Does Improved Local Supply of Schooling Enhance Intergenerational Mobility in Education? Evidence from Jordan*

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Abstract

This paper examines the effect of increased local supply of public schools 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 schools in the sub-district of birth at the time the individual was of age to enroll, from a school census. We identify the effect by exploiting the variation in the supply of basic and secondary public schools across cohorts and sub-districts of birth in Jordan, controlling for year and sub-district of birth fixed effects and interactions of governorate and year of birth fixed effects. To further address the potential endogeneity of school supply, we alternatively include a full set of interactions of sub-district of birth and year of birth fixed effects. Our findings show that the local availability of basic public schools does in fact increase intergenerational mobility in education. For instance, a one standard deviation increase in the supply of basic public schools per 1,000 people reduces the father-son and mother-son associations of schooling by 18-20 percent and the father-daughter and mother-daughter associations by 33-44 percent. The effects of basic schools on daughters are larger than for sons and are robust to including sub-district by year of birth fixed effects. However, an increase in the local supply of secondary public schools does not seem to have a similar effect on intergenerational mobility in education.

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I. Introduction

Raising intergenerational mobility of educational attainment, or achieving greater equality of opportunity in the acquisition of human capital, 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 increasing the local supply of public schools actually increase intergenerational educational mobility. This result will only hold if the intergenerational persistence of educational attainment is perpetuated because of supply-side factors, such as limited local supply of schools or high tuition fees. If, on the other hand, a child's acquisition of education is constrained by parental attitudes toward education, high opportunity costs, or other demand side factors, increasing the local supply of public schools will not necessarily improve the average educational attainment, let alone that of the children of the poorest and most marginalized parents.

This paper examines the question of whether an increase in the local supply of public schools reduces the intergenerational persistence of educational attainment within a new context, Jordan, one of the so far understudied Middle Eastern countries. 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 with the often-stated goal of raising equality of opportunity. It is particularly important to evaluate the effectiveness of these programs in enhancing intergenerational educational mobility and hence promoting equality of opportunity. The question is also relevant to socially conservative settings, typical in many developing countries, where children's educational attainment, especially of girls, is constrained by the limited local supply of schools, as girls are often not allowed to enroll in a distant school.

We employ new and unique data sources from Jordan, the 2010 Jordan Labor Market Panel Survey (JLMPS 2010), 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 sub-district, type, and date of establishment of every school in Jordan, allowing us to measure the local supply of each type of schools in each sub-district in every year (under the presumption that there were no significant school closures or changes in type over time, which is likely the case). The exposure of an individual in the JLMPS 2010 sample to the supply of public schooling is then determined by the number of sex-appropriate basic (or secondary) public schools (per 1,000 individuals) that were available to them in their sub-district of birth at the time they were of age to enroll in that school level (6 years of age for basic and 15 years for secondary). The richness of the data set makes it the first in the Middle East to allow such a study.

We employ a standard difference-in-differences approach to disentangle the impact of the expansion of local public schooling on the correlation between a child's educational attainment and that of his/her parents. In particular, we exploit the variation in the supply of public schools across cohorts and sub-districts of birth, and allow the effect of this variable to vary by parent's schooling, where we control for both sub-district of birth and year of birth fixed effects. Our empirical strategy is similar to 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 public schools to obtain the effect of public school supply on the coefficient of intergenerational persistence of educational attainment.[4]

[4] 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 schooling and child's schooling.

One fundamental limitation of our empirical strategy though is that, unlike in Duflo (2001) or Meghir and Palme (2005), the growth of the local supply of public schools in Jordan was gradual rather an abrupt change due to a specific reform and thus it is likely to have been affected by both supply-side and demand-side factors, making it challenging to disentangle the causal impact of local school supply. While we are unable to rule out this limitation, we argue that the results are likely causal for three reasons. First, the allocation of public schools in Jordan is highly centralized and thus unlikely to be affected by local demand for schooling. Second, we include a full set of interactions of governorate of birth and year of birth fixed effects which control for time-varying characteristics of governorates that may drive differences between sub-districts in the growth of local school supply and educational attainment. This should arguably account for most of the spatial heterogeneity in Jordan. Third, unlike in Duflo (2001), we are *not* interested in the impact of school supply on educational attainment per se, but rather in its *differential* impact on attainment by parental schooling. Because we observe local school supply *within* sub-districts over time, we include as an alternative strategy a full set of interactions of sub-district of birth and year of birth fixed effects which control for time-varying characteristics of sub-districts that may drive inter sub-district differences in the growth of local school supply and educational attainment. Despite these points, there might still be omitted time-varying individual- or household-level characteristics within sub-districts of birth that drive the results.

Our findings indicate that the supply of public basic schools does significantly increase the intergenerational mobility of education in Jordan, especially among daughters, but the supply of secondary schools does not have the expected effect. Increasing the supply of sex-appropriate basic schools per 1,000 people by one standard deviation (~ 0.19 for males and 0.13 for females) reduces the father-son and mother-son intergenerational persistence coefficients by 18-20 percent,

and reduces the father-daughter and mother-daughter coefficients by 44 percent and 33 percent, respectively. These effects are robust to including governorate of birth by year of birth fixed effects. However, when controlling for sub-district of birth by year of birth fixed effects, the effects on daughters retain their magnitude and statistical significance, but the effects on sons become statistically insignificant. In contrast, an increase in the supply of secondary schools per 1,000 has 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.

Overall, the findings suggest that the local supply of basic schools is a binding constraint on both the educational attainment and the intergenerational educational mobility of Jordanian females but less so among males. On the other hand, the demand-side factors, particularly, the social conservatism that is inherent in many Middle Eastern and developing countries, and not the local supply of secondary schools, seem to be the binding constraint when it comes to secondary educational attainment among females.

The paper is linked to the vast literature on intergenerational mobility of educational attainment (Behrman et al., 1999; Salehi-Isfahani, 2001; Dahan and Gaviria, 2001; Daouli, Demoussis, and Giannakopoulos, 2010; Checchi, Fiorio, and Leonardi, 2013). One line of this literature focused on examining the impact of specific policies on educational mobility. For example, Behrman and Wolfe (1987) examined the relative impact of parental schooling versus school supply on child's educational attainment. Checchi, Ichino, and Rustichini (1999) and Davies, Zhang, and Zeng (2005) studied the effect of public versus private educational systems on mobility. Schütz, Ursprung, and Wößmann (2008) explored the impact of a number of educational policies on an index of equality of educational opportunity across countries. Checchi and Flabbi (2013) studied the effect of secondary schooling tracks systems on mobility. This

paper makes two contributions to this literature. First, it extends the analysis in Behrman and Wolfe (1987) by examining the impact of the expansion of the local supply of public schools on educational mobility. As far we know, this question has not been studied before. This policy is of primary relevance to the experiences of developing countries where public schooling was the only realistic means to eradicate illiteracy among the masses. Second, while previous 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 on parental characteristics, the JLPMS allows us to improve on these studies by including information on parental characteristics of all adults in the sample.

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 describes the conceptual framework that motivates the empirical analysis. Section IV includes a description of the data. Section V characterizes the trend across cohorts of intergenerational persistence in Jordan. Section VI describes our identification strategy. Section VII presents our findings with regard to the effect of increasing the local supply of public schools on intergenerational educational mobility. We discuss several robustness checks in Section VIII. Finally, section IX concludes.

II. Jordan's Growth of Educational Attainment and Public School Supply

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, 2013). Figure I depicts the evolution of the average years of schooling of males and females by year of birth based on data from JLMPS 2010.[5] 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 the 1940 cohort to ten years for the 1955 cohort. It then stagnated at about 11 years for cohorts born between 1960 and 1975, 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 fewer than two years for the 1940 cohort, rises rapidly to about ten years for the 1965 cohort. Although the rate of increase of female schooling slows after that, the mean years of schooling for women exceeds that of their male counterparts for the youngest cohort born between 1975 and 1985.

To investigate whether this dramatic increase in educational attainment corresponds to the expansion of public schools in the country, we depict in Figures II.A and II.B the average number of basic and secondary public schools per 1,000 individuals in sub-district of birth for the JLMPS 2010 sample. The data on the number of public schools is obtained from the school census carried out in 2010 by the Jordanian Ministry of Education.[6] We focus on public schools because they enroll the vast majority of students in Jordan.[7] One can clearly see from Figure II.A

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

[6] Since these figures are based exclusively on surviving schools in 2010, 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).

[7] 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 public schools run by the Ministry of Education or some other Ministry of the Jordanian government or by the UN Relief and Works Agency for Palestinian Refugees in the Near East (UNRWA), which 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.

that the growth in the supply of public basic schools started to take off for the cohort born in 1950 and continued at a rapid pace through the mid-1970s cohort. 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 for the cohort born in 1950 onward, but by the 1965 cohort, there appears to have been a concerted effort to dramatically increase the supply of mixed schools. This corresponds roughly to the cohort of Jordanian women that have experienced the largest increase in schooling relative to previous cohorts.

Figure II.B depicts the growth in the supply of public secondary schools. The growth in the supply of boys', girls', and mixed secondary schools was steady across the observed birth cohorts. Perhaps unsurprisingly, the number of boys' secondary schools was equal to the number of girls' and mixed secondary schools combined.

III. Conceptual Framework

The classic model of intergenerational mobility attributes the transmission of human capital from parent to child to either inheritance of parental endowment (both genetic traits and culture) or parental investment in child's human capital (Becker and Tomes, 1979; Solon, 2004). In this model, the steady-state intergenerational association between parent's income and child's income depends *positively* on two factors, (a) the elasticity of child's income with respect to parental investment in child's human capital, where richer parents invest more in their child's human capital hence making their children richer, and (b) the heritability coefficient of parental genetic and cultural endowment, where richer parents tend to have greater endowment that is passed on to their offspring.

The impact of the provision of public schools on the intergenerational association of human capital could be analyzed using Solon's (2004) model, which adapts Becker and Tomes

(1979) model by including public investment into the production function of child's human capital. In this model, the steady-state intergenerational correlation of income depends *negatively* on a third factor besides the two factors described above, (c) the degree of "progressivity" of public investment in child's human capital. Progressive public investment in child's human capital means that the ratio, and not necessarily the absolute value, of public investment to parental after-tax income *decreases* with parental income. The more progressive the governmental policy is, the faster this ratio declines with parental income and the less the intergenerational correlation of income is.

One could think of Jordan's growth of local supply of public basic and secondary schools that it increases the human capital production for children of *marginal* parents in terms of income and educational attainment. Those are parents who would have chosen higher investment in the human capital of their offspring, but were constrained by the limited supply of schools in their sub-districts of residence and could not afford to send their children to more distant schools outside their jurisdiction or to provide them with home schooling. However, the increase in public schools is expected to have less of an effect on richer or more educated parents, who are expected to provide education to their children regardless of the availability of schools in their sub-districts either via home schooling or sending their children to distant schools. On average though we expect the increase in the local supply of public schools to reduce the intergenerational correlation of educational attainment or enhance intergenerational educational mobility.

IV. Data

We employ two new and unique data sources in the empirical 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, which is quite rare in household surveys from developing countries. We also observe the actual years of schooling completed and not only the highest educational degree attained, which allow us to observe the schooling variable with precision. 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, mother's schooling, and local supply of schools in sub-district of birth.[8] These exclusions resulted 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 sex-appropriate public basic and secondary schools per 1,000 individuals available in the individual's sub-district 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).[9] A school is considered sex-appropriate for a female if it is a girls' or a mixed school and for a male if it is a boys' or mixed school. We should note here, however, that a mixed school, especially a mixed secondary school, might be seen as inaccessible or inappropriate for girls in a socially conservative setting. This is why we also perform the empirical analysis where we enter boys', girls', and mixed schools

[8] 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 the exclusion of 34 observations (missing age), 1 observation (missing father's schooling), and 7 observations (missing mother's schooling).

[9] 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.

separately.[10] We chose to measure the local supply of public schools 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 are shown in Table I. Sons' and daughters' samples have similar statistics for most variables, except that sons have slightly higher years of schooling on average (10.8 vs. 9.8 years). Most of the local supply of public basic schools comes from mixed and boys' schools; the average supply of each is about three times the supply of girls' schools. Unsurprisingly, secondary schools are mostly boys' schools where the average supply of boys' secondary schools is equal to the supply of mixed and girls' secondary schools combined. The male-biased nature of public schools means that the average local supply of basic and secondary schools that are sex-appropriate for sons (boys' schools + mixed schools) is higher than for daughters (girls' schools + mixed schools). Gender inequality is even greater in magnitude if we take into account that many mixed schools, especially at the secondary level, are not in fact available for women as we noted above.

V. Intergenerational Educational Mobility in Jordan: Time Trend

Before getting into the effect of the growth of the local supply of public schools on intergenerational educational mobility, we conduct a few regressions to characterize the rate at which the intergenerational educational correlation coefficient has been changing across cohorts for the four different parent-child combinations (father/son, mother/son, father/daughter, and mother/daughter). We estimate the following OLS regression:

[10] 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.

(1)

$$childeduc_{ij}$$

$$= \beta_{11} parenteduc_{ij} + \beta_{12} agedev_{ij} + \beta_{13}\left(\frac{agedev_{ij}^2}{100}\right) + \beta_{14}\left(parenteduc_{ij} \times agedev_{ij}\right)$$

$$+ \beta_{15}\left(parenteduc_{ij} \times \frac{agedev_{ij}^2}{100}\right) + \alpha_j + \varepsilon_{1ij}$$

Where the outcome variable, $childeduc$, is years of schooling of child i born in sub-district j and $parenteduc$ is parent's years of schooling. In order to depict the change in intergenerational educational mobility across cohorts of birth, we control for $agedev$, or the difference between child's age and children's average age in the sample, and its square divided by 100, and we interact each with parent's schooling. Finally, we include α_j, a full set of sub-district of birth fixed effects to capture mean differences in child's schooling across sub-districts; ε_{1ij} is an error term.

The results are shown in Table II. Model 1 shows that the average intergenerational correlation 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 I). 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 of the intergenerational persistence coefficient estimated in Model 2 for the various parent-child combinations is illustrated graphically in Figure III. 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 above, 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.

VI. Empirical Strategy

We now come to the main question motivating this paper, namely the effect of the local supply of public schools on the intergenerational transmission of educational attainment. We employ a difference-in-differences methodology that exploits the variation across years and sub-districts of birth in the local supply of public basic and secondary schools. Specifically, we estimate the following OLS regression:

(2)

$$childeduc_{ijkt} = \beta_{21} parenteduc_{ijkt} + \beta_{22} basicschool_{jkt} + \beta_{23} secschool_{jkt} + \beta_{24}\left(parenteduc_{ijkt} \times basicschool_{jkt}\right) + \beta_{25}\left(parenteduc_{ijt} \times secschool_{jkt}\right) + \alpha_j + \gamma_t + \delta_k * \gamma_t + \varepsilon_{2ijkt}$$

Where the outcome variable, $childeduc$, is years of schooling of child i born in sub-district j in governorate k in year t; $basicschool$ and $secschool$ are the number of sex-appropriate public basic and secondary schools per 1,000 individuals that were available in the child's sub-district of birth in the year when the child 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); number of sex-appropriate schools is defined as the sum of boys' and mixed schools for sons and the sum of girls' and mixed schools for daughters, but we also estimate the equation where we break down schools by

gender (boys, girls, and mixed schools); ε_{2ijkt} is an error term. All standard errors are clustered at the sub-district of birth level.

There are three sets of fixed effects in this equation. First, α_j are a full set of sub-district of birth fixed effects to control for unobserved time-invariant characteristics of sub-districts that may affect child's educational attainment, γ_t are a full set of year of birth fixed effects to control for unobserved aggregate shocks that may have affected child's educational attainment in all sub-districts in a given year, and $\delta_k * \gamma_t$ are a full set of interactions of governorate of birth and year of birth fixed effects to control for unobserved shocks that may have affected child's educational attainment in sub-districts within a given governorate in a certain year. We are interested in the two parameters, β_{24} and β_{25}, which capture the impact on intergenerational educational transmission of the local supply of public basic and secondary schools respectively. We expect each of the two coefficients to be negative, implying a positive impact of public schools on intergenerational educational mobility.

The identifying assumption underlying this estimation strategy is that the variation in the local supply of public schools across years and sub-districts of birth is uncorrelated with unobservable *within-governorate* time-varying characteristics of sub-districts that may drive both the local supply of public schools and intergenerational educational mobility. A confounding factor that could violate this assumption is that, within a given governorate, sub-districts with a rising demand for education over time (perhaps because of economic development) may tend to obtain differentially more public schools and also have higher intergenerational educational mobility compared to other sub-districts even in the absence of a causal relationship between the supply of public schools and intergenerational educational mobility.

In order to rule out these confounding factors and argue that the impact of the local supply of schools on intergenerational educational mobility is causal, we ideally want to observe, as in Card and Krueger (1992), Duflo (2001), and Meghir and Palme (2005), an *abrupt* change in the local supply of public schools for exogenous reasons that are *not* driven by the preferences of the local population or other demand-side factors (e.g. educational reform or school construction program). However, as Figure II demonstrates, the growth of the supply of public schools in Jordan was *gradual*, making it challenging to disentangle its causal impact on intergenerational educational mobility, because it could have been driven by both supply and demand factors. While, in the absence of a historical natural experiment, we are unable to rule out this fundamental limitation of the empirical strategy, there are three reasons that make us more confident of our results. First, the decision-making process about the allocation of public schools in Jordan is highly centralized in the Ministry of Education and is unlikely to be affected by local shifts at the sub-district level in demand for schooling. Second, and perhaps more importantly, including a full set of interactions of governorate and year of birth fixed effects allows us to control for unobserved time-varying characteristics at the governorate-level, and it is likely that most of the unobserved geographic heterogeneity in the allocation of public schools and intergenerational educational mobility in Jordan is *between* rather than *within* governorates. Third, our interest is *not* to identify the causal impact of the local supply of public schools on child's educational attainment per se, as is the case in Duflo (2001), but we are rather interested in its *differential* impact by parental schooling. This allow us to include in an alternative strategy in equation (3) below an even more demanding set of fixed effects, a full set of interactions of year and sub-district of birth fixed effects, which controls for unobserved time-varying characteristics at the sub-district of birth level:

(3)

$$childeduc_{ijkt}$$

$$= \beta_{31} parenteduc_{ijkt} + \beta_{34}\left(parenteduc_{ijkt} \times basicschool_{jkt}\right)$$

$$+ \beta_{35}\left(parenteduc_{ijt} \times secschool_{jkt}\right) + \alpha_j + \gamma_t + \alpha_j * \gamma_t + \varepsilon_{3ijkt}$$

Adding these fixed effects does not allow us to estimate the baseline impact of basic and secondary public schools, but we are able to estimate their impact on intergenerational educational mobility. Here the variation comes from comparing children *within* the same sub-district and year of birth, but whose parents have different educational levels.

VII. Results

The central results of the paper are shown in Tables III and IV, which include the estimation results of equations (2) and (3) respectively for each of the four parent-child combinations. For each combination, we estimate the equations using the total supply of sex-appropriate public basic and secondary schools and the school supply broken down by school gender. In Table III, we estimate equation (2) with and without governorate by year of birth fixed effects.

We start by discussing the results for sons shown in Panel (A) of Table III. We first note that, among sons of uneducated parents, the baseline impact of the local supply of public schools on son's school attainment is positive and statistically significant for both basic and secondary. An increase of one standard deviation in male-appropriate basic schools per 1,000 people (~ 0.19) is associated with 0.57-0.60 additional years of schooling for sons, whereas an increase of one standard deviation in male-appropriate secondary schools per 1,000 people (~ 0.19) is associated with 0.85-0.94 additional years of schooling. The baseline effect is attributable to mixed schools in the case of basic schools and to both boys' and mixed schools in the case of secondary schools. However, the baseline effect of basic schools becomes small and statistically insignificant when

we control for governorate by year of birth fixed effects, suggesting that it is impossible to disentangle the effect from unobserved time-varying variables at the governorate level. The baseline coefficient on secondary schools (in particular, mixed schools) retains its magnitude and statistical significance though.

The interaction term of the local supply of schools with parental schooling has the expected negative effect for basic schools, indicating that the effect of basic schools is smaller for sons whose parents have more years of schooling, but is insignificant for secondary schools, which means that the impact of secondary schools does *not* vary with parental schooling. This suggests that the local supply of basic schools increases intergenerational educational mobility for sons but the local supply of secondary schools does not. In terms of magnitude, a one standard deviation increase in basic schools per 1,000 results in a *relative* reduction in the coefficient of intergenerational educational persistence of 18-20 percent [= (0.19 * 0.275)/0.284] for both parents. When we control for governorate by year of birth fixed effects, the impact of basic schools on intergenerational educational persistence relatively retains its magnitude, although it loses its statistical significance in the case of mothers.

Moving on to the results for daughters shown in Panel (B) of Table III, we find that the baseline effect of the local supply of basic schools on educational attainment among daughters of uneducated parents is positive, as expected, and larger in magnitude than that for sons. As for sons, the positive effect of basic schools on attainment is attributable to the growth of mixed schools. A one standard deviation increase in the local supply of female-appropriate basic schools per 1,000 population (~ 0.13) results in an increase of 1.07-1.23 years of schooling for girls. In contrast, the baseline effect of the local supply of secondary schools on attainment among daughters of uneducated parents is statistically insignificant. While controlling for

governorate by year of birth fixed effects reduces the baseline effect of basic schools in half, it remains statistically significant because of its large magnitude, unlike for sons.

The negative sign on the interaction term of the supply of basic schools and parental schooling indicates that the supply of basic schools significantly reduces the coefficient of intergenerational persistence for daughters as well, where the effects are much stronger than for sons. The coefficient falls by 44 percent and 33 percent for a one standard deviation increase in female-appropriate basic schools per 1,000 individuals for fathers and mothers, respectively, with both of these effects significant at the 1 percent level. Unexpectedly, the supply of secondary schools appears to *increase* the coefficient of intergenerational persistence for daughters, an issue we return to below. When we include governorate by year of birth fixed effects, the effects of basic schools are slightly smaller in magnitude but are statistically significant. The effects of secondary schools are smaller but still significant for fathers and are insignificant for mothers.

Table IV shows the estimation results of equation (3) where we control for sub-district by year of birth fixed effects. While these regressions are more convincing in handling endogeneity concerns because they control for unobserved time-varying characteristics of sub-districts of birth, they are likely to increase standard errors of the coefficients, because of the limited variation in our main regressors that we are exploiting here, i.e. variation within year and sub-district of birth. We find that for sons the effects of basic schools on mobility are smaller than in Table III (with governorate by year of birth fixed effects) and are statistically insignificant, but for daughters the effects of basic schools are actually similar for fathers and larger for mothers than in Table III and are still statistically significant at the 5 percent level. The paradoxical

positive effects of secondary schools on mobility for daughters are smaller in magnitude but are still significant at the 10-percent level for fathers.

To summarize, our main finding is that the local supply of public basic schools appears to be a binding constraint on the educational attainment of both sons and daughters. Thus, loosening this constraint raises attainment levels differentially more for individuals whose parents have lower educational levels. As such it increases intergenerational mobility in education. While these effects hold for both sons and daughters, they are only robust to the inclusion of sub-district by year of birth fixed effects (and are larger in magnitude) in the case of daughters, suggesting that the local supply of public basic schools is more of a binding constraint for daughters than for sons.

The results on the supply of secondary schooling are more complicated. For sons, we find that the local supply of schooling significantly raises attainment levels on average, but not differentially by parents' schooling. This suggests that the supply of secondary schooling is a binding constraint on attainment for sons, but is equally binding regardless of the level of parental education. In the case of daughters, the supply of secondary schools does not appear to be a binding constraint since higher local supply does not appear to raise educational attainment. This suggests that demand-side factors may be more important at the secondary level for girls. In other words, enrollment in secondary schools for girls may have been more constrained by parental attitudes towards girls' education in what is a fairly conservative social setting. In fact, the positive interaction between the supply of secondary schools and parental education lends support to this interpretation. More educated parents are likely to have more liberal attitudes toward girls' education and are thus more likely to take advantage of the increased supply of secondary schools.

VIII. Robustness Checks

We conduct several robustness checks in order to address various concerns about the results. First, one may be concerned that we observe the local supply of schools in the individual's sub-district of birth and not in the sub-district of residence when the individual was of age to access school, and it is possible that parents moved with their children between the child's birth and the year they entered basic or secondary schools. Fortunately though, the JLMPS 2010 sample allows us to identify "movers," those individuals who changed their sub-district of residence between age 0 and 15. We thus exclude these individuals from the sample and re-estimate equation (2) for both sons and daughters. The results are shown in Table V. We find that the baseline effects of basic schools on educational attainment and their effects on mobility are stronger and often more significant than those estimated in Table III for both sons and daughters.

A second concern is that Jordan received a large influx of Palestinian refugees in the aftermath of the 1967 Arab-Israeli War. While refugees benefited from the UNRWA basic schools, their educational attainment and intergenerational educational mobility were perhaps subject to a different set of constraints than those facing other Jordanians. We thus attempt to exclude refugees from the sample as a robustness check. However, the JLMPS 2010 does not allow us to identify Palestinian refugees who are mostly Jordanian citizens, and so we had to employ two alternative indirect methods to identify individuals who are likely to be Palestinian refugees. In Method I we exclude individuals born in sub-districts where the percentage of individuals who were ever enrolled (or are currently enrolled) in an UNRWA school exceeds 10 percent out of all individuals below 36 of age in the sample. In Method II we exclude individuals born in sub-districts where the percentage of UNRWA schools exceeds 10 percent of the total

number of schools. The results for the restricted sample according to both methods are shown in Tables VI and VII respectively. Overall, the results remain unchanged from those in Table III.

A third concern is that the full samples of sons and daughters that are employed in the analysis may include siblings who belong to the same household. So as a robustness check, we restrict the sample to household heads and their spouses. The results are shows in Table VIII and are similar to those in Table III.

Fourth, in an attempt to understand why, in the case of sons, the effect of the local supply of public schools varies by the level of parental education for basic schools but not for secondary schools, we examined whether parents have an outside option where public schools are absent. In particular, if private schools are available in the vicinity, educated parents are more likely to avail themselves of them, resulting in a less binding public school supply constraint the higher the parental education. However, if private schools are not available, the education of the children of even educated parents will be constrained by the absence of public schools, making the local supply of public schools equally binding regardless of parental education. Accordingly, we examined the supply of private basic and secondary schools at the sub-district level in the 2010 Jordanian school census. We found that private basic schools are relatively spread out across sub-districts whereas private secondary schools are mostly concentrated in a handful of districts. For example, 79 percent of all sub-districts in 2010 had no private secondary schools and therefore no outside option for parents, as compared to only 45 percent of sub-districts not having private basic schools. Thus an increase in the supply of public secondary schools relieves a constraint for everyone, while an increase in the supply of public basic schools provides relatively more relief for less educated parents.

Finally, we conducted two sets of regressions to further examine the robustness of our results. In particular, we were concerned about possible collinearity between the local supply of basic and secondary schools, so we ran regressions with one or the other type of school supply. For both sons and daughters, when only the supply of basic schools was retained there was no appreciable change in the baseline effect or in its interaction with parental schooling. When the supply of secondary schooling was retained, the positive baseline effect for sons was unchanged and the interaction remained small and insignificant. For daughters, the main effect of secondary schools remained insignificant and the interaction remained positive and significant at the 5 percent level for the father-daughter regression, but not for the mother-daughter regression. Thus the results remain essentially unchanged.

IX. Conclusions

This paper investigated the extent to which intergenerational mobility in education in Jordan was enhanced by government policies to increase the supply of public basic and secondary schools. Our identification strategy relied on exploiting the variation in school supply across sub-districts and cohorts of birth to identify the effect of school supply on the coefficient of intergenerational persistence in educational attainment, where we control for year of birth and sub-district of birth fixed effects. Importantly, we also control for a full set of interactions of year of birth and governorate of birth fixed effects, and as an alternative strategy, a full set of interactions of year of birth and sub-district of birth fixed effects. These fixed effects allow us to control for time-varying characteristics of governorates or sub-districts of birth that may drive both local public school supply and educational attainment for a given year of birth. But while these interactions of fixed effects more adequately address the endogeneity concerns about the allocation of growth of school supply, they tend to increase standard errors of estimates because

we limit the exploited variation in regressors to within governorate (or sub-district) and year of birth. This is especially true in the case of interacting sub-district by year of birth fixed effects.

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 of children of uneducated parents is significantly enhanced by the increased supply of basic schools (the baseline effect), with the effect being larger for daughters than for sons. These effects are primarily due to mixed schools for both sons and daughters.

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 standard deviation increase in basic schools per 1,000 people reduces the coefficient of intergenerational persistence by at least one third for women and by one fifth for men. Both effects are robust to controlling for interactions of year and governorate of birth fixed effects, but only the effect on women remains stable in magnitude and statistically significant if we include interactions of year and sub-district of birth fixed effects. The fact that the effect of the local supply of basic schools 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.

We find that while the supply of secondary schooling substantially increases school attainment for sons of uneducated parents, with the effect stemming from both boys' and mixed secondary schools, it has no differential effect across parental education levels. We interpret this result as indicating that in the absence of public secondary schools educated parents had few outside options given the relative absence of private secondary schools outside the capital

Amman. Thus, both educated and uneducated parents were equally constrained by the local supply of public schools. The results for girls suggest that the supply of secondary schooling was not the main constraint to educational attainment but that demand-side factors may have played a more important role until recently in limiting girls' access to secondary school in a socially conservative setting. We find evidence that in this case, increasing the supply of secondary school actually raises intergenerational persistence because more educated parents are more likely to take advantage of the increased school supply.

This research therefore demonstrates that a more *progressive* governmental policy to construct more public basic schools and to equalize the supply of basic schools across jurisdictions does in fact contribute to improved equality of opportunity in education. 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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TABLE I
Summary Statistics

	Sons	Daughters
Years of schooling	10.79	9.83
	(3.97)	(4.95)
Father's schooling	3.10	3.39
	(4.19)	(4.40)
Mother's schooling	1.49	1.59
	(3.13)	(3.28)
Boys' basic schools per 1000	0.08	0.07
	(0.08)	(0.08)
Girls' basic schools per 1000	0.03	0.03
	(0.03)	(0.03)
Mixed basic schools per 1000	0.09	0.09
	(0.13)	(0.12)
Total basic schools available to sons per 1000	0.16	0.16
individuals = Boys' schools + Mixed schools	(0.19)	(0.18)
Total basic schools available to daughters per 1000	0.11	0.12
individuals = Girls' schools + Mixed Schools	(0.13)	(0.13)
Boys' secondary schools per 1000	0.11	0.11
	(0.11)	(0.11)
Girls' secondary schools per 1000	0.05	0.05
	(0.05)	(0.05)
Mixed secondary schools per 1000	0.06	0.06
	(0.09)	(0.09)
Total secondary schools available to sons per 1000	0.17	0.16
individuals = Boys' schools + Mixed schools	(0.19)	(0.19)
Total secondary schools available to daughters per	0.11	0.11
1000 individuals = Girls' schools + Mixed Schools	(0.12)	(0.12)
Observations	4139	4131

Means are reported and 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 in sub-district of birth.

TABLE II
Intergenerational Mobility of Education: Basic Regressions

	Sons-Fathers		Sons-Mothers		Daughters-Fathers		Daughters-Mothers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Parent's schooling	0.232***	0.241***	0.263***	0.301***	0.243***	0.297***	0.274***	0.368***
	(0.015)	(0.017)	(0.024)	(0.027)	(0.012)	(0.020)	(0.021)	(0.029)
Age deviation	-0.044***	-0.062***	-0.046***	-0.057***	-0.174***	-0.228***	-0.180***	-0.205***
	(0.011)	(0.013)	(0.012)	(0.013)	(0.020)	(0.020)	(0.022)	(0.021)
Age deviation squared/100	-0.225***	-0.208***	-0.246***	-0.225***	-0.422***	-0.305***	-0.425***	-0.360***
	(0.054)	(0.061)	(0.053)	(0.057)	(0.060)	(0.074)	(0.063)	(0.074)
Parent's schooling * age deviation		0.008***		0.015***		0.018***		0.025***
		(0.002)		(0.003)		(0.002)		(0.005)
Parent's schooling * age deviation sq./100		0.027**		0.070***		0.030*		0.077*
		(0.012)		(0.025)		(0.016)		(0.039)
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4139	4139	4139	4139	4131	4131	4131	4131
Adjusted R^2	0.173	0.179	0.158	0.163	0.419	0.440	0.407	0.422

Standard errors clustered at the sub-district of birth level are in parentheses. *p < 0.10, ** p < 0.05, and *** p < 0.01.

TABLE III
Intergenerational Educational Mobility and Local Supply of Public Schools - Full Sample - Equation (2)

A. Sons' Sample

	Sons-Fathers				Sons-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.284***	0.300***	0.280***	0.289***	0.310***	0.318***	0.317***	0.309***
	(0.017)	(0.019)	(0.018)	(0.020)	(0.038)	(0.042)	(0.040)	(0.042)
Total basic schools per 1000	3.181***		1.294		2.989***		1.186	
	(0.865)		(0.801)		(0.842)		(0.739)	
Parent's schooling * total basic schools	-0.275**		-0.242*		-0.320*		-0.306	
	(0.120)		(0.127)		(0.187)		(0.197)	
Total secondary schools per 1000	4.949***		4.447***		4.910***		4.462***	
	(1.108)		(1.250)		(1.133)		(1.282)	
Parent's schooling * total secondary schools	-0.002		-0.008		0.096		0.039	
	(0.140)		(0.146)		(0.185)		(0.189)	
Boys' basic schools per 1000		2.422		-0.336		1.790		-0.952
		(2.036)		(2.218)		(1.959)		(2.129)
Parent's schooling * boys' basic schools		-0.445*		-0.302		-0.279		-0.113
		(0.230)		(0.271)		(0.358)		(0.384)
Mixed basic schools per 1000		3.430***		1.789		3.428***		1.867*
		(1.135)		(1.129)		(1.125)		(1.078)
Parent's schooling * mixed basic schools		-0.210		-0.221		-0.324		-0.386
		(0.173)		(0.180)		(0.217)		(0.243)
Boys' secondary schools per 1000		5.004*		3.627		4.777*		3.478
		(2.546)		(2.608)		(2.506)		(2.505)
Parent's schooling * boys' secondary schools		-0.423		-0.261		-0.224		0.055
		(0.457)		(0.514)		(0.662)		(0.719)
Mixed secondary schools per 1000		4.626*		5.206*		4.989**		5.546*
		(2.414)		(2.759)		(2.398)		(2.790)
Parent's schooling * mixed secondary schools		0.561		0.325		0.414		-0.011
		(0.486)		(0.546)		(0.570)		(0.635)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	4139	4139	4139	4139	4139	4139	4139	4139
Adjusted R^2	0.194	0.194	0.209	0.208	0.176	0.175	0.191	0.190

B. Daughters' Sample

	Daughters-Fathers				Daughters-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.286***	0.377***	0.274***	0.342***	0.348***	0.398***	0.347***	0.353***
	(0.024)	(0.041)	(0.024)	(0.037)	(0.036)	(0.061)	(0.039)	(0.057)
Total basic schools per 1000	9.448***		5.480***		8.230***		4.223***	
	(1.891)		(1.340)		(1.841)		(1.390)	
Parent's schooling * total basic schools	-0.973***		-0.798***		-0.890***		-0.720**	
	(0.219)		(0.195)		(0.268)		(0.288)	
Total secondary schools per 1000	-0.648		-0.584		0.632		0.743	
	(2.367)		(2.231)		(2.501)		(2.287)	
Parent's schooling * total secondary schools	0.950***		0.732***		0.673***		0.455	
	(0.195)		(0.187)		(0.230)		(0.302)	
Girls' basic schools per 1000		-9.922		-10.424		-18.714*		-17.320*
		(9.624)		(9.239)		(10.403)		(9.811)
Parent's schooling * girls' basic schools		-2.255***		-1.662***		-0.789		-0.008
		(0.399)		(0.402)		(0.719)		(0.726)
Mixed basic schools per 1000		8.497***		5.524***		7.913***		4.771***
		(1.581)		(1.370)		(1.631)		(1.458)
Parent's schooling * mixed basic schools		-0.772***		-0.668***		-0.846***		-0.741***
		(0.207)		(0.194)		(0.262)		(0.270)
Girls' secondary schools per 1000		-6.241*		-5.721		-6.865*		-6.193
		(3.512)		(4.195)		(3.486)		(4.413)
Parent's schooling * girls' secondary schools		-0.478		-0.487		-1.161*		-0.947
		(0.437)		(0.463)		(0.648)		(0.721)
Mixed secondary schools per 1000		0.852		0.781		2.264		2.229
		(2.960)		(3.142)		(3.041)		(3.174)
Parent's schooling * mixed secondary schools		1.156***		1.032***		1.539***		1.354***
		(0.259)		(0.257)		(0.432)		(0.428)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	4131	4131	4131	4131	4131	4131	4131	4131
Adjusted R^2	0.432	0.439	0.450	0.453	0.417	0.424	0.439	0.442

Standard errors clustered at the sub-district of birth level are in parentheses. *p < 0.10, ** p < 0.05, and *** p < 0.01.

TABLE IV
Intergenerational Educational Mobility and Local Supply of Public Schools - Full Sample - Equation (3)

A. Sons' Sample

	Sons-Fathers		**Sons-Mothers**	
	(1)	(2)	(3)	(4)
Parent's schooling	0.292***	0.311***	0.314***	0.330***
	(0.023)	(0.031)	(0.058)	(0.082)
Parent's schooling * total basic schools	-0.188		-0.213	
	(0.215)		(0.408)	
Parent's schooling * total secondary schools	-0.166		-0.013	
	(0.234)		(0.529)	
Parent's schooling * boys' basic schools		-0.411		-0.252
		(0.483)		(0.841)
Parent's schooling * mixed basic schools		-0.116		-0.230
		(0.235)		(0.463)
Parent's schooling * boys' secondary schools		-0.625		-0.608
		(0.724)		(1.325)
Parent's schooling * mixed secondary schools		0.515		0.802
		(0.862)		(1.343)
Year of birth FE?	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes
Sub-district of birth FE * Year of birth FE?	Yes	Yes	Yes	Yes
Observations	4139	4139	4139	4139
Adjusted R^2	0.243	0.242	0.223	0.223

B. Daughters' Sample

	Fathers		Mothers	
	(1)	(2)	(3)	(4)
Parent's schooling	0.266***	0.276***	0.380***	0.362***
	(0.038)	(0.064)	(0.049)	(0.094)
Parent's schooling * total basic schools	-0.806**		-0.912**	
	(0.330)		(0.395)	
Parent's schooling * total secondary schools	0.785*		0.549	
	(0.416)		(0.430)	
Parent's schooling * girls' basic schools		-0.906		-0.430
		(0.667)		(1.004)
Parent's schooling * mixed basic schools		-0.785**		-0.931**
		(0.340)		(0.376)
Parent's schooling * girls' secondary schools		0.593		0.259
		(0.750)		(1.185)
Parent's schooling * mixed secondary schools		0.830		0.873
		(0.592)		(0.804)
Year of birth FE?	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes
Sub-district of birth FE * Year of birth FE?	Yes	Yes	Yes	Yes
Observations	4131	4131	4131	4131
Adjusted R^2	0.491	0.491	0.491	0.491

Standard errors clustered at the sub-district of birth level are in parentheses. *p < 0.10, ** p < 0.05, and *** p < 0.01.

TABLE V
Intergenerational Educational Mobility and Local Supply of Public Schools - Excluding Movers

A. Sons' Sample

	Sons-Fathers				Sons-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.290***	0.300***	0.286***	0.290***	0.307***	0.299***	0.301***	0.275***
	(0.020)	(0.023)	(0.021)	(0.024)	(0.041)	(0.043)	(0.042)	(0.042)
Total basic schools per 1000	3.536***		1.634*		3.161***		1.277*	
	(0.933)		(0.844)		(0.893)		(0.752)	
Parent's schooling * total basic schools	-0.370***		-0.337**		-0.382**		-0.337*	
	(0.118)		(0.130)		(0.189)		(0.199)	
Total secondary schools per 1000	4.833***		4.043***		4.824***		4.111***	
	(1.081)		(1.276)		(1.066)		(1.280)	
Parent's schooling * total secondary schools	0.102		0.101		0.192		0.136	
	(0.129)		(0.136)		(0.185)		(0.185)	
Boys' basic schools per 1000		3.263		0.451		2.284		-0.922
		(2.171)		(2.248)		(2.075)		(2.108)
Parent's schooling * boys' basic schools		-0.592**		-0.496*		-0.337		-0.070
		(0.244)		(0.273)		(0.350)		(0.369)
Mixed basic schools per 1000		3.473***		1.811		3.418***		1.920*
		(1.258)		(1.153)		(1.221)		(1.089)
Parent's schooling * mixed basic schools		-0.263		-0.251		-0.414*		-0.475*
		(0.195)		(0.205)		(0.231)		(0.244)
Boys' secondary schools per 1000		4.208*		2.180		4.201*		2.280
		(2.276)		(2.344)		(2.304)		(2.265)
Parent's schooling * boys' secondary schools		0.032		0.220		0.435		0.732
		(0.269)		(0.309)		(0.448)		(0.467)
Mixed secondary schools per 1000		5.593**		6.253**		5.672**		6.355**
		(2.324)		(2.663)		(2.417)		(2.891)
Parent's schooling * mixed secondary schools		0.175		-0.097		-0.081		-0.536
		(0.311)		(0.329)		(0.418)		(0.464)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	3758	3758	3758	3758	3758	3758	3758	3758
Adjusted R^2	0.200	0.199	0.216	0.216	0.179	0.178	0.194	0.193

B. Daughters' Sample

	Daughters-Fathers				Daughters-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.277***	0.376***	0.265***	0.340***	0.334***	0.403***	0.338***	0.371***
	(0.024)	(0.041)	(0.023)	(0.036)	(0.034)	(0.062)	(0.036)	(0.054)
Total basic schools per 1000	9.470***		5.145***		8.226***		3.830***	
	(1.916)		(1.386)		(1.852)		(1.430)	
Parent's schooling * total basic schools	-0.925***		-0.740***		-0.801***		-0.604**	
	(0.226)		(0.196)		(0.268)		(0.280)	
Total secondary schools per 1000	-0.825		-0.714		0.350		0.527	
	(2.398)		(2.104)		(2.538)		(2.123)	
Parent's schooling * total secondary schools	0.905***		0.675***		0.596***		0.309	
	(0.203)		(0.188)		(0.204)		(0.283)	
Girls' basic schools per 1000		-9.602		-10.412		-18.086		-16.554
		(10.508)		(10.053)		(11.296)		(10.608)
Parent's schooling * girls' basic schools		-2.307***		-1.643***		-0.958		-0.158
		(0.443)		(0.438)		(0.787)		(0.765)
Mixed basic schools per 1000		8.456***		5.196***		7.830***		4.290***
		(1.606)		(1.455)		(1.639)		(1.532)
Parent's schooling * mixed basic schools		-0.731***		-0.629***		-0.757***		-0.620**
		(0.207)		(0.190)		(0.254)		(0.252)
Girls' secondary schools per 1000		-8.083*		-8.509		-9.074**		-9.122
		(4.373)		(5.516)		(4.325)		(5.734)
Parent's schooling * girls' secondary schools		-0.786**		-0.796*		-1.507**		-1.548**
		(0.394)		(0.407)		(0.612)		(0.701)
Mixed secondary schools per 1000		1.556		1.565		3.057		2.994
		(2.935)		(2.915)		(3.095)		(2.939)
Parent's schooling * mixed secondary schools		1.257***		1.119***		1.558***		1.362***
		(0.262)		(0.263)		(0.386)		(0.392)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	3760	3760	3760	3760	3760	3760	3760	3760
Adjusted R^2	0.441	0.450	0.458	0.462	0.426	0.433	0.448	0.451

Standard errors clustered at the sub-district of birth level are in parentheses. Sample excludes those who changed their place of residence between age 0 and 15. *p < 0.10, ** p < 0.05, and *** p < 0.01.

TABLE VI
Intergenerational Educational Mobility and Local Supply of Public Schools - Excluding Refugees (Method I)

A. Sons' Sample

	Sons-Fathers				Sons-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.244***	0.262***	0.233***	0.246***	0.260***	0.281***	0.244***	0.252***
	(0.021)	(0.021)	(0.026)	(0.026)	(0.040)	(0.042)	(0.047)	(0.050)
Total basic schools per 1000	2.478***		0.274		2.124**		0.106	
	(0.908)		(0.869)		(0.830)		(0.776)	
Parent's schooling * total basic schools	-0.261**		-0.198		-0.317		-0.202	
	(0.127)		(0.145)		(0.193)		(0.235)	
Total secondary schools per 1000	3.794***		3.491***		3.626***		3.476***	
	(1.020)		(1.160)		(0.955)		(1.154)	
Parent's schooling * total secondary schools	0.051		0.056		0.150		0.044	
	(0.147)		(0.175)		(0.180)		(0.223)	
Boys' basic schools per 1000		2.825		0.331		2.447		-0.233
		(2.141)		(2.485)		(2.010)		(2.299)
Parent's schooling * boys' basic schools		-0.453*		-0.349		-0.473		-0.297
		(0.257)		(0.334)		(0.404)		(0.487)
Mixed basic schools per 1000		2.367**		0.343		2.005*		0.286
		(1.182)		(1.196)		(1.091)		(1.164)
Parent's schooling * mixed basic schools		-0.190		-0.149		-0.229		-0.165
		(0.180)		(0.199)		(0.235)		(0.292)
Boys' secondary schools per 1000		3.915*		4.094		3.611		3.897
		(2.284)		(2.833)		(2.197)		(2.720)
Parent's schooling * boys' secondary schools		-0.412		-0.261		-0.325		-0.100
		(0.478)		(0.558)		(0.700)		(0.834)
Mixed secondary schools per 1000		3.235		2.563		3.454		3.047
		(2.407)		(2.620)		(2.328)		(2.672)
Parent's schooling * mixed secondary schools		0.686		0.518		0.631		0.217
		(0.498)		(0.583)		(0.585)		(0.689)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	2325	2325	2325	2325	2325	2325	2325	2325
Adjusted R^2	0.243	0.243	0.266	0.265	0.230	0.229	0.251	0.249

B. Daughters' Sample

	Daughters-Fathers				Daughters-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.307***	0.376***	0.298***	0.353***	0.374***	0.406***	0.367***	0.362***
	(0.027)	(0.057)	(0.033)	(0.051)	(0.053)	(0.079)	(0.063)	(0.076)
Total basic schools per 1000	6.718***		4.492***		5.599***		3.543**	
	(1.976)		(1.563)		(2.039)		(1.655)	
Parent's schooling * total basic schools	-0.838***		-0.697***		-0.803***		-0.739**	
	(0.216)		(0.221)		(0.295)		(0.333)	
Total secondary schools per 1000	-1.902		-2.411		-1.090		-1.388	
	(2.229)		(2.573)		(2.296)		(2.645)	
Parent's schooling * total secondary schools	0.730***		0.535**		0.453**		0.399	
	(0.195)		(0.232)		(0.205)		(0.296)	
Girls' basic schools per 1000		-3.304		-5.241		-10.451		-9.169
		(8.630)		(9.607)		(9.804)		(10.494)
Parent's schooling * girls' basic schools		-1.974***		-1.251*		-0.356		0.625
		(0.689)		(0.664)		(1.071)		(1.071)
Mixed basic schools per 1000		6.540***		4.497***		5.765***		3.725**
		(1.843)		(1.585)		(2.008)		(1.668)
Parent's schooling * mixed basic schools		-0.738***		-0.651***		-0.814***		-0.787***
		(0.210)		(0.209)		(0.267)		(0.290)
Girls' secondary schools per 1000		-5.685		-2.915		-6.351*		-3.275
		(3.696)		(4.669)		(3.658)		(4.910)
Parent's schooling * girls' secondary schools		-0.397		-0.657		-1.126*		-0.898
		(0.428)		(0.522)		(0.639)		(0.838)
Mixed secondary schools per 1000		-0.472		-2.334		0.702		-1.092
		(2.871)		(3.218)		(2.951)		(3.348)
Parent's schooling * mixed secondary schools		1.032***		0.998***		1.361***		1.292***
		(0.228)		(0.267)		(0.383)		(0.433)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	2284	2284	2284	2284	2284	2284	2284	2284
Adjusted R^2	0.492	0.496	0.506	0.507	0.475	0.479	0.493	0.494

Standard errors clustered at the sub-district of birth level are in parentheses. Sample excludes those born in sub-districts where the percentage of individuals below 36 of age in the sample who were ever enrolled (or are currently enrolled) in an UNRWA school exceeds 10 percent. *p < 0.10, ** p < 0.05, and *** p < 0.01.

TABLE VII
Intergenerational Educational Mobility and Local Supply of Public Schools - Excluding Refugees (Method II)

A. Sons' Sample

	Sons-Fathers				Sons-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.280***	0.298***	0.278***	0.288***	0.318***	0.330***	0.324***	0.320***
	(0.018)	(0.021)	(0.019)	(0.021)	(0.037)	(0.041)	(0.040)	(0.042)
Total basic schools per 1000	3.195***		1.404*		3.064***		1.315*	
	(0.876)		(0.812)		(0.855)		(0.740)	
Parent's schooling * total basic schools	-0.278**		-0.249*		-0.353*		-0.338*	
	(0.122)		(0.129)		(0.188)		(0.201)	
Total secondary schools per 1000	4.917***		4.321***		4.894***		4.352***	
	(1.120)		(1.252)		(1.144)		(1.289)	
Parent's schooling * total secondary schools	0.002		0.003		0.116		0.061	
	(0.141)		(0.145)		(0.189)		(0.192)	
Boys' basic schools per 1000		2.459		-0.288		1.780		-1.053
		(2.081)		(2.253)		(2.005)		(2.136)
Parent's schooling * boys' basic schools		-0.469*		-0.342		-0.381		-0.225
		(0.244)		(0.284)		(0.366)		(0.407)
Mixed basic schools per 1000		3.412***		1.889*		3.507***		2.054*
		(1.146)		(1.127)		(1.145)		(1.069)
Parent's schooling * mixed basic schools		-0.203		-0.212		-0.324		-0.378
		(0.175)		(0.182)		(0.221)		(0.248)
Boys' secondary schools per 1000		4.820*		3.352		4.669*		3.349
		(2.482)		(2.578)		(2.461)		(2.499)
Parent's schooling * boys' secondary schools		-0.411		-0.212		-0.256		0.040
		(0.468)		(0.507)		(0.674)		(0.716)
Mixed secondary schools per 1000		4.774*		5.297*		5.100**		5.536*
		(2.415)		(2.749)		(2.392)		(2.813)
Parent's schooling * mixed secondary schools		0.550		0.279		0.480		0.041
		(0.496)		(0.535)		(0.568)		(0.628)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	3968	3968	3968	3968	3968	3968	3968	3968
Adjusted R^2	0.194	0.194	0.209	0.209	0.179	0.178	0.194	0.193

B. Daughters' Sample

	Daughters-Fathers				Daughters-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.285***	0.379***	0.274***	0.345***	0.344***	0.409***	0.345***	0.365***
	(0.024)	(0.042)	(0.023)	(0.037)	(0.037)	(0.062)	(0.040)	(0.058)
Total basic schools per 1000	9.387***		5.370***		8.245***		4.182***	
	(1.925)		(1.355)		(1.878)		(1.403)	
Parent's schooling * total basic schools	-0.955***		-0.780***		-0.896***		-0.740**	
	(0.218)		(0.194)		(0.271)		(0.294)	
Total secondary schools per 1000	-0.583		-0.575		0.704		0.733	
	(2.376)		(2.235)		(2.523)		(2.301)	
Parent's schooling * total secondary schools	0.950***		0.715***		0.666***		0.447	
	(0.194)		(0.188)		(0.227)		(0.305)	
Girls' basic schools per 1000		-10.232		-9.839		-18.522		-15.442
		(10.321)		(9.811)		(11.252)		(10.308)
Parent's schooling * girls' basic schools		-2.290***		-1.685***		-1.138*		-0.343
		(0.423)		(0.426)		(0.633)		(0.677)
Mixed basic schools per 1000		8.447***		5.413***		7.904***		4.669***
		(1.595)		(1.399)		(1.648)		(1.479)
Parent's schooling * mixed basic schools		-0.755***		-0.650***		-0.829***		-0.738***
		(0.207)		(0.194)		(0.266)		(0.277)
Girls' secondary schools per 1000		-6.182*		-4.979		-6.755*		-5.361
		(3.516)		(4.210)		(3.499)		(4.417)
Parent's schooling * girls' secondary schools		-0.504		-0.539		-1.178*		-0.955
		(0.443)		(0.463)		(0.653)		(0.723)
Mixed secondary schools per 1000		0.907		0.490		2.374		1.972
		(2.979)		(3.119)		(3.065)		(3.149)
Parent's schooling * mixed secondary schools		1.155***		1.024***		1.441***		1.262***
		(0.258)		(0.258)		(0.409)		(0.418)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	3963	3963	3963	3963	3963	3963	3963	3963
Adjusted R^2	0.435	0.442	0.454	0.457	0.418	0.425	0.443	0.445

Standard errors clustered at the sub-district of birth level are in parentheses. Sample excludes those born in sub-districts where the percentage of UNRWA schools exceeds 10 percent of the total number of schools. *p < 0.10, ** p < 0.05, and *** p < 0.01.

TABLE VIII
Intergenerational Educational Mobility and Local Supply of Public Schools - HH Heads and Spouses Only

A. Sons' Sample

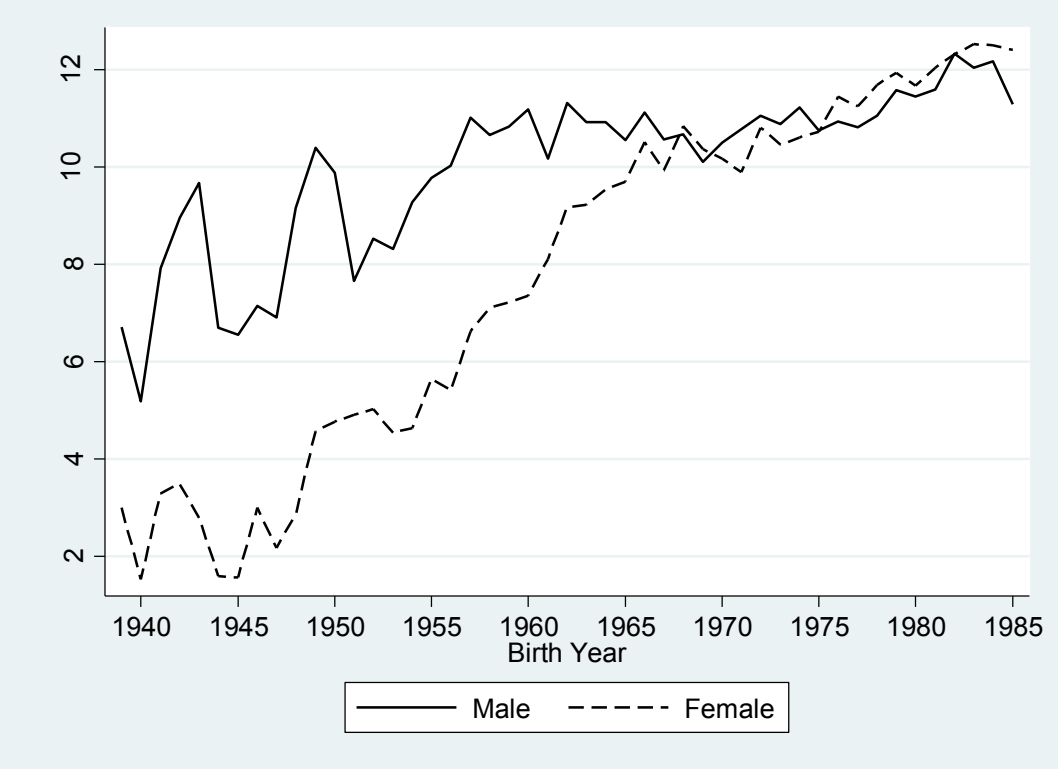
	Sons-Fathers				Sons-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.288***	0.296***	0.279***	0.273***	0.343***	0.334***	0.335***	0.306***
	(0.019)	(0.021)	(0.021)	(0.025)	(0.038)	(0.044)	(0.040)	(0.047)
Total basic schools per 1000	3.457***		1.160		3.128***		0.849	
	(0.888)		(0.794)		(0.806)		(0.738)	
Parent's schooling * total basic schools	-0.452***		-0.465***		-0.698**		-0.692**	
	(0.168)		(0.166)		(0.288)		(0.327)	
Total secondary schools per 1000	4.581***		4.092***		4.583***		4.268***	
	(1.092)		(1.039)		(1.136)		(1.063)	
Parent's schooling * total secondary schools	0.064		0.187		0.236		0.287	
	(0.154)		(0.145)		(0.300)		(0.294)	
Boys' basic schools per 1000		1.275		-1.672		0.000		-2.963
		(2.160)		(2.405)		(2.195)		(2.368)
Parent's schooling * boys' basic schools		-0.764**		-0.439		-0.696		-0.395
		(0.328)		(0.366)		(0.479)		(0.538)
Mixed basic schools per 1000		4.339***		2.131**		4.389***		2.242**
		(1.168)		(1.067)		(1.115)		(1.050)
Parent's schooling * mixed basic schools		-0.343		-0.491**		-0.706*		-0.837*
		(0.221)		(0.238)		(0.370)		(0.445)
Boys' secondary schools per 1000		4.744*		2.607		4.689*		2.737
		(2.608)		(2.352)		(2.597)		(2.392)
Parent's schooling * boys' secondary schools		0.307		0.491		0.842		1.143
		(0.386)		(0.364)		(0.659)		(0.716)
Mixed secondary schools per 1000		4.593*		6.118**		4.713*		6.436**
		(2.641)		(2.538)		(2.754)		(2.697)
Parent's schooling * mixed secondary schools		-0.328		-0.296		-0.672		-0.906
		(0.551)		(0.500)		(0.791)		(0.964)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	3271	3271	3271	3271	3271	3271	3271	3271
Adjusted R^2	0.187	0.187	0.200	0.199	0.167	0.167	0.179	0.179

B. Daughters' Sample

	Daughters-Fathers				Daughters-Mothers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Parent's schooling	0.309***	0.430***	0.300***	0.400***	0.409***	0.513***	0.411***	0.455***
	(0.031)	(0.047)	(0.029)	(0.044)	(0.043)	(0.066)	(0.046)	(0.066)
Total basic schools per 1000	10.697***		6.669***		9.381***		5.481***	
	(2.101)		(1.724)		(1.970)		(1.647)	
Parent's schooling * total basic schools	-1.218***		-1.063***		-1.229***		-1.120***	
	(0.295)		(0.250)		(0.397)		(0.383)	
Total secondary schools per 1000	0.329		1.716		1.868		3.192	
	(2.484)		(2.584)		(2.544)		(2.502)	
Parent's schooling * total secondary schools	0.990***		0.788***		0.576**		0.420	
	(0.207)		(0.248)		(0.219)		(0.325)	
Girls' basic schools per 1000		-5.439		-6.229		-14.515		-12.947
		(10.823)		(9.865)		(11.517)		(10.198)
Parent's schooling * girls' basic schools		-3.167***		-2.602***		-2.115***		-1.221*
		(0.517)		(0.663)		(0.663)		(0.633)
Mixed basic schools per 1000		9.394***		6.789***		8.629***		5.940***
		(1.870)		(1.810)		(1.812)		(1.791)
Parent's schooling * mixed basic schools		-0.953***		-0.846***		-1.061***		-1.072***
		(0.270)		(0.250)		(0.383)		(0.385)
Girls' secondary schools per 1000		-6.675*		-4.109		-7.207*		-4.987
		(3.774)		(5.136)		(3.626)		(5.359)
Parent's schooling * girls' secondary schools		-0.572		-0.610		-1.712**		-1.119
		(0.537)		(0.590)		(0.826)		(0.896)
Mixed secondary schools per 1000		3.019		4.134		4.755		5.971*
		(3.170)		(3.583)		(3.134)		(3.330)
Parent's schooling * mixed secondary schools		1.084***		0.943**		1.469***		1.259**
		(0.324)		(0.400)		(0.517)		(0.628)
Year of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sub-district of birth FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governorate of birth FE * Year of birth FE?	No	No	Yes	Yes	No	No	Yes	Yes
Observations	3333	3333	3333	3333	3333	3333	3333	3333
Adjusted R^2	0.447	0.455	0.470	0.474	0.431	0.438	0.458	0.461

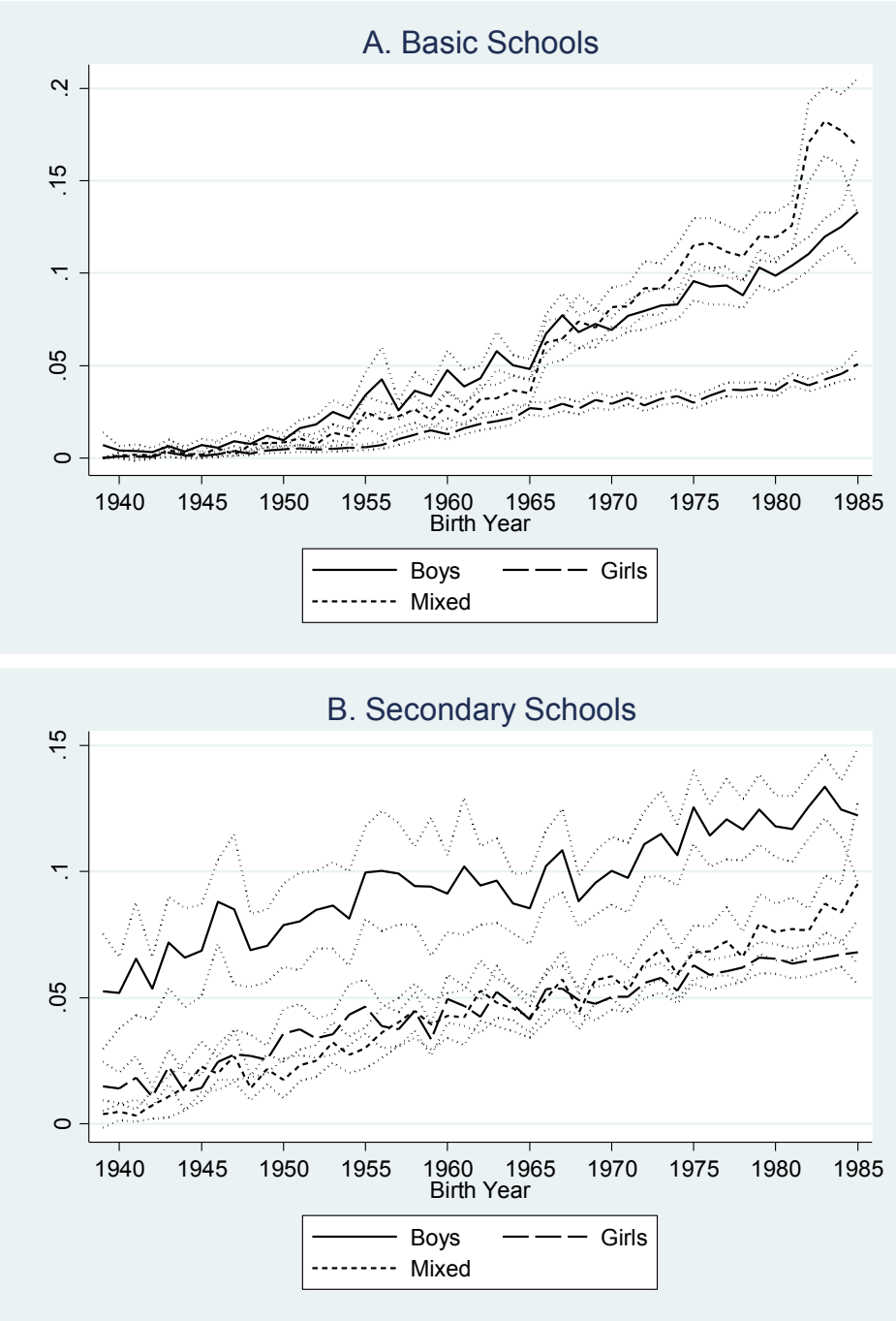
Standard errors clustered at the sub-district of birth level are in parentheses. Sample is restricted to household heads or spouses. *p < 0.10, ** p < 0.05, and *** p < 0.01.

FIGURE I
Average Years of Schooling by Sex and Year of Birth



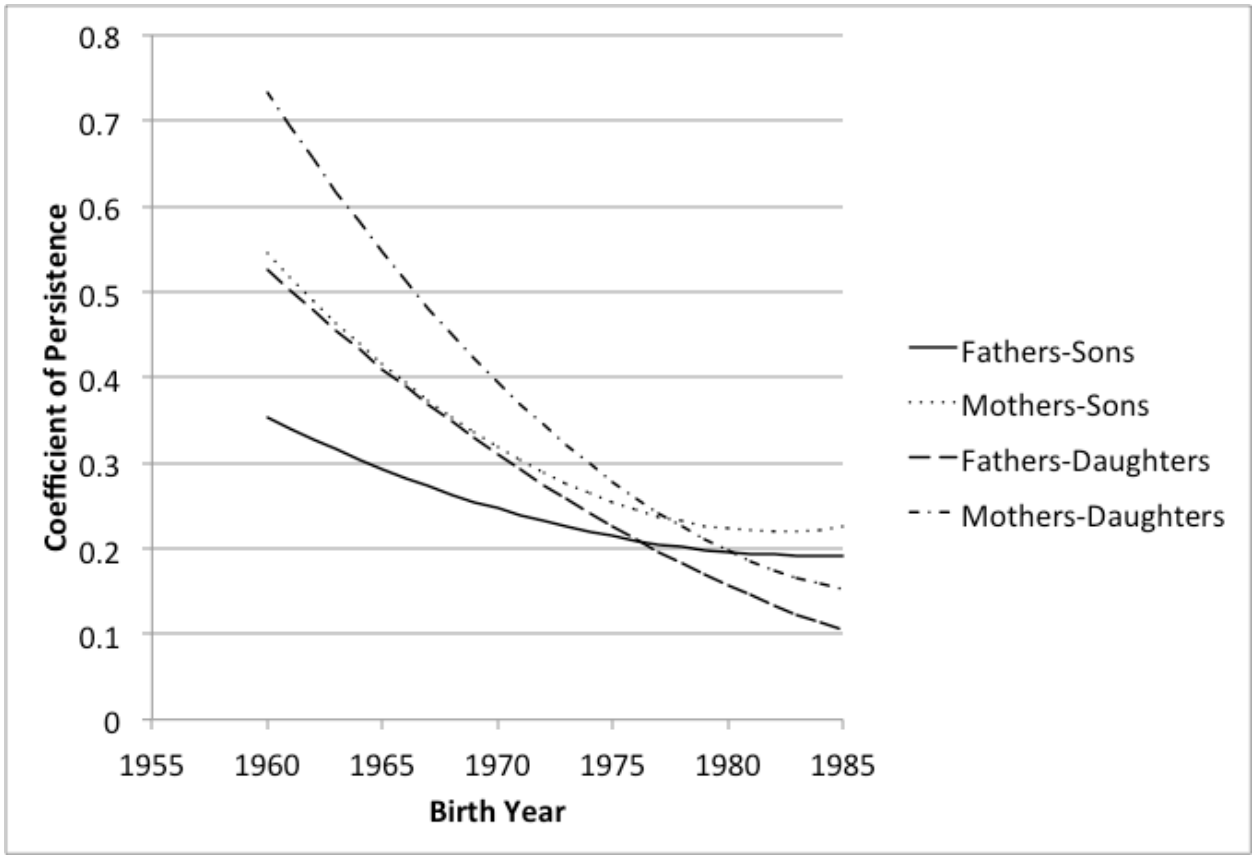
Graph is based on the 2010 Jordanian Labor Market Survey. Sample is restricted to individuals who are aged 25 to 70 years in 2010, are born in Jordan, and with non-missing values for age, sub-district of birth, years of schooling, father's schooling, and mother's schooling.

FIGURE II
Average Number of Public Schools (Per 1,000 Individuals) by Birth Year



Averages are computed across all individuals in the sample, where the upper and lower bounds of the confidence intervals are shown. Basic schools are the *asasi* schools, while secondary schools include secondary (*acadimi*) and vocational (*mihani*) schools plus schools with both secondary and vocational sections (*acadimi* + *mihani*). Public schools lie under the jurisdiction of Ministry of Education, Ministry of Higher Education, Ministry of Defense, Ministry of Social Development, Ministry of Religious Endowments (*awqaf*), and UNRWA.

FIGURE III
Estimated Coefficient of Intergenerational Transmission of Educational Attainment



Graph is based on estimating a regression of child's schooling on parent's schooling, age deviation from the mean, square of age deviation (divided by 100), interaction of parent's schooling with age, and interaction of parent's schooling with age deviation squared (divided by 100).