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Abstract

This paper examines the effect of increased local supply of schooling on intergenerational mobility in education in Jordan. We use a unique data set that links individual data on own schooling and parents' schooling for adults, from a household survey, with the supply of schooling in the sub-district of birth, from Ministry of Education data. We identify the effect by exploiting the variation in the supply of basic and secondary schools over time and across sub-districts in Jordan, controlling for both cohort and sub-district fixed effects. School availability is determined based on the existence of a sex-appropriate school in the individual's sub-district of birth at the time the individual was ready to start that schooling stage. Our findings show that the local availability of schools does in fact increase intergenerational mobility in schooling. For instance, an increase in the supply of basic schools of one school per 10,000 people reduces the association between father and son and mother and son schooling by 10 percent and that between father-daughter and mother-daughter by nearly 30 percent. An increase in the local supply of secondary schools does not seem to have a similar effect on intergenerational mobility in education.

JEL Classification: I24, I28

Keywords: Supply of schooling, education, intergenerational mobility, inequality of opportunity, Jordan

ملخص

تبحث هذه الورقة تأثير زيادة المعروض المحلي من التعليم على التنقل بين الأجيال في التعليم في الأردن . نستخدم مجموعة من البيانات الفريدة والتي تربط بين البيانات الفردية في التعليم الخاص وتعليم الآباء، من المسح الأسري ، مع توفير التعليم المدرسي في حي الميلاد ، من بيانات وزارة التربية والتعليم. نقوم بالتعرف على التأثير من خلال استغلال الاختلاف في المعروض من مدارس التعليم الأساسي و الثانوي على مر الزمن وعبر الدوائر الفرعية في الأردن ، مع تثبيت الآثار لكلا من التعليم الجماعى و المناطق الفرعية. يتم تحديد توفر المدرسة على أساس وجود المدرسة المناسبة حسب النوع للافراد فى حي الميلاد في ذلك الوقت وايضا اذا ما كان الفرد على استعداد لبدء تلك المرحلة المدرسية. تظهر نتائجنا أن توفر المدارس في المنطقة في الواقع يزيد من التنقل بين الأجيال في التعليم . وعلى سبيل المثال ، فان زيادة المعروض من مدارس التعليم الأساسي من مدرسة واحدة لكل 10،000 شخص يقلل من العلاقة بين الأب وابنه و الأم و الابن فى التعليم بنسبة 10 في المئة و ذلك بين الأب وابنته والأم وابنتها من قبل ما يقرب من 30 في المئة . الزيادة في الإمدادات المحلية من المدارس الثانوية لا يبدو أن يكون لها تأثير مماثل على التنقل بين الأجيال في التعليم.

1. Introduction

Raising intergenerational mobility of educational attainment, or achieving greater equality of opportunity in the acquisition of human capital over time, is a major objective of public policy. It should therefore be of great interest to policymakers whether policies aimed at improving access to education by building more schools actually increase intergenerational mobility in education. Although this may seem obvious, it would only be true if the local supply of schooling were the primary constraint to the acquisition of education. If, on the other hand, the acquisition of education was constrained by parental attitudes, perceptions about the value of education, high opportunity costs or other demand side factors, increasing the local supply of schooling would not necessarily improve the education acquisition of the poorest and most marginalized groups.

This paper employs new and unique data sources from Jordan to examine the question of whether an increase in the local supply of schooling reduces the intergenerational persistence of education. The question is of major interest in the Middle East and other developing regions in the world, where many countries carried out state-led programs in the post-independence period in order to expand the supply of public schooling. It is particularly important to evaluate the effectiveness of these programs in reducing the intergenerational persistence of educational attainment and hence promoting equality of opportunity.

We employ a difference-in-difference approach to disentangle the impact of the expansion of public schooling on the correlation between a child's schooling and that of his/her parents'. In particular, we exploit the variation in the supply of public schooling across cohorts and sub-districts of birth, and allow the effect of this variable to vary by parent's schooling. Our empirical strategy is a direct extension of that used in Duflo (2001) who looked at the impact of increased school supply on educational attainment. We add parents' schooling as an additional regressor and interact it with the local supply of schools to obtain the effect of school supply on the coefficient of intergenerational persistence.[1]

We employ the 2010 Jordan Labor Market Panel Survey (JLMPS), which includes information on parents' schooling for every adult in the sample, along with the 2010 School Census produced by the Jordanian Ministry of Education (Hashemite Kingdom of Jordan 2010). The school census provides the location, type and date of establishment of every school in Jordan. The exposure of an individual to the supply of public schooling is determined by the number of basic (or secondary) schools (per 1000 individuals) that are available to them in their sub-district of birth at the time they were of age to enroll in that school level (basic or secondary). The richness of the data set perhaps makes it the first in the Middle East to allow such a study.

There is a vast literature on intergenerational mobility of educational attainment, i.e. the impact of parental schooling on child's schooling (e.g. Glewwe and Jacoby 1994; Behrman and Wolfe 1987; Behrman et al. 1999; Salehi-Isfahani 2001; Checchi, Fiorio, and Leonardi 2008; Daouli, Demoussis, and Giannakopoulos 2010; Dahan and Gaviria 2001). One line of this literature focuses on examining the impact of public policies on educational mobility (e.g. Checchi, Ichino, and Rustichini 1999; Schütz, Ursprung, and Wößmann 2008; Checchi and Flabbi 2007; Davies, Zhang, and Zeng 2005). This paper contributes to this branch of the literature by examining the impact of a particular public policy, the expansion of public schooling, on intergenerational mobility. Previous educational mobility studies in the developing world examined outcomes for children who are co-resident with their parents, in order to be able to make use of standard surveys that lack longitudinal or retrospective data

[1] Potential endogeneity of parent's schooling is not a concern here because we are not interested in identifying the causal impact of parent's schooling on child's schooling but rather the effect of the expansion of public schooling on the correlation between parent's and child's schooling.

on parental characteristics. By including information on parental characteristics of all adults in the sample, the JLPMS allows us to improve on these studies.

Our findings indicate that the supply of basic schools does significantly reduce the intergenerational mobility of education among adults in Jordan, but the supply of secondary schools does not have the expected effect. Increasing the supply of basic schooling by one school per ten thousand people (roughly equivalent to half a standard deviation of the basic school supply for sons and 0.8 standard deviation for daughters) reduces the father-son and mother-son intergenerational persistence coefficient by 10 percent, and reduces the father-daughter and mother-daughter coefficient by 34 percent and 26 percent, respectively. The reduction in intergenerational persistence of schooling appears to be mostly due to the effect of schooling on an older cohort (born between 1940 and 1965) rather than a younger cohort (born between 1975 and 1985). This is consistent with the cohorts of Jordanians that experienced the most rapid increases in education. In contrast, an increase in the supply of secondary schooling had no significant effect on the intergenerational persistence coefficients of sons, and is even associated with an increase in the coefficient of intergenerational persistence for daughters.

The rest of the paper is organized as follows: Section II provides a background on the evolution of educational attainment and the expansion of public schooling in Jordan, Section III includes a description of the data, Section IV describes our identification strategy, Section V characterizes the trend across cohorts of intergenerational persistence in Jordan, Section VI presents our findings with regard to the local supply of school and intergenerational persistence, and Section VII concludes.

2. Background: Educational Attainment and the Expansion of Public Schooling in Twentieth Century Jordan

Educational attainment in Jordan witnessed dramatic growth in the second half of the twentieth century. According to the Barro and Lee's educational attainment dataset, Jordan ranks ninth among 146 countries by the absolute increase in the mean years of schooling from 1970 to 2010 for the population 25 and older, with 6.4 years of additional schooling on average in that period. It ranks eighth in the increase of mean years of schooling among females 25 and older, with 7.2 additional years of schooling in that period (Barro and Lee forthcoming). Figure 1 depicts the evolution of the average years of schooling of males and females by age based on data from JLMPS 2010.[2] The figure clearly depicts the rapid increase in educational attainment across cohorts for both males and females. For males, the increase occurred earlier, with their mean years of schooling rising from under six years for 65-year-olds (in 2010) to ten years for 55-year-olds. It then stagnated at about 11 years for cohorts ranging from age 50 to age 35, only to start rising again for younger cohorts. The increase in female mean years of schooling occurred later and was more sustained. The mean years of schooling starts as low as two years for 65-year-olds, rises rapidly to about 10 years for 45-year-olds. Although the rate of increase of female schooling slows after that, the mean years of schooling for Jordanian women exceeds that of their male counterparts for those 35 and younger.

To investigate whether this dramatic increase in educational attainment corresponds to the expansion of public schooling in the country, we depict in figures 2a and 2b, the national supply of basic and secondary public schools per 10,000 people in the population from 1938 to 2010.[3] This data is obtained from a school census carried out in 2010 by the Jordanian

[2] Mean years of schooling for older cohorts may be biased upward due to selectivity resulting from the likely higher mortality of less educated individuals.

[3] Data from the JLMPS 2010 indicates that 94.1 percent of Jordanians between the ages of 25 and 35 who went to basic schools within Jordan were enrolled in schools run by the Ministry of Education or some other Ministry

Ministry of Education.[4] One can clearly see from figure 2a that the growth in the supply of basic public schools started to take off around 1950 and continued at a rapid pace through the mid 1970s. Initially more boys' schools were being built, corresponding to the early school acquisition of Jordanian males. The supply of girls' and mixed schools was also rising from 1950 onward, but by 1970, there appears to have been a concerted effort to dramatically increase the supply of mixed schools. A school built in 1970 would have been accessible to someone born around 1965. This person would be around age 45 in 2010. This corresponds roughly to the cohort of Jordanian women that have experienced the largest increase in schooling relative to previous cohorts.

Figure 2b depicts the growth in the supply of public upper secondary schools. Again the growth in the supply of boys' schools was most rapid from the late 1940s to the late 1950s, that of girls' schools was slower but lasted through the mid-1960s, and that of mixed schools continued through the early to mid 1970s. The apparent drop in supply in the late 1960s is mostly due to the sharp increase in Jordan's population that resulted from the large inflow of Palestinian refugees after the June 1967 Arab-Israeli war. The fact that such a decline is not as readily apparent in the supply of basic schools may have to do with the fact that the United Nations Relief and Works Agency for Palestinian Refugees in the Near East (UNRWA) was responsible for providing Palestinian refugees with basic schooling and probably managed to increase the supply of basic schools in line with the inflow of refugees.

In order to discern the effects of the increased supply of schooling on different cohorts, we examine an "old" cohort born from 1940 to 1965, who would have been 45-70 in 2010, and a "young" cohort born from 1975 to 1985, who would have been 25 to 35 in 2010. Our expectation is that the old cohort is more likely to be affected by the increased supply of schooling since that increase would have occurred when they were ready to enroll in school. We also provide estimates for the full sample of adults aged 25 to 70 born in Jordan.

3. Data

We employ two new and unique data sources in this analysis. First, the Jordan Labor Market Panel Survey of 2010, carried out by the Economic Research Forum in cooperation with the Jordanian Department of Statistics, is a rich source of information on all aspects of the Jordanian labor market (JLMPS 2010). Most importantly for our purposes is the fact that the survey provides individual-level data on own schooling and parents' schooling for all adults in the sample. We restrict the sample to individuals born in Jordan who are aged 25 to 70 in 2010 and who have non-missing information on age, sub-district of birth, years of schooling, father's schooling, and mother's schooling.[5] These exclusions result in a sample of 4,139 males and 4,131 females, which we refer to as the sons' and daughters' samples, respectively.

Second, each individual in the JLMPS restricted sample is matched to the 2010 Jordanian Schools Census. The matching process determines for each individual the number of public basic and secondary schools (per 10,000 individuals) present in the individual's sub-district

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of the Jordanian government or schools run by the UN Relief and Works Agency for Palestinian Refugees in the Near East (UNRWA). UNRWA provides basic schooling to Palestinian refugees in Jordan. For purposes of our analysis, UNRWA schools are considered public schools. The proportion of secondary school students in 2010 enrolled in public schools is 94.7 percent.

[4] Since these figures are based exclusively on surviving schools, they ignore school closures and school conversions from one type of school to another. Basic schools currently go from first to tenth grade. Before 1994, they were subdivided into primary schools (going from first to sixth grade) and preparatory schools (going from seventh to ninth grade).

[5] The original sample size of all individuals who are aged 25 to 70 years in 2010 and are born in Jordan is 8,312 observations. The sample restrictions on the missing values result, in practice, in the exclusion of 34 observations (missing age), 1 observation (missing father's schooling), and 7 observations (missing mother's schooling).

of birth when the individual was of age to accede to this educational level (6 years of age for the basic level and 15 years of age for the secondary level). [6] A school is considered available for a female if it is a girls' or a mixed school and for a male if it is a boys' or mixed school.[7] We chose to employ the local supply of public schooling at the sub-district of birth, rather than the sub-district of residence, in order to avoid potential endogeneity originating from parents who have a higher taste for schooling moving to districts where public schooling is more abundant when their children are of school age.

The summary statistics for the full sample of sons and daughters and for the "young" and "old" subcomponents are shown in table 1. While sons have higher years of schooling on the whole (10.8 vs. 9.8 years), this is reversed among the young cohort where daughters now have slightly higher years of schooling than sons (11.9 vs 11.5 years). We note that the supply of schooling has increased substantially from the old to the young cohort, but much more so for basic schools than for secondary schools. For sons, the supply of basic schools increased 4.6 times and that of secondary schools 1.6 times from the old to the young cohort. For daughters, the supply of basic schools increased 5.6 times and that of secondary schools doubled. Despite, the more rapid increase in the supply of schools available to girls, the supply of both basic and secondary schools available to sons in the young cohort continues to be larger than that available to daughters.

4. Identification Strategy

We use a difference-in-difference methodology that exploits variation across districts in the rate at which public basic and secondary schools become available. Our focus is on the intergenerational persistence coefficient between parent and child and the way in which the local supply of schooling affects this coefficient. We include sub-district fixed effects to control for time-invariant characteristics of places that may be correlated with both the local supply of schooling and school attainment, and cohort fixed effects to control for the time trend in school attainment.

The identifying assumption underlying this estimation strategy is that the variation in the supply of public schools across cohorts and sub-districts of birth is uncorrelated with unobservable time-varying characteristics of the sub-district that affect both the supply of schooling and school attainment. A possible confounding factor that could violate this assumption is that sub-districts with a rising taste for education over time may tend to get more public schools and also have higher educational attainment compared to other sub-districts even in the absence of a causal relationship between the supply of schooling and educational attainment. We argue that this is highly unlikely given the way school construction decisions are made in Jordan. Decision-making about school construction in Jordan is highly centralized in the Ministry of Education and is unlikely to be affected by local shifts in demand for schooling. Similar identifying assumptions are used in Duflo (2001) and the literature on returns to education (Card and Krueger 1992).

[6] Because of the absence of annual estimates of sub-district populations, the population used to normalize the supply of schooling at the sub-district level is the 2004 population of the sub-district. There are 86 sub-districts in Jordan. If sub-district populations are growing at different rates, this could introduce some measurement error of the true supply of schooling available to different cohorts. Conversely, because annual estimates of population are available at the national level, the estimates of the national supply of different kinds of schools shown in Figures 2a and 2b is normalized using year-specific population estimates.

[7] Secondary schools include both general and vocational secondary schools. Public schools include schools under the jurisdiction of: (i) Ministry of Education, (ii) Ministry of Higher Education, (iii) Ministry of Defense, (iv) Ministry of Social Development, (v) Ministry of Religious Endowments (Awqaf), and (vi) UNRWA. We should note here that we consider the presence of a mixed school as being available for both boys and girls when, in fact, a mixed school, especially a mixed secondary school, may be seen as inaccessible or inappropriate for girls in a socially conservative setting. It is beyond the scope of this paper to investigate the relative effects of the availability of single sex vs. mixed schools.

5. Characterizing the Trend in the Intergenerational Persistence of Education in Jordan

Before getting into the effect of school construction on the intergenerational persistence of educational attainment, we conduct a few regressions to characterize the rate at which the coefficient of persistence has been changing across cohorts for different parent-child combinations. The regressions shown in table 2 relate child's year of schooling to that of the parent for father/son, mother/son, father/daughter and mother/daughter combinations. All regressions include sub-district fixed effects to capture mean differences in schooling across sub-districts. In each case, Model 1 includes the parent's schooling and the age deviation from the mean for the child and its square. Model 2 adds to these variables the interaction between parent schooling and the age deviation and its square. Model 1 shows that the average intergenerational persistence coefficient for all age groups of individuals 25 to 70 in 2010 is higher between mothers and their children than between fathers and their children and it is also slightly higher for daughters than it is for sons, with both parents. It also shows that years of schooling decrease at an increasing rate with age, capturing the rapid increase of educational attainment among increasingly younger cohorts in Jordan (shown in figure 1). Model 2 shows that intergenerational persistence also increases at an increasing rate with age in Jordan, meaning that intergenerational mobility in education has risen rapidly over time in Jordan. The trend in the intergenerational persistence coefficient estimated in Model 2 for the various parent-child combinations is illustrated graphically in figure 3. For instance, the correlation between the educational attainment of a 50 year-old woman in Jordan with that of her mother was 0.7, while that of a 25 year-old woman was only 0.15. As discussed earlier, the coefficient of intergenerational persistence tends to be larger for both sexes of children with their mothers. It also tends to be larger for females with both their parents, but only for those above age 30-35. This implies that the intergenerational persistence coefficient has fallen more sharply across cohorts for women in Jordan, as women began acquiring education in large numbers in recent years.

6. The Relationship Between the Local Supply of Schools and the Intergenerational Persistence of Educational Attainment

We now come to the main question motivating this paper, namely the effect of the local supply of schools on the intergenerational persistence in education. As before, we run separate regressions for the four parent-child combinations. For each combination, we estimate four models: (i) Model 1 which includes only the main effects of parent's schooling, basic and secondary school supply on the full sample (ages 25-70); (ii) Model 2, which adds the interaction of parent's schooling with the basic and secondary school supply variables for the full samples; (iii) Model 3, which is the same as Model 2, but where the sample is limited to the old cohort (ages 45-70); (iv) Model 4, which is the same as Model 2, but limited to the young cohort (ages 25-35). As before, the dependent variable in all models is the child's years of schooling. The school supply variables are defined as number of schools in the sub-district of birth available to the individual when he or she was of age for that level of schooling per 1,000 individuals in the population of the sub-district in 2004. We include in all models sub-district fixed effects to capture the effects on school attainment of any time-invariant district characteristics, and single-year cohort fixed effects to capture any general time trends in educational attainment that affect all sub-districts in Jordan. Results for sons are shown in table 3 and for daughters in table 4.

We first note that an increased supply of schooling has a significant direct impact on school attainment. The effect of increased supply of basic schooling is significantly larger for girls than for boys and the opposite is true for the effect of secondary schooling. For the full sample, an increase of one basic school per 10,000 people (roughly equivalent to half a standard deviation for sons and 0.8 standard deviations for daughters) is associated with 0.21 to 0.23 additional years schooling for sons and 0.63-0.65 additional years for daughters (See

Model 1 in tables 3 and 4). An increase of one secondary school per 10,000 people is associated with 0.5 additional years of schooling for sons, but only a statistically insignificant 0.15-0.16 increase for daughters. Comparing the results for Models 3 and 4, we can see that the impact of increased supply of basic schooling on educational attainment is about the same for the old and young cohorts of sons, but nearly twice as large for the old cohort of daughters as it is for the young cohort.

We now move to the effect of school supply on the intergenerational coefficient of persistence in education, given by the coefficient of the interaction between parent's schooling and the supply of basic and secondary schools. These results are shown in detail in tables 3 and 4. The relative size of the effect on the intergenerational persistence coefficient is summarized in table 5. We first note that an increase in the supply of basic schools significantly reduces the coefficient of intergenerational persistence with both parents for both sons and daughters. The effect for daughters is nearly three times larger than for sons. As shown in table 5, sons experience a relative reduction in the coefficient with both parents of 10 percent as a result of an increase in basic school supply of one school per 10,000 people. The effect is statistically significant at the 5 percent level for fathers and at the 10 percent level of mothers. Daughters, on the other hand, experience a reduction in the coefficient of 34 percent with fathers and 26 percent with mothers for a similar increase in basic school supply, with both these effects significant at the 1 percent level.

When the sample is sub-divided into old and young cohorts, we can immediately see that these effects are primarily due to the experience of the old cohort, whose schooling was likely to be more constrained by the availability of basic schools. We should note, however, that the effect is non-negligible among the young cohort of daughters although not very significant statistically.

The effect of the supply of secondary schools on intergenerational persistence is either insignificant or has an unexpected sign. For the full sample of sons, the effect is virtually non-existent. For the full sample of daughters, however, the increase supply of secondary schools appears to *increase* intergenerational persistence in education. This positive effect for daughters does not appear to be entirely due to collinearity between the supply of basic and secondary schools. To check this, we ran additional regressions where we dropped the supply of basic schools and its interaction with parent's schooling from the regression. While the coefficient of the interaction of the supply of secondary schools with parent's schooling was still small and insignificant for sons, it was still positive and significant at the 5 percent level in the full sample of daughters, at least for the father-daughter relationship. The implied increase in intergenerational persistence due to increased supply of secondary schools fell, however, from 33 percent to 18 percent for the father-daughter relationship and from 19 percent to 8 percent, and became statistically insignificant, for the mother-daughter relationship.[8]

7. Conclusions

This paper investigated the extent to which intergenerational mobility in education in Jordan was enhanced by government policies to increase the supply of basic and secondary schools. Our identification strategy relied on exploiting the variation in school supply across sub-districts over time to identify the effect of school construction on the coefficient of intergenerational persistence in educational attainment.

[8] We also ran regressions where we dropped the supply of secondary schools and its interaction with parent's schooling to see if the effect of the supply of basic schooling would change. There was no appreciable change in the effect of the supply of basic schooling.

By first analyzing intergenerational mobility across cohorts we establish that mobility has increased significantly in Jordan over time, and more so for women than for men. We also find that school attainment is significantly enhanced by the increased supply of schooling, with the effect of increased supply of basic schools being larger for girls than for boys and the opposite being true for the effect of secondary schooling.

With regard to our main research question regarding the effect of school supply on intergenerational mobility in education, we find that an increase in the local supply of basic schools reduces intergenerational persistence in education for women three times more than it does for men. A one school per 10,000 people increase reduces the coefficient of intergenerational persistence by one third for women and by one tenth for men. The effect is almost entirely explained by the experience of an older cohort of Jordanians born between 1940 and 1965, for whom the supply of basic schooling was clearly a constraint, although younger women also benefited somewhat. The fact that the effect of the local supply of basic school is larger for women on both attainment and intergenerational persistence can be explained that girls in a conservative social setting are more constrained geographically and are often unable to go to school in a jurisdiction different from their own.

A somewhat surprising result of this study is that the local supply of secondary schools has no effect on intergenerational mobility in education, for either men or women. The supply of secondary schools does enhance educational attainment for men, but does not affect the coefficient of intergenerational persistence. For women, it does not directly affect attainment in a statistically significant fashion and even seems to mildly reduce intergenerational mobility. We have no ready explanation for this anomalous result.

This research therefore demonstrates that a policy to construct more basic schools and to equalize the supply of basic schools across jurisdictions does in fact contribute to improved equality of opportunity in education, especially at early stages of education acquisition. It remains to be seen in future research whether it is better in a socially conservative setting such as Jordan to establish single-sex schools or mixed schools if the objective is to improve the educational attainment of girls.

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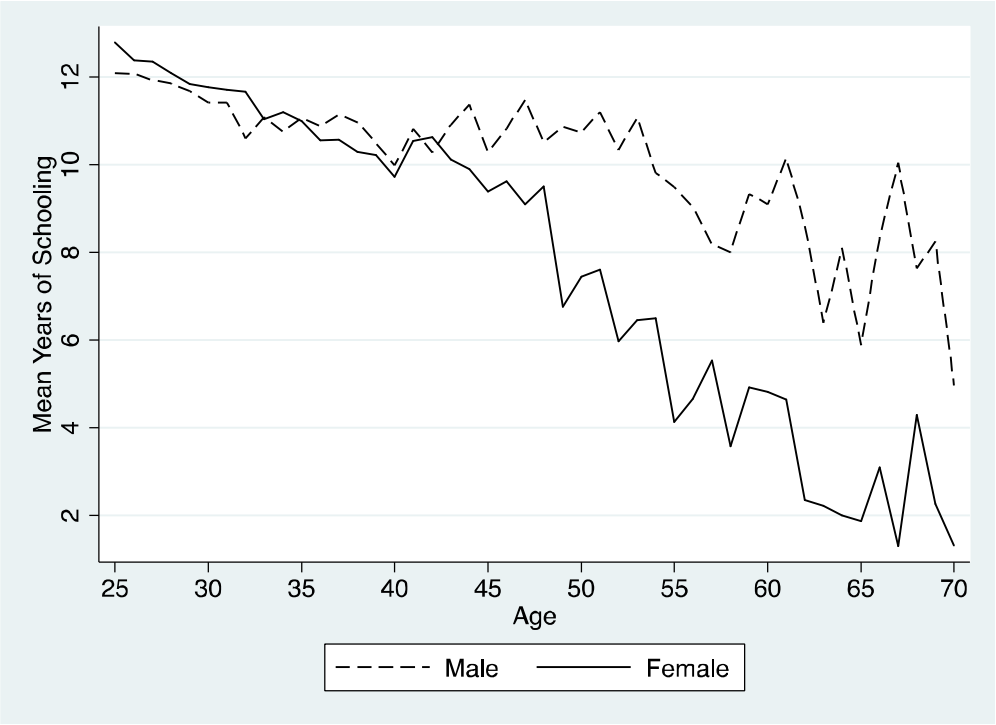
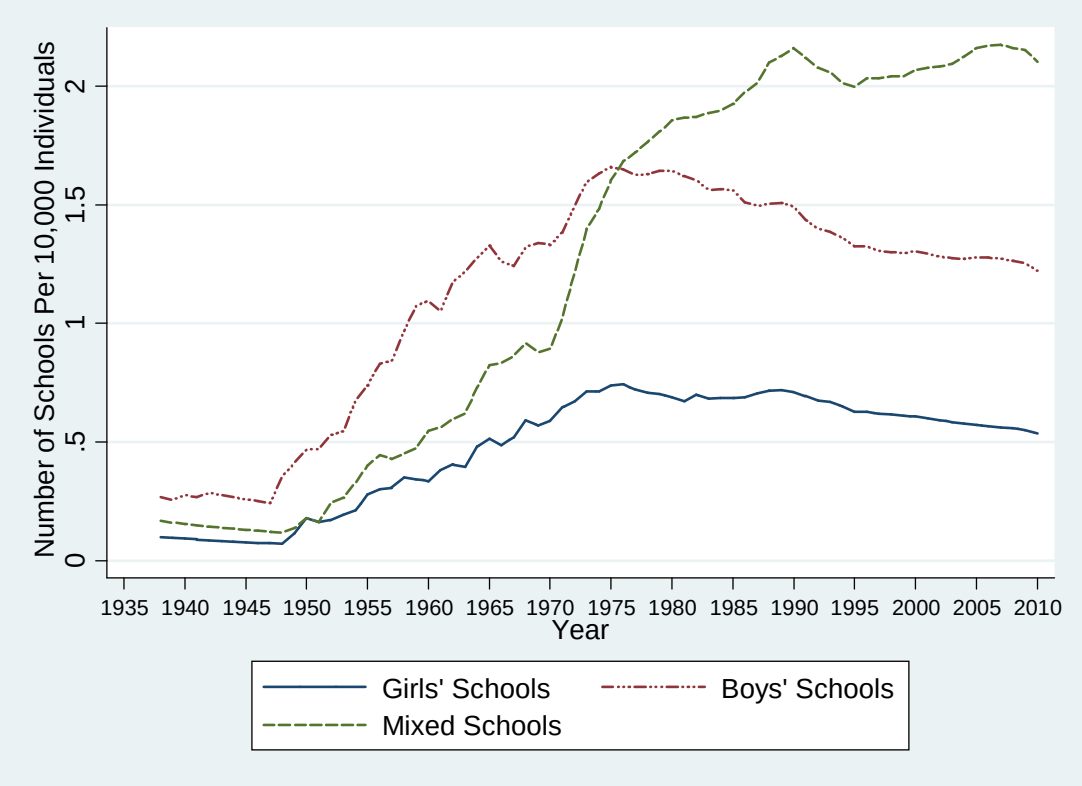
Figure 1: Mean Years of Schooling by Age and Sex



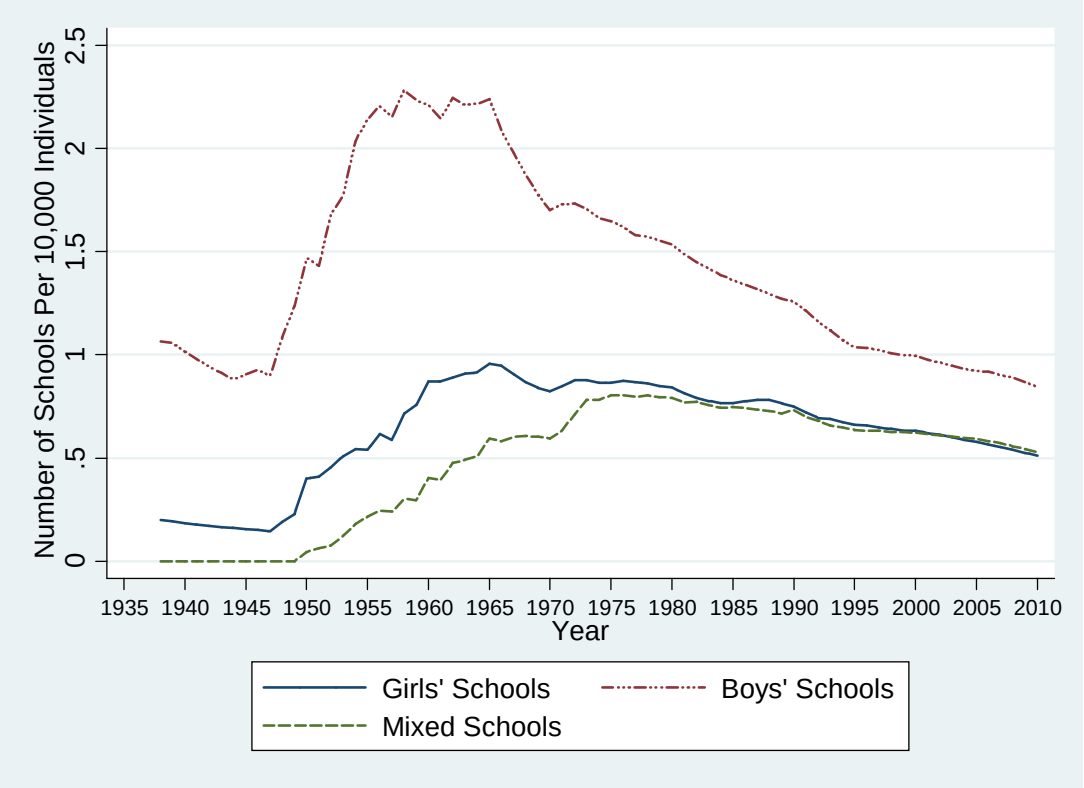
Notes: Graph is based on the 2010 Jordanian Labor Market Survey. Sample is restricted to individuals who are aged 25 to 70 years in 2010, are born in Jordan, and with non-missing values for year of birth, sub-district of birth, years of schooling, father's schooling, and mother's schooling.

Figure 2a: National Supply of Public Basic Schools (Per 1,000 Individuals) in 1938-2010



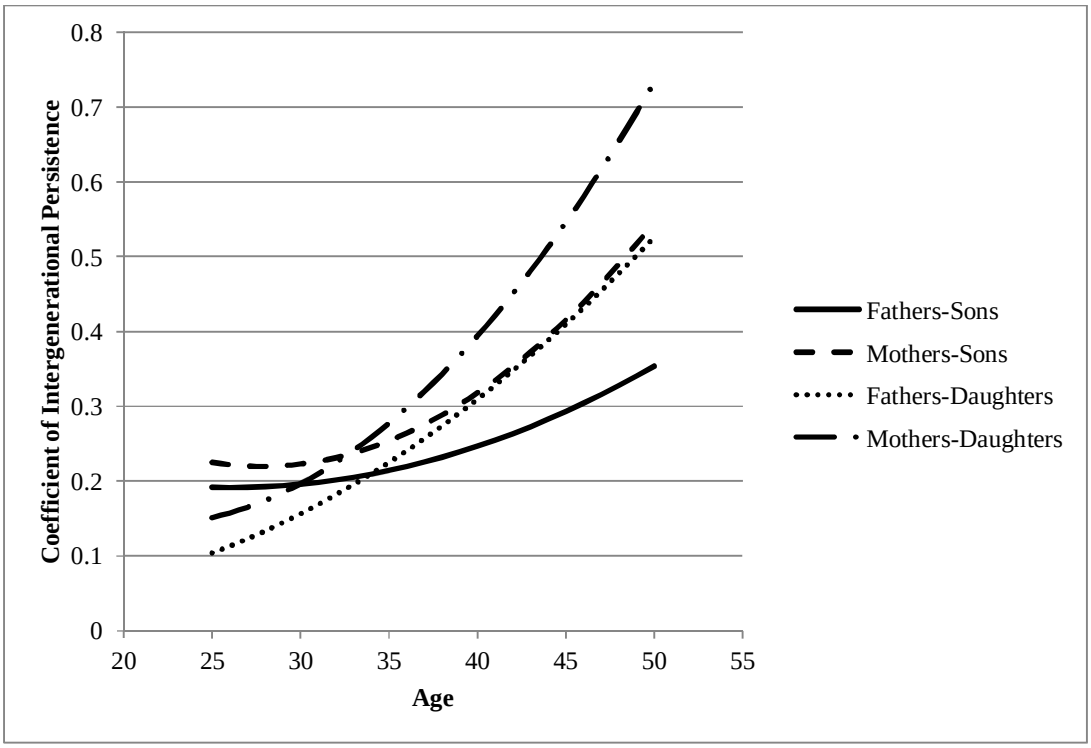
Notes: The figure is based on the schools database provided by the Jordanian Ministry of Education. Public basic schools are the basic (*asasi*) schools under the jurisdiction of: (i) Ministry of Education, (ii) Ministry of Higher Education, (iii) Ministry of Defense, (iv) Ministry of Social Development, (v) Ministry of Religious Endowments (*awqaf*), and (vi) UNRWA. The number of schools is weighted by the population size in each year. Population figures are based on: (i) Casto and Dotson (1938) for the year 1938, and (ii) the population estimates from the UN Population Division, which are available every five years from 1950 to 2010 United Nations, Department of Economic and Social Affairs, Population Division (2011). The population figures for the years in between were linearly interpolated.

Figure 2b: National Supply of Public Secondary Schools (Per 1,000 Individuals) in 1938-2010



Notes: The figure is based on the schools database provided by the Jordanian Ministry of Education. Public secondary schools include (i) secondary (*acadimi*) schools, (ii) vocational (*mihani*) schools, and (iii) schools with both secondary and vocational sections (*acadimi* + *mihani*), which lie under the jurisdiction of: (i) Ministry of Education, (ii) Ministry of Higher Education, (iii) Ministry of Defense, (iv) Ministry of Social Development, (v) Ministry of Religious Endowments (*awqaf*), and (vi) UNRWA. The number of schools is weighted by the population size in each year. Population figures are based on: (i) Casto and Dotson (1938) for the year 1938, and (ii) the population estimates from the UN Population Division, which are available every five years from 1950 to 2010 United Nations, Department of Economic and Social Affairs, Population Division (2011) The population figures for the years in between were linearly interpolated.

Figure 3: Estimated Coefficient of Intergenerational Persistence of Educational Attainment



Notes: Graph is based on estimating a regression of child's schooling on parent's schooling, age, age squared, interaction of parent's schooling with age, and interaction of parent's schooling with age squared. Sample is restricted to individuals who are aged 25 to 70 years in 2010, are born in Jordan, and with non-missing values for year of birth, sub-district of birth, years of schooling, father's schooling, and mother's schooling.

Table 1: Summary Statistics- The 2010 Jordanian Labor Market Panel Survey (JLMPS): Means and Standard Deviations Reported

	Sons			Daughters		
	Young	**Old**	**All**	**Young**	**Old**	**All**
Years of schooling	11.510	9.804	10.789	11.865	6.409	9.831
	(3.565)	(4.670)	(3.972)	(3.692)	(5.458)	(4.945)
Father's schooling	4.536	1.544	3.102	4.870	1.777	3.387
	(4.873)	(2.757)	(4.193)	(5.076)	(2.988)	(4.397)
Mother's schooling	2.624	.431	1.491	2.699	.493	1.593
	(3.989)	(1.417)	(3.132)	(4.155)	(1.662)	(3.275)
Basic public schools per 10,000 people	2.424	.531	1.621	1.769	.315	1.152
available to individual	(2.162)	(0.752)	(1.901)	(1.434)	(.412)	(1.259)
Secondary public schools per 10,000 people	1.985	1.216	1.653	1.403	.709	1.109
available to individual	(2.173)	(1.335)	(1.907)	(1.427)	(.739)	(1.208)
# Observations	1,723	1,242	4,139	1,700	1,218	4,131

Notes: Standard deviations are in parentheses. Sample is restricted to individuals born in Jordan, and aged 25 to 70 in 2010, with non-missing year of birth, sub-district of birth, years of schooling, father's schooling, mother's schooling, and local supply of schools. The "young" cohort includes those born in 1975 or later, while the "old" cohort includes those born in 1965 or earlier.

Table 2: Intergenerational Mobility of Education- Basic Regressions: Dependent Variable: Child's Years of Schooling- OLS Regression

	Sons				Daughters			
	Fathers		Mothers		Fathers		Mothers	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Parent's schooling	.232***	.241***	.263***	0.301***	.243***	.297***	.274***	0.368***
	(.015)	(.017)	(.024)	(.027)	(.012)	(.020)	(.021)	(.029)
Age deviation	-.044***	-.062***	-.046***	-.057***	-.174***	-.228***	-.18***	-.205***
	(.011)	(.013)	(.012)	(.013)	(.020)	(.020)	(.022)	(.021)
Age deviation	-.225***	-.208***	-.246***	-.225***	-.422***	-.305***	-.425***	-.36***
squared/100	(.054)	(.061)	(.053)	(.057)	(.06)	(.074)	(.063)	(.074)
Parent's schooling * age		.008***		.015***		.018***		.025***
deviation		(.002)		(.003)		(.002)		(.005)
Parent's schooling * age		.027**		.070***		.030*		.077*
deviation Sq./100		(.012)		(.025)		(.016)		(.039)
Constant	10.346**	10.322**	10.701**	10.663**	9.508***	9.358***	9.900***	9.809***
	* (.082)	* (.081)	* (.081)	* (.079)	(0.082)	(.102)	(.067)	(.083)
Sub-district of birth fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	.173	.179	.158	.163	.419	.440	.407	.422
# Observations	4,139	4,139	4,139	4,139	4,131	4,131	4,131	4,131

Notes: Robust standard errors clustered at the sub-district of birth level are in parentheses. * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level; and *** indicates significance at the 1 percent level. Sample is restricted to individuals born in Jordan, and aged 25 to 70 in 2010, with non-missing year of birth, sub-district of birth, education, father's education, mother's education, and local supply of schools.

Table 3: Intergenerational Mobility and Local Supply of Schools- Sons' Sample: Dependent Variable: Child's Schooling- OLS Regression

	Fathers				Mothers			
	Model 1 1-Full Sample	**Model 2 2-Full Sample**	**Model 3 3-Old Cohort**	**Model 4 4-Young Cohort**	**Model 1 1-Full Sample**	**Model 2 2-Full Sample**	**Model 3 3-Old Cohort**	**Model 4 4-Young Cohort**
Parent's schooling	.236***	.284***	.378***	.238***	.262***	.310***	.721***	.273***
	(.015)	(.017)	(.062)	(.023)	(.027)	(.038)	(.089)	(.041)
Basic public schools per 10,000 people avail. to indiv.	.211***	.318***	.184	.161	.235***	.299***	.105	.219
	(.073)	(.086)	(.364)	(.179)	(.077)	(.084)	(.369)	(.178)
Parent's schooling * Basic public schools		-.027**	-.123	.002		-.032*	-.412*	-.014
		(.012)	(.128)	(.014)		(.019)	(.210)	(.019)
Secondary public schools per 10,000 people avail. to indiv.	.506***	.495***	.481	.689	.498***	.491***	.448	.460
	(.106)	(.111)	(.328)	(.577)	(.109)	(.113)	(.338)	(.573)
Parent's schooling * Secondary public schools		-.0002	.069	-.018		.001	.088	.004
		(.014)	(.055)	(.020)		(.018)	(.163)	(.024)
Constant	6.434***	6.418***	5.962***	8.410***	6.387***	6.388***	5.890**	9.102***
	(1.642)	(1.632)	(1.807)	(1.107)	(1.639)	(1.639)	(1.829)	(1.096)
Sub-district of birth fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of birth fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	.192	.194	.222	.165	.175	.176	.206	.152
# Observations	4,139	4,139	1,242	1,723	4,139	4,139	1,242	1,723

Notes: Robust standard errors clustered at the sub-district of birth level are in parentheses. * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level; and *** indicates significance at the 1 percent level. Sample is restricted to males born in Jordan, and aged 25 to 70 in 2010, with non-missing year of birth, sub-district of birth, education, father's education, mother's education, and local supply of schools. The "young" cohort includes those born in 1975 or later, while the "old" cohort includes those born in 1965 or earlier. The supply of public schools is the number of boys' and mixed schools that were available to the "son" in his sub-district of birth at the time he reached the entrance age for this level of schooling (6 years for basic and 15 years for secondary).

Table 4: Intergenerational Mobility and Local Supply of Schools- Daughters' Sample: Dependent Variable: Child's Years of Schooling- OLS Regressions

	Fathers				Mothers			
	Model 1 1-Full Sample	Model 2 2-Full Sample	Model 3 3-Old Cohort	Model 4 4-Young Cohort	Model 1 1-Full Sample	Model 2 2-Full Sample	Model 3 3-Old Cohort	Model 4 4-Young Cohort
Parent's schooling	.249***	.286***	.675***	.183***	.284***	.348***	.828***	.259***
	(.012)	(.024)	(.075)	(.028)	(.020)	(.036)	(.134)	(.038)
Basic public schools per	.630***	.945***	1.511***	.626***	.649***	.823***	1.031**	.563**
10,000 people avail. to indiv.	(.154)	(.189)	(.509)	(.216)	(.165)	(.184)	(.480)	(.224)
Parent's schooling * Basic		-.097***	-.425***	-.029*		-.089***	-.264	-.029
public schools		(.022)	(.155)	(.016)		(.027)	(.247)	(.0264)
Secondary public schools per	.160	-.065	.043	-.217	.146	.063	.067	-.282
10,000 people avail. to indiv.	(.247)	(.237)	(.398)	(1.055)	(.254)	(.250)	(.430)	(.974)
Parent's schooling * Secondary		.095***	.108	.049***		.067***	-.022	.028
public schools		(.019)	(.090)	(.017)		(.023)	(.243)	(.020)
Constant	3.521**	3.813**	2.236	9.475***	3.921**	4.193**	3.625	9.939***
	(1.574)	(1.496)	(1.507)	(1.496)	(1.853)	(1.822)	(2.21)	(1.374)
Sub-district of birth fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year of birth fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	.425	.432	.433	.203	.414	.417	.380	.206
# Observations	4,131	4,131	1,218	1,700	4,131	4,131	1,218	1,700

Notes: Robust standard errors clustered at the sub-district of birth level are in parentheses. * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level; and *** indicates significance at the 1 percent level. Sample is restricted to females born in Jordan, and aged 25 to 70 in 2010, with non-missing year of birth, sub-district of birth, education, father's education, mother's education, and local supply of schools. The "young" cohort includes those born in 1975 or later, while the "old" cohort includes those born in 1965 or earlier. The supply of public schools is the number of girls' and mixed schools that were available to the "daughter" in her sub-district of birth at the time she reached the entrance age for this level of schooling (6 years for basic and 15 years for secondary).

Table 5: The Relative Effect of an Increase in the Local Supply of Basic and Secondary Schools by One School per 10,000 People on the Coefficient of Intergenerational Persistence for Different Parent-Child Combinations

	Basic						Secondary					
	Full Sample		Old		Young		Full Sample		Old		Young	
Father-son	-10%	**	-33%		1%		0%		18%		-8%	
Mother-son	-10%	*	-57%	*	-5%		0%		12%		1%	
Father-daughter	-34%	***	-63%	***	-16%	*	33%	***	16%		27%	***
Mother-daughter	-26%	***	-32%		-11%		19%	***	-3%		11%	

Notes: The relative size of the effect is obtained by dividing the coefficient of the interaction term between parent schooling and the supply of schools by the parent's schooling coefficient in models 2, 3 and 4 in tables 3 and 4. The significance level of the underlying coefficient of the interaction term is indicated by * at the 10 percent level, ** at the 5 percent level, and *** at the 1 percent level.