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DP14056

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This Discussion Paper is issued under the auspices of the Centre's research programmes:

- Development Economics
- Economic History

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Abstract

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Impact of Syrian Refugees
on Education Outcomes in Jordan[*]

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December 7, 2018

Abstract

Mass influxes of refugees have potentially large effects on host countries; while labor market impacts are frequently studied, outcomes like children's education could also be affected. This paper examines the impact of Syrian refugees on the educational attainment of Jordanians. Combining detailed household surveys with school-level records on the density of Syrians, we study both quantity and quality of education for the hosts using a differences-in-differences design across refugee prevalence and birth cohort. We find no evidence that greater exposure to Syrian refugees affected the attainment of Jordanians; adding a second, donor-funded shift in high-Syrian areas appears sufficient to mitigate potential over-crowding.

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1 Introduction

Sixty-eight million people are currently displaced from their homes by conflict, the highest number on record (UNHCR, 2018). Millions more are potentially affected in the destinations, where natives often worry they will be crowded out of the labor market and public services.[1] Multiple studies examine the effects on the labor market (see Schuettler and Verme (2018) for a review of forced migration contexts), but there have been few studies of other outcomes where forced migrants could help or harm the host communities.

With more than half of the displaced under the age of 18, the education sector could be significantly affected. We study the impact of the recent Syrian refugee influx on Jordan, the third largest recipient of Syrian refugees after Turkey and Lebanon, on the outcomes of Jordanian students. The Syrian conflict is among the world's major conflicts that received significant attention in international media, presumably because of its proximity to, and effects on, Europe. The conflict that began in 2011 led to between 662,000 and 1.3 million Syrians arriving in Jordan by 2015, about 7 to 13 percent of Jordan's population.[2] Many of these Syrians were of school age requiring the Jordanian authorities to find place in their schools for large numbers of newcomers in short order. According to the Ministry of Education's Educational Management Information System (EMIS 2016), there were 126 thousand Syrian students in Jordanian public schools in 2016/17, comprising 9% of the student body (Ministry of Education 2017). Syrians made up 12% of students in basic public schools and 6% of students in secondary schools.

There are multiple challenges to identifying the effect of the refugee influx on educational outcomes. First, Syrians did not settle randomly in Jordan; if they chose areas with worse outcomes among native students, for instance, a negative correlation between refugee prevalence and native outcomes ex post would partially include these pre-existing differences. Second, the refugee influx was not the only effect of the Syrian conflict; macroeconomic growth was slowed dramatically as a result of the disruption of trade routes, tourism flows and foreign investments, all of which could have adversely affected education outcomes and changed the incentives to invest in human capital. To identify the effect of the refugee influx on education, we employ a difference-in-difference methodology comparing the cross-cohort change in education outcomes in places with varying exposure to the Syrian refugee influx,

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[1]85% of the displaced are also in developing countries, where those affected could be particularly vulnerable.

[2]The two estimates come from UNHCR (2018) and the Jordanian population census of 2015 respectively. Ongoing research is attempting to resolve the discrepancy between the two figures.

before and after the onset of the Syrian crisis. To this end, we employ a unique data source, the 2016 wave of the Jordan labor Market Panel Survey (JLMPS 2016) carried out by the Economic Research Forum in cooperation with the Jordanian Department of Statistics. This survey contains retrospective information on educational attainment for all individuals in the sample, including school entry, enrollment at various educational levels, and advancement from one level to the next. We restrict the JLMPS 2016 to Jordanians born in Jordan, and we measure the intensity of their exposure to Syrians by two variables: (1) the proportion of Syrians in an individual's locality of birth, which we obtained from the 2015 population census, and (2) the proportion of Syrian students in an individual's (basic or secondary) school, which we obtained from EMIS 2016 for the school year 2016/17. Our identifying assumption in the empirical analysis is that high-Syrian and low-Syrian localities would have witnessed similar educational trends in the absence of the Syrian influx. Examining the educational trends before the influx lends support to this assumption.

Overall, we fail to find evidence of any effects of Syrian refugees on the educational attainment and learning outcomes of Jordanians. We attribute these null findings to a bundle of mechanisms that mitigated any (adverse) effects of the influx. In the current working paper version of the article, we focus on one mechanism, whether and how Jordanian schools responded to the arrival of Syrians. Using the school-level data in 2016/17 from EMIS 2016, we document that Jordanian schools were more likely to attend a second shift in areas that received more Syrians, and that the teacher-to-student ratio and classroom size were not altered by the Syrian influx. These results suggest that the arrival of Syrians did not adversely affect the quality of schooling Jordanians received.

Results are mixed from the limited literature on forced migrants and natives' education. Rozo and Sviastchi (2018) also examine Syrian refugees' effects on Jordanians and find no evidence of an effect. Our analyses differ in three main dimensions. First, their identification strategy uses distance from the two refugee camps as an instrument for location choice; it is reassuring that we find similar results using different variation. Second, we measure variation at the school level instead of the sub-district level; given that refugees are not uniformly distributed through sub-districts, effects might be concentrated at a lower level that is difficult to capture in a wider area. Third, we expand on their analysis with outcomes beyond the probability of enrollment, including attainment, repetition, and test scores. Tumen (2018) examines the impact of Syrian refugees on natives' education in Turkey and finds that refugee arrivals *increased* native enrollment, which he attributes to an increase in the returns to education from the low-skill influx. He finds the increase in enrollment comes from males with lower parental backgrounds, which is the demographic crowded out in the Turkish labor market.

As he points out, our results are not inconsistent, because similar crowd out has not been found in the Jordanian labor market, for instance by Fallah, Krafft, & Wahba (2018). Baez (2011) examines an influx of Burundian and Rwandan refugees to Tanzania in 1994; he finds the influx negatively affected the schooling and literacy of Tanzanians. One of the ways the contexts differ, however, is the degree of assistance to the host community schools; while assistance to Tanzanian schools was limited, assistance to affected schools in Jordan was significant. Finally, this is also one of a series of papers that examines the impact of the Syrian refugee influx on a range of outcomes, including employment and wages (Fallah, Krafft, & Wahba, 2018)), internal migration (El-mallakh & Wahba, 2018), migrant workers in Jordan (Malaeb & Wahba, 2018), and housing outcomes (Al-Hawarin, Assaad, & Elsayed, 2018).

2   Background

2.1   Jordan as Destination for Refugees

Jordan has a long history as a country of refuge for populations displaced by conflict in neighboring countries. It welcomed large numbers of Palestinian refugees after the 1948 and 1967 Arab-Israeli wars and after the first Gulf War of 1991. It also hosted a large number of Iraqi refugees after the US invasion of Iraq in 2003 and the conflicts that ensued. The response to the Palestinian refugee influx was partially met by assistance from the United Nations Relief and Works Agency (UNRWA), an agency that was explicitly established to assist Palestinian refugees in neighboring countries. UNWRA set up its own schools in Jordan and elsewhere, some of which are still operating.[3] However, these schools only admitted Palestinians with official refugee status and were limited to basic schools. The Jordanian government was left with the responsibility of meeting the schooling needs of Palestinians not officially registered as refugees and all secondary level schooling (Abu Lughod 1973). Subsequent refugee inflows were absorbed in Jordan's public schooling system, with varying degrees of assistance from the international community.

In the latest of these large-scale refugee inflows, the one that is the subject of this paper, Jordan is hosting 660,000 Syrians registered with UNHCR, but the 2015 Population Census

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[3]The Ministry of Education's EMIS database puts the number of UNWRA schools in 2016/17 at 176, serving a total of 66 thousand students.

placed the total number of Syrians in Jordan at 1.3 million, or 13.3% of the total population of Jordan at the time (Salemi, Bowman, & Compton, 2018). Based on registration status alone, Krafft et al. (2018) estimate that 86% of Syrians 15-59 in Jordan are refugees. If the definition is expanded to include those who report leaving Syria due to violence, conflict or lack of security, the estimate goes up to 93% (Krafft, Sieverding, Salemi, & Keo, 2018). Syrian refugees contain a disproportionate number of children, with 48% being under the age of 15 compared to 34% of Jordanians.

Prior to 2014, the settlement process of refugees was somewhat haphazard, and many were able to directly locate in host communities. Since 2014, the process was tightened and required refugees to start in one of three official refugee camps; Zaatari in Mafraq goverorate, and Azraq and the Emirati-Jordanian camp, both in Zarqa governorate. Refugees could seek permission to leave the camps by obtaining formal sponsorship by a relative already living outside the camps. Many who were unable to obtain such sponsorships left the camps without authorization, but that prevented them from being able to obtain the Ministry of Interior (MOI) service card and the UNHCR asylum-seeker certificates, which were necessary to access public services. Specifically, prior to the 2017 school year, parents wishing to register their children in school needed to have both the MOI service card and the asylum seeker certificate to do so (Salemi, Bowman, & Compton, 2018). In JLMPS 2016, 18% of refugees said they were living in camps, 18% said they had previously lived in a camp, and 64% said they were never in a camp (Krafft, Sieverding, Salemi, & Keo, 2018).[4]

Furthermore, 92% of the Syrians in Jordan resided in four of the twelve governorates according to the 2015 Population Census (DoS, 2016). Thirty-four percent were in the capital Amman, which contains 42% of the population of Jordan. 27% are in the governorate of Irbid, which is close to the Syrian border, and has 18% of the country's population. 16% and 14%, are in Mafraq and Zarqa, governorates, respectively, the governorates where the three official refugee camps are located. Figure 1 shows the prevalence of Syrian households at the sub-district level. There are 89 sub-districts in Jordan. The two sub-districts with the highest prevalence (indicated by the darkest color on the map) contain the two large refugee camps: Al-Badia Al-Shamalia al-Gharbiya sub-district, which contains the Zaatari camp, has a prevalence of 81%, and Azraq sub-district, which contains the Azraq camp, has a prevalence of 76%. Fifteen additional sub-districts have a prevalence of 14.5% to 36%, indicated by the second darkest shade on the map. They include Al-Dalil sub-district, also in Zarqa governorate, which contains the Emirati-Jordanian camp, with a prevalence of 34%.

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[4]Only 13% were in fact located in an officially recognized camp. The discrepancy between the self-reporting and the observed location could be due to the existence of unofficial camps and tented settlements.

Of the remaining 14, five are in Irbid governorate, eight are in Mafraq governorate and one each in Amman, Ajloun, and Aqaba governorates.

Examining the prevalence of Syrian refugees at the locality level, which is the level of aggregation of our first measure of the "treatment" variable in the multivariate analysis, we see that 270 of 958 localities (28%) do not have any Syrian refugees at all and 178 localities (18.4%) have a prevalence higher than the national average prevalence of 13.3%. Of these, 86% are in the top four governorates of Mafraq (38%), Irbid (28%), Amman (11%) and Zarqa (9%).[5] As shown in Figure 2, the first quartile of localities, weighted by population, has a proportion Syrian of less than 6%. The proportion Syrian in the second quartile varies from 6% to 9.7%, from 9.7% to 13.6% in the third quartile, and exceeds 13.6% in the fourth quartile.

Overall, Syrian refugees have mostly located in proximity to the official refugee camps and close to the Syrian border. A substantial fraction is located in Amman, where much of the population and economic activity of the country is concentrated, and a few are located in Aqaba, where Jordan's main port is located.

2.2   Evolution of Educational Attainment in Jordan

Over the past several decades, Jordan has been one the world's top performers in terms of increasing educational attainment for its population while maintaining fairly high levels of education quality compared to its peers in the region. According to the Barro and Lee dataset on educational attainment in the world, Jordan was the country with the third largest increase in the world in average years of schooling over the period from 1980 to 2010 (Barro & Lee, 2013). Jordan had the highest average score in science and the second highest score in mathematics, after Lebanon, in the 8th grade IMSS tests in 2007 among the 13 Arab countries that participated in the test that year.

As shown in Figure 3, which is based on JLMPS 2016 data, the proportion of illiterates among Jordanians was over forty percent among Jordanians born in 1945 and then declined rapidly to under 10 percent for those born two decades later. At the other end of the education spectrum, the proportion with university degrees began to increase rapidly with cohorts born in the late 1960s, going from 10 percent to 30 percent across a single generation.

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[5] Based on population data by nationality at the locality level from the 2015 Population Census provided by the Jordanian Department of Statistics.

The increase in educational attainment in Jordan was almost entirely due to an increase in women's education and the closing, if not reversal, of the gender gap in average years of schooling. As shown in Figure 2, men born in 1945 had on average 6 years of schooling more on average than women in the same birth cohort, an almost 3:1 advantage. By the 1975 birth cohort, the gender gap had completely closed, with the two sexes reaching parity at an average of 10 years of schooling. The increase had almost completely stalled for men from the 1995 to the 1975 birth cohorts, whereas it had continued unabated for women. While the increase in average years of schooling has resumed for men since the 1975 birth cohort, it continued to be more rapid for women, with a gap of approximately one year in favor or women developing by 1990 birth cohort. This dramatic increase in women's educational attainment can at least be partly attributable to an increase in the local supply of public basic schools (Assaad & Saleh, 2016).

As we demonstrate below and is important for our methodology, these trends are similar across areas with high and low densities of refugees.

2.3   Jordan's Education System and Syrian Refugees

Jordan's pre-university education system is comprised of a pre-school stage, which is almost entirely private, a basic compulsory schooling stage, which spans first grade to tenth grade, and a secondary stage, which includes the eleventh and twelfth grades, as well as academic and vocational tracks.[6] As of the 2016/17 school year, there were 3,925 basic schools in Jordan, of which 2,621 (67%) are public schools.[7]Similarly, there were 1,477 secondary schools, of which 1,215 (82%) are public. In the description that follows we focus on public school as these schools enroll 89% of Syrian students in Jordan.

The Jordanian government took a number of steps to accommodate Syrian children into the Jordanian public school system. First, with the assistance of UNICEF, some schools were

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[6]Prior to 1994, there was a primary stage comprising of the first six grades, a preparatory stage that went from 7th grade to 9th grade, and a secondary stage that comprised 10th grade to 12th grade. Together the primary and preparatory stages comprised the compulsory schooling stage. When compulsory schooling was extended to the10th grade in 1994, the primary and preparatory stages were merged and together with the tenth grade formed the basic schooling stage. The remaining two years comprised the secondary stage (UNESCO, 2006).

[7]We rely in this section on information from the Ministry of Education's Education Management Information System (EMIS) for the year 2016/17. The number of basic public schools does not include 169 UNRWA basic schools.

established in refugee camps (Salemi, Bowman, & Compton, 2018).[8]Second, a number of schools were converted into double-shift schools to accommodate Syrian students, a policy that was supported by donor funds (Hashemite Kingdom of Jordan Ministry of Planning and International Cooperation & United Nations, 2013). This policy resulted in more than half of Syrian students being accommodated in the second shift of double-shift schools. Nearly four-fifths of Jordanian students remained in single shift schools, which were composed of 4% Syrians. Only 5% of Jordanians ended up in the evening shift of double-shift schools, where most of the Syrians were concentrated. We explore these responses as potential mechanisms for the lack of an adverse effect of the Syrian influx on Jordanian students after we present the findings.

3 Empirical Analysis

3.1 Data

The paper draws on two novel and unique data sources. The first source is the Jordan Labor Market Panel Survey of 2016 (JLMPS 2016), the second wave in the JLMPS series after the 2010 wave. The JLMPS 2016 is administered to nationally representative sample of households residing in Jordan. It is a rich individual-level data source on the Jordanian labor market, containing retrospective information on a wide range of educational outcomes for all individuals in the sample. The second data source is the Education Management Information System database for 2016/17 (EMIS 2016). This unique source provides school-level information on the number of shifts, classrooms, teachers, and students broken down by nationality, among other variables.

We restrict the JLMPS sample to Jordanians born in Jordan with non-missing date and locality of birth. Throughout the empirical analysis, we employ individual weights according to the sampling design of the JLMPS 2016. For further detail about the data, please refer to Assaad and Krafft (2018).

We focus on 11 educational outcomes for males and females: (1) ever attended school, (2) years of basic schooling completed among those who entered basic school, (3) ever repeated

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[8]Thirty-nine schools in the EMIS have only Syrian students and are presumed to be located in refugee camps.

a grade in basic school among those who entered basic school, (4) finished basic school among those who entered basic school, (5) grade in basic school examination among those who passed the examination (calculated as the standardized grade, which is equal to the difference between an individual's grade and the average grade within her year of birth, divided by the standard deviation), (6) ever enrolled in secondary school among those who completed basic school, (7) enrolled in vocational track among those who entered secondary school, (8) ever repeated a grade in secondary school among those who entered secondary school, (9) finished secondary school among those who entered secondary school, (10) grade in secondary school examination among those who passed the examination (calculated as the standardized grade, using the same formula as for the grade in basic school), and (11) ever enrolled in tertiary education among those who completed secondary school. All outcomes are dummy variables, except years of basic schooling completed, grade in basic school, and grade in secondary school. The outcomes capture both educational attainment, in terms of enrollment and completion of grades, and learning outcomes, in terms of grade repetition, type of track in secondary school, and test scores.

We capture the intensity of exposure to the refugee influx by two measures. The first is the proportion of Syrian individuals out of the total population in an individual's locality of birth, which we obtained from the 2015 Jordanian population census. Given that there were extremely few Syrians in all Jordanian localities before 2011 according to the 2004 population census, this measure captures the cross-locality variation in the change in the proportion of Syrians, presumably as a result of the Syrian Civil War that erupted in 2011. The second measure of intensity of exposure to Syrians is the proportion of Syrian students who were enrolled in an individual's school in 2016/17. We obtained this measure by matching an individual's (basic and secondary) school, which is recorded in the JLMPS 2016 for every individual who was ever enrolled in a given school level, to the information on the nationality composition of students in the EMIS 2016. This measure better captures the competition over educational resources that is caused by the influx for some educational outcomes. Nevertheless, it is subject to the caveat that Jordanian students may have moved across schools in response to the influx of Syrian students. Movement across schools may have been correlated with ability and the educational outcomes.[9] We thus use both measures of intensity of exposure to Syrians in the empirical analysis, and we show the findings using

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[9] Note that in principle, the first measure of exposure, the proportion of Syrians in 2015 in an individual's locality of birth, is subject to a similar caveat: the possibility that Jordanian students may have moved across localities where they received their schooling in response to the Syrian influx. This cross-locality movement may have also been correlated with ability, and thus with our educational outcomes. Nevertheless, movement across schools has a higher probability than movement across localities, and thus poses a more serious threat to our second measure of exposure.

both measures. Note though that the second measure will be feasible to use for all outcomes except the first one: ever enrolled in school. This is because it is not defined for individuals who never enrolled in school.

3.2   Empirical Strategy

We employ a difference-in-differences strategy to identify the effect of the influx of Syrian refugees on the educational outcomes of Jordanians, where we exploit the variation across cohorts and localities of birth in exposure to the Syrian influx. Two factors determine an individual's exposure to the influx: (1) the proportion of Syrians in 2015 in their locality of birth, or alternatively, the proportion of Syrian students in 2016/17 in their basic or secondary school, and (2) their cohort of birth relative to the timing of the influx. The basic idea is to compare educational outcomes of cohorts who were exposed to the influx (i.e. at the relevant age of schooling during the Syrian conflict) and those who were not, across "high-Syrian" localities and "low-Syrian" localities. Specifically, we estimate the following OLS regression:

$$y_{ijc} = \gamma(young_c \times \ Syrians) + \alpha_j + \beta_c + \epsilon_{ijc}$$

where y_{ijc} is the educational outcome of individual i born in locality j in year c, $young_c$ is a dummy variable for being in the "treated" cohort (potentially affected by the Syrian crisis), $Syrians$ is the intensity of the Syrian influx, which is measured at the locality of birth or school level, α_j and β_c are two full sets of locality of birth and year of birth fixed effects, and ϵ_{ijc} is an error term. We cluster standard errors at the locality of birth level, the level of aggregation of our first measure of exposure to Syrians. This is a higher level of aggregation than the school level, and hence provides a more conservative estimate of standard errors for our second measure.[10]

The main regressor is the interaction of $young_c$ and $Syrians$. We calculate each of our two measures of syrians in two ways: first as a continuous measure of the proportion, and second, to allow for non-linear effects, as a set of dummy variables indicating if a locality of birth

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[10]We choose to estimate a Linear Probability Model rather than a Logit or a Probit, because including a large number of fixed effects for locality and year of birth fixed effects may cause the incidental parameters problem.

(or school) lies in the second, third, or fourth quartiles of exposure to Syrians. The quartiles are calculated based on the locality-level or the school-level proportion of Syrians, weighted by the total population of Jordanians in the 2015 census data. The first quartile, with the least exposure to Syrians, is the omitted category.

For each educational outcome, we compare a treated, "young" cohort ($young_c = 1$) that was potentially affected by the influx of Syrian refugees, to a control, "old" cohort ($young_c = 0$) that was too old to be affected when Syrians arrived in 2011. Because the relevant age range varies for each outcome, the definition of the treated and control cohorts varies accordingly. Table 1 specifies the treated and control cohorts. We constructed the age range of the treated and control cohorts as follows: for each outcome, we first specified the youngest age in 2011 that was too old to be affected by the influx (control cohort). This age forms the boundary between the youngest age in the control cohort and the oldest age in the treated cohort. Second, since age is not a perfect predictor of educational attainment, we defined the oldest age in 2011 that was potentially treated by adding a one-year buffer to the youngest age in the control cohort. Third, we selected the youngest age in the treated cohort by identifying the youngest age in the JLMPS 2016 that is potentially treated; for example, the youngest anyone has entered secondary school is age 16. Finally, we chose the oldest age in the control cohort to balance the number of birth years in the treatment and control cohorts when possible.

For the first outcome, ever attending school, we use every person in the relevant age range; for all other outcomes, we use a restricted sample in which we condition on entering or finishing basic or secondary school, or passing the basic or secondary final examination. Estimating the effects on a restricted sample is justifiable because, we do not find evidence of an effect of exposure to Syrians on entering or finishing basic or secondary school, or on passing the final examinations, which mitigates some concern about sample selection.

Table 2 shows the summary statistics for all 11 educational outcomes, broken down by gender. The sample size varies from one outcome to another due to variation in the definition of the sample that we described above. There is almost universal school enrollment among males and females, but females have better educational outcomes than males at all stages of education. Conditional on entering basic school, females have slightly higher years of basic schooling completed, are less likely to repeat a grade, and are more likely to finish basic schooling. Among those who finished basic schooling, females are more likely than males to enter secondary school. Conditional on entering secondary school, females are less likely to repeat a grade and more likely to finish secondary school. Finally, within those who finished

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secondary school, females are more likely to enter tertiary education.

The coefficient of interest is γ which measures the difference in outcomes between the old and young cohorts across high-Syrian and low-Syrian localities. If the influx adversely affected the educational outcomes of Jordanians - if individuals born in high-Syrian localities experience a larger decrease (or a smaller increase) across cohorts in their outcomes, in comparison to those born in low-Syrian localities - γ would be negative.

The identification assumption of the difference-in-difference strategy is that in the absence of the Syrian refugee influx, high-Syrian and low-Syrian localities would have witnessed similar trends of the outcome of interest across the old and young cohorts.

As a first test of the parallel trends assumption, we plot the evolution of the mean of each outcome before and after the Syrian crisis in high-Syrian localities (above the median) and low-Syrian localities (below the median). We shows these trends in Figures 5-8. For all outcomes, we do not observe different trends across localities before the crisis, which increases our confidence in our identification strategy. We also run placebo tests on two control cohorts who were both past the relevant age of the educational outcome of interest; we do not find any effect of the Syrian crisis.

3.3   Findings

We fail to find evidence of any effects of the Syrian refugee influx on the educational outcomes of Jordanians. In a very few cases, we find statistically significant (mostly positive) effects, but they are not monotonic across quartiles of the proportion of Syrians. We thus attribute these statistically significant coefficients, if any, to sampling error and multiple hypotheses testing, rather than to an underlying effect. We will now go through the results for each outcome.

We start by examining the effect of exposure to the Syrian influx on the probability of attending school. Table 3 indicates that the Syrian influx had no statistically significant effects on school enrollment among Jordanian males or females. If anything, we find in column (4) a positive effect on females born in localities at the second quartile of the proportion of Syrians. However, the effect is not systematically higher at higher quartiles of the proportion of Syrians.

Table 4 shows statistically insignificant effects with respect to the number of years completed in basic school among those who ever attended basic schooling. The null results are the same regardless of which measure we use for the exposure to Syrians.

Table 5 shows the effects on the probability of ever repeating a grade in basic school among those who ever entered basic school. Again, we find no statistically significant effects of exposure to Syrians for males or females. If anything, we find in columns (4) and (6) unexpected negative effects on repeating a grade in basic school among Jordanians at the fourth quartile (and also third quartile for females) of the proportion of Syrian students in basic school.

The effects on the probability of finishing basic school among those who ever attended basic school are shown in Table 6. The effects are again mostly statistically insignificant, except in column (6), where we find a positive and statistically significant effect on females at the second quartile of the proportion of Syrians in the locality of birth, but the effect goes away at the third and fourth quartiles.

The effects on grade in the basic school final examination among those who passed the examination are shown in Table 7. Again, we fail to find statistically significant effects except in columns (4), (5), and (6), where we find unexpected positive effects.

In Tables 8 and 9, we present results from secondary school outcomes. Although we find statistically significant effects on the probability of entering secondary school among those who finished basic school, these are not robust to alternative specifications and likely the result of multiple hypothesis testing. In the additional columns, we do not find statistically significant effects on the following outcomes for males or females: the probability of entering the vocational track among those who entered secondary school; the probability of repeating a grade in secondary school among males and females who entered secondary school; the probability of finishing secondary school among those who ever attended secondary school; the grade in secondary school examination; or the probability of entering tertiary education among those who finished secondary school.

Overall, we fail to find evidence on any negative effects of the Syrian refugee influx on the educational outcomes of Jordanians, whether in terms of educational attainment (enrollment and completion of grades) or learning outcomes (grade repetition, vocational track, and test scores).

4 Mechanisms

The findings suggest that there are negligible effects of the Syrian refugee influx on Jordanians' educational outcomes. We attribute these null findings to a bundle of changes (mechanisms) that took place in response to the Syrian refugee influx and that arguably mitigated its adverse effects. In the current working paper version, we focus on one mechanism, the measures undertaken by Jordanian schools to accommodate Syrian students that we outlined in the background section. In the future, we plan to examine this mechanism in more depth: how were Jordanian schools able to carry out these policies? Was this due to foreign aid or government investment? Also, we will explore other mechanisms apart from the school supply response, such as out-migration of Jordanians, and other labor market and housing responses.

The EMIS 2016 is a unique and rich data source that allows us to analyze the response of Jordanian schools to the Syrian influx. As shown in Table 10, 56% of Syrian students are in the evening shift of double shift schools, compared to 5% of Jordanian students. An additional 17% percent of Syrian students are in the morning shift of double shift schools, as compared to 15% of Jordanian students. These double shift schools, which comprise less than 10% of the total number of public schools in Jordan, include 73% of Syrian students. Syrians make up half of the students in the evening shift and 10% of students in the morning shift of double shift schools. They constitute only 3% of students in single shift schools, which make up more than 90% of Jordanian schools and where nearly 80% of Jordanian students are concentrated.

Although exposure at both levels is small, Jordanian students are somewhat more exposed to Syrians in basic schools than in secondary schools. While 9% of Jordanian basic school students are in the evening shift of double-shift schools, where Syrians are concentrated, only a tiny fraction of Jordanian secondary school students are. In fact, the evening shift in secondary schools is almost entirely Syrian (89%). Similarly, while 19% of Jordanian basic school students are in the morning shift of double-shift schools, only 10% of Jordanian secondary school students are. The vast majority of Jordanian secondary school students (90%) are in single shift schools where the proportion of Syrian students averages 3%.

We then examine the correlation across sub-districts between the proportion of Syrians and three school characteristics: the share of Jordanian students in a two-shift school, the student-teacher ratio, and the number of students per classroom. The first measure captures whether schools responded to the arrival of Syrian students by opening a second shift, thus

mitigating the adverse effect of the influx on classroom size, whereas the second and third measures capture school quality.

At the sub-district level, we do see a positive relationship between being in a double-shift school and the percentage of Syrian students in the sub-district. As shown in Figure 9, the proportion of Jordanian students in double-shift school rises with the proportion of Syrians, but the relationship is due to a handful of sub-districts that have a relatively higher proportion of Syrian students. Double-shift schools are especially prevalent in a handful of larger sub-districts (represented by the size of the circle). Three of the five largest sub-districts are in Amman, Zarqa and Irbid.

Besides the increase in the number of students in double-shift schools, other school–level indicators, such as student-teacher ratios and classroom density do not appear to be related to high exposure to Syrian refugees. As shown in Figure 10, there is no relationship between student-teacher ratios and the percentage of Syrian students in a sub-district. Again, the only variable that seems to increase student-teacher ratios is the size of the district. The same applies to the ratio of students to available classrooms (Figure 11), which is particularly high in the largest sub-districts, but shows no relationship with the proportion of Syrian students in the sub-district.

5   Conclusion

We have attempted in this paper to assess the impact of the Syrian refugee influx on schooling outcomes of Jordanians. We use a difference-in-difference methodology that identifies the effect by comparing various education outcomes across individuals whose localities of birth (or schools) experienced different levels of exposure to the refugee influx and who belong to cohorts that were of age to be affected by the influx and ones that were too old to be affected. The education outcomes we examine include school entry, progression through basic schooling, grade in basic school, advancement to, and progression through, secondary schooling, grade in secondary school, and entry into higher education. Our identification strategy depends on the assumption that high and low exposure localities would have had similar trends in these outcomes in the absence of the refugee influx, and we show attainment was very similar in the areas with high and low exposure to Syrians.

We fail to find evidence of any adverse effects of the Syrian influx on the educational outcomes of Jordanians. We attribute this null finding to a number of mechanisms that acted to shield

Jordanians students from the potential effects of the refugee influx. Using the EMIS data of the Jordanian Ministry of Education, we show that most Syrian students were accommodated by adding evening shifts to a small fraction (less than 10%) of existing schools. Only 5% of Jordanian students had to be accommodated in the evening shifts and only 15% were in the morning shift of these double-shift schools. Nearly 80% of Jordanian students remained in single shift schools that had on average 3% Syrian students. Although the exposure of Jordanians to the Syrian influx was a bit higher at the basic level than the secondary level, it remained fairly limited there as well. As a result of these measures and other measures taken by the education authorities with the assistance of the international community, class sizes appear not to have been affected by the refugee influx.

Lastly, the cost to educate Syrians did not come at the expense of the Jordanian taxpayer; additional education expenditures were almost entirely borne by foreign donations that provided budget support to the Government of Jordan to assist with the overall refugee influx (Nasser & Symansky, 2014).

We plan to expand our analysis in future versions of this paper in several ways. First, we plan to explore how Jordanian education authorities were able to expand school capacity to accommodate Syrian students and the role of international aid in helping them do that. Second, we plan to examine other mechanisms that may have attenuated the impact on Jordanians, such as possible out-migration of Jordanian families from areas that were highly exposed to the refugee influx.

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Figures and Tables

Figure 1: Percentage of all Resident Households that are Syrian by Sub-District, 2015
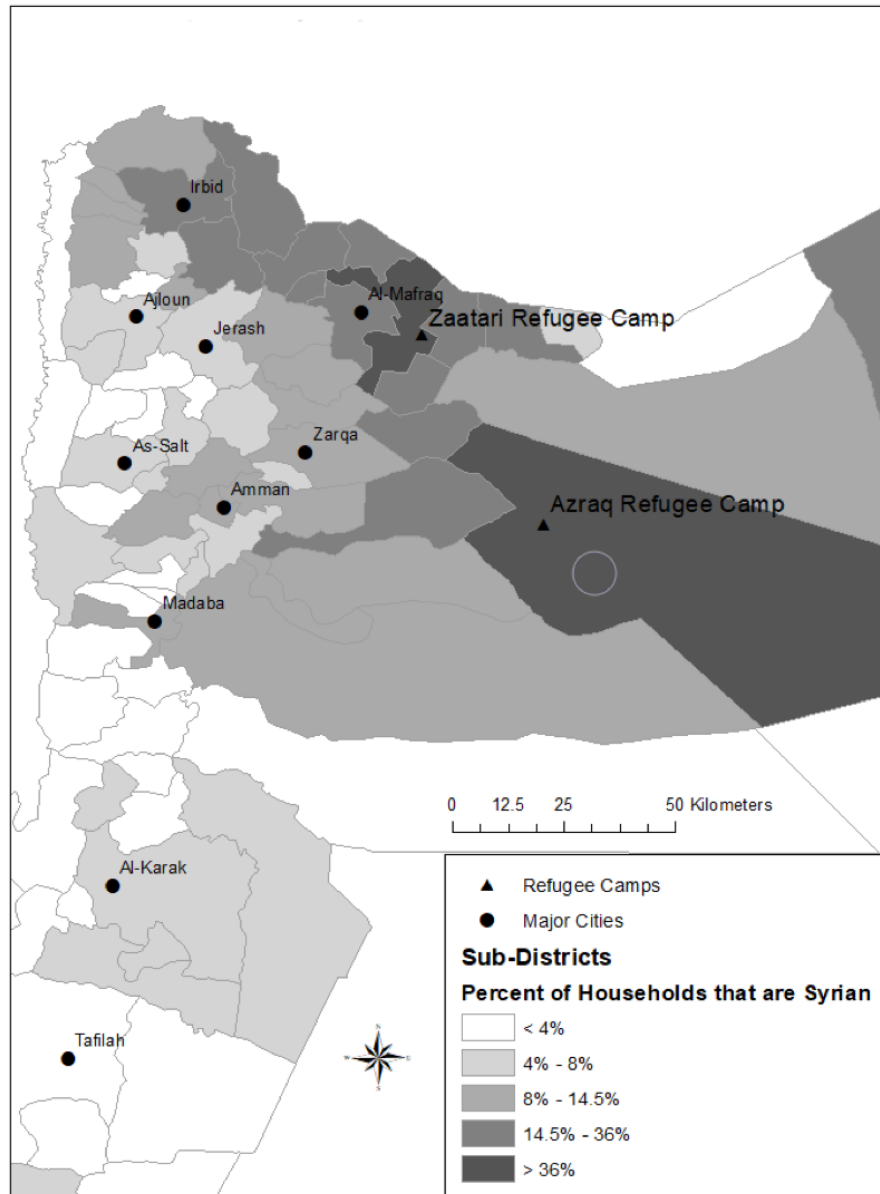
Source: Salemi, Bowman, & Compton (2018)

Figure 2: Kernel Density Plot of Proportion of Syrians at the Locality Level, 2015
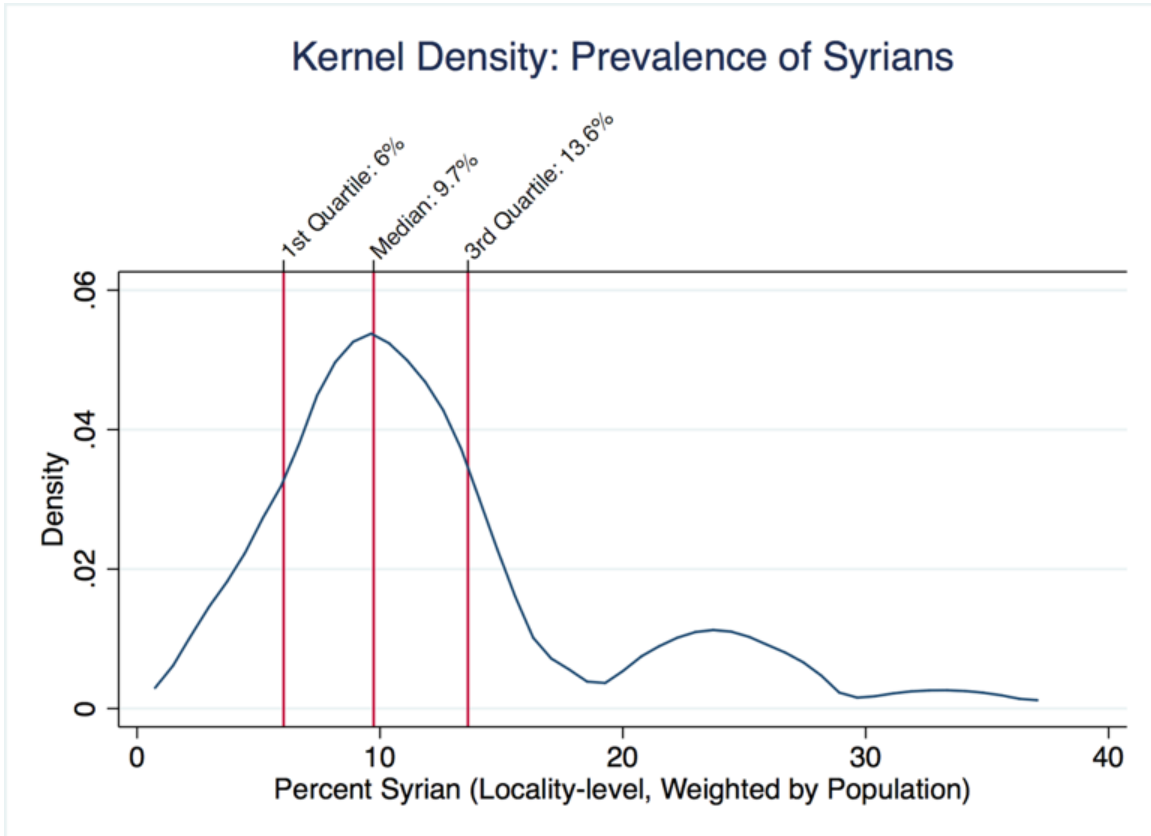
Authors' calculations based on data from the 2015 Population Census.
Epanechnikov kernel, bandwidth = 2.242.

Figure 3: Distribution of Educational Attainment by Year of Birth for Jordanian Nationals, 2016
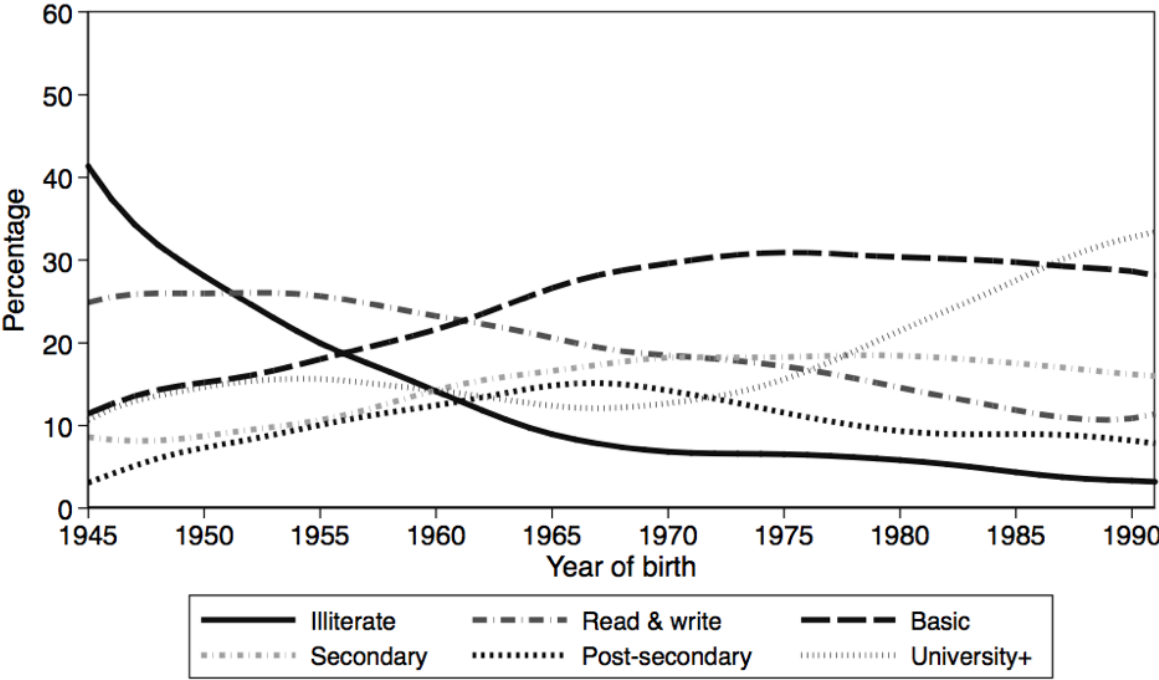
Assaad, Krafft, & Keo (2018) based on data from JLMPS 2016
Lowess smoothed with bandwidth 0.5. Restricted to cohorts 25+ in 2016

Figure 4: Average Years of Schooling by Year of Birth and Sex, Jordanians, 2016
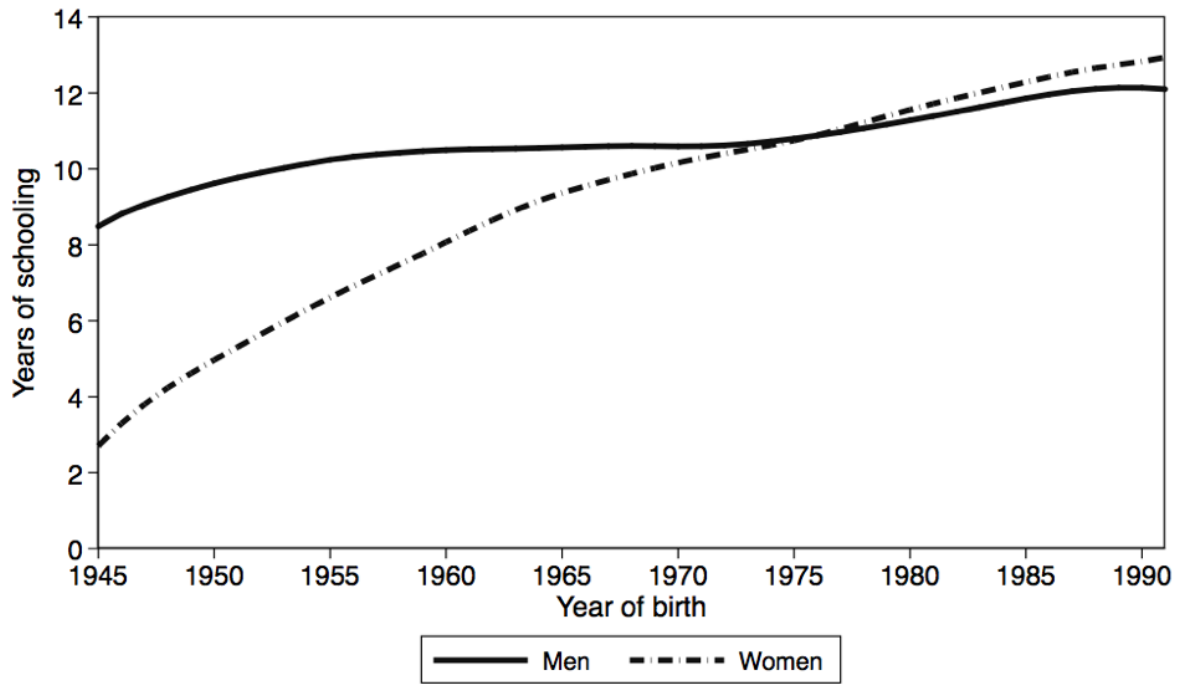
Assaad, Krafft, & Keo (2018) based on data from JLMPS 2016
Lowess smoothed with bandwidth 0.5. Restricted to cohorts 25+ in 2016

Table 1: Treated (Young) and Control (Old) Cohorts for Each Education Outcome

		Years of Birth	Age in 2011	Age in 2016	Observations	Total Observations
Ever Attended	Old (Control)	1998 to 2003	8 to 13	13 to 18	3548	6900
	Young (Treated)	2005 to 2010	1 to 6	6 to 11	3352	
Years Basic	Old	1990 to 1995	16 to 21	21 to 26	7709	10958
	Young	1997 to 2010	1 to 14	6 to 19	3249	
Repeated Basic	Old	1988 to 1993	18 to 23	23 to 28	8376	11321
	Young	1995 to 2009	2 to 16	7 to 21	2945	
Finished Basic	Old	1989 to 1994	17 to 22	22 to 27	3328	6451
	Young	1996 to 2001	10 to 15	15 to 20	3123	
Entered Second	Old	1988 to 1993	18 to 23	23 to 28	2932	5523
	Young	1995 to 2000	11 to 16	16 to 21	2591	
Repeated Second	Old	1988 to 1992	19 to 23	24 to 28	2136	3938
	Young	1994 to 1998	13 to 17	18 to 22	1802	
Finished Second	Old	1985 to 1991	20 to 26	25 to 31	2909	5182
	Young	1993 to 1999	12 to 18	17 to 23	2273	
Entered Tertiary	Old	1986 to 1991	20 to 25	25 to 30	1629	3147
	Young	1993 to 1998	13 to 18	18 to 23	1518	

Notes: Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016).

Table 2: Summary Statistics

	Males			Females		
	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.
Ever Attended	0.99	0.1	3504	0.99	0.08	3396
Years Basic	7.03	3.32	5524	7.08	3.35	5434
Repeated Basic	0.02	0.14	5736	0.01	0.11	5585
Finished Basic	0.8	0.4	3256	0.84	0.37	3195
Entered Second	0.77	0.42	2741	0.82	0.38	2782
Repeated Second	0.23	0.42	1853	0.16	0.37	2085
Finished Second	0.64	0.48	2502	0.73	0.44	2680
Entered Tertiary	0.63	0.48	1362	0.74	0.44	1785

Notes: Sample is restricted to Jordanians from JLMPS born in Jordan.
Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016).

Figure 5: Trends in Basic Education Outcomes by Syrian Prevalence: Females

Blue represents trends for Jordanians with above median exposure to Syrians by locality of birth.
Red represents below median exposure to Syrians by locality of birth.
Red line separates cohorts exposted to Syrians from cohorts unexposed based on age in 2011.

Figure 6: Trends in Basic Education Outcomes by Syrian Prevalence: Males

Blue represents trends for Jordanians with above median exposure to Syrians by locality of birth.
Red represents below median exposure to Syrians by locality of birth.
Red line separates exposed cohorts from unexposed cohorts based on age in 2011.
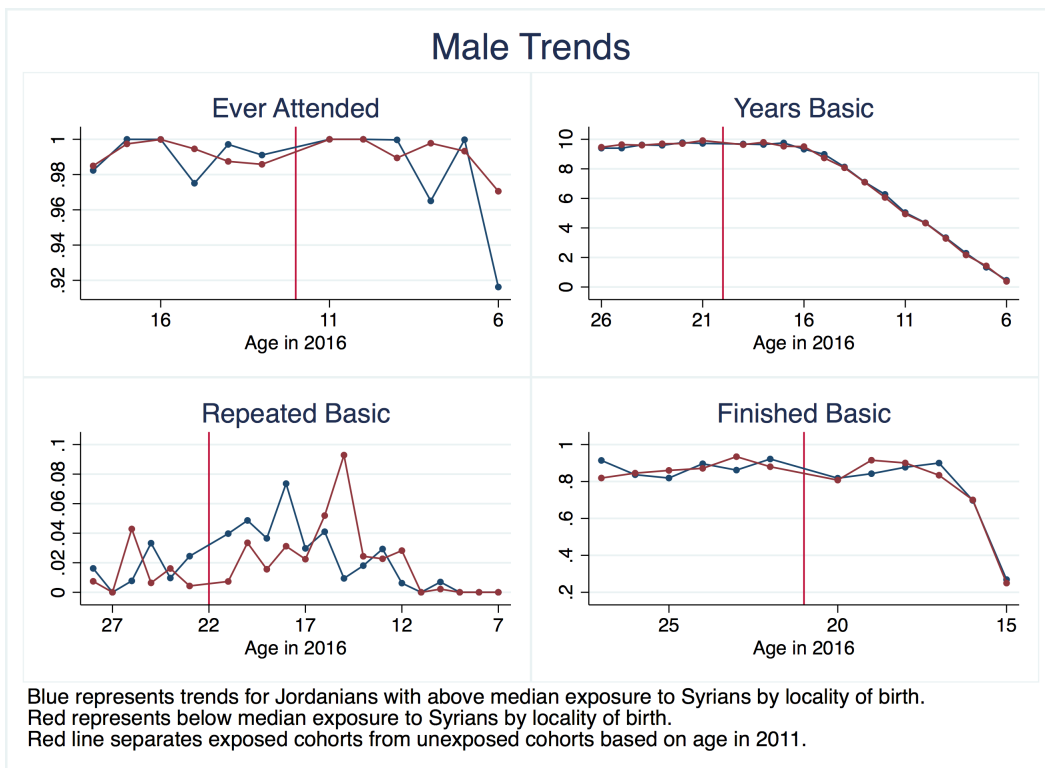
Figure 7: Trends in Secondary Education Outcomes by Syrian Prevalence: Females

Blue represents trends for Jordanians with above median exposure to Syrians by locality of birth.
Red represents below median exposure to Syrians by locality of birth.
Red line separates cohorts exposted to Syrians from cohorts unexposed based on age in 2011.
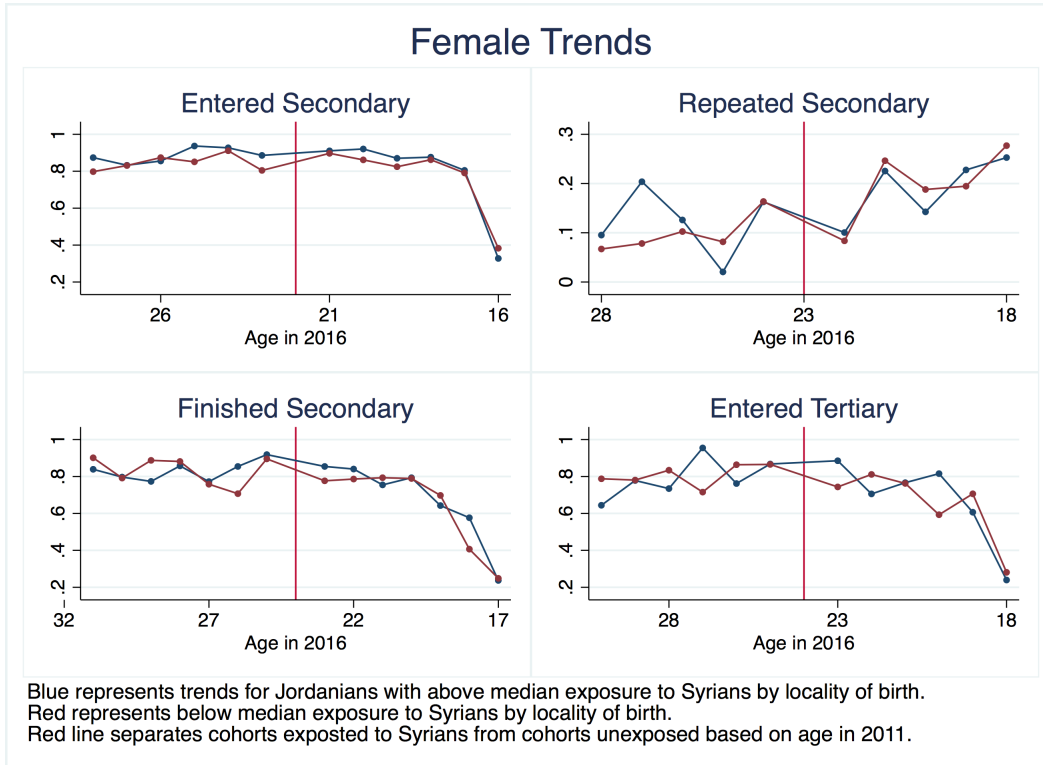
Figure 8: Trends in Secondary Education Outcomes by Syrian Prevalence: Males

Blue represents trends for Jordanians with above median exposure to Syrians by locality of birth.
Red represents below median exposure to Syrians by locality of birth.
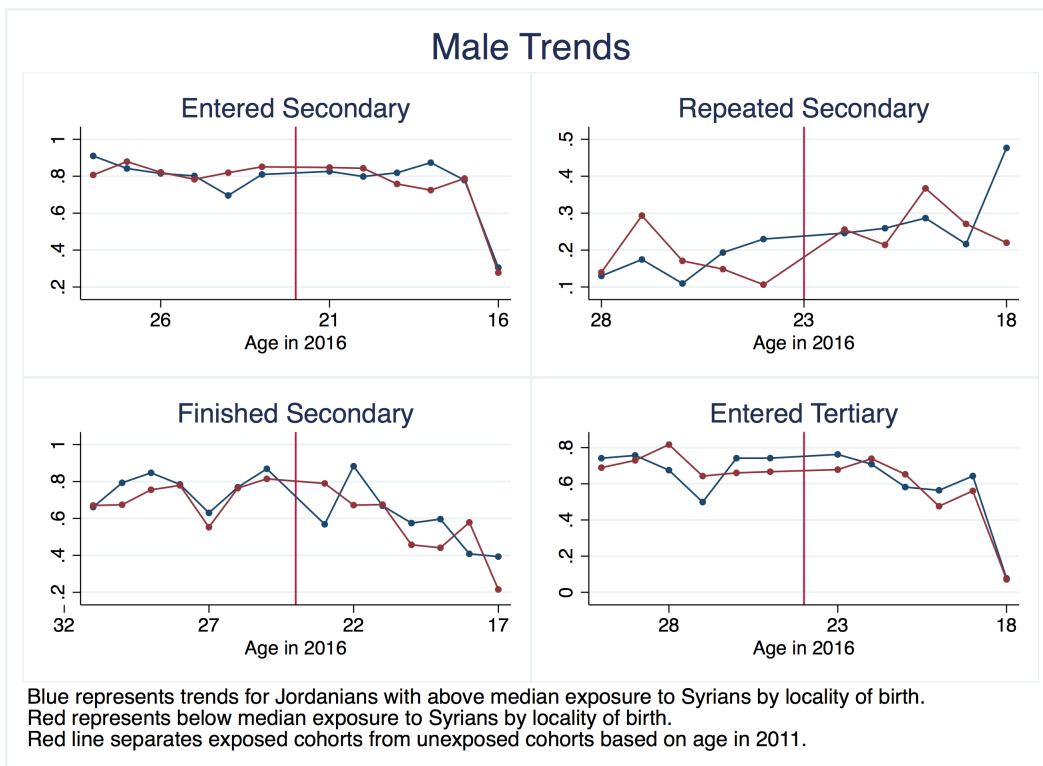Red line separates exposed cohorts from unexposed cohorts based on age in 2011.

Table 3: Effect of Exposure to Syrian Refugees on Enrollment in Basic School

	Dependent Variable = 1 if Ever Attended School			
	Proportion of Syrians at Locality Level			
	Males		Females	
	-1	-2	-3	-4
LABELS	Continuous	Quartile	Continuous	Quartile
Proportion Syrians X Born in or after 2005	-0.0707		0.0111	
	(0.0552)		(0.0335)	
Quartile Syrians X Born in or after 2005 = 2		0.00439		0.0111*
		(0.0102)		(0.00644)
Quartile Syrians X Born in or after 2005 = 3		0.00322		0.0078
		(0.0106)		(0.0114)
Quartile Syrians X Born in or after 2005 = 4		-0.023		0.00792
		(0.0205)		(0.0065)
Constant	0.982***	0.982***	0.991***	0.991***
	(0.011)	(0.0109)	(0.00685)	(0.0068)
Observations	3,501	3,501	3,396	3,396
R-squared	0.154	0.155	0.093	0.093
Birth Year FEs	Yes	Yes	Yes	Yes
Locality of Birth / School FEs	Yes	Yes	Yes	Yes
Mean Dep Var.	0.989	0.989	0.994	0.994

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Sample is restricted to Jordanians from JLMPS born in Jordan from 1998-2003 and 2005-2010. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 4: Effect of Exposure to Syrian Refugees on Years of Basic School Completed

				Dependent Variable = Years of Basic School Completed				
		Males			Females			
Level:	-1 Locality	-2 Locality	-3 School	-4 School	-5 Locality	-6 Locality	-7 School	-8 School
Proportion Syrians X Born in or after 1997	-0.301 (0.773)		1.494 (1.889)		-0.388 (0.344)		0.384 (0.928)	
Quartile Syrians X Born in or after 1997 = 2		-0.00708 (0.229)		-0.271 (0.18)		0.0264 (0.101)		-0.14 (0.115)
Quartile Syrians X Born in or after 1997 = 3		0.176 (0.173)		-0.145 (0.237)		0.205 (0.128)		-0.00862 (0.135)
Quartile Syrians X Born in or after 1997 = 4		0.0962 (0.23)		0.0007 (0.211)		-0.0605 (0.0726)		-0.076 (0.121)
Constant	9.446*** (0.149)	9.437*** (0.148)	9.488*** (0.168)	9.493*** (0.164)	9.568*** (0.149)	9.569*** (0.149)	9.477*** (0.163)	9.478*** (0.162)
Observations	5,521	5,521	4,497	4,497	5,434	5,434	4,531	4,531
R-squared	0.916	0.916	0.937	0.937	0.941	0.941	0.963	0.963
Birth Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality of Birth / School FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var.	7.037	7.037	7.114	7.114	7.081	7.081	7.105	7.105

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Sample is restricted to Jordanians from JLMPS born in Jordan from 1990-1995 and 1997-2010 who entered basic. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 5: Effect of Exposure to Syrian Refugees on Grade Repetition in Basic School

	Dependent Variable = 1 if Ever Repeated a Grade in Basic School							
	Males				Females			
	-1	-2	-3	-4	-5	-6	-7	-8
Level:	Locality	Locality	School	School	Locality	Locality	School	School
Proportion Syrians X Born in or after 1995	-0.0284		-0.0213		-0.0745		0.0211	
	(0.0537)		(0.108)		(0.0534)		(0.0788)	
Quartile Syrians X Born in or after 1995 = 2		-0.0142		-0.0116		-0.0291		-0.000149
		(0.0109)		(0.0166)		(0.02)		(0.0255)
Quartile Syrians X Born in or after 1995 = 3		-0.0149		-0.018		-0.0158*		-0.00589
		(0.0122)		(0.0136)		(0.00953)		(0.0302)
Quartile Syrians X Born in or after 1995 = 4		-0.00462		-0.0270*		-0.0179**		0.00933
		(0.0107)		(0.0159)		(0.00833)		(0.0254v)
Constant	0.0150**	0.0152**	0.0225*	0.0234*	0.0308	0.0308*	0.0419	0.0424
	(0.0071)	(0.00707)	(0.0128)	(0.0129)	(0.0195)	(0.0184)	(0.0332)	(0.0329)
Observations	5,733	5,733	4,682	4,682	5,585	5,585	4,667	4,667
R-squared	0.109	0.109	0.309	0.31	0.136	0.137	0.274	0.274
Birth Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality of Birth / School FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var.	0.0202	0.0202	0.0229	0.0229	0.0113	0.0113	0.0122	0.0122

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Sample is restricted to Jordanians from JLMPS born in Jordan from 1988-1993 and 1995-2009 who entered basic. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 6: Effect of Exposure to Syrian Refugees on Basic School Completion

| | Dependent Variable = 1 if Finished Basic School | | | | | | | |
| | Males | | | | Females | | | |
Level:	-1 Locality	-2 Locality	-3 School	-4 School	-5 Locality	-6 Locality	-7 School	-8 School
Proportion Syrians X Born in or after 1996	-0.343		-7.41E-05		-0.0676		0.253	
	(0.248)		(0.727)		(0.249)		(0.223)	
Quartile Syrians X Born in or after 1996 = 2		0.0283		-0.0755		0.0922**		-0.0286
		(0.0761)		(0.0864)		(0.042)		(0.0624)
Quartile Syrians X Born in or after 1996 = 3		0.0136		0.0258		0.0515		-0.0416
		(0.0552)		(0.0668)		(0.0371)		(0.0809)
Quartile Syrians X Born in or after 1996 = 4		-0.0303		0.0216		0.0171		0.00807
		(0.0603)		(0.0858)		(0.0456)		(0.0656)
Constant	0.860***	0.864***	0.905***	0.908***	0.946***	0.946***	1.004***	1.002***
	(0.0346)	(0.0344)	(0.041)	(0.0413)	(0.0216)	(0.0209)	(0.048)	(0.0477)
Observations	3,256	3,256	2,697	2,697	3,195	3,195	2,683	2,683
R-squared	0.279	0.279	0.542	0.543	0.302	0.304	0.584	0.585
Birth Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality of Birth / School FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var.	0.803	0.803	0.803	0.803	0.84	0.84	0.837	0.837

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Sample is restricted to Jordanians from JLMPS born in Jordan from 1989-1994 and 1996-2001 who entered basic. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 7: Effect of Exposure to Syrian Refugees on Basic School Grade

| | Dependent Variable = Standardized Grade in Basic School Examination | | | | | | | |
| | Males | | | | Females | | | |
Level:	-1 Locality	-2 Locality	-3 School	-4 School	-5 Locality	-6 Locality	-7 School	-8 School
Proportion Syrians X Born in or after 1996	0.516		-0.899		1.262**		0.81	
	(0.812)		(1.183)		(0.605)		(0.758)	
Quartile Syrians X Born in or after 1996 = 2		0.0687		0.34		0.0362		0.1
		(0.203)		(0.28)		(0.125)		(0.226)
Quartile Syrians X Born in or after 1996 = 3		0.128		0.433*		0.299**		0.111
		(0.144)		(0.242)		(0.138)		(0.273)
Quartile Syrians X Born in or after 1996 = 4		0.238		-0.00176		0.309***		0.284
		(0.152)		(0.254)		(0.115)		(0.231)
Constant	-0.115	-0.112	0.0237	0.0111	-0.0926	-0.0909	0.0304	0.021
	(0.102)	(0.101)	(0.164)	(0.153)	(0.0823)	(0.0817)	(0.137)	(0.136)
Observations	2,593	2,593	2,147	2,147	2,631	2,631	2,223	2,223
R-squared	0.2	0.201	0.548	0.553	0.228	0.231	0.558	0.559
Birth Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality of Birth / School FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var.	-0.18	-0.18	-0.196	-0.196	0.151	0.151	0.171	0.171

Notes: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ Sample is restricted to Jordanians from JLMPS born in Jordan from 1989-1994 and 1996-2001 who entered basic. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 8: Effect of Exposure to Syrian Refugees on Male Secondary School Outcomes

	(1) Ever Enrolled	(2) Vocational Track	(3) Repeated	(4) Finished	(5) Grade	(6) Any Tertiary
Proportion Syrians X Born after cutoff	0.415**	-0.738	0.221	0.361	0.245	-0.136
	(0.18)	(0.82)	(0.89)	(0.56)	(2.54)	(1.37)
Constant	0.852***	0.149***	0.206***	0.701***	-0.360**	0.747***
	(0.05)	(0.04)	(0.08)	(0.09)	(0.17)	(0.11)
Observations	2,260	1,816	1,552	2,088	838	1,113
R-squared	0.293	0.548	0.438	0.474	0.6	0.557
Birth Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
School FEs	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var.	0.766	0.17	0.238	0.632	-0.173	0.639

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Sample is restricted to Jordanians from JLMPS born in Jordan; exact cutoffs and samples depend on the dependent variable and range from 1985 to 1998. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 9: Effect of Exposure to Syrian Refugees on Female Secondary School Outcomes

|	(1) Ever Enrolled	(2) Vocational Track	(3) Repeated	(4) Finished	(5) Grade	(6) Any Tertiary
Proportion Syrians X Born after cutoff	-0.406**	-0.0801	-0.562	0.261	-0.761	0.00642
	(0.16)	(0.23)	(0.40)	(0.39)	(1.03)	(0.53)
Constant	0.824***	0.115***	0.0759*	0.857***	0.0945	0.782***
	(0.05)	(0.04)	(0.04)	(0.05)	(0.19)	(0.10)
Observations	2,331	2,033	1,747	2,256	1,124	1,483
R-squared	0.281	0.381	0.401	0.481	0.517	0.457
Birth Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
School FEs	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep Var.	0.826	0.0804	0.161	0.723	0.125	0.75

Notes: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ Sample is restricted to Jordanians from JLMPS born in Jordan; exact cutoffs and samples depend on the dependent variable and range from 1985 to 1998. Omitted categories are the old cohorts and the young cohorts in the lowest quartile of exposure to Syrians. Weighted according to sampling design. Standard errors clustered at the locality of birth. Source: Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). Data on the proportion of Syrians in an individual's locality of birth are computed from the Jordanian population census for 2015.

Table 10: Number and Distribution of Students by Nationality in Jordanian Public Schools, 2016/17

|	Number of Pub. Schools	Number of Students			Proportion of Students			Percent Syrian
		Jordanians 000s	Syrians 000s	Total 000s	Jordanians	Syrians	Total	
Basic								
Single shift	2,062	494	21	533	72%	23%	66%	4%
First of double shift	256	128	16	151	19%	17%	19%	11%
Second of double shift	303	63	56	124	9%	60%	15%	45%
All	2,621	686	93	808	100%	100%	100%	12%
Secondary								
Single shift	1,102	444	13	472	90%	39%	86%	3%
First of double shift	80	50	5	57	10%	15%	11%	9%
Second of double shift	33	1	15	17	0%	46%	3%	89%
All	1,215	496	33	546	100%	100%	100%	6%
All								
Single shift	3,164	938	34	1,005	79%	27%	74%	3%
First of double shift	336	179	21	208	15%	17%	15%	10%
Second of double shift	336	65	71	142	5%	56%	10%	50%
All	3,836	1,181	126	1,354	100%	100%	100%	9%

Source: Ministry of Education, Education Management Information System, 2016/17.

Figure 9: Proportion of Jordanian Students in Double Shift Basic Public Schools by Proportion of Syrian Students in a Sub-District, 2016/17
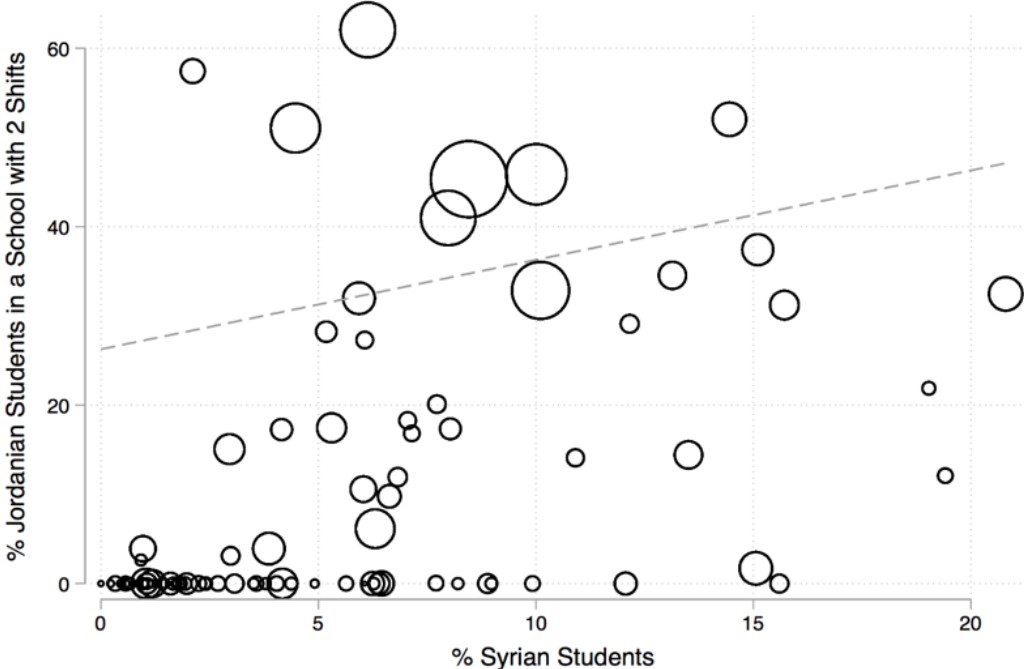
Source: Authors' calculations from data from EMIS, 2016/17 (ministry of Education 2017)
Note: The size of the circle indicates of the total number of students in a sub-district.
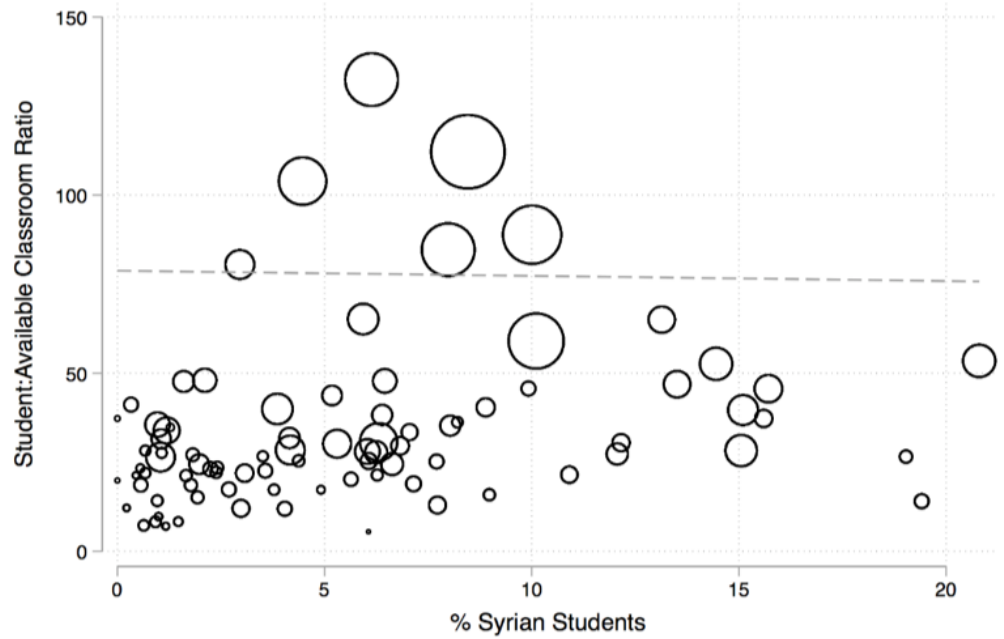
Figure 10: Average Student-Teacher Ratios vs. Proportion of Syrian Students in the Sub-district, 2016/17
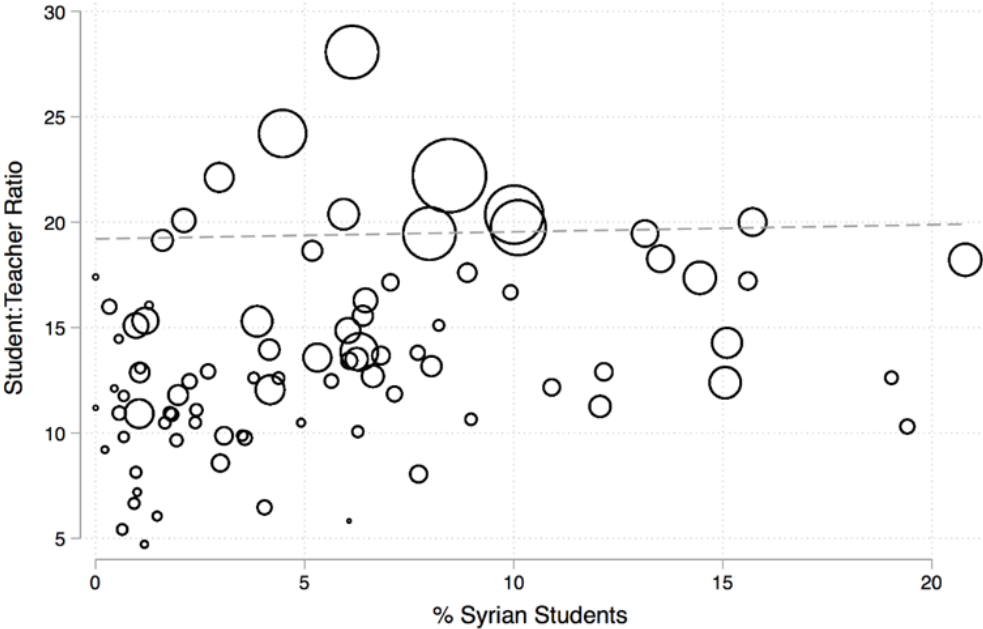
Source: Authors' calculations from data from EMIS, 2016/17 (ministry of Education 2017)
Note: The size of the circle indicates of the total number of students in a sub-district.

Figure 11: Students to Available Classroom Ratio vs Proportion of Syrian Students in Sub-district, 2016/17

Source: Authors' calculations from data from EMIS, 2016/17 (ministry of Education 2017)
Note: The size of the circle indicates of the total number of students in a sub-district.