the Israel State Archives. The number of Arabs born in 1933-1936 (in the denominator) is calculated using microdata from the 1972 Israeli Census of Population and Housing.

the children of the minority elite went to school beyond the eighth grade. In addition, Israeli Arabs during those decades (1948-1966) were subject to military rule that restricted travel outside a person registered residence. Thus, de facto access to schools outside of localities of residence was restricted. The end of military rule (1966) allowed many more children to access primary schools and led to a significant increase of 0.5-1.0 years of schooling in education enrollment, especially among girls (Lavy and Zablotsky, 2015).

High schools were particularly absent in small Arab towns, although there was some demand for them, especially among local Arab politicians who believed that building such schools would increase the relative prestige and status of their locality. The Ministry of Education however, was more reluctant to increase the supply of secondary schools before primary school enrollments were exhausted. Government officials were also concerned that demand for high schools would be low, and that there would not be enough trained teachers to fill the new schools.[10]

However, in the 1970s, when the number of Arab students in primary schools has nearly reached a saturation, a clear trend toward opening Arab high schools accelerated accelerated(Figure 2a and Figure 3).While in 1970 about 28% of the Arab population (not including Bedouin of the Negev) resided in a locality with a high school, by 1990 84% of them did so (Figure 2b). Today, the corresponding rate is 95.

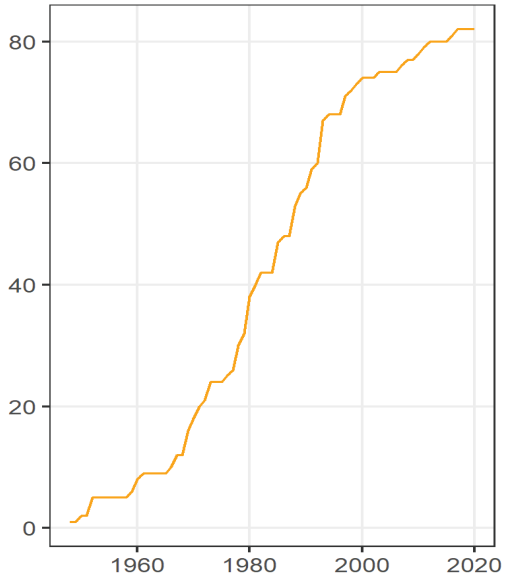
The opening of the local high schools marked a significant change in access to education for the youth in the locality. Prior to the openings, students from places with no high-schools were forced to travel independently to the nearest town where there was a high-school. There were no specially designated buses to the nearest schools, and subsidies for public transportation were provided only for students in the compulsory

[10] See for example, Israel State Archives, File no. GL-1223/4, where Shmuel Salmon, head of the Arab education department in the ministry of Education is complaining about the reluctance of local Arab politicians to accept the fact that it was impractical to build a high school in every Arab village during that time.

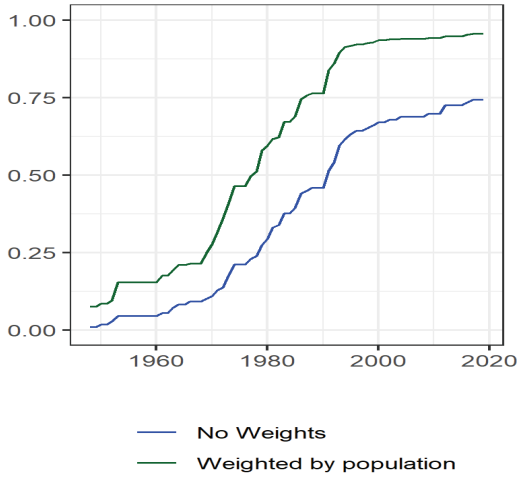
age.[11] Public buses ran very infrequently in Arab localities during this period.[12,13] Therefore, transportation was a significant obstacle for these students to attend upper secondary education.

Figure 2: Arab (Non-Bedouin) Localities with High School (1948-2020)

a. *Number* of Localities with High School



b. *Share* of Localities with High School



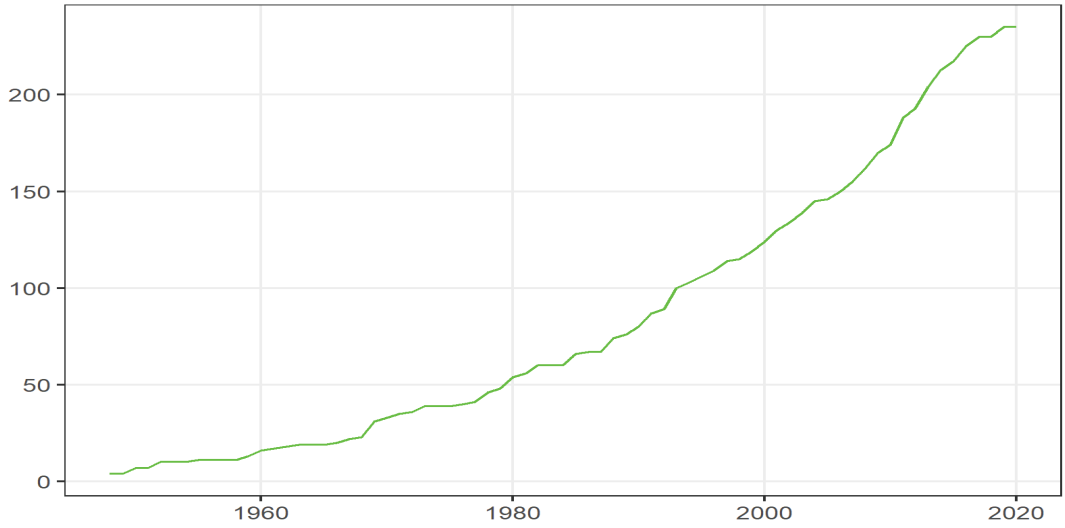
Notes: The left figure presents the change over time in the number of Arab (non-Negev-Bedouin) localities with at least one high school. The right figure presents the share of Arab (non-Negev-Bedouin) localities that had at least one high school, simple and weighted by the population in the locality. Data is taken from the Israeli Ministry of Education digital institutions files. As detailed later in the Data section, this data is not as accurate as the archival data on school openings that I use for my main estimation, but it covers all years since the establishment of the state of Israel and provides a general picture of the trends over time.

[11] See 1981 Israeli Ministry of Education Special Executive Director's Circular on the transportation of school students. (Israel State Archives, File no. GL-18629/7)

[12] There are no public data on bus services in Arab localities in 1970s to 1990s. According to data I obtained from Barak (2019), most Arab localities had very low bus frequency in 2010 with 20 trips per day or less, and 28% of the localities (35) didn't have any bus access. There were 7.2 bus trips per 1,000 Arab individuals, compared to 19.9 trips a day per 1,000 Jewish individuals. Since then, bus frequency in Arab localities has improved significantly due to government reform. See Greenwald et al. (2018), Barak (2019) and Abu-Qarn and Lichtman-Sadot (2022) for assessments of the reform.

[13] In very rare cases, there were specially designated school buses in small Arab villages that resided in a common regional council with Jewish rural villages, but none of these villages had opened schools during the period of study. (Israel State Archives, File no. GL-18629/10)

Figure 3: Number of Arab (Non-Bedouin) High Schools (1948-2020)



Notes: The figure presents the change over time in the number of Arab (non-Negev-Bedouin) high schools. Data is taken from the Israeli Ministry of Education institutions files.

A major milestone in the history of Arab education was the extension of compulsory school laws to the higher (9th and 10th) grades. The 9th grade compulsory schooling law was introduced gradually between 1969 and 1973 (Krief, 2009), but did not in itself lead to the immediate construction of high schools, as most Arab 9th grade classes were added to the existing primary schools. In 1978, the 10th grade compulsory high school law was implemented. However, it was not fully enforced among the Arab population, due to lack of schools, classrooms and teaching staff.[14] Later, since 2009, similar compulsory school laws were implemented in Israel for the 11th and 12th grades, and this reform is more relevant to the timing of the establishment of Bedouin schools, which is discussed later. I account for the differential implementation of the compulsory school laws across localities in all my baseline estimations, as detailed in Section 5, and the results are not significantly different compared to simpler estimates that do not take this reform into account. Thus, the study focuses on the effects of opening a high school in a locality *independent* of the effects of compulsory school implementation during that period.

3.2. Education among the Negev Bedouin Minority

A notable minority in the Arab population is the Negev Bedouin community who comprise (in 2019) about 14% of the total Arab population. These are traditionally nomadic Arab tribes who underwent a significant process of sedentarization that began n

[14] Eliezer Shmueli, Director General of the Ministry of Education and Culture and Knesset Member Aharon Yadlin. Education and Culture Committee of the Knesset, Protocol no. 57, March 22, 1978.

the 19th century but accelerated considerably after the establishment of the State of Israel. Only 11,000 of them remained in Israel after the 1948 Arab-Israeli War (Marx, 1967). They were resettled in an area named the Siyag (fence), known for its low agricultural fertility, northeast of the city of Be'er Sheva. Between 1968 and 1989, seven townships were built for the Bedouin community.[15] As of 2019 about 62% of the Bedouin lived in these towns. (Almasi and Weissblei, 2020). However, the remaining part of the Bedouin decided not to settle in the new towns and many of them continued to live in so-called "unrecognized villages" without proper access to basic infrastructure such as water, electricity, roads, education and health care. There is also an ongoing land dispute between the Negev Bedouin and the Israeli state.[16]

The educational system of the Bedouin Arabs in the Negev developed more slowly than that of the rest of the Arabs (Saad, 1991). Until the end of the military rule, there were no Bedouin high schools in the Negev, so only a very small proportion of Bedouin attended post-secondary schools in Arab localities in the north.

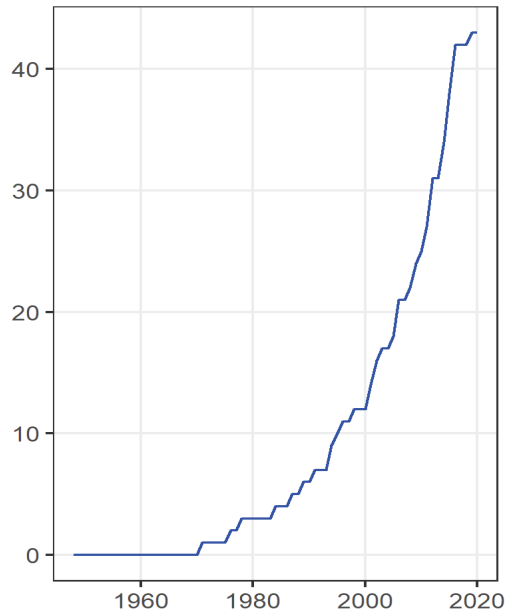
In 1969, the first Bedouin high school in the Negev was opened in the region of what is now the town of Kuseife. By 1991, three more schools were built in planned Bedouin government settlements. However, the decisive change in the Bedouin community of the Negev took place in the 1990s, when the number of schools increased tenfold and there are today more than 40 Bedouin high schools (Figure 4). The percentage of Bedouin high school graduates has also increased considerably since the 1990s.

[15] Tel Sheva, Rahat, Segev-Shalom, Ar'ara, Kuseife, Lakiya and Hura.

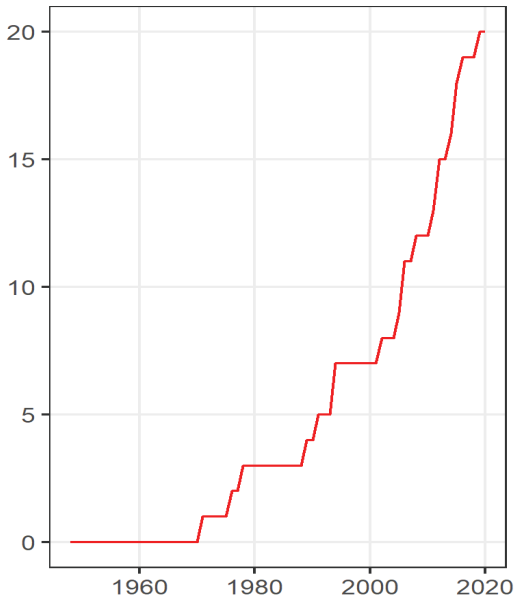
[16] See Falah (1989) and Yahel (2019) for more details on the historical relationship between the Bedouin community and the Israeli state.

Figure 4: High Schools in Negev Bedouin Communities

a. Number of Negev Bedouin High Schools



b. Number of Negev Bedouin Localities With High School



Notes: The left figure presents the change over time in number of Negev Bedouin localities with at least one high school. The right figure presents the change over time in number of Negev-Bedouin schools**.** Data is taken from the Israeli Ministry of Education institutions files.

My focus in the study will be on high schools that were opened, for the first time, in newly recognized localities. Since 2003, the Israeli government has retroactively recognized 11 previously unrecognized villages, improved infrastructure and basic services, and upgraded existing buildings in order to maintain the basic urban-agricultural lifestyle, as part of an official government resolution in 2003. As a result, access to education and schools for residents of these villages, as well as adjacent unrecognized villages has improved significantly. In 8 out of these 11 localities high schools were opened, which I examine in this study. It is important to note that unlike the historical Arab sample, Bedouins in communities without high-school have designated publicly funded transportation to high-schools due to the high geographic dispersion of the Bedouin Arabs

To conclude, this study includes two separate samples. The historical Arab sample which includes the cohorts of non-Negev-Bedouin Arabs who were of high school age in the 1967-2001 (1950-1984 born). The second sample includes Bedouins in the Negev who reached high school age during the period 2004-2016.

4. Data

In this study, I link individual administrative data with unique data on the historical rollout of Arab high schools in Israel. I determine the year of opening of each high school by combining information from several sources: CBS (Israeli Central Bureau of Statistics) and MOE (Ministry of Education) publications containing the number of schools and students in all grade levels in each local authority (1968-1978); Publications on the number of schools and students for local authorities in each level of education (primary, middle and high school) for multiple years (1979-1990); Census of all Israeli schools from 1978 and from 1990 published by CBS and the MOE; official digital school files from MOE for the 1990-1991 school year and thereafter. It is important to note, that various sources are not always consistent, especially before the 1990s. However, it is possible to conclude by a relatively high degree of confidence, the first year in which a high school was opened in the locality.

I combine several administrative data sources, maintained by the CBS, on all Arab Israeli citizens born in 1950-2000, as well as the 1972 and 1983 Israeli Censuses. I include birth cohorts 1950-1984 to estimate the effect on high schools opened in 1972-1995 ("the main Arab sample"), and the 1987-2000 cohorts to estimate the impact of Bedouin school openings in 2007-2014.

The population register contains information on individuals' year of birth, sex, and current place of residence. Unfortunately, the population register is not available for years prior to 1995, so for the historical Arab sample I cannot observe the exact place of residence at high school ages according to this register. Therefore, I use the 1972 and 1983 Israeli Censuses, as well as the 1995 Israeli population register to know the place of residence in those years. I impute the locality of residence according to the closest year to age 15 for which I have data. Although this is an imperfect proxy, the measurement error is probably negligible because the rate of internal migration of Israeli Arabs is very low (Bank of Israel, 2017). According to a 2007 representative survey, only 9.5% of adult Arabs did not live in the locality in which they were born, with the most common reason for moving being a woman's marriage to a man from another town, before having children (Hlihel, 2011). I exclude from the sample all individuals who lived in mixed or Jewish cities.

The education register allows me to observe the number of years of education, and the highest education certificate of the individuals. I exclude all individuals for whom I do not have information on their years of education. This allows me to evaluate the effects

of high school on education attainment and school completion, since no direct high school data on individuals are available prior to 1990-1991 school-year. Later, I will show that the probability to have a missing value is not affected by the school opening, and that the main results remain similar, when I impute education values for these observations.[17]

For the Bedouin sample whose schools opened in the 2000s, I can also observe data on actual school enrollment and on achievement in the Matriculation Exams ("Bagrut"), national high school exit exams taken in various subjects that are prerequisites for entering in higher education. For this sample, I also have data on juvenile criminal records in the years 2003-2019. The data contain information on the year of the arrest and the type of crime. I focus on crimes in ages 16-18 which are the relevant ages for high school, and for which I have uncensored data for all relevant cohorts.

I also examine adult outcomes, which are naturally available only for the historical sample. I link the data on Arabs born in 1950-1984 to the Israeli Tax Authority Earnings Register. The data provide information on individual annual labor earnings as well as the number of months worked. I use data on earnings in ages 33-35, as these are the ages for which data are available for all cohorts. Fortunately, these years also reflect best individuals' permanent income as shown by previous studies (Haider and Solon, 2006; Böhlmark and Lindquist 2006).

5. Research Design: Establishment of Arab high Schools in various localities

My methodology exploits variation across localities and years in the opening of high school to examine the effect of school accessibility on individuals' future outcomes. The rollout of Arab high schools in different localities is presented in Figure 5. The figure shows considerable geographic variation in the timing of opening. At the beginning of 1972, the first year I examine school openings, there were high schools in 14 localities. Over the years, high schools became more geographically dispersed, so by 1990 there were 50 such localities.

To determine where and when to open high schools, the Ministry of Education had a Mapping and Planning Division, which was responsible for the physical planning of the education system. Planning for future high schools is based on an analysis of urban and

[17] These are usually individuals who did not study in the Israeli Education system: E.g. Palestinians from Gaza or the West Bank, who married the Israeli and therefore migrated. Thus, their locality of residence is less likely to represent the place they actually lived when they were teenagers.

demographic trends in various localities and on making demographic projections at the regional and local levels to determine the need and timing for construction of new buildings. Distance of the localities from other high-schools was also an important aspect.[18] Historically, In the Arab society, I have evidence on contention between residents and politicians who favored opening high schools in their localities, while the Ministry of Education favored opening regional high schools to optimize the use of skilled labor force, equipment, and laboratories.[19]

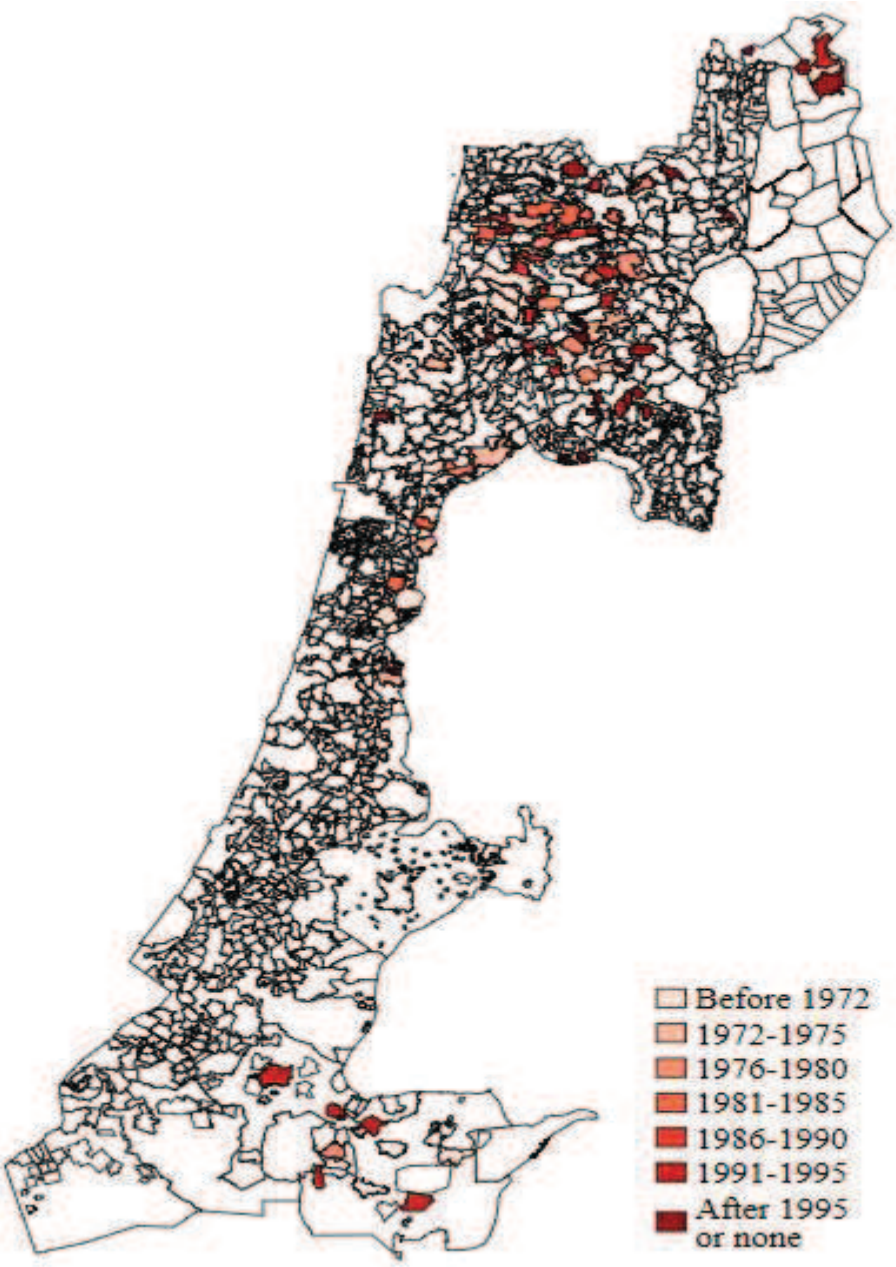
It can be concluded that one of the most important determinants for the openings of high schools is the population size of the localities, both before the openings and the projected population size based on future projections.

Figure 6 shows the negative relationship between the size of the localities and the timing of openings of high schools.

[18] I do not have systematic documentation of the planning documents for all schools, but I did manage to obtain some archival data on the planning and openings of two high schools (Daliyat El-Karmel 1973; Kafar Qasem, 1975; files no. GL-13967/7 and GL-13009/6 in the Israel State Archives). These documents contained an extensive study and analysis of recent demographic trends, as well as future projections of expected increases in student numbers, and preexisting distance from other high-schools.

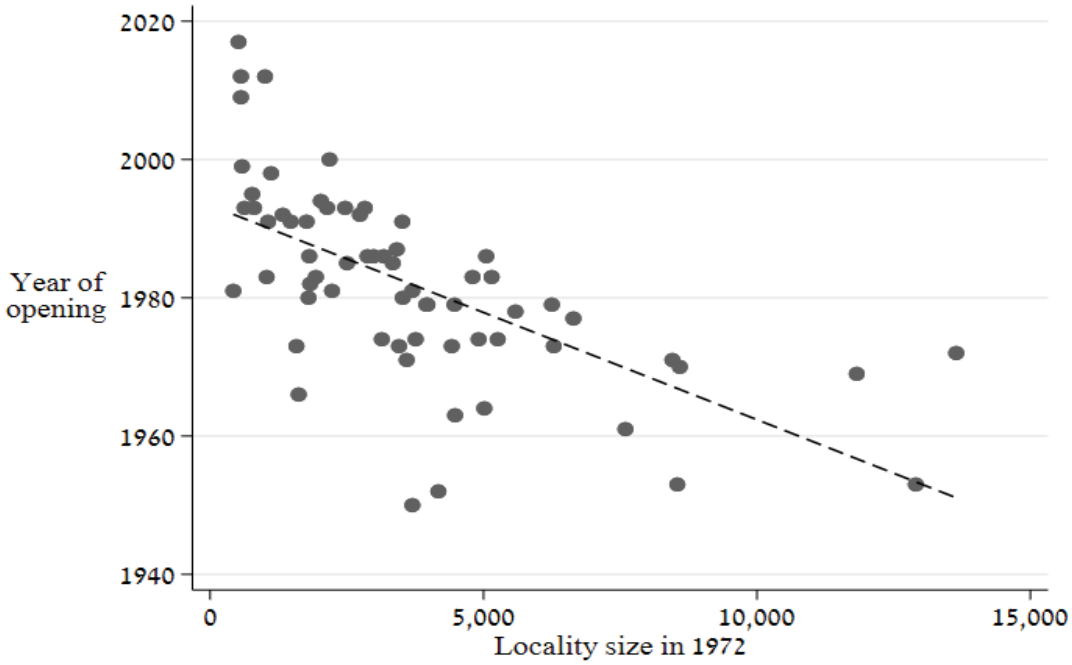
[19] For example, file no. GL-13010/7 in the Israel state archives reports on a protest in the locality of Arrabe in 1974, demanding the construction of a local high-school. File no. GL-13011/4 in these archives shows a rejection letter of the vice-head of the Ministry of Education to the Major of Abu-Sinan, where the reason for the rejection in an insufficient locality size and an existence of a nearby locality with a high-school; See also the description of Emmanuel Koplovich, head of the Department of Arab Education in the Ministry of Education regarding the disagreements with the local Arab politicians in file no. GL-17998/7, as well as his speech, documented in file no. GL-13009/6 in the Archives.

Figure 5: The Rollout of Arab School Openings in North and Central Israel



Notes: The figure shows a map of the geographical distribution of the rollout of Arab school openings in North and Central Israel since 1972.

Figure 6: The Relationship Between Locality Size and the Year of Opening of the First High-School



Notes: This figure plots the relationship between the locality size and the year of the first high school. Locality size is taken from the 1972 Israeli Census of Population and Housing. Year of opening is compiled from various sources as detailed in the Data section. City of Nazareth is not included the graph, as it is a significant outlier for the scale of the graph (about 33,000 residents in 1972).

In my analysis of the historical sample, I focus on non-Negev-Bedouin Arab localities in which the first high school was established in 1972-1995. In the comparison group, I include localities in which high school existed for at least 8 years before 1972, in order to ensure that trends in these comparison localities do not reflect the time-varying effects of the establishment of high school in previous years.[20] The comparison group also includes localities in which no high-school was opened up until 1995. Table 1 summarizes the key characteristics of the treated and comparison localities. Table A1 in the Appendix provides a more detailed breakdown, distinguishing comparison localities where school opened early from localities where there was no school at the end of the study period (1995).

[20] These localities are "always treated" in the entire period of study. I use them as comparison localities by assuming there is no trend in the treatment effect after more than 8 years. However, in my robustness checks I use method of Callway and Sant'anna as well as Sun and Abraham (2021) which effectively compare the treated localities only to never-treated and not-yet-treated localities, finding very similar results.

For the contemporary Negev Bedouin sample, I compare localities or tribes where schools opened in 2007-2014 versus incumbent Bedouin localities where schools existed prior to the 2000s and with Bedouin in tribes without access to secondary schools, mostly unrecognized villages. I define a treated community (locality or tribe) as the community which the majority of students of the newly established high-school reside in.[21] The geographic distribution of treated and established Bedouin localities is presented in Figure 7.

Table 1: Summary of 1972 Characteristics of Localities of the Study

Historical Arab Sample, not including Bedouin of the Negev

	Treated Localities: (HS Opening in 72'-95')	**Comparison localities** (HS Opening before 64' or no HS)	**Difference (2)-(1)**	**p-value (2)-(1)**
	(1)	(2)	(3)	(4)
Population per locality	4,795	3,207	-1,588	0.92
Young Population (ages 0-17)	2,918	1,731	-1,187	0.66
Years of education	4.29	4.62	0.33	0.09
Share Muslim	0.74	0.82	0.07	0.32
Share Druze	0.18	0.04	-0.14	0.04
Share Christian	0.07	0.14	0.07	0.19
Married	0.95	0.91	-0.04	0.00
Emp. Rate of men	0.86	0.85	-0.01	0.98
Emp. Rate of women	0.03	0.04	0.01	0.54
Northern District	0.67	0.68	0.01	0.45
Haifa District	0.23	0.18	-0.05	0.58
Central District	0.10	0.14	0.04	0.67
Number of localities with data from 1972 Census[1]	46	28		
Total Number of localities	49	40		

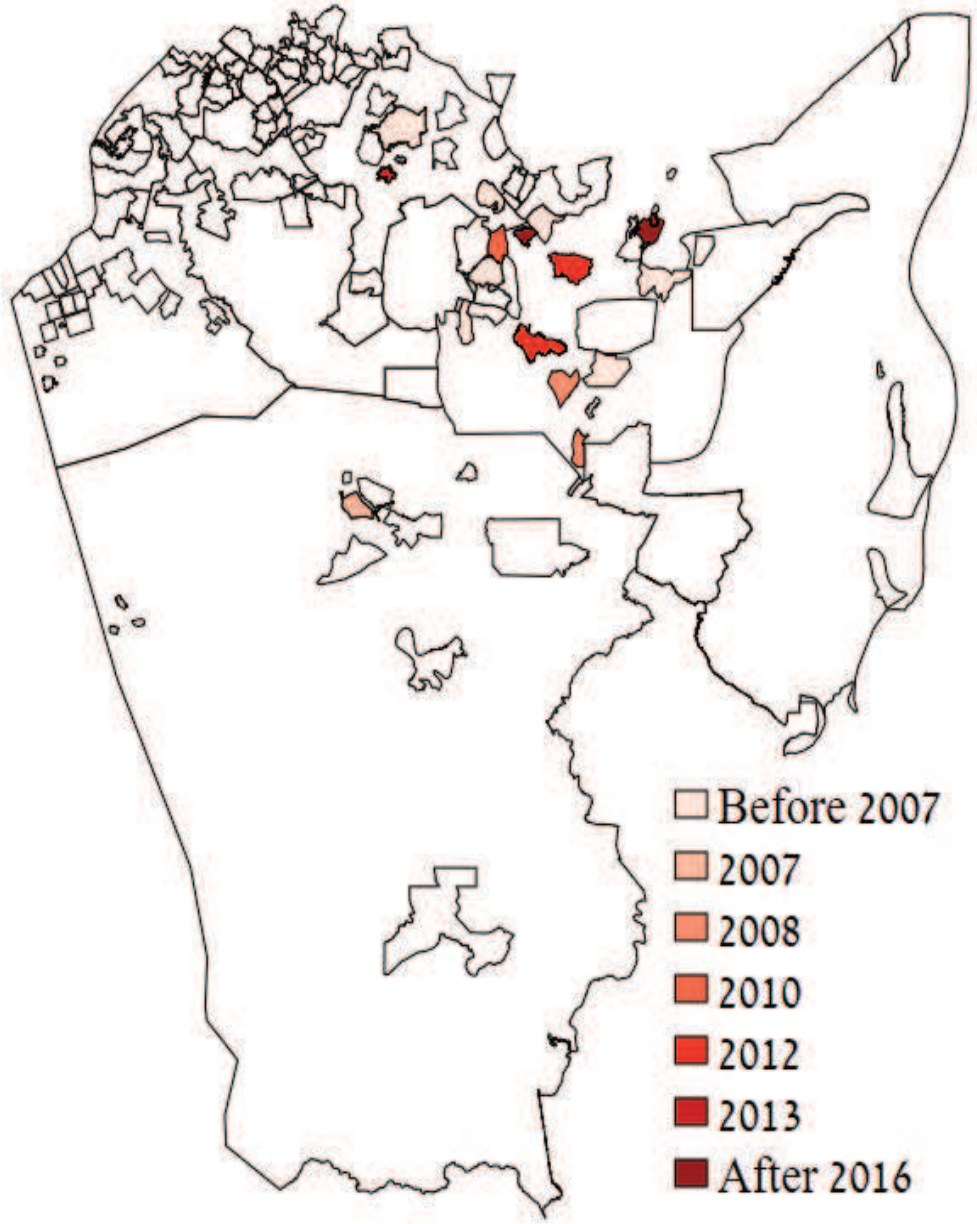
Notes: Localities' characteristics are taken from the 1972 Israeli Census of Population and Housing. The estimates are not weighted by 1972 locality population so that they can be interpreted as the shares of the average locality in the relevant category.

(1) There are 3 treatment and 12 comparison localities in the study that are excluded from this analysis as did not appear in the 1972 census. These are either Druze localities in the Golan heights or Bedouin communities from the North, that were not registered as localities during that time. Only 5% of the individuals in the study are from these localities. All results of the study are very similar when I include or exclude these localities.

[21] In most cases, it was the same as the official registered locality of the school, but not always, as schools that serve tribes in unrecognized villages are officially registered in other localities. E.g, in 2014 an high-school was officially opened in the city of Be'er Sheva but almost all students were from the A'sam tribe.

My identification assumption is that the timing of school opening is not correlated with other unobserved determinants of trends in future outcomes. In my estimates, I will perform various robustness tests on my results to support this assumption. A preliminary examination can already be obtained in Table 2 by using the 1972 and 1983 Israeli censuses and analyzing the relationship between the locality's characteristics and the presence or timing of school establishment prior to 1995.

Figure 7: The Rollout of High School Openings in Bedouin Communities in the Negev



Notes: The figure shows a map of the geographical distribution of the rollout of Negev-Bedouin school openings in Southern Israel. The figure does not include unrecognized villages due to data unavailability, although they are part of the estimations in the main results.

Column (2) of Table 2 shows that, after controlling for area fixed-effects, the significant determinants for predicting the timing of the establishment of the first high school are the population size in 1972 and the year of compulsory schooling. Therefore, I will control for the population size and include fixed effects for cohort × year of compulsory schooling in my main estimates, as explained in Section 0. The marriage rate among young people (proxy for traditionalism) is significantly correlated only when excluding the region fixed effects. In the extensive margin, the most significant determinant for the existence of local high-school in the end of the period (1995) is the population size. Men's employment rate (my closest proxy for SES status in 1972) is also marginally significant at the 10% level. Other characteristics from 1972, as well as changes in characteristics between 1972 and 1983, fail to significantly predict the timing of high school establishment. In my robustness checks I will also control for differential cohort effects for localities with different population size, employment, marriage rates of the young residents (18-30), and education rates of adults.

Figure 8 shows the evolution of upper secondary education in the treated localities. It is important to remember that the educational level of the Arabs also increased during this period for secular reasons unrelated to the opening of the local high schools. Thus, even for the cohorts who were too old to study when the local high school opened (18-21 years old), there is a pre-trend of rising educational attainment. However, for the cohorts who were 17 years old or younger when the local high school opened (at the end of the school-year), there is a clear increase in educational attainment that exceeds the pre-trend.[22]

[22] A 17-year-old individual (at the end of the school-year) is in the age of 11th grade (out of 12). Figure 8 and Figure 9 shows this is the oldest age which is still somewhat affected by the opening of a local high-school.

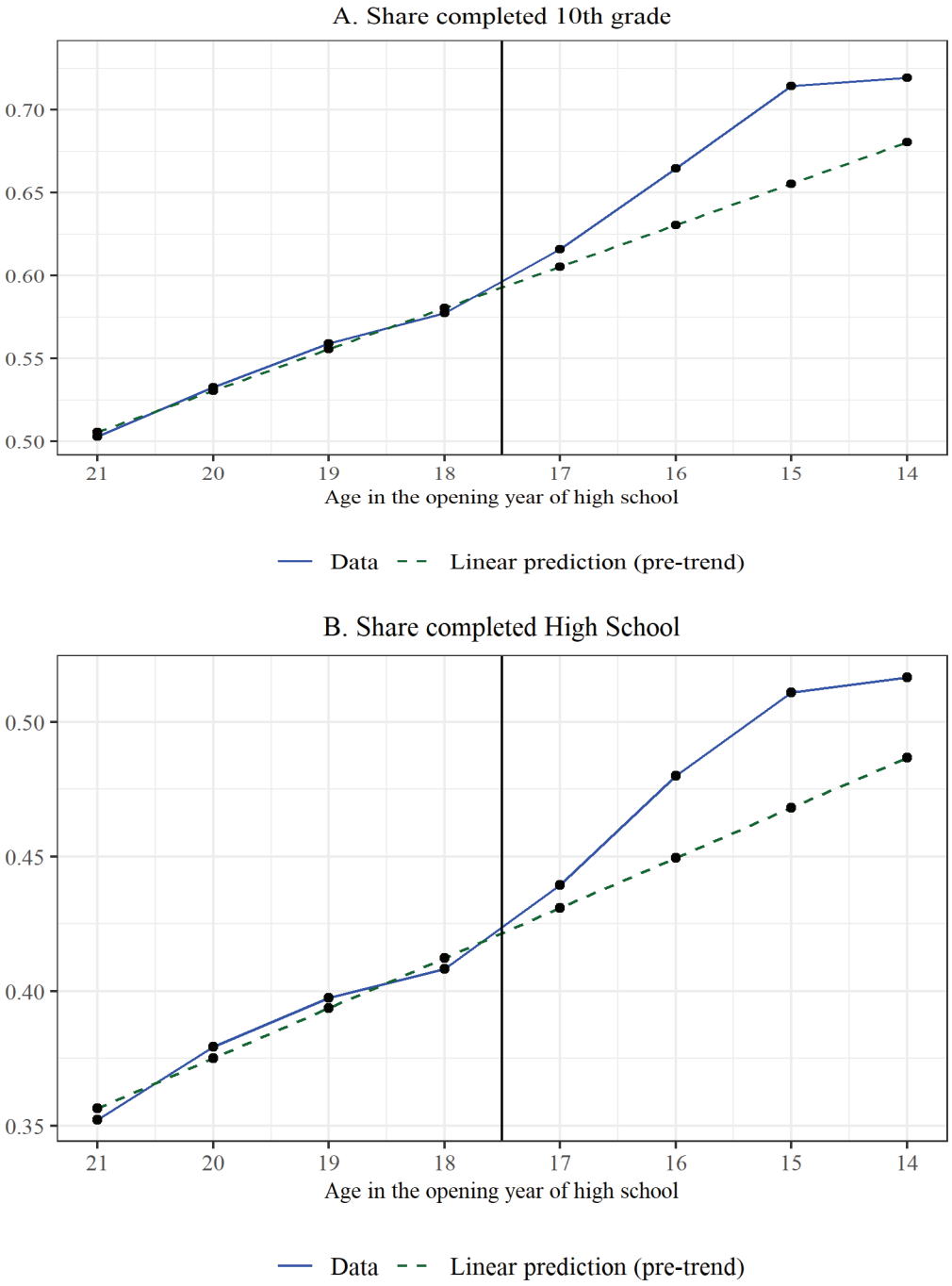
Table 2: The Relationship between Locality's Characteristics and Timing of School Opening

Historical Arab Sample, Not Including Bedouin of the Negev

Independent Variable	Year of School Opening	Year of School Opening	School Exists (before 1995)	School Exists (before 1995)
(Log) Total population in ages 0-17 (1972)	-8.747***	-7.637***	0.199***	0.220***
	(1.892)	(2.269)	(0.0402)	(0.0447)
Δ population in ages 0-17 (1972-1983)	1.775	-1.088	0.111	0.176
	(6.102)	(7.319)	(0.102)	(0.111)
No. of years of schooling (ages 30+, 1972)	-3.032	-2.452	-0.0688	-0.0392
	(1.907)	(2.546)	(0.0441)	(0.0517)
Δ No. of years of schooling (ages 30+, 1972-1983)	1.927	4.385	0.0382	0.0688
	(2.722)	(3.134)	(0.0583)	(0.0674)
Share Muslim in 1972	-9.423	4.271	-0.162	-0.0709
	(11.18)	(17.37)	(0.249)	(0.352)
Share Druze in 1972	-8.254	3.052	0.0398	0.181
	(11.74)	(15.77)	(0.258)	(0.341)
Employment Rate (Men, ages 25-64, 1972)	4.907	23.15	0.790	1.147*
	(22.78)	(33.56)	(0.492)	(0.606)
men's employment rates (1972-1983)	-5.676	-19.93	0.713	0.789
	(21.54)	(33.49)	(0.430)	(0.476)
Employment Rate (Women, ages 25-64, 1972)	-48.57	-53.02	0.260	0.149
	(34.11)	(45.47)	(0.720)	(0.856)
Δ Women's employment rate (1972-1983)	-0.452	-7.854	-0.230	-0.460
	(15.42)	(17.89)	(0.336)	(0.388)
Share married (ages 18-30) (1972-1983)	26.86*	16.33	0.412	0.459
	(15.44)	(19.94)	(0.436)	(0.504)
Δ Share married in ages 18-30 (1972-1983)	-7.973	0.772	0.173	0.299
	(14.59)	(22.03)	(0.333)	(0.371)
Year of Compulsory Schooling Law implementation	1.522**	1.535*	-0.0239*	-0.0266
	(0.707)	(0.876)	(0.0135)	(0.0171)
Region fixed effects	No	Yes	No	Yes
Number of localities	58	58	84	84

Notes: Columns 1 and 2 represent regressions of the year of a center opening on various locality's characteristics in 1972 or changes in locality's characteristics between 1972 and 1983. Columns 3 and 4 represent linear probability models on the likelihood of high school establishment before 1995. The data is collected from 1972 and 1983 CBS Census micro-data (1 in 5). Number of observations is higher in columns 1-2 compared to columns 3-4, because the latter ones also include places where no high-school existed by 1995.

Figure 8: Completion of 10th and 12th Grades, by Age in the End of the School-year of the First High School Opening



Notes: This figure presents the share of individuals who completed 10th Grade and completed high school, by the age they were at the end of the school year of the first high school in the locality. The estimation includes all localities where a high school was opened between 1972 and 1995. For example, if the first high-school was opened in 1979-1980, the cohort born in 1963 would receive a value of 17, the cohort born in 1964 would receive a value of 16, and so on.

6. Empirical Methodology

I use a difference-in-differences setup, exploiting the rollout of high schools across localities over time. My main empirical specification can be written as:

$$(1) \qquad y_{ilt} = \alpha + \beta HSAccess_{lt} + \gamma X_{ilt} + \delta CohortSize_{lt} + \lambda_{crt} + \eta_l + \varepsilon_{ilt}$$

Where *i* indexes the individual, *l* the locality of residence and *t* the birth-year and *r* is the region. $HSAccess_{lt}$ is an indicator variable with a value of 1 for the presence of a high school in the locality of residence at age 17 or younger (in end of the school-year), and 0 otherwise[23]; β is the main coefficient of interest for the effect of having an access to a local high school. X_{ilt} is a set of individual characteristics (gender, parents' years of education, religion, and number of siblings). $CohortSize_{lt}$ denotes the size of the cohort's population in the locality and controls for differential school-age population growth. η_l denotes locality fixed effects that capture time-invariant differences in characteristics across localities. λ_{crt} capture time-varying national or regional changes, and is a set of either fixed effects for cohort or fixed effects for cohort-by-area or fixed effects for cohort-by-area-by-year of implementation of compulsory schooling laws.

In order to capture the dynamic effect of school openings I also use a more flexible event-study specification:

$$(2) \qquad y_{ilt} = \boldsymbol{\alpha} + \sum_{\tau=13,\tau\neq18}^{\tau=22} \beta_\tau HS_{lt}^{\tau} + \gamma X_{ilt} + \delta CohortSize_{lt} + \lambda_{crt} + \eta_l + \theta I(\tau < 13) + I(\tau > 22) + \varepsilon_{ilt}$$

Where HS_{lt}^{τ} is an indicator equal to 1 if the individual was in age 17 *for exactly* τ *years* after a high school was opened in locality *l,* and 0 otherwise. The specification includes different coefficients for each age at high school opening, rather than estimating only the aggregated effect in all post-treatment cohorts. These estimates are intention-to-treat (ITT) effects of high school on outcomes for different cohorts, relative to the cohort who was 18 years old when the high school was opened (omitted $\tau = 18$).

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[23] For example, if the first school-year of the high-school in the locality was 1979/1980. Then cohorts 1950-1972 receive the value 0, and cohort 1973-1983 receive the value 1.

7. Results

7.1. Main findings: Historical Arab sample

First, I present the results for the historical Arab sample. Table 3 shows baseline estimates obtained from the regression of Equation (1) on completion of 10^{th}-12^{th} grade. Column 1 contains a simple difference-in-differences estimate, controlling only for locality and cohort fixed effects. Column 2 adds individual controls, column 3 adds control for the cohort population of locality and column 4 extends the cohort-effects with cohort-by-region effects. My preferred baseline estimates are in column 5, as they include fixed effects for cohort×region×year-of-compulsory-high-school-introduction, so this will be the default specification for the rest of the paper. However, the estimates are substantial and significant in the same direction also in the estimates with fewer controls as in columns 1-4. The fact that the estimates get smaller as we move from column (1) to column (5) points out the importance of taking into account factors correlated with school openings such as population size and compulsory schooling law implementation. The preferred estimates in column (5) show a relative increase of 7 percentage points in 10^{th} grade completion rate, and about 5.5 percentage points increase in high school completion rate.

Figure 9 plots event-study estimates of the effect of school openings on educational attainment using the baseline specification in Equation (2). The results provide no evidence of differential trends in treated localities for earlier cohorts who were in ages 18-21 when their local high school was established. Following the opening of local high school, education gradually increased in the treated localities. For example, Panel C shows that cohorts who were 17 years old at the end of the first school-year (11^{th} graders) were only about 3.5 percentage points more likely to complete high school, while the estimates for younger cohorts are about 6-7 percentage points.

Table 4 displays the estimated effects on educational attainment for boys and girls separately. I find that the effects on 10^{th}-12^{th} grade completion rates are higher for girls than for boys. For example, girls increased their probability to complete high school by 7 percentage points, the increase was only 4 percentage points, This is consistent with traditional social norms in Arab society which often do not allow girls to travel outside their place of residence. For example, in a study by Lavy and Zablotsky (2015) the removal of historical mobility restrictions increased the education of young girls by 0.5-1.0 years of schooling, while the effect on boys is small and insignificant.

Table 3: Effects of High School Openings on Enrollment and Completion of High School:

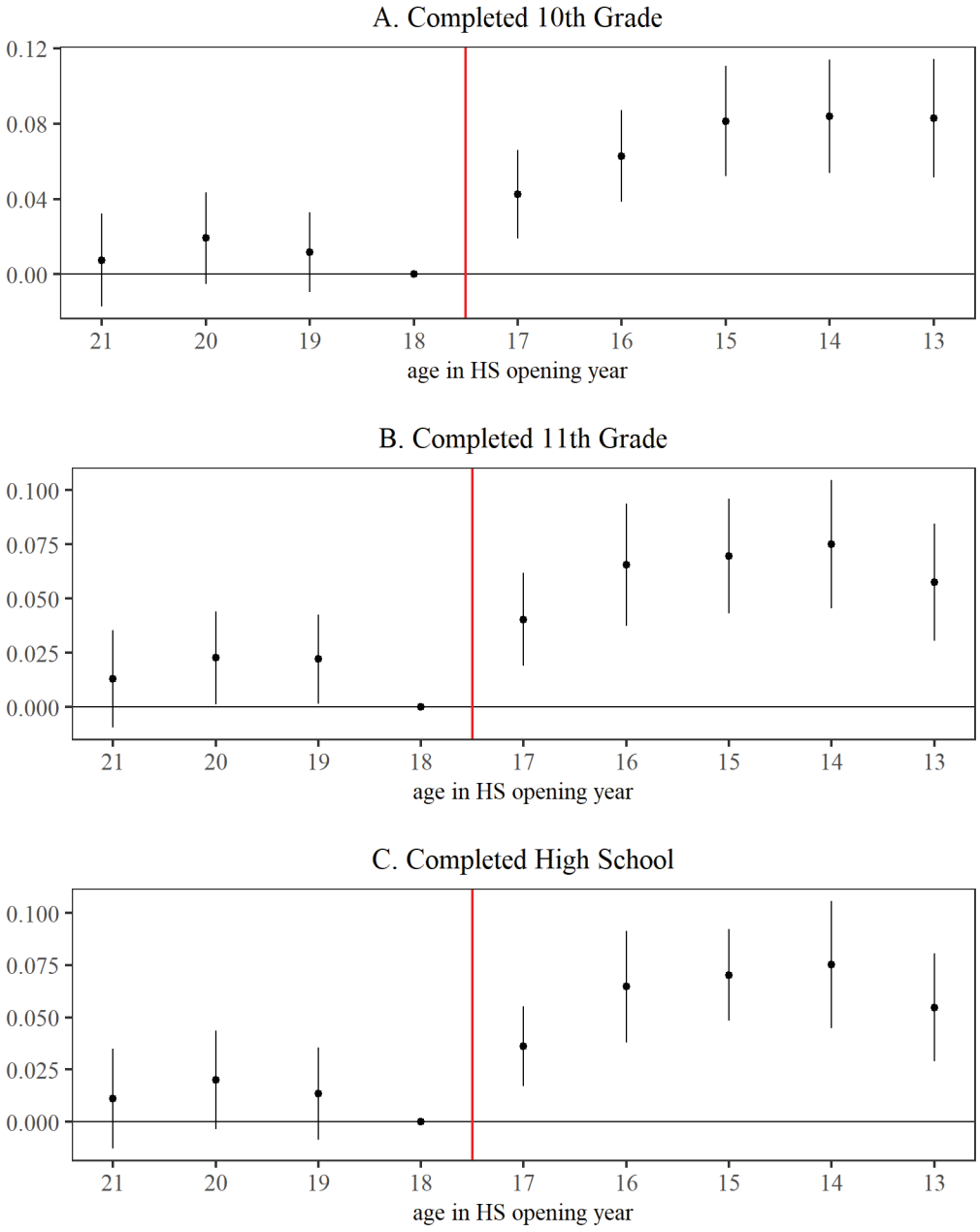
Historical Arab Sample, (HS Openings in 1972-1995)

	(1)	(2)	(3)	(4)	(5)
Panel A: Completed 10th Grade					
High school access	0.102***	0.105***	0.078***	0.070***	0.070***
	(0.021)	(0.021)	(0.017)	(0.015)	(0.019)
Mean outcome	0.577	0.577	0.577	0.577	0.577
Individual controls		X	X	X	X
Locality's population (cohort size)			X	X	X
Locality fixed effects	X	X	X	X	X
Type of cohort fixed effects	Cohort	Cohort	Cohort	Cohort × region	Cohort × region × compulsory HS introduction
No. of Localities	89	89	89	89	89
No. of observations (N)	316,322	316,322	316,322	316,322	316,322
Panel B: Completed 11th Grade					
High school access	0.071***	0.082***	0.063***	0.054***	0.054***
	(0.017)	(0.019)	(0.016)	(0.014)	(0.015)
Mean outcome	0.449	0.449	0.449	0.449	0.449
Individual controls		X	X	X	X
Locality's population (cohort size)			X	X	X
Locality fixed effects	X	X	X	X	X
Type of cohort fixed effects	Cohort	Cohort	Cohort	Cohort × region	Cohort × region × compulsory HS introduction
No. of Localities	89	89	89	89	89
No. of observations (N)	316,322	316,322	316,322	316,322	316,322
Panel C: Completed HS (12th Grade)					
High school access	0.060***	0.074***	0.058***	0.054***	0.055***
	(0.015)	(0.017)	(0.015)	(0.013)	(0.015)
Mean outcome	0.408	0.408	0.408	0.408	0.408
Individual controls		X	X	X	X
Locality's population (cohort size)			X	X	X
Locality fixed effects	X	X	X	X	X
Type of cohort fixed effects	Cohort FE	Cohort FE	Cohort FE	Cohort × region FE	Cohort × region × compulsory HS introduction
No. of Localities	89	89	89	89	89
No. of observations (N)	316,322	316,322	316,322	316,322	316,322

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence during childhood (Equation 1). Columns (2)-(5) include controls for parental education, number of siblings and religion. Columns (3)-(5) also control for cubic trends in cohort size in the locality. Mean outcome indicates the average for individuals aged 18 in the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Figure 9: Event-Study Estimates of the Effects of School Openings

Historical Arab Sample (HS Openings in 1972-1995)



Notes: Figures are based on an event-study specification (Equation 2) and plots the treatment effects of school openings on completion of various high school grades by age in the year the first high school was established in the locality. The vertical bars indicate 95% confidence intervals. The sample includes all Israeli Arabs born in 1950-1984 that live in non-Negev-Bedouin and non-mixed localities, as described in Section 4. The specification includes fixed effects for the locality and for cohort×region×year-of-compulsory-high-school-introduction, and controls for gender, parental education, number of siblings, and for cubic trends of cohort size in the locality. Standard errors are clustered at the locality level.

Table 4: Effects of School Openings on Educational Outcomes, by Gender,
Historical Arab Sample (HS Openings in 1972-1995)

Dependent Variable	All	Boys	Girls
Completed 10th Grade	0.070***	0.061***	0.080***
	(0.019)	(0.018)	(0.023)
	Mean=0.577	Mean=0.648	Mean=0.504
Completed 11th Grade	0.054***	0.039**	0.072***
	(0.015)	(0.015)	(0.019)
	Mean=0.449	Mean=0.512	Mean=0.382
Completed High School	0.055***	0.040***	0.071***
(12th Grade)	(0.015)	(0.014)	(0.018)
	Mean=0.408	Mean=0.466	Mean=0.348
Years of Education ≥ 13	0.011*	0.007	0.016**
(Proxy for Post-Secondary enrollment)	(0.006)	(0.007)	(0.008)
	Mean=0.173	Mean=0.212	Mean=0.132
Years of Education ≥ 15	0.012***	0.011**	0.013**
(Proxy for Academic Degree attainment)	(0.004)	(0.005)	(0.007)
	Mean=0.123	Mean=0.147	Mean=0.098
Number of localities	89	89	89
Number of observations (N)	316,322	163,262	153,060

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on educational outcomes (Equation 1). Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.

* p<.0.10, **p<0.05, *** p<0.01

Note also that the results reported in Table 4 document a positive effect of opening up high school not only on high school completion, but also on enrollment in post-secondary education, as I find that the share of individuals with 13 or more years of education increased by about 1.1 percentage point. I find similar results (1.2 percentage points/10% increase) for completing 15 years of education or more, which is a proxy for attaining an academic degree (B.A.), as Israeli degrees require at least 3 years of academic post-secondary studies.

Next, I analyze the effects of high school openings on labor market outcomes. I measure data on labor market outcomes at ages 33-35, because I have consistent data across cohorts for these years. The results in column 3 of Table 5 indicate an increase of 0.04 years or 0.6 months of employment in ages 33-35 for women. These are statistically significant effects, although quite small in absolute terms. Thus, it appears that openings of schools had a fairly limited effect on overcoming cultural and traditional barriers to labor market participation of Arab women.[24] The estimated effects on earnings in Table 5 are significant, with a relative magnitude of about 11%. However, in absolute term, it is an increase of about 1,617 NIS (in 2019 terms, equivalent of 450 Dollars) per year. If we take account of the fact that women employment share was low (about 25% of the total months per year, on average), then for a full-time employment this is about an increase of about 1800 US dollars per year (2019). For men, however the effect on employment and earnings is insignificant. With a 95% confidence interval, I rule out effects of over 1.6% in employment and 3.3% in average annual earnings.

[24] See discussion of cultural barriers to employment of Arab women in Yashiv and Kasir, 2013.

Table 5: Effects of School Openings on Labor Market Outcomes, by Gender,
Historical Arab Sample (HS Openings in 1972-1995)

	(1)	(2)	(3)
Dependent Variable	**All**	**Men**	**Women**
Ever employed in ages 33-35	0.002	-0.003	0.009
(At least one month)	(0.006)	(0.008)	(0.009)
	Mean=0.610	Mean=0.807	Mean=0.403
Total years employed in ages 33-35	0.012	-0.010	0.039*
	(0.015)	(0.023)	(0.024)
	Mean=1.543	Mean=2.120	Mean=0.936
Total months employed in aged 33-35	0.188	-0.177	0.633**
	(0.157)	(0.263)	(0.257)
	Mean=15.156	Mean=21.322	Mean=8.675
Mean annual earnings in ages 33-35	581	-382	1,617**
(=0 for individuals with no	(687)	(1112)	(668)
earnings)	Mean=35,213	Mean=54,982	Mean=14,433
Log annual earnings in ages 33-35	0.038**	0.004	0.109**
(Excl. individuals with no	(0.019)	(0.018)	(0.046)
earnings)	Mean=10.383	Mean=10.724	Mean=9.665
Number of localities	89	89	89
Number of observations (N)	316,322	163,262	153,060
Number of observations (N) with positive earnings in ages 33-35	205,263	130,817	74,446

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on labor market outcomes (Equation 1). Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.* p<.0.10, **p<0.05, *** p<0.01

I now examine the heterogeneity of the effect of high schools in different types of localities. To do so, I use the baseline specification in equation (1), where the main coefficient of interest interacts with the following characteristics of the locality: Population size above 4,000, above/below the median distance to the nearest locality with a high school (before the local school opened), Druze localities, above the median education level in 1972, above the median employment rate of men in 1972 (proxy for socioeconomic status) [25], above the median share of married persons aged 18-30 as a proxy for traditionalism. Table 6 shows that for most dimensions, there is no statistically significant heterogeneity in the short-term effects of high school on 10th-12th grade completion. Thus, it appears th t the direct positive effects of high school supply are significant in all types of localities. The only statistically significant heterogeneity we find, relates to the odds of completing 10^{th} grade, where I find a higher effect for localities that were farther from other localities with high-school, before the local high school was opened.

However, I find some interesting patterns of heterogeneity in the effects on long-term outcomes, as shown in Table 7. There is some evidence of significant differences in the effects on labor market outcomes between the Druze community and the rest of the Arabs. Unlike the rest of the Arab population, there is a positive significant effect on employment and earnings for Druze men, and not just for women (Panel B, columns 2 and 3).[26] Another significant determinant of heterogeneity, is men's employment rate, as localities with low employment rate were more likely to increase their post-secondary enrollment rates (Panel E). No other interesting heterogeneity was found for the remaining outcomes.

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[25] In Table 7 I also include the results for the heterogeneity of the effect for a low or high aggregate socioeconomic ranking from 1995, the earliest year for which such official ranking is available from the CBS. The results are very similar to the results for heterogeneity by men's employment rate in 1972, although they are available for fewer localities (59), because small localities are excluded from this ranking.

[26] In Table A2 in the Appendix, I estimate the main results using a sample of only Muslim Arabs in localities with a Muslim majority finding they are very similar to the main results.

Table 6: Heterogeneity in the Effect of School Openings on High School Educational Attainment

Historical Arab Sample (HS Openings in 1972-1995)

	Completed 10th Grade	Completed 11th Grade	Completed 12th Grade
	(1)	(2)	(3)
Panel A: heterogeneity by pop. size			
HS access	0.065***	0.048***	0.044***
	(0.017)	(0.015)	(0.014)
HS access × High pop. size	0.050	0.038	0.061
	(0.043)	(0.058)	(0.064)
Panel B: heterogeneity by distance			
HS access	0.076***	0.059***	0.060***
	(0.016)	(0.016)	(0.016)
HS access × distance ≥ median (1972)	0.084**	0.022	0.017
	(0.037)	(0.029)	(0.026)
Panel C: heterogeneity by religion			
HS access	0.080***	0.046**	0.045**
	(0.025)	(0.019)	(0.018)
HS access × Druze locality	-0.042	-0.009	-0.011
	(0.028)	(0.025)	(0.027)
Panel D: heterogeneity by education			
HS access	0.082***	0.058***	0.055***
	(0.018)	(0.017)	(0.017)
HS access × yrs of educ ≥ median (1972)	-0.036	-0.019	-0.020
	(0.030)	(0.032)	(0.033)
Panel E: heterogeneity by employment rate			
HS access	0.087***	0.063***	0.057***
	(0.020)	(0.017)	(0.015)
HS access × men emp. Rate ≥ median (1972)	-0.026	-0.014	-0.010
	(0.039)	(0.036)	(0.033)
Panel F: heterogeneity by SES ranking[1]			
HS access	0.091***	0.052***	0.052***
	(0.021)	(0.019)	(0.019)
HS access × above median socioeconomic index	-0.046	-0.013	-0.015
	(0.030)	(0.030)	(0.031)
Panel G: heterogeneity by traditionalism			
HS access	0.064***	0.066***	0.055***
	(0.015)	(0.015)	(0.015)
HS access × Share married (18-30) ≥median (1972)	0.034	-0.010	0.001
	(0.030)	(0.026)	(0.025)
Mean Outcome	0.563	0.439	0.400
Number of observations	299,499	299,499	299,499
Number of localities	74	74	74

(1) CBS socio-economic ranking for the year 1995, the earliest year for which such a ranking is available.

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on educational outcomes (based on Equation 1), adding interaction for various heterogeneity dimensions. Fixed effects for locality are included. Controls include cohort×region×year-of-compulsory-high-school-introduction fixed effect and cubic trend of cohort size in the locality interacted with the relevant heterogeneity dimension. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table 7: Heterogeneity in the Effect of School Openings on Long-term Outcomes

Historical Arab Sample (HS Openings in 1972-1995)

	Postsec. Education	Months of work (men)	Real annual Wages (men)	Months of work (women)	Real annual Wages (women)
Panel A pop. size					
HS access	0.017**	0.027	1,211	0.881**	1,984**
	(0.007)	(0.354)	(1,168)	(0.343)	(947)
HS access ×	-0.017	-1.295	-6,283**	-0.256	-1,599
high pop. size	(0.013)	(0.872)	(2,915)	(0.721)	(1,680)
Panel B: distance to closest locality with HS					
HS access	0.014*	-0.316	-931	0.773**	1,186
	(0.008)	(0.411)	(2,076)	(0.350)	(954)
HS access ×	-0.005	0.384	132	-0.237	1,926
high pop. size	(0.011)	(0.539)	(2,335)	(0.797)	(1,856)
Panel C: religion					
HS access	0.003	-0.342	-1,872	0.547**	464
	(0.007)	(0.280)	(1,225)	(0.256)	(1,788)
HS access ×	0.018	2.834***	11,644***	-1.263**	1,200
Druze locality	(0.013)	(0.576)	(3,242)	(0.550)	(1,939)
Panel D: education					
HS access	0.007	-0.451	370	0.479	1,549**
	(0.008)	(0.366)	(2,777)	(0.319)	(736)
HS access ×yrs of educ ≥ median (1972)	-0.001	0.411	1,556	0.646	-1,695
	(0.013)	(0.607)	(4,816)	(0.566)	(2,000)
Panel E: employment rate					
HS access	0.022**	-0.305	-22	0.680	1,119
	(0.009)	(0.417)	(1,542)	(0.424)	(1,123)
HS access × men emp. rate ≥ median (1972)	-0.024**	0.090	-729	0.178	1,530
	(0.012)	(0.573)	(2,175)	(0.600)	(1,598)
Panel F: Socioeconomic index of 1995					
HS access	0.010	-0.285	-260	0.670*	2,745***
	(0.009)	(0.446)	(1,897)	(0.336)	(981)
HS access ×SES ranking ≥ median (1972)	0.009	-0.216	-1,197	0.339	-1,247
	(0.015)	(0.590)	(2,603)	(0.625)	(1,899)
Panel G: traditionalism					
HS access	0.016	-0.430	-2,374	0.877*	1,188
	(0.012)	(0.394)	(1,727)	(0.482)	(1,210)
HS access × haremarried (18-30) ≥median (1972)	0.003	0.340	1,835	-0.426	-115
	(0.014)	(0.527)	(2,225)	(0.608)	(-1,671)
Mean Outcome	0.173	21.462	56,176	24.096	14,046
Number of observations	299,499	154,448	154,448	145,051	145,406
Number of localities	74	74	74	74	74

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on educational outcomes (based on Equation 1), adding interaction for various heterogeneity dimensions. Fixed effects for locality are included. Controls include cohort×region×year-of-compulsory-high-school-introduction fixed effect and cubic trend of cohort size in the locality interacted with the relevant heterogeneity dimension. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

7.2. Main findings: Contemporary Negev Bedouin Sample

The next set of results focuses on estimating the effects for the Negev Bedouin population for whom schools were opened during 2007-2014. The first column of Table 8 reports the results of the baseline difference-in-differences estimation with fixed effects for locality and for cohort. The second column adds the covariates (as described in Section 0), the third column controls for cohort size and the fourth columns controls for different trajectories according to year of implementation 12th grade compulsory schooling laws. The results in all specification are similar, and indicate an increase of about 4 percentage points in 10th grade completion, 7 percentage points in 11th grade completion, and 6 percentage points in 12th grade completion. The results on the effects on the completions of 11th and 12th grades, are quite similar to those presented earlier in Table 3 for the historical Arab sample, despite the later time period (2000-2010s compared to 1970s-1990s) and the very different characteristics of the Negev Bedouin compared to the rest of the Arabs. However, the estimated effect on completion of 10th grade is lower for the Negev Bedouin than for the historical Arab sample (5 percentage points vs 7 percentage points). This reflects the fact that this grade was already compulsory prior to school openings in the 2000s (although not fully enforced among the Bedouin), unlike the times of high-school for a substantial period of time in the historical Arab sample.

Table 8: Effects of High School Openings on Enrollment and Completion of High School:

Contemporary Negev Bedouin Sample (HS Openings in 2007-2014)

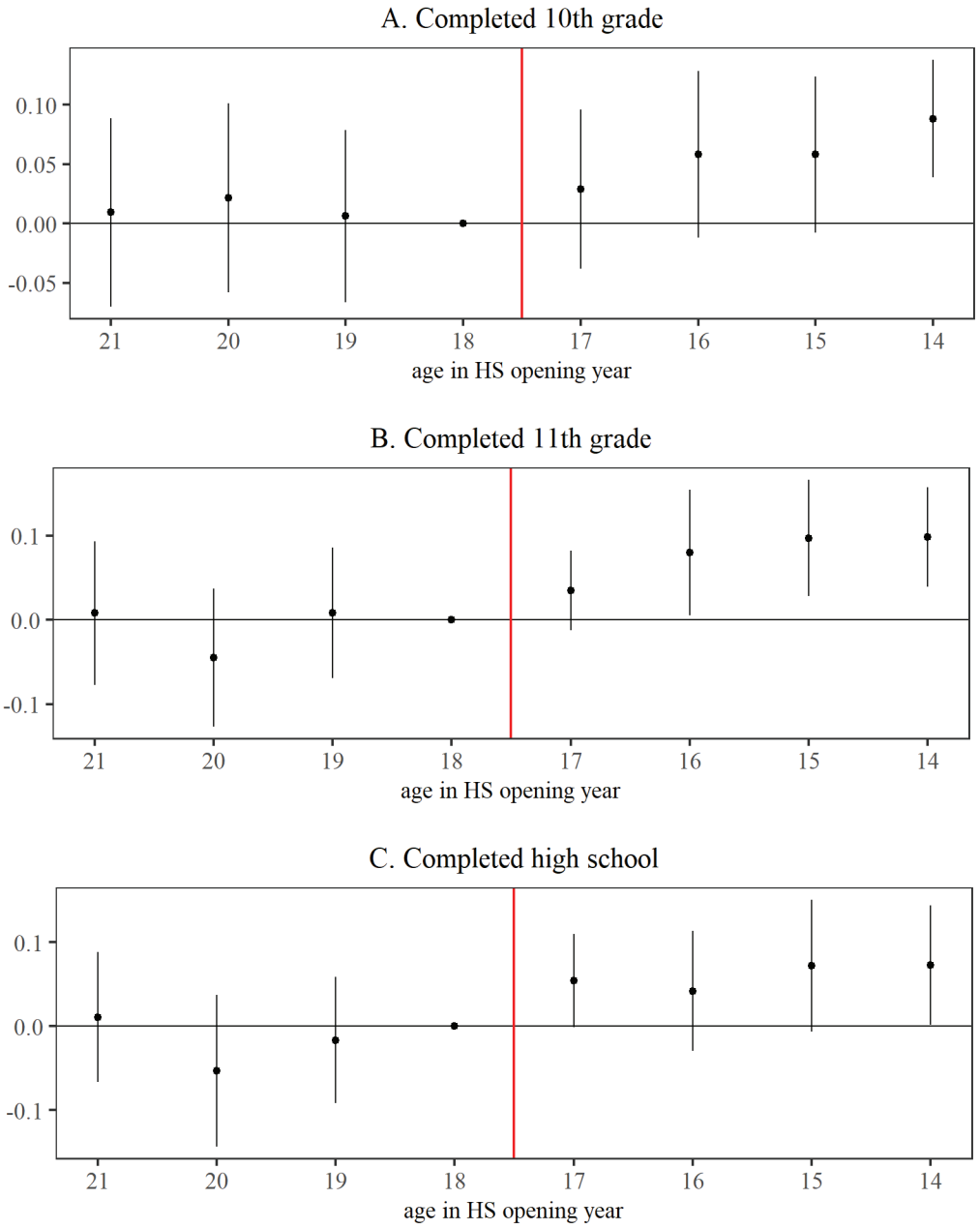
	(1)	(2)	(3)	(4)
Panel A: Completed 10th Grade				
High school access	0.051***	0.055***	0.049***	0.052***
	(0.016)	(0.016)	(0.017)	(0.009)
Mean outcome	0.695	0.695	0.695	0.695
Individual controls		X	X	X
Locality's population (cohort size)			X	X
Locality fixed effects	X	X	X	X
Type of cohort fixed effects	Cohort	Cohort	Cohort	Cohort × compulsory 12th grade introduction
Panel B: Completed 11th Grade				
High school access	0.073***	0.076***	0.075***	0.083***
	(0.015)	(0.015)	(0.015)	(0.014)
Mean outcome	0.648	0.648	0.648	0.648
Individual controls		X	X	X
Locality's population (cohort size)			X	X
Locality fixed effects	X	X	X	X
Type of cohort fixed effects	Cohort	Cohort	Cohort	Cohort × compulsory 12th grade introduction
Panel C: Completed 12th Grade				
High school access	0.066**	0.069**	0.064**	0.071***
	(0.028)	(0.028)	(0.027)	(0.022)
Mean outcome	0.596	0.596	0.596	0.596
Individual controls		X	X	X
Locality's population (cohort size)			X	X
Locality fixed effects	X	X	X	X
Type of cohort fixed effects	Cohort	Cohort	Cohort	Cohort × compulsory 12th grade introduction
No. of localities	35	35	35	
No. of observations (N)	54,800	54,800	54,800	

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence during childhood (Equation 1). Columns (2)-(5) include controls for parental education, number of siblings and religion. Columns (3)-(5) also control for cubic trends in cohort size in the locality. Mean outcome indicates the average for individuals aged 18 in the year of school opening. The sample includes all Negev Bedouin Arabs born in 1987, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.

Also, the event-study in Figure 10 show no evidence of differential pre-trends between the treated and the comparison localities, and reveals a gradually increasing effect. The results in Table 9 show that, unlike the historical Arab sample, the effect on educational attainment was more significant for boys than it was for girls. I also observe a very significant effect of 7 percentage points for eligibility for a matriculation diploma. However, I find no effect on postsecondary academic education. Thus, I can conclude that while the establishment of Bedouin high schools in the Negev benefitted many students, it did not have a significant effect on higher achieving individuals who were on the margin of enrollment in postsecondary institutions.

Figure 10: Event-Study Estimates of the Effects of School Openings

Contemporary Negev Bedouin Sample (HS Openings in 2007-2014)



Notes: Figures are based on an event-study specification (Equation 2) and plots the treatment effects of school openings on completion of various high school grades by age in the year the first high school was established in the locality. The vertical bars indicate 95% confidence intervals. The sample includes all Negev Bedouin born in 1987-1999, as described in Section 4. The specification includes fixed effects for the locality and for cohort ×year-of-compulsory-high-school-introduction, and controls for gender, parental education, number of siblings, and for cubic trends of cohort size in the locality. Standard errors are clustered at the locality level.

Table 9: Effects of School Openings on Educational Outcomes, by Gender

Contemporary Negev Bedouin Sample (HS Openings in 2007-2014)

Dependent Variable	**All**	**Boys**	**Girls**
	(1)	(2)	(3)
Completed 10th Grade	0.053***	0.061**	0.047*
	(0.009)	(0.025)	(0.026)
	Mean=0.695	Mean=0.828	Mean=0.556
Completed 11th Grade	0.083***	0.107***	0.062**
	(0.014)	(0.028)	(0.029)
	Mean=0.648	Mean=0.757	Mean=0.533
Completed High School (12th Grade)	0.071***	0.104***	0.038
	(0.022)	(0.034)	(0.028)
	Mean=0.596	Mean=0.677	Mean=0.511
Participated in the matriculation exams	0.020	0.026	0.017
	(0.024)	(0.023)	(0.031)
	Mean=0.459	Mean=0.436	Mean=0.482
Any matriculation diploma	0.067**	0.080***	0.055
	(0.031)	(0.025)	(0.040)
	Mean=0.200	Mean=0.107	Mean=0.297
University-eligible matriculation diploma	0.012	0.024**	0.001
	(0.011)	(0.011)	(0.015)
	Mean=0.121	Mean=0.054	Mean=0.191
Post-secondary academic student by age 21	0.002	0.007	-0.003
	(0.010)	(0.006)	(0.016)
	Mean=0.037	Mean=0.027	Mean=0.048
Number of localities	35	35	35
Number of observations (N)	54,797	27,897	26,900

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on educational outcomes (Equation 1). Fixed effects for locality and for cohort×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Negev Bedouin born in 1987-1999 in communities where school was opened after 2007 or never opened, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.* p<.0.10, **p<0.05, *** p<0.01

However, the benefits of high school enrollment need not be merely academic. Table 10 illustrates the contribution that the opening of high schools has made to the decline in juvenile crime among Bedouin boys. The estimated decrease is both in the probability of having any criminal juvenile record, as well as in the number of criminal records.[27] The strongest effect (3 pp, about 2.3%) was found for property offenses, the most common offenses. A significant decrease was found also for security and order offenses, and for administrative or other offenses, but not for offenses of violent crime. These estimates are similar in magnitude to the findings of Anderson (2014) regarding the effects of compulsory high school laws on Juvenile arrests. In the absence of data on adult crime, it is not possible to determine whether the observed effect is transitory or persists into adulthood, leaving the question open for future research.[28] The effect of the crime rates among girls is effectively zero and us not presented here due to the very low crime rate among females in the sample (less than 1%).

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[27] I cannot rule out an option that some of the observed decrease is due to "police reporting effect" as it could be that police officers have lower tendency to report offenses committed by individuals who attend schools.

[28] According to the "incapacitation effect", keeping teenagers in school decreases the time and opportunity available to commit crimes. According to the" human capital effect", education may reduce crime by reducing it future wage opportunity cost, and may also increase risk aversion or psychic costs of crime. See discussion in Anderson (2014) and Lochner (2010).

Table 10: Effects of School Openings on Juvenile Crime Outcomes of Boys in ages 16-19

Contemporary Negev Bedouin Sample (HS Openings in 2007-2014)

Dependent Variable	**Any Criminal Record**	**No. of Criminal Records**
Criminal juvenile offense (all types)	-0.023	-0.248*
	(0.015)	(0.124)
	Mean=0.175	Mean=0.635
Property Offense	-0.030**	-0.219**
	(0.012)	(0.102)
	Mean=0.130	Mean=0.475
Violent Offense	-0.009	-0.006
	(0.007)	(0.012)
	Mean=0.040	Mean=0.054
Security/order offense	-0.031	-0.075**
	(0.019)	(0.030)
	Mean=0.083	Mean=0.167
Any administrative/other offense	-0.010**	-0.012**
	(0.004)	(0.006)
	Mean=0.009	Mean=0.010
Number of localities	35	
Number of observations	27,897	

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on juvenile crime offenses of boys (Equation 1). Fixed effects for locality and for cohort×year-of-compulsory-high-school-introduction are included. Individual controls parental education, number of siblings and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Negev Bedouin born in 1987-1999, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.

8. Robustness tests

I perform several robustness tests to validate my results. My baseline estimates assume similar trends between the treated and comparison localities. However, this assumption can be partially relaxed by assuming different linear trends between localities, although it is also problematic to explicitly control for locality-specific linear trends when the treatment effect is varying over time. This is because a gradually increasing effect between cohorts can be mistaken as a locality-specific trend, attenuating the estimated effects toward zero. (See, e,g., Neumark et al. 2014; Meer and West 2016; Goodman-Bacon, 2021).

To overcome this bias, I use an approach which is along the lines of Lundborg et al. (2021) and Lee and Solon (2011). First, I estimate a regression model for the different outcomes, as a function of linear trends in each locality separately, but only for the pre-treatment cohorts who did not have an access to a local high school in the locality, I use the coefficients from these regressions to predict pre- and post- treatment outcomes for all cohorts. Finally, I include the predicted trends as control variables in my DiD regression. Tables A3 and A4 report results for the specifications that include locality-specific pre-trends finding that the point-estimates and statistical significance are very similar to the baseline estimates.

As was discussed earlier, substantial measurement errors exist for the places of residence in the Bedouin population, Therefore, in Table A5 I examine the effect of school openings in a sample which excludes Bedouin tribes in unrecognized villages, and use only the largest Bedouin towns as comparison groups. I find very similar results to the baseline estimates.

I showed earlier (in Table 2) that the timing of school opening is significantly correlated with the size of the locality. Although I control for changes in locality's cohort size in all of my estimation, it could still be argued that differences in the *initial* population size of the localities was the main driver for the different trajectories of outcomes in treated localities. Therefore, column (2) in Table A6 presents results of an alternative model, interacting the cohort effects of the baseline model with an additional term for three categories of locality size (0-5,000 ; 5,000-10,000; 10,000 or more), avoiding Difference-in-differences comparisons between localities with very different population size. Results remain very similar to the baseline estimates. In columns (3) and (4) of Table A6. in a similar manner, I control for different trajectories of localities by initial employment or traditionality status in 1972, as those two characteristics were marginally significant

(Previously in Table 2) in predicting the opening and the timing of high-school establishments. Most results do not change in any significant way.

Table 11 presents a falsification test, examining outcomes that should not be affected by high school openings: completion of earlier school grades (5^{th}-8^{th}). All the relevant estimated are not significant at the 5% level, which reassures that I am not capturing an increase in education that is unrelated to secondary education.

As mentioned earlier, individuals with missing information on the number of years of education are excluded from the analysis. This potentially could lead to bias, if the missing values are not random and the probability of having a missing education value is correlated with school openings. In Table A7, I examine the effect of school openings on the presence of a non-missing education outcome in the data. Reassuringly, I find a precisely estimated null effect. Moreover, Table A8 shows that the results remain similar when I impute either 0 or 1 for the main dummy outcomes of the study.

The effects of local high schools may not be limited only to the first school established, but also to later schools. Only nine localities in the historical Arab sample had more than one high-school at the end of the period, and only in six of them, the later schools were built during the period of the study. Therefore, it is not very common. Nonetheless, I present results in Table A9, where I add a specification with the marginal effects of the first versus the second high school.[29] The estimated marginal effect of the second high school is smaller than the effect of the first high-school. It is also statistically insignificant, likely due to the low number of localities where a second high school was established.

Additionally, it could be argued the opening of a high-school within a locality not only affects the locality itself, but also has positive spillovers to other nearby localities without prior high-schools. Therefore, using the latter localities as comparison localities may lead some downward bias in the estimated effect. To assess the importance of this claim, in Table A10 I compare my baseline estimates with additional estimates of specifications where I control for the distance to the nearest locality without a high-school. Thus, I check the effect of school *independent* of the effect of reducing distance to the nearest locality with a high-school. I find that the main estimates remain relatively similar.

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[29] Nazareth is a major outlayer with many private Christian high-schools, so it was not taken into account as a treated locality in these estimates. Otherwise, all localities had no more than two high schools at the end of the period.

Table 11: Effects of School Openings on Pre- High School ("Placebo") Outcomes

Dependent Variable	Historical Arab Sample	Contemporary Negev Bedouin Sample
	(1)	(2)
Completed 6th grade	0.011	0.003
	(0.008)	(0.007)
	Mean=0.944	Mean=0.972
Completed 7th grade	0.015	0.014
	(0.011)	(0.013)
	Mean=0.906	Mean=0.952
Completed 8th grade	0.017	0.015
	(0.012)	(0.015)
	Mean=0.865	Mean=0.917
Completed 9h grade[1]		0.002
		(0.023)
		Mean=0.854

(1) The outcome of 9th grade completion is presented only for the Bedouin sample, as this grade was an integral part of high school for many localities in the historical Arab sample.

Notes: This table reports estimates of a falsification test for examining the effects of having an access to a local high school at age 17 or younger in the locality of residence during childhood (Equation 1) on outcomes that are determined prior to high school enrollment. The includes fixed effects for the locality. For the historical Arab sample, Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. For the Negev Bedouin sample, I include fixed effects for cohort. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Columns (2) and (4) also include controls for predicted outcomes based on pre-treatment trends, as described in Subsection 8 Mean outcome indicates the average for individuals aged 18 in the year of school opening. Standard errors clustered at the locality level are reported in parentheses.

I also address issues raised in recent econometric work about possible biases in a staggered Difference-in-Differences design where there is heterogeneity in the treatment effect across different units. In such a setting, the standard two-way fixed effects estimates may include negative weights for some of the treatment effects (Goodman-Bacon, 2021; Roth et al., 2022).[30] This may also bias lead and lag coefficients in event studies where all treated individuals are pooled across groups (Sun and Abraham, 2021). In Figures A1-A4 in the Appendix I compare estimates of the standard two-way fixed-effects estimates with alternative methods proposed by Sun and Abraham (2021) and

[30] Such bias is caused by "forbidden comparisons" where early treated units serve as controls for late treated units, where in fact their treatment effect is dynamic and changes over time (Roth et al. 2021).

Callaway and Sant'Anna (2021).[31] The results show very similar patterns to my main estimates.

9. Summary and Conclusions

In this study, I estimated the causal effect of high school openings in the Arab society in Israel. Although secondary schooling has spread worldwide in recent decades, very few economic studies to date have examined the effects of geographic access to high school on future outcomes, and none of them have examined the long-term effects, beyond school enrollment and graduation. Combining novel data on historical high school openings with detailed administrative data on individuals' short- and the long- term outcomes, I examined the effect of high school openings for both the main sample of Israeli Arabs in the 1972-1995 period and for poorer sample of the Negev Bedouin after 2007.

I found that opening a high school within a locality increases high school enrollment and graduation. The effect on the high school completion rate is about 5-7 percentage points which is about 10-11% over the baseline rates. I also find a marginally significant increase in matriculation rates of Bedouin, as well as a decline in juvenile violent crime.

In the long run, for the historical Arab sample, I found that individuals who had access to a high school in their locality of residence were more likely to pursue post-secondary education. I also observed an increase in women's employment and earnings for all Arabs groups. Among men, only Druze significantly improved their labor-market outcomes. Altogether, these findings suggest that geographic access to secondary education is beneficial in multiple ways, beyond its effect on short-term school enrollment.

The findings of this study underscore the role and importance of the geographic barrier to education, particularly for disadvantaged communities with low educational and socioeconomic backgrounds. This is true both in the local Israeli context, where 30-40% of the Negev Bedouin minority live in unrecognized communities without access to high school, and in the global context where secondary school enrollment is around 64% (80% in the OECD countries) and therefore high school dropout remains a key challenge for policy makers.

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[31] In order to ease computational load, I collapse and demean all data at the locality-cohort level.

Bibliography

Abu-Qarn, Aamer, and Shirlee Lichtman-Sadot. 2022. "The trade-off between work and education: evidence from public transportation penetration to Arab towns in Israel." *Journal of Policy Analysis and Management* (Wiley Online Library) 41: 193–225.

Akresh, Richard, Daniel Halim, and Marieke Kleemans. 2018. "Long-term and intergenerational effects of education: Evidence from school construction in Indonesia." Tech. rep., National Bureau of Economic Research.

Al-Haj, Majid. 1995. *Education, Empowerment, and Control: The Case of the Arabs in Israel.* SUNY Press.

Almasi, Oriana and Weissblei, Eti. 2020. "Bedouin population in the Negev: data summary." Tech. rep., The Knesset Research and Information Center, Jerusalem.

Anderson, D. Mark. 2014. "In school and out of trouble? The minimum dropout age and juvenile crime." *Review of Economics and Statistics* (The MIT Press) 96: 318–331.

Angrist, Joshua D., and Alan B. Krueger. 1992. "The effect of age at school entry on educational attainment: an application of instrumental variables with moments from two samples." *Journal of the American statistical Association* (Taylor & Francis) 87: 328–336.

Bank of Israel. 2017. "Annual Report 2016, Chapter 8, Welfare Issues." Jerusalem.

—. 2021. "Annual Report 2020, Chapter 7, Welfare Policy Issues." Jerusalem.

Barak, Arnon. 2019. "The effect of public transportation on employment in Arab society." *Bank of Israel Discussion Paper 2019.03.*

Bhuller, Manudeep, Magne Mogstad, and Kjell G. Salvanes. 2017. "Life-cycle earnings, education premiums, and internal rates of return." *Journal of Labor Economics* (University of Chicago Press Chicago, IL) 35: 993–1030.

Black, Sandra E., Paul J. Devereux, and Kjell G. Salvanes. 2008. "Staying in the classroom and out of the maternity ward? The effect of compulsory schooling laws on teenage births." *The economic journal* (Oxford University Press Oxford, UK) 118: 1025–1054.

Böhlmark, Anders, and Matthew J. Lindquist. 2006. "Life-cycle variations in the association between current and lifetime income: Replication and extension for Sweden." *Journal of Labor Economics* (The University of Chicago Press) 24: 879–896.

Burde, Dana, and Leigh L. Linden. 2013. "Bringing education to Afghan girls: A randomized controlled trial of village-based schools." *American Economic Journal: Applied Economics* 5: 27–40.

Callaway, Brantly, and Pedro H. C. Sant'Anna. 2021. "Difference-in-differences with multiple time periods." *Journal of Econometrics* (Elsevier) 225: 200–230.

Cameron, Stephen V., and Christopher Taber. 2004. "Estimation of educational borrowing constraints using returns to schooling." *Journal of Political Economy* (The University of Chicago Press) 112: 132–182.

Card, David. 1993. "Using geographic variation in college proximity to estimate the return to schooling." Tech. rep., National Bureau of Economic Research.

Carneiro, Pedro, James J. Heckman, and Edward J. Vytlacil. 2011. "Estimating marginal returns to education." *American Economic Review* 101: 2754–81.

Caucutt, Elizabeth M., and Lance Lochner. 2020. "Early and late human capital investments, borrowing constraints, and the family." *Journal of Political Economy* (The University of Chicago Press Chicago, IL) 128: 1065–1147.

Clark, Damon, and Heather Royer. 2013. "The effect of education on adult mortality and health: Evidence from Britain." *American Economic Review* 103: 2087–2120.

Currie, Janet, and Enrico Moretti. 2003. "Mother's education and the intergenerational transmission of human capital: Evidence from college openings." *Quarterly Journal of Economics* (MIT Press) 118: 1495–1532.

Devereux, Paul J., and Robert A. Hart. 2010. "Forced to be rich? Returns to compulsory schooling in Britain." *The Economic Journal* (Oxford University Press Oxford, UK) 120: 1345–1364.

Devereux, Paul J., and Wen Fan. 2011. "Earnings returns to the British education expansion." *Economics of Education Review* (Elsevier) 30: 1153–1166.

Dickerson, Andy, and Steven McIntosh. 2010. "The Impact of Distance to Nearest Education Institution on the Post–Compulsory Education Participation Decision." *Sheffield Economic Research Paper Series SERP.*

Duflo, Esther. 2001. "Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment." *American economic review* 91: 795–813.

Falah, Ghazi. 1989. "Israeli state policy toward Bedouin sedentarization in the Negev." *Journal of Palestine studies* (Taylor & Francis) 18: 71–91.

Falch, Torberg, Päivi Lujala, and Bjarne Strøm. 2013. "Geographical constraints and educational attainment." *Regional Science and Urban Economics* (Elsevier) 43: 164–176.

Galor, Oded, and Joseph Zeira. 1993. "Income distribution and macroeconomics." *The review of economic studies* (Wiley-Blackwell) 60: 35–52.

Garrouste, Manon, and Meryam Zaiem. 2020. "School supply constraints in track choices: A French study using high school openings." *Economics of Education Review* (Elsevier) 78: 102041.

Goodman-Bacon, Andrew. 2021. "Difference-in-differences with variation in treatment timing." *Journal of Econometrics* (Elsevier) 225: 254–277.

Greenwald, Diana B., Guy Grossman, and Amir Levi. 2018. "Does greater public transit access increase employment for the Israel-Arab population? a preliminary analysis." *Harvard Kennedy School Working Paper No. 95.*

Haider, Steven, and Gary Solon. 2006. "Life-cycle variation in the association between current and lifetime earnings." *American economic review* 96: 1308–1320.

Hlihel, A. 2011. "Barriers and motives for internal immigration among Palestinian citizens of Israel." *Arab Society in Israel (4): Population, Society, Economy. The Van Leer Jerusalem Institute: Hakibbutz Hameuchad Publication House* 69–86.

Israel Democracy Institute. 2022. *Statistical Report on Arab Society in Israel 2021.*

Kamhöfer, Daniel A., Hendrik Schmitz, and Matthias Westphal. 2018. "Heterogeneity in marginal non-monetary returns to higher education." *Journal of the European Economic Association* (Oxford University Press) 17: 205–244.

Kazianga, Harounan, Dan Levy, Leigh L. Linden, and Matt Sloan. 2013. "The effects of" girl-friendly" schools: Evidence from the BRIGHT school construction program in Burkina Faso." *American Economic Journal: Applied Economics* 5: 41–62.

Kazianga, Harounan, Dan Levy, Leigh Linden, and Matt Sloan. 2013. "The Effects of "Girl-Friendly" Schools: Evidence from the BRIGHT School Construction Program in Burkina Faso." *American Economic Journal: Applied Economics* (National Bureau of Economic Research) 5: 41–62. doi:10.3386/w18115.

Knight, John, Li Shi, and Deng Quheng. 2009. "Education and the poverty trap in rural China: Setting the trap." *Oxford Development Studies* (Taylor & Francis) 37: 311–332.

Krief, Tomer. 2009. "The Compulsory Education Law in Israel and Liquidity Constraints." *Israel Economic Review* (Bank of Israel) 7: 73–112.

Krueger, Alan B., and Jitka Malečková. 2003. "Education, poverty and terrorism: Is there a causal connection?" *Journal of Economic perspectives* 17: 119–144.

Lavy, Victor, and Alexander Zablotsky. 2015. "Women's schooling and fertility under low female labor force participation: Evidence from mobility restrictions in Israel." *Journal of Public Economics* (Elsevier) 124: 105–121.

Lee, Jin Young, and Gary Solon. 2011. "The fragility of estimated effects of unilateral divorce laws on divorce rates." *The BE Journal of Economic Analysis & Policy* (De Gruyter) 11.

Lithwick, Harvey. 2000. *An urban development strategy for the Negev's Bedouin community.* Negev Center for Regional Development.

Lochner, Lance. 2010. "Education Policy and Crime." *NBER Working Paper No. w15894* (National Bureau of Economic Research).

Lochner, Lance, and Enrico Moretti. 2004. "The effect of education on crime: Evidence from prison inmates, arrests, and self-reports." *American economic review* 94: 155–189.

Lundborg, Petter, Dan-Olof Rooth, and Jesper Alex-Petersen. 2022. "Long-term effects of childhood nutrition: Evidence from a school lunch reform." *The Review of Economic Studies* (Oxford University Press) 89: 876–908.

Marx, Emanuel. 1967. *Bedouin of the Negev.* Manchester University Press.

Mazumder, Bhashkar, Maria Fernanda Rosales-Rueda, and Margaret Triyana. 2021. "Social interventions, health and wellbeing: The long-term and intergenerational effects of a school construction program." *Journal of Human Resources* (University of Wisconsin Press) 0720–11059R1.

McFarland, Joel, Jiashan Cui, Amy Rathbun, and Juliet Holmes. 2020. "Trends in High School Dropout and Completion Rates in the United States: 2019. Compendium Report. NCES 2020-117." *National Center for Education Statistics* (ERIC).

Meer, Jonathan, and Jeremy West. 2016. "Effects of the minimum wage on employment dynamics." *Journal of Human Resources* (University of Wisconsin Press) 51: 500–522.

Mountjoy, Jack. 2021. "Community colleges and upward mobility." Tech. rep., National Bureau of Economic Research.

Neumark, David, J.M. Ian Salas, and William Wascher. 2014. "Revisiting the minimum wage—Employment debate: Throwing out the baby with the bathwater?" *Ilr Review* (SAGE Publications Sage CA: Los Angeles, CA) 67: 608–648.

Nybom, Martin. 2017. "The distribution of lifetime earnings returns to college." *Journal of Labor Economics* (University of Chicago Press Chicago, IL) 35: 903–952.

OECD. 2021. *Education at a Glance 2021.*

Oreopoulos, Philip. 2006. "Estimating average and local average treatment effects of education when compulsory schooling laws really matter." *American Economic Review* 96: 152–175.

Roth, Jonathan, Pedro H. C. Sant'Anna, Alyssa Bilinski, and John Poe. 2022. "What's Trending in Difference-in-Differences? A Synthesis of the Recent Econometrics Literature." *arXiv preprint arXiv:2201.01194.*

Rubin, Ori. M.A. Thesis, unpublished. "The effect of high school proximity on socio-economic outcomes of Israeli Palestinian women." *Tel-Aviv University.*

Saad, Ismael. 1991. "Towards an Understanding of Minority Education in Israel: the case of the Bedouin Arabs of the Negev." *Comparative Education* (Informa UK Limited) 27: 235-242. doi:10.1080/0305006910270209.

Sun, Liyang, and Sarah Abraham. 2021. "Estimating dynamic treatment effects in event studies with heterogeneous treatment effects." *Journal of Econometrics* (Elsevier) 225: 175–199.

UNESCO. 2018. "One in Five Children, Adolescents and Youth is Out of School." Tech. rep., Fact Sheet No. 48. UIS/FS/2018/ED/48. 2018. Contract No.: UIS/FS/2018/ED/48.

Yahel, Havatzelet. 2019. "The Conflict Over Land Ownership and Unauthorized Construction in the Negev." *Contemporary Review of the Middle East* (SAGE Publications Sage India: New Delhi, India) 6: 352–369.

Yashiv, Eran, and Nitsa Kasir. 2013. "Arab women in the Israeli labor market: Characteristics and policy proposals." *Israel Economic Review* 10: 1–41.

Appendix

Table A1: Summary of 1972 Characteristics of Localities of the Study:

Historical Arab Sample, not including Bedouin of the Negev

	Localities with HS Opening in 72'-95'	Localities with HS Opening before 1972	difference (2-1)	p-value (2-1)	No HS or HS after 1995	difference (5-1)	p-value (5-1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Population per locality	4,795	19,314	14,519	0.00	976	-3,819	0.00
Young Population (ages 0-17)	2,918	10,274	7,356	0.00	496	-2,422	0.00
Years of education	4.29	6.06	1.77	0.00	4.69	0.40	0.90
Share Muslim	0.74	0.66	-0.09	0.39	0.78	0.04	0.09
Share Druze	0.18	0.07	-0.11	0.80	0.00	-0.18	0.02
Share Christian	0.07	0.27	0.20	0.01	0.22	0.14	0.58
Married	0.95	0.90	-0.05	0.00	0.91	-0.05	0.00
Emp. Rate of men	0.86	0.90	0.04	0.48	0.88	0.02	0.80
Emp. Rate of women	0.03	0.10	0.07	0.02	0.04	0.01	0.59
Share Northern District	0.67	0.55	-0.12	0.07	0.83	0.16	0.99
Share Haifa District	0.23	0.16	-0.07	0.29	0.09	-0.14	0.89
Share Central District	0.10	0.29	0.19	0.20	0.08	-0.02	0.87
Number of localities with data from 1972 Census[1]	46	7	-	-	21	-	-
Total number of localities	49	8	-	-	32	-	-

Notes: Localities' characteristics are taken from the 1972 Israeli Census of Population and Housing. The estimates are not weighted by 1972 locality population so that they can be interpreted as the shares of the average locality in the relevant category.

(1) There are 4 treatment and 11 comparison localities in the study that are excluded from this analysis as did not appear in the 1972 census. These are either Druze localities in the Golan heights or Bedouin communities from the North, that were not registered as localities during that time. Only 5% of the individuals in the study are from these localities. All results of the study are very similar when I include or exclude these localities.

Table A2: Effects of School Openings on Outcomes, Baseline Sample and Muslim-only Sample

Historical Arab Sample (HS Openings in 1972-1995)

Dependent Variable	Baseline:	Muslim Only	Dependent Variable	Baseline	Muslim Only
	(1)	(2)		(3)	(4)
Completed 10th	0.070***	0.084***	Months of work	-0.177	-0.347
Grade	(0.019)	(0.026)	(ages 33-35, men)	(0.263)	(0.289)
	Mean=0.577	Mean=0.546		Mean=21.322	Mean=21.080
Completed 11th	0.054***	0.049**	Months of work	0.633***	0.517*
Grade	(0.015)	(0.021)	(ages 33-35, women)	(0.257)	(0.265)
	Mean=0.449	Mean=0.416		Mean=8.675	Mean=7.814
Completed High	0.055***	0.047**	(Log) ann. wages	0.004	0.036
School (12th Grade)	(0.015)	(0.020)	(ages 33-35, men)	(0.018)	(0.024)
	Mean=0.408	Mean=0.376		Mean=10.724	Mean=10.348
Post-sec. education	0.011*	0.007	(Log) ann. wages	0.109**	0.104*
(Yrs of educ $\geq$ 13)	(0.006)	(0.007)	(ages 33-35, women)	(0.046)	(0.058)
	Mean=0.173	Mean=0.149		Mean=9.665	Mean=9.614
Acad. degree proxy	0.012***	0.013**			
(Yrs of educ $\geq$ 15)	(0.004)	(0.005)			
	Mean=0.135	Mean=0.107			
Number of localities	89	50	Number of observations (N)	316,322	221,983

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on various outcomes (Equation 1). Column 1 is the baseline sample, and column 2 includes only Muslims in localities with a Muslim majority. Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Column 1 and 3 provide the baseline specification while columns 2 and 4 add interaction of differential cohort effects for localities according to population of 0-5000, 5000-10000, and 10,000+ individuals. as described in Subsection 8. Sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Mean outcome indicates the average for individuals aged 18 at the year of school opening. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table A3: Effects of School Openings on Outcomes, With and Without Controlling for Locality-specific Pre-trends

Historical Arab Sample (HS Openings in 1972-1995)

Dependent Variable	Baseline	Locality-specific pre-trends	Dependent Variable	Baseline	Locality-specific pre-trends
	(1)	(2)		(3)	(4)
Completed 10th	0.070***	0.071***	Months of work	-0.177	-0.005
Grade	(0.019)	(0.018)	(ages 33-35, men)	(0.263)	(0.270)
N=316,322	Mean=0.577	Mean=0.577	N=163,262	Mean=21.322	Mean=21.322
Completed 11th	0.054***	0.054***	Months of work	0.633***	0.807***
Grade	(0.015)	(0.015)	(ages 33-35, women)	(0.257)	(0.264)
N=316,322	Mean=0.449	Mean=0.449	N=163,262	Mean=8.675	Mean=8.675
Completed High	0.055***	0.055***	(Log) ann. wages	0.004	0.004
School (12th Grade)	(0.015)	(0.015)	(ages 33-35, men)	(0.018)	(0.018)
N=316,322	Mean=0.408	Mean=0.408	N=130,817	Mean=10.724	Mean=10.724
Post-sec. education	0.011*	0.014**	(Log) ann. wages	0.109**	0.111**
(Yrs of educ $\geq$ 13)	(0.006)	(0.005)	(ages 33-35, women)	(0.046)	(0.045)
N=316,322	Mean=0.173	Mean=0.173	N=74,446	Mean=9.665	Mean=9.665
Number of localities	89	50	Number of observations (N)	316,322	221,983

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on various outcomes (Equation 1). Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. .Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Column 1 and 3 provide the baseline specification while columns 2 and 4 add controls for predicted outcomes according to pre-treatment trends, as described in Subection 8. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Mean outcome indicates the average for individuals aged 18 at the year of school opening. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table A4: Effects of School Openings on Outcomes, With and without controlling for Locality-specific Pre-trends

Contemporary Negev Bedouin Sample (HS Openings in 2007-2014)

Dependent Variable	Baseline	Locality-specific pre-trends	Dependent Variable	Baseline	Locality-specific pre-trends
	(1)	(2)		(3)	(4)
Completed 10th	0.053***	0.050***	Any matriculation	0.067**	0.067**
Grade	(0.009)	(0.013)	diploma	(0.031)	(0.030)
	Mean=0.695	Mean=0.695		Mean=0.200	Mean=0.200
Completed 11th	0.083***	0.085***	University-eligible	0.012	0.010
Grade	(0.014)	(0.015)	matriculation	(0.011)	(0.013)
	Mean=0.648	Mean=0.648		Mean=0.121	Mean=0.121
Completed High	0.071***	0.075***	Postsec. academic	0.002	-0.001
School (12th Grade)	(0.022)	(0.021)	student by age 21	(0.010)	(0.010)
	Mean=0.596	Mean=0.596		Mean=0.037	Mean=0.037
Participated in the	0.019	0.016	Any criminal	-0.023	-0.056***
matriculation exams	(0.024)	(0.022)	Juvenile offense	(0.015)	(0.016)
	Mean=0.459	Mean=0.459		Mean=0.175	Mean=0.175
Number of localities	35	35	Number of observations (N)	54,797	54,797

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on various outcomes (Equation 1). Column 1 and 3 provide the baseline specification while columns 2 and 4 add controls for predicted outcomes according to pre-treatment trends, as described in Subsection 8. Fixed effects for locality and for cohort× year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Negev Bedouin born in 1987-1999, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table A5: Effects of School Openings on Outcomes, Including and Excluding unrecognized villages

Contemporary Negev Bedouin Sample (HS Openings in 2007-2014)

Dependent Variable	Baseline	Excl. unrecognized villages	Dependent Variable	Baseline	Excl. unrecognized villages
	(1)	(2)		(3)	(4)
Completed 10th	0.052***	0.064***	Any matriculation	0.067**	0.087**
Grade	(0.009)	(0.013)	diploma	(0.031)	(0.038)
	Mean=0.695	Mean=0.695		Mean=0.200	Mean=0.200
Completed 11th	0.083***	0.103***	University-eligible	0.012	0.029*
Grade	(0.014)	(0.015)	matriculation	(0.011)	(0.016)
	Mean=0.648	Mean=0.648		Mean=0.121	Mean=0.121
Completed High	0.071***	0.105***	Postsec. academic	0.002	0.009
School (12th	(0.022)	(0.021)	student by age 21	(0.010)	(0.013)
Grade)	Mean=0.596	Mean=0.596		Mean=0.037	Mean=0.037
Participated in the	0.020	0.060**	Any criminal	-0.023	-0.056***
matriculation exams	(0.024)	(0.023)	Juvenile offense	(0.015)	(0.017)
	Mean=0.459	Mean=0.459		Mean=0.175	Mean=0.175
Number of localities	35	15	Number of observations (N)	54,797	44,833

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on various outcomes (Equation 1). Column 1 and 3 provide the baseline specification while columns 2 and 4 add controls for predicted outcomes according to pre-treatment trends, as described in Subsection 8. Fixed effects for locality and for cohort× year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Negev Bedouin born in 1987-1999, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table A6: Effects of School Openings on Outcomes, With Differential Cohort Effects by Locality's Characteristics

Historical Arab Sample (HS Openings in 1972-1995)

	Baseline: Cohort× Region × Compul. Year Effect	**Baseline × Categories of pop. size**	**Baseline × Tertiles of education level in 72'**	**Baseline × Tertiles of employment rate of men in '72**	**Baseline × Tertiles of traditionalism (Share of ages 18-30 married in '72)**
	(1)	(2)	(3)	(4)	(5)
Completed 10th	0.070***	0.050***	0.079***	0.069***	0.065***
Grade	(0.019)	(0.012)	(0.014)	(0.025)	(0.018)
N=316,322	Mean=0.577	Mean=0.577	Mean=0.578	Mean=0.577	Mean=0.577
Completed 11th	0.054***	0.055***	0.062***	0.058***	0.050***
Grade	(0.015)	(0.013)	(0.011)	(0.020)	(0.014)
N=316,322	Mean=0.449	Mean=0.449	Mean=0.450	Mean=0.449	Mean=0.449
Completed High	0.055***	0.056***	0.062***	0.060***	0.051***
School (12th Grade)	(0.015)	(0.014)	(0.011)	(0.018)	(0.014)
N=316,322	Mean=0.408	Mean=0.408	Mean=0.409	Mean=0.408	Mean=0.408
Acad. degree proxy	0.012***	0.012***	0.010*	0.012**	0.013**
(Yrs of educ ≥ 15)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)
N=316,322	Mean=0.173	Mean=0.123	Mean=0.124	Mean=0.123	Mean=0.123
No. of Months of work	-0.177	0.272	-0.206	-0.292	-0.284
(ages 33-35, men)	(0.263)	(0.281)	(0.279)	(0.377)	(0.335)
N=163,262	Mean=21.322	Mean=21.322	Mean=21.314	Mean=21.322	Mean=21.322
No. of Months of work	0.633***	0.584*	0.666**	0.574*	0.479
(ages 33-35, women)	(0.257)	(0.316)	(0.272)	(0.327)	(0.336)
N=153,060	Mean=8.675	Mean=8.675	Mean=8.662	Mean=8.675	Mean=8.675
(Log) ann. wage	0.004	0.032	0.011	0.014	-0.002
(ages 33-35, men)	(0.018)	(0.021)	(0.021)	(0.025)	(0.027)
N=130,817	Mean=10.724	Mean=10.724	Mean=10.726	Mean=10.724	Mean=10.724
(Log) ann. wages	0.109**	0.093*	0.107**	0.146**	0.091
(ages 33-35, women)	(0.046)	(0.048)	(0.042)	(0.056)	(0.059)
N=74,446	Mean=9.665	Mean=9.665	0.107**	Mean=9.665	Mean=9.665
Number of localities	89	89	89	89	89

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on various outcomes (Equation 1). Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Column 1 and 3 provide the baseline specification while columns 2 and 4 add interaction of differential cohort effects for localities according to population of 0-5000, 5000-10000, and 10,000+ individuals. as described in Subsection 7.3. Sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Mean outcome indicates the average for individuals aged 18 at the year of school opening. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table A7: Effects of School Openings on the probability of having non-missing education outcomes

Historical Arab Sample (HS Openings in 1972-1995)

Dependent Variable	All	Men	Women
	(1)	(2)	(3)
Probability to have	0.002	0.002	0.002
non-missing data	(0.004)	(0.005)	(0.005)
on years of education	Mean=0.876	Mean=0.886	Mean=0.867
	N=353,642	N=180,757	N=172,885

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on the probability of having a non-missing outcome (Equation 1). Colum (1) represent the baseline sample, and column 2 and 3 adds observations with missing values, imputing a value of either 0 or 1. Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.
* p<.0.10, **p<0.05, *** p<0.01

Table A8: Effects of School Openings on Educational Outcomes, Imputing Values for Missing Outcomes

Historical Arab Sample (HS Openings in 1972-1995),

Dependent Variable	**Baseline Sample** (excl. missing outcomes)	**Missing outcome=0** (lower bound)	**Missing outcome=1** (higher bound)
	(1)	(2)	(3)
Completed 10th Grade	0.070***	0.059***	0.058***
	(0.019)	(0.016)	(0.016)
	Mean=0.577	Mean=0.507	Mean=0.630
Completed 11th Grade	0.054***	0.046***	0.044***
	(0.015)	(0.013)	(0.013)
	Mean=0.449	Mean=0.394	Mean=0.518
Completed High School	0.055***	0.047***	0.045***
(12th Grade)	(0.015)	(0.013)	(0.013)
	Mean=0.408	Mean=0.359	Mean=0.482
Post-secondary Education	0.011*	0.009*	0.007
(Years of Education ≥ 13)	(0.006)	(0.005)	(0.007)
	Mean=0.173	Mean=0.152	Mean=0.276
Years of Education ≥ 15	0.012***	0.010**	0.008
(Proxy for Academic Degree	(0.004)	(0.004)	(0.005)
attainment)	Mean=0.123	Mean=0.108	Mean=0.232
Number of localities	89	89	89
Number of observations (exc. missing)	316,322	353,642	353,642

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on educational outcomes (Equation 1). Colum (1) represent the baseline sample, and column 2 and 3 adds observations with missing values, imputing a value of either 0 or 1. Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Table A9: Effects of High School Openings on Enrollment and Completion of High-School: Effects of the First School vs Effects of Later Schools

	(1)	(2)	(3)
Panel A:			
High school access	0.070***		
	(0.019)		
I{No. of schools>=1}		0.071***	
		(0.018)	
I{No. of schools>=2}		0.015	
		(0.038)	
No. of schools			0.044***
			(0.015)
Mean outcome	0.577	0.577	0.577
Panel B:			
High school access	0.054***		
	(0.015)		
I{No. of schools>=1}		0.056***	
		(0.015)	
I{No. of schools>=2}		0.039	
		(0.033)	
No. of schools			0.045***
			(0.012)
Mean outcome	0.449	0.449	0.449
Panel C:			
High school access	0.055***		
	(0.015)		
I{No. of schools>=1}		0.057***	
		(0.014)	
I{No. of schools>=2}		0.037	
		(0.029)	
No. of schools			0.045***
			(0.011)
Mean outcome	0.408	0.408	0.408
Number of Localities	89	89	89
Number of Observations	316,322	316,322	316,322

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on educational outcomes (Equation 1). Column (1) presents the baseline effects of having an access to any school, column (2) separates the marginal effect of the first and the second school, and column (3) presents the effects of the number of schools in the locality. Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Mean outcome indicates the average for individuals aged 18 at the year of school opening. The sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Standard errors clustered at the locality level are reported in parentheses.

Table A10: Effects of School Openings on Outcomes, With and Without Controls for Distance to the Nearest Locality with a High-School (Not inc. own locality)

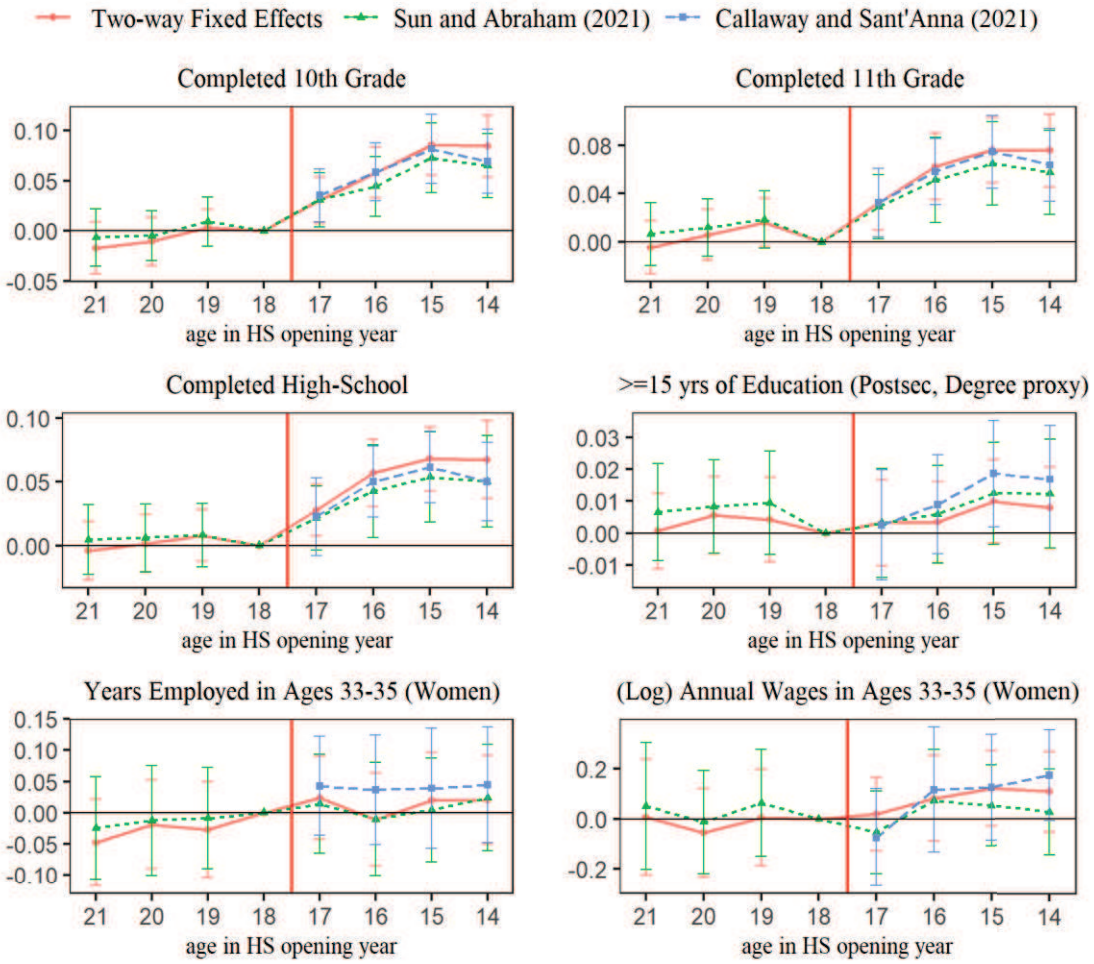
Historical Arab Sample (HS Openings in 1972-1995)

Dependent Variable	Baseline:	+Distance Control	Dependent Variable	Baseline	+Distance Control
	(1)	(2)		(3)	(4)
Completed 10th	0.070***	0.081***	Months of work	-0.177	-0.207
Grade	(0.019)	(0.026)	(ages 33-35, men)	(0.263)	(0.274)
	Mean=0.578	Mean=0.578		Mean=21.314	Mean=21.314
Completed 11th	0.054***	0.049**	Months of work	0.633**	0.597**
Grade	(0.015)	(0.021)	(ages 33-35, women)	(0.257)	(0.275)
	Mean=0.450	Mean=0.450		Mean=8.662	Mean=8.662
Completed High	0.055***	0.047**	(Log) ann. wages	0.004	-0.005
School (12th Grade)	(0.015)	(0.020)	(ages 33-35, men)	(0.018)	(0.019)
	Mean=0.409	Mean=0.409		Mean=10.724	Mean=10.726
Post-sec. education	0.011*	0.007	(Log) ann. wages	0.109**	0.104*
(Yrs of educ ≥ 13)	(0.006)	(0.007)	(ages 33-35, women)	(0.046)	(0.058)
	Mean=0.173	Mean=0.173		Mean=9.665	Mean=9.664
Acad. degree proxy	0.012***	0.013**			
(Yrs of educ ≥ 15)	(0.004)	(0.005)			
	Mean=0.124	Mean=0.124			
Number of localities	89	50	Number of observations (N)	316,322	221,983

Notes: This table reports estimates of the effects of having an access to a local high school at age 17 or younger in the locality of residence on various outcomes. Column 1 is the baseline specification, shown in Equation 1. Column 2 adds a control for the distance to the nearest locality with a high-school (not inc. own locality). Fixed effects for locality and for cohort×region×year-of-compulsory-high-school-introduction are included. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. Column 1 and 3 provide the baseline specification while columns 2 and 4 add interaction of differential cohort effects for localities according to population of 0-5000, 5000-10000, and 10,000+ individuals. as described in Subsection 8. Sample includes all Israeli Arabs born in 1950-1984 and living in non-Negev-Bedouin and non-mixed/Jewish localities, as described in Section 4. Mean outcome indicates the average for individuals aged 18 at the year of school opening. Standard errors clustered at the locality level are reported in parentheses. * p<.0.10, **p<0.05, *** p<0.01

Figure A1: Event-Study Estimates According to Different Methods for Staggered Difference-in-Differences Design

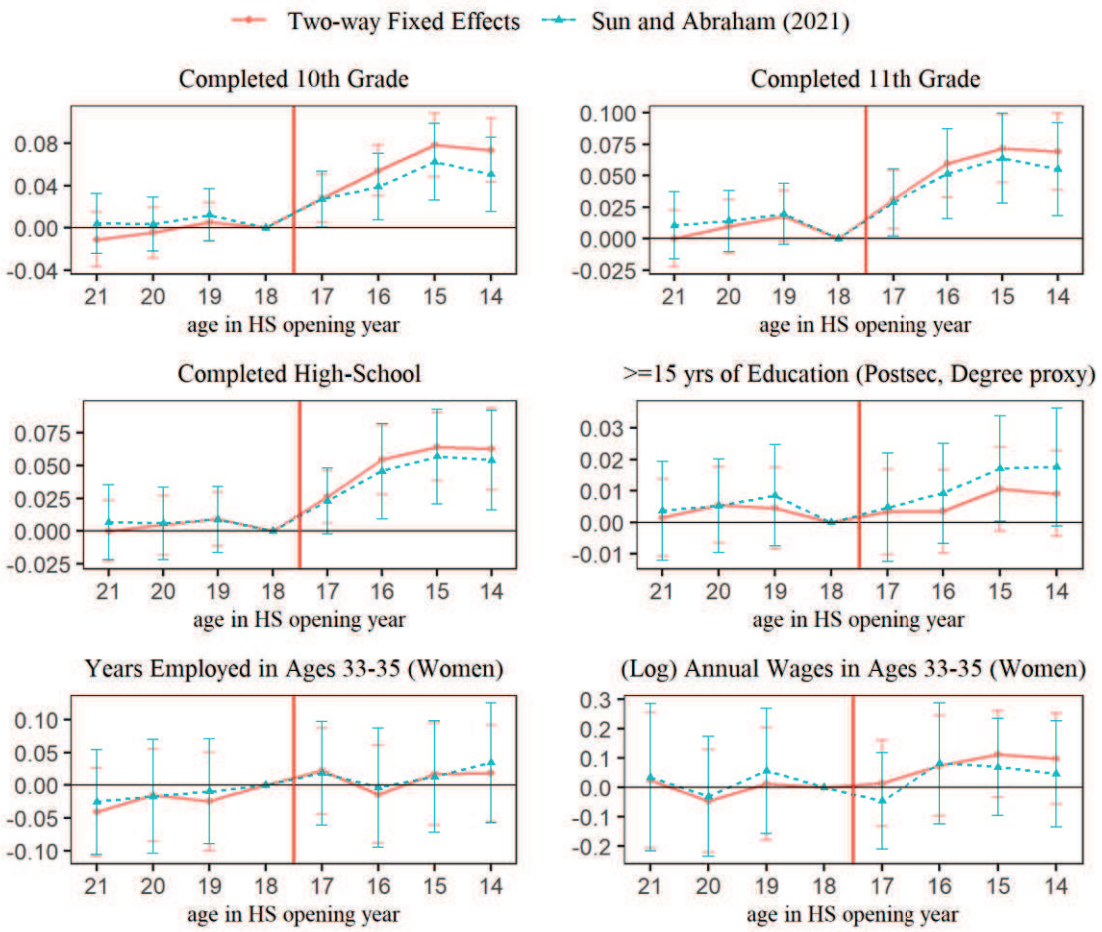
Historical Arab Sample



Notes: This figure presents difference-in-differences event-study estimates of the effect of high school opening on different outcomes in the historical Arab sample according to three methods: Two-way fixed-effects, Callaway and Sant'anna (2021) and Sun and Abraham (2021). The latter two methods are designed to avoid problematic comparisons of early treated units as control groups for the late treated units. Callaway and Sant'anna (2021) include only coefficients for the post-treatment cohorts relative to age 18. The estimation is based on a simple version of Equation (2), with fixed effects for cohort and for locality and without any control variables. 95% confidence intervals are presented. Data is collapsed at the locality-cohort level in order to ease computational burden so confidence intervals are higher than the baseline estimates. All estimations are made using the population weights. All estimations are made using the population weights. All standard errors are clustered at the level of the locality.

Figure A2: Event-Study Estimates According to Different Methods for Staggered Difference-in-Differences Design, including Covariates

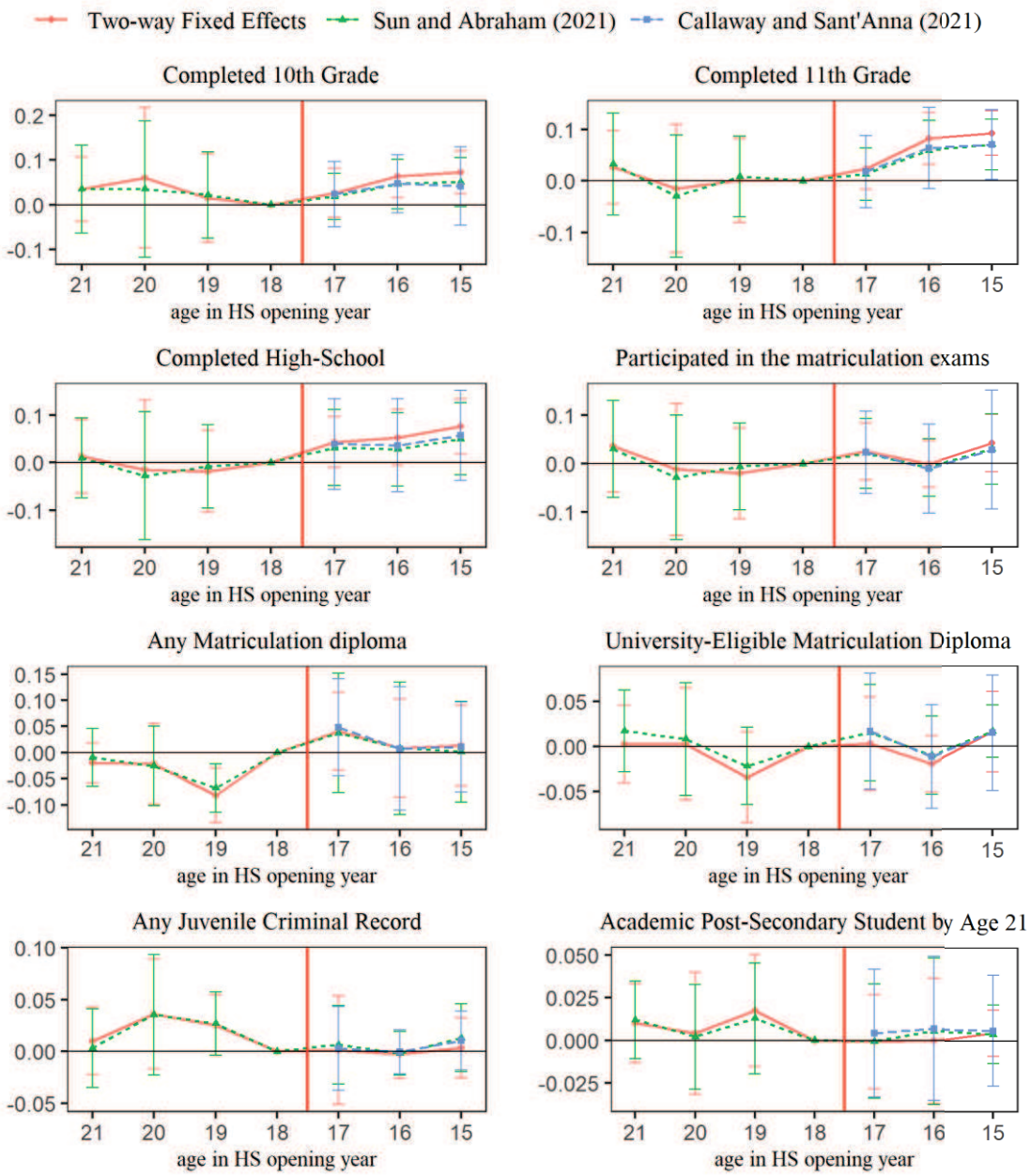
Historical Arab Sample



Notes: This figure presents difference-in-differences event-study estimates of the effect of high school opening on different outcomes in the historical Arab sample according to two methods: Two-way fixed-effects, and Sun and Abraham (2021). The latter method is designed to avoid problematic comparisons of early treated units as control groups for the late treated units. Callaway and Sant'anna (2021) estimations are not included, as they are very imprecise when using covariates. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. The estimation is based on a simple version of Equation (2), with fixed effects for cohort and for locality and without any control variables. 95% confidence intervals are presented. Data is collapsed at the locality-cohort level in order to ease computational burden, so confidence intervals are higher than the baseline estimates. All estimations are made using the population weights. All standard errors are clustered at the level of the locality.

Figure A3: Event-Study Estimates, According to Different Methods for Staggered Difference-in-Differences Design

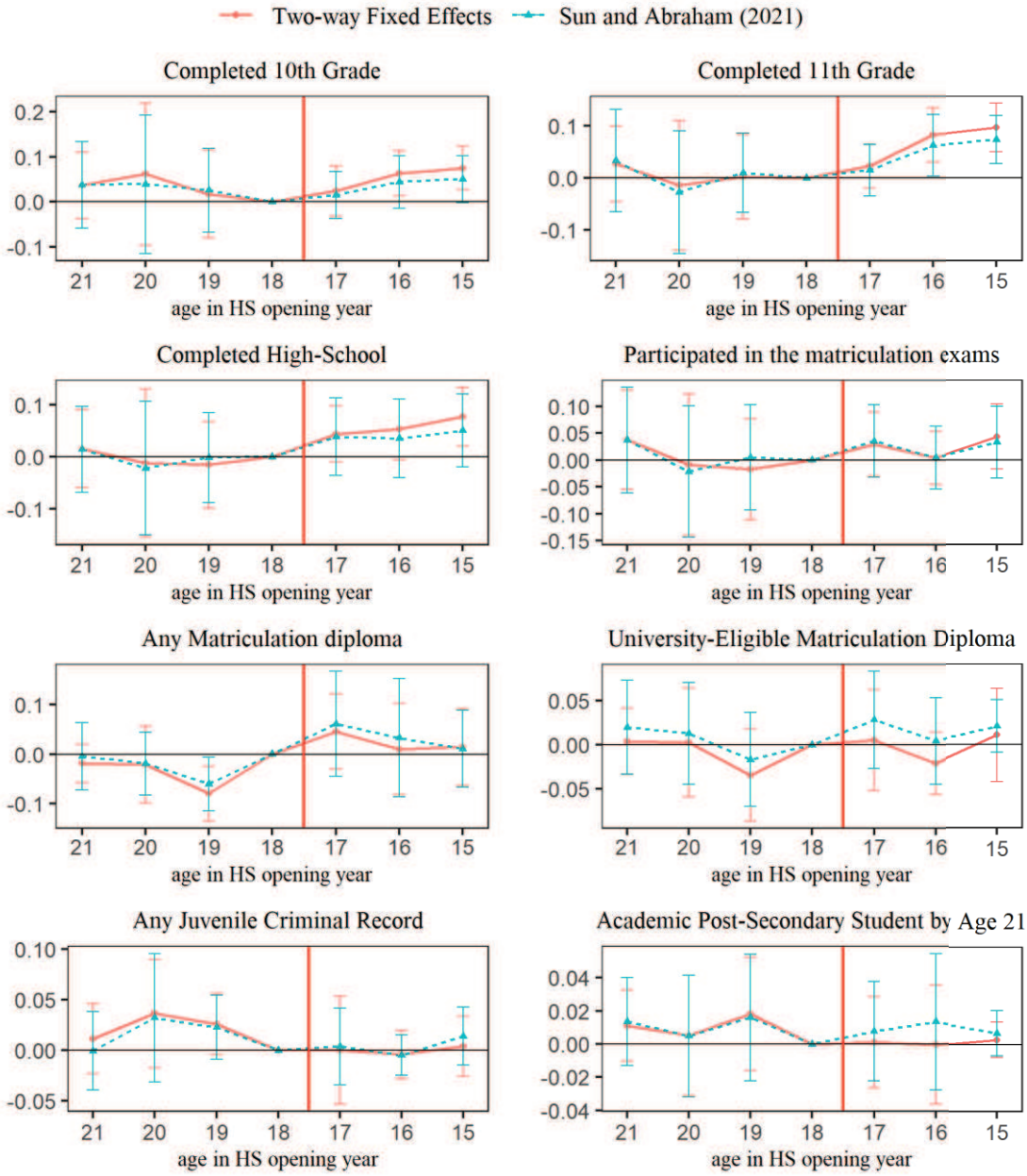
Contemporary Negev Bedouin Sample



Notes: This figure presents difference-in-differences event-study estimates of the effect of high school opening on different outcomes in the Negev Bedouin sample according to three methods: Two-way fixed-effects, Callaway and Sant'anna (2021) and Sun and Abraham (2021). The latter two methods are designed to avoid problematic comparisons of early treated units as control groups for the late treated units. Callaway and Sant'anna (2021) include only coefficients for the post-treatment cohorts relative to age 18. The estimation is based on a simple version of Equation (2), with fixed effects for cohort and for locality and without any control variables. . 95% confidence intervals are presented. Data is collapsed at the locality-cohort level in order to ease computational burden so confidence intervals are higher than the baseline estimates. All estimations are made using the population weights. All estimations are made using the population weights. All standard errors are clustered at the level of the locality.

Figure A4: Event-Study Estimates, According to Different Methods for Staggered Difference-in-Differences Design, including Covariates

Contemporary Negev Bedouin Sample



Notes: This figure presents difference-in-differences event-study estimates of the effect of high school opening on different outcomes in the Negev Bedouin sample according to two methods: Two-way fixed-effects, and Sun and Abraham (2021). The latter method is designed to avoid problematic comparisons of early treated units as control groups for the late treated units. Callaway and Sant'anna (2021) estimations are not included, as they are very imprecise when using covariates. Controls include gender, parental education, number of siblings, religion and cubic trend of cohort size in the locality. The estimation is based on a simple version of Equation (2), with fixed effects for cohort and for locality and without any control variables. 95% confidence intervals are presented. Data is collapsed at the locality-cohort level in order to ease computational burden, so confidence intervals are higher than the baseline estimates. All estimations are made using the population weights. All standard errors are clustered at the level of the locality.