Inequality of Education Attainment in Jordan: Patterns and Trends

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Abstract

There is substantial inequality in educational achievement in Jordan, but few studies examine its extent and the way forward to reduce inequality and achieve social mobility. This paper attempts to examine the sources and trends of inequality in educational outcomes in Jordan using Household Income and Expenditure Surveys (HIES) from 2008 to 2017. In addition, using the D-index and shapely decomposition, we model the sequential nature of attaining education to give an overall view of the influence of circumstances on child progression through schooling years. We find that inequality is high, especially with respect to transition from basic completion to secondary education and above. Parents' education, in particular fathers' education, and family financial resources are considered the main drivers of the inequality in the transition from basic to secondary and tertiary education levels. In the 2017 HIES wave, shapely decomposition shows an increasing gender gap over time where girls have lower completion rates compared to boys.

1. Introduction

Educational achievements are one of the most important cornerstones shaping youth's entire life course, including their social lives and careers. Yet, there are huge inequalities in educational attainment around the globe (Graetz et al., 2018; Ibourk and Amaghouss, 2012) that weaken people's functioning and capabilities and their ability to pursue a life of their choosing (Sen, 2007, 1990, 1994). Delving into the causes of inequality of educational achievement is therefore essential, particularly for developing countries, where welfare systems that can provide adequate education for the most vulnerable are either weak or absent (Abu-Ismail, 2019).

A decade ago, several revolutionary acts and coups called for such economic justice in the Middle East and North Africa (MENA) region. Recently, a decreasing trend of educational inequality has been observed in basic education, but less success has been achieved in tertiary education (Peragine et al., 2015). In that sense, understanding the determinants of inequality in educational opportunities and achievements is still a major concern for the region and has been the focus of several studies. Some authors argue that a family's wealth profile and educational background are critical factors (Rizk, 2019; Rizk, Abdel-Latif, and Staneva, 2019; Rizk and Hawash, 2020), while others argue that gender and regional characteristics (Shahateet, 2006) have been identified as main drivers explaining inequalities in educational achievement in the MENA region. Directing efforts to eliminate these sources of inequality in the short term is not an achievable goal for countries with limited resources. Tracking the drivers of the highest contributions to educational inequality is thus needed for more effective policymaking. This issue is particularly relevant because drivers of inequality seem not only to differ from one country to the other, but also depend on the level of education achieved at any given point in time.

To our knowledge, very few studies have attempted to conduct a comparative analysis of the drivers of inequality over different levels of schooling, at least for Jordan. Our main contribution uses the new wave of the Household Income and Expenditure Survey (HIES 2017) to examine the determinants of educational outcomes over the period 2008-2017. We use the Dissimilarity index (D-index), complemented by shapely decomposition, to highlight the most important drivers of inequality at each educational level. In assessing educational inequality at the tertiary level in Tunisia, Jordan, and Egypt, Krafft and Alawode (2018) used the D-index. However, since we focus on educational inequality at different levels of education, we additionally use the sequential logit (SQL) model, which is designed to model the sequential nature of educational attainment and assess the factors that influence the transition from one level of education to the next.

The paper demonstrates that there is substantial inequality in attaining different levels of education in Jordan over time. The inequality of primary completion is mainly attributed to parents' low educational background, which may be affecting children's educational outcomes

in terms of their learning. Furthermore, the inequality of attaining secondary education and above is also high; however, the main driver here is the household's wealth. Policies aimed at reducing inequality in secondary education should be designed to reduce the influence of the family's financial resources on inequality by providing higher cash transfers to children of poor families. This is an unsurprising result given the structure of the education system in Jordan, where the government does not subsidize tertiary education for all students.

This paper is organized as follows. Section 2 provides a comprehensive literature review. Section 3 describes the educational system in Jordan. Section 4 provides a description of our working sample, before we explain the approach and method we apply in section 5. In Sections 6 and 7, we discuss our results and conclude.

2. Inequality of outcomes in education: Theory and evidence

Inequality, a concept closely related to distributional analysis, boils down to two main views: inequality of outcomes and inequality of opportunities (UN-DESA, 2015). Inequality of opportunity (IOP) arises from circumstances beyond the individual's control such as parents' education and financial resources. In contrast, inequality of outcomes is related to individual effort such as time and effort spent on educational attainment (Peragine et al., 2015; Roemer, 1998). Much of the recent literature has focused on analysing IOP, out of the belief that inequalities arising from effort are socially desirable and acceptable. However, focusing only on IOP can be methodologically problematic for two main reasons. First, it is hard to account for unobserved circumstances and this can overestimate or underestimate the impact of the observable circumstances on existing inequalities. Second, it is difficult to disentangle the effects of circumstances from that of efforts (Ramos and Van de Gaer, 2016). Inequality of outcomes and opportunities suffer from reverse causality as they are closely related (Alazzawi and Hlasny, 2020; Rizk, 2019). This is particularly relevant in the literature on returns to education. For instance, children born in poor communities are usually the least informed about the benefits they can get from education, and so are also likely to exert less effort than children born in richer communities (Becker, 1962; Bredtmann and Smith, 2018; Jensen, 2010). Therefore, we prefer to focus on inequality of outcomes, which is comprehensive in both effort and circumstances. This means that, unlike the literature on IOP which uses school access and enrollment as the main dependent variable (Antoninis et al., 2020; Dorius, 2013), we attempt to explain the determinants of inequality using the highest educational level attained by Jordanian students from 2008 to 2017.

Globally, the main drivers of educational inequality vary across regions. For instance, in South Asia, educational inequality is attributed more to household wealth, gender, and ethnicities (Psaki, McCarthy, and Mensch, 2018; Rama et al., 2014; UNESCO, 2020), while in Africa, regional disparities gain the most attention for their growing impact on inequality (Graetz et al., 2018). For Arab countries, inequality of education is the highest in all aspects of human development (Abu-Ismail, 2019). Examining educational inequality in 11 MENA countries using Trends in International Mathematics and Science Study (TIMSS) scores and parametric decomposition techniques, Salehi-Isfahani, Hassine, and Assaad (2014) find that family and

community background are the main drivers of educational inequality. Ibourk and Amaghouss (2015) used a sample of 15 Arab countries and found a significant primary attainment gap for children from the lowest-income households residing in rural areas. In determining the main drivers of educational inequality in several MENA countries, Rizk, Abdel-Latif, and Staneva (2019) and Rizk and Hawash (2020) find that mothers' education is responsible for inequality of education, while Bouhlila (2017), using hierarchical linear models and a concentration index on four MENA countries, showed that school type and parents' financial and education background are the main drivers. Similarly, Assaad, Salehi-Isfahani, and Hendy (2019), using censored ordered probit to adjust estimates for those who still did not finish school, found high degrees of inequality in secondary school attainment for eight MENA countries. For higher education in Jordan, Tunisia, and Egypt, Krafft and Alawode (2018) showed that mothers' education is the main contributor to inequality and that the gender gap declined over time in the selected MENA countries. Likewise, using Gini coefficients, the Atkinson index and generalized entropy index, Shahateet (2006) showed that inter-governorate income inequality worsens educational inequality in Jordan. We complement this previous literature by observing inequality of outcomes in Jordan over time and using the most recent round of the Jordanian HIES of 2017. The novelty of this paper is that, unlike previous studies, we also introduce a new technique for measuring the sequential nature of educational systems, namely the SQL model: a model tailored to study educational achievements, which are defined as progressions attained by a set of transitions from one level to another. This model can thus disentangle the different sources and weights of inequality that may affect school progression (Buis, 2017).

3. The structure of the educational system in Jordan

Jordan guarantees free education from the pre-primary to the secondary level. Early childhood care and education (ECCE) commences at the age of three months up to the age of six and involves three stages: nursery for children aged between three months and four years, Kindergarten 1 (KG1) for children aged four, and Kindergarten 2 (KG2) for children aged five. The Ministry of Education covers KG2 while the other stages of ECCE are provided by private institutions regulated by the Ministry of Social Development.[3] However, starting 2017, the Ministry of Education began universalizing KG, and by 2025 it is expected to be accessible to all Jordanians. Basic education lasts for ten years and involves primary and lower secondary levels, followed by upper secondary levels, either vocational or academic, depending on the student's score in lower secondary examinations. Higher education in Jordan, which is either a two- or three-year diploma program or a four-year university-level program, depends on the examination scores gained in the "Tawjihi" program (high stake exams at the end of the secondary education track). Higher education is not free in Jordan and the tuition fees depend on both the type of program and a student's nationality (UNICEF, 2014a; b).

4. Data and sample characteristics

The paper relies on the 2008, 2010, 2013, and 2017 rounds of the Household Income, Expenditure, and Consumption Surveys (HIECS) for Jordan. The HIECS datasets are

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[3] https://www.jordantimes.com/opinion/editorial/access-pre-primary-education

nationally representative samples collected by the Department of Statistics (DOS) in Jordan and harmonized by the Economic Research Forum (ERF).[4] The four rounds of HIECS contain detailed information on individuals' demographics and educational background, in addition to household assets and parents' characteristics.

For all rounds of HIES used, we limit our sample to children living with their parents, aged between six and 25 years old. The data is grouped by individuals into Jordanians (83.17 percent) and non-Jordanians (16.8 percent) The highest level of education[5] attained is used as our main dependent variable. The variable is constructed using three categorical classes: no education, basic and secondary education, or higher education. No education[6] includes those who are illiterate and those who can read and write, while basic education includes those who attained primary and lower secondary education. Finally, due to very few numbers of observations of those continuing to college, we grouped together students who are in secondary and tertiary education.

Table 1 presents the sample sizes of the original and the working sample.[7] Our working sample, used to assess inequality of outcomes in education, are children aged six to 25 living with their parents. We focus on this group because this will avoid including children who do not live with their parents or are in their late 20s and are not in school, as they might differ in important characteristics from those living with their parents (Assaad, Salehi-Isfahani, and Hendy, 2019).

Table 1. Sample size for the original surveys and working sample (by sex)

Year	Overall (1)	Overall (2)	Overall (3)	Boys (4)	Girls (5)
2008	9,565	8,293	5,984	3,237	2,747
2010	9,402	8,094	5,749	3,062	2,687
2013	15,649	13,509	9,537	5,114	4,423
2017	27,458	23,467	16,707	8,978	7,729
Parental information	No	Yes	Yes	Yes	Yes
Age restriction	No	No	Yes	Yes	Yes

Column (1) shows the sample size of sons and daughters of the household head. Column (2) shows the sample size of children who live with their parents and the rounds of the HIES that have information on their parents' characteristics. Column (3) represents our working sample for children aged six to 25 living with their parents and column (4) and (5) dissects our working sample by gender.

Source: Authors' calculations using Jordanian HIES for 2008, 2010, 2013 and 2017.

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[4] https://erf.org.eg/erf-data-portal/
[5] HIES 2017 includes only children who have completed a certain level of education.
[6] With no certificate.
[7] Working sample is constructed for children who are aged six to 25 and are sons and daughters to the head of the household.

The paper analyzes the familial background of children aged six to 25 to examine the inequality of outcomes in education in Jordan from 2008 to 2017. We notice that most of the children in our working samples have mothers with basic education. Over the years, more children are born to mothers with basic education; their share has increased from 38 percent to 48 percent between 2008 and 2017. This increasing trend is opposed by a slight decrease in the share of mothers with no certificate at all from 2008 to 2017. Mothers with secondary education or higher maintained their share since 2008. Overall, mothers are becoming more educated over time.

The majority of children have fathers with basic education and their share increased from 43 percent in 2008 to 52 percent in 2017. There has been a steady decline in children with fathers with no certificate at all from 2008 to 2013, along with a slight two percent increase in 2017. There is an important decline in children whose fathers have a secondary education or higher from 38 percent in 2008 to 31 percent in 2017.

Regarding the gender profile of the children, the share of girls in school who attained secondary education or higher decreased from 51 percent in 2008 to 44 percent in 2017.[8] Regional compositions also show a changing trend and are classified into three main groups: (1) middle regions including Amman, Al-Balqa, Az-Zarqa, and Madaba; (2) northern regions including Irbid, Al-mafraq, Jerash, and Ajloun, and (3) southern regions including Al-Karak, Al-Tafilah, Maan, and Al-Aqaba. While the majority of the sample reside in the middle of Jordan, their share has experienced a decline over time from 68 percent in 2008 to 55 percent in 2017. This decline in the middle region was redistributed to the southern and northern regions. The share of children living in the south increased from nine percent in 2008 to 22 percent in 2017 and the north witnessed an increase in its share from 23 percent in 2008 to 31 percent in 2013 and a decline to 29 percent in 2017. Finally, with respect to the wealth quintiles, the share of children with secondary education or higher is highest among those in the highest quintiles but witnessed a decline from 38 percent in 2010 to 34 percent in 2017.

5. Methodology

We empirically model the probability of transition from one level of education to another as a function of individual circumstances with the SQL model. The model helps us study not only the characteristics of those who finish a certain level of schooling, but also the sequence of transitions between one level of schooling to the other, by estimating the relationship between the individual and family characteristics and the odds of passing each transition (Buis, 2011; Nagakura & Kobayashi, 2009). Figure 1 shows how children in the Jordanian education system face three transitions represented by a hierarchical set of "continue and stop" decisions: they can attend primary education (B) or opt for no education at all (A); if they opt for basic education (B), they can choose to leave the system or complete secondary education and above (C) (Buis, 2007).

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[8] Results from 2017 should, however, be taken with caution because they are right censored. That is, those who are still enrolled cannot be separated from those who have already finished school/ dropped out of the education system.

Figure 1. Simplified model of Jordanian education system
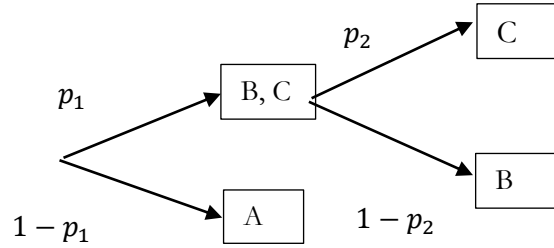
Source: (Buis 2017)

The SQL model is very useful in getting precise estimates on the effects of the child and family's background while controlling for educational expansion (Breen and Jonsson, 2005; Mare, 1981). First, it assumes that one must be at risk of passing a transition and can only make a decision about a transition if they have passed their previous level of education (Buis, 2017). Second, it minimizes confounding bias because it does not assume that each variable's effect is homogenous across different transitions. However, as with non-experimental design, the SQL model cannot eliminate omitted variable bias, such as unobserved personality traits and efforts. Eq. (1) shows that the probability p is related to the explanatory variables x, with the function $\gamma(.)$, such that $\gamma(.) = \frac{\exp(.)}{1+\exp(.)}$ (Buis, 2011).

$$\Pr(pass_{1,i} = 1 \,|\, x_{1i}, x_{2i}) = p_{1i} = \gamma(\beta_{01} + \beta_{11}x_{1i} + \beta_{21}x_{2i}) \tag{1}$$

$$\Pr(pass_{2,i} = 1 \,|\, x_{1i}, x_{2i}, pass_1 = 1) = p_{2i} = \gamma(\beta_{02} + \beta_{12}x_{1i} + \beta_{22}x_{2i}) \tag{2}$$

$$\Pr(pass_{3,i} = 1 \,|\, x_{1i}, x_{2i}, pass_2 = 1) = p_{3i} = \gamma(\beta_{03} + \beta_{13}x_{1i} + \beta_{23}x_{2i}) \tag{3}$$

To decompose changes in inequality of educational outcomes over time and estimate its main determinants, we rely on the D-index, which estimates a separate logistic model to predict the probability of completing a certain level of education, namely basic education and secondary education or higher, given a child's circumstances such as region, parents' education, wealth, and gender. This can be easily assessed using shapely decomposition (Deutsch, Pi Alperin, and Silber, 2018; Shorrocks, 2013). Shapely decomposition estimates the expected marginal contribution of any given source to inequality by estimating the difference between overall inequality and inequality obtained after eliminating a particular component (Sastre and Trannoy, 2002).

$$D = \frac{1}{2\bar{p}} \sum_{i=1}^{k} \alpha_i \,|p_i - \bar{p}| \tag{4}$$

Where

$$\overline{p} = \sum_{i=1}^{k} \alpha_i \ p_i \qquad\qquad\qquad\qquad\qquad (5)$$

In order to do so, there are three immediate determinants associated with constructing the D-index: p_i shows the predicted probability of a child completing a certain level of education; $|p_i - \overline{p}|$ is the absolute gap between a group specific circumstance and the overall mean, and finally, α_i the population share, where $\alpha_i = 1/n$ is defined as the sample weights (Barros et al., 2009). The D-index, which ranges from zero percent to 100 percent, is interpreted as the percentage of resources that should be redistributed from the better off group to the worse-off group, to make them equal (Krafft and Alawode, 2018). For sensitivity analysis, we repeated the SQL model using different variables of interest such as mother's education, gender, and household wealth. Similar and consistent results were found for different variables of interest.

6. Empirical results

Shapely decomposition

Figure 1. Shapely decomposition for basic and secondary education completion rates or higher, aged 6-25 (percentages)
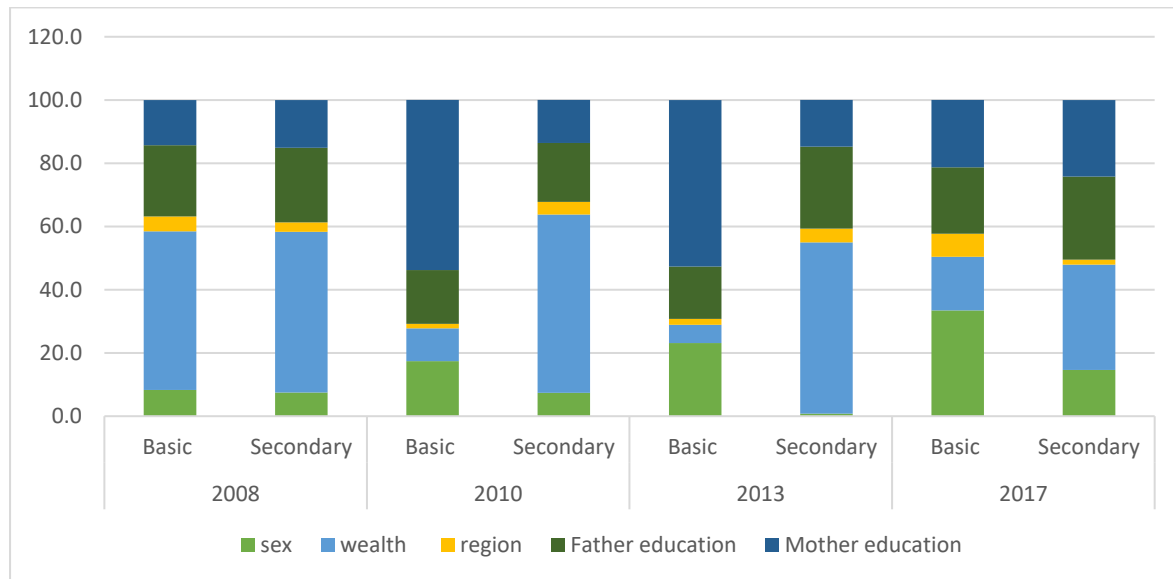
Source: Authors' calculations using Jordanian HIECS for 2008, 2010, 2013 and 2017.

In this section, we estimate the D-index and the shapely decomposition to quantify the changes in inequality of outcomes in education in Jordan and show how it changes over time. The D-index is rising for both basic and secondary education completion rates and is much larger for secondary education completion rates or higher as shown in Table 3. For basic education, the D-index witnessed a decline from 10.4 percent in 2008 to 5.5 percent in 2013 followed by a rise to 9.7 percent in 2017. Moreover, inequality of outcomes grew for secondary education completion or higher from 18.2 percent in 2008 to 21 percent in 2010 and then declined to 17.5 percent in 2013 and increased to 28.2 percent in 2017.

Shapely decomposition

Figure 1 further illustrates the main drivers of inequality in educational outcomes and shows how it varied over time. In 2008, inequality in basic education was related mainly to wealth (50 percent) and father's education (22.5 percent). In 2010, mother's education (53.8 percent), gender of the child (17.4 percent) and father's education (17 percent) were the main drivers of inequality. Also, mother's education (52.7 percent) and gender of the child (23.1 percent) continued to be primary determinates of inequality in 2013. In 2017, the gender gap was the largest contributor (33.5 percent), explaining the inequality in basic education and indicating that girls are not on equal terms with boys in education. Father and mother's education (21 percent) and wealth (17 percent) came in the second and third position to explain inequality in basic education. For secondary education, the main drivers of inequality are mainly: wealth, with the greatest share ranging from 51 percent to 56 percent; father's education (19 percent to 26 percent); and mother's education (14 percent to 15 percent) from 2008 to 2013. In 2017, inequality was mainly driven by wealth (33.3 percent), father's education (26.3 percent), mother's education (24 percent) and gender of the child (15 percent). Similar findings from previous studies found that parent's education and child's gender are major contributors to inequality of education (ESCWA-ERF, 2019; Krafft and Alawode, 2018).

SQL model results

The effects of a child's family background on their educational expansion over time in Jordan are represented in Tables 4-7 in the Appendix. The coefficient of each covariate is the odds ratio at each transition, as the SQL model can easily be interpreted as two separate logistic regressions with binary dependent variables (Barboza and Dominguez, 2016). In our case, the first transition is the decision to leave schooling or get at least basic education, while the second transition shows the completion of secondary education or higher versus completing only basic education. We start with father's education as a variable of interest to show its impact on the process of attaining education, as shown in Table 4. In 2008 and 2013, children with educated fathers had higher chances of completing basic education than children of uneducated fathers. The odds of children with educated fathers completing secondary education or higher are much lower than those whose fathers are illiterate, especially in 2017 relative to 2013 and 2008. With respect to the gender of the child, the odds of basic completion among girls are much higher than boys in 2013 and 2017. Nevertheless, when it comes to the transition from basic to secondary education or higher, girls are more likely to complete secondary education or higher. These results are consistent across years and regardless of the variable of interest, as shown in Tables 5, 6, and 7. Compared to the poorest wealth quintiles, the odds of children completing both transitions are monotonically declining with higher wealth quintiles. Similar results were found when using mother's education and household wealth as the main variables of interest. Mother's education mattered only in 2013 for children whose mothers completed only basic education. Those are more likely to complete the same grade level as their mothers when compared to children of illiterate mothers. Likewise, in 2017, mothers with higher education were more likely to help children finish at least secondary schooling when compared to illiterate mothers. Household region matters in 2017; the odds of children residing in the south completing secondary education or higher are lower than those who live in the middle.

Meanwhile, the odds of children completing secondary education or higher residing in the north are much higher than those who live in the middle.

We obtain the same results using different variables of interest. Table 5 shows the influence of mothers' education as a variable of interest. The results are similar to that of Table 4 for all the covariates and we observe that a mother's education does not have a meaningful impact on child progression from one school level to another. Table 6 shows the influence of household wealth quintiles on the school progression process; the odds of completion were the lowest for attaining basic and secondary education or higher for children belonging to the richest quintiles when compared to poorest quintiles. These results are consistent over years. In 2017, after controlling for the impact of wealth as an interest variable, we found that the odds of secondary and above completion for children whose mothers/fathers finished secondary education and above are lower than children with illiterate parents.

Table 7 controls for the gender of the child as a variable of interest. We constantly find that girls are more likely to complete secondary or higher education compared to boys. We also find that children residing in the north/south are less likely to complete secondary education or higher compared to those residing in the middle. Children with mothers with secondary education or higher are more likely to complete secondary education than children of illiterate mothers.

The last five rows of Tables 4-7 show the decomposition effect of each transition, when all variables are held constant at their mean. The weight indicator shows that the transition from being illiterate to choosing to pursue basic education is more important in affecting the equality of outcomes than the transition from basic to secondary education. This is with the exception of 2017, where the weight of the second transition is greater than the first when using wealth as the variable of interest (Table 6). Additionally, every child is at risk of not passing the first transition (equal to 1), but the probability of passing the first transition is always greater than the second one. The expected gains of passing the first transition are also increasing over time when compared to the second one.

7. Discussion and conclusion

This paper discusses the inequality of educational outcomes using four cross-sectional waves of the Jordanian HIECS. To track the changes and the sources of inequality in educational attainment, we used the D-index, complemented by the Shapley decomposition. In addition, the SQL model is used to handle the fact that many children in our sample are still attending school, except in the 2017 wave, and to account for changes in the probabilities of passing different transitions from one level of education to the next.

We find that overall inequality of educational outcomes has been widening over time in Jordan. We note from the D-index that inequality in secondary education and above is higher than basic completion across years. We also find that family's wealth and parents' education are the main

drivers of inequality. In addition, we find that the gender gap is higher in 2017 with lower completion rates for girls compared to boys, particularly for basic education.

Unlike previous research, we modelled the sequential nature of educational attainment while controlling for educational expansion in Jordan. We define educational transition through two transitions: from no certificate to basic education and from basic education to secondary education or higher. We observe that children with educated fathers are more likely to complete basic and secondary or higher education. We find, only in 2017, that children with mothers with secondary education and above are more likely to complete secondary education or higher compared to those with illiterate mothers. Compared to the poorest families, children who belong to the richest wealth quintiles are more likely to progress in school, in particular from basic to secondary education or higher. It is also noteworthy that girls have the highest share of completing secondary education or above compared to boys, which is commonly explained by boys having to work and earn income to support their families. Compared to boys, girls have lower basic completion rates, as they may be vulnerable to child marriage or family favoritism to invest more in boys' education.

A number of caveats may still affect our measurement of inequality of educational outcomes in Jordan. First, unlike other HIES waves,[9] the most recent wave in 2017 provided information on the child's highest level of education only for those who are not enrolled in school anymore. In previous waves, we have information for both children who left school and those who are still enrolled,[10] which can lead to overestimated results compared to other waves. However, this did not change the fact that inequality in Jordan increased over time because, in other cases, we find that inequality may be underestimated. To reduce the bias, we control for the important determinants for measuring inequality of education: namely, parents' education, financial resources, and gender of the child. Second, the 2017 HIES does not have proxies to measure the quality of education to assess the convergence for reducing gaps in enhanced and basic capabilities. This, in turn, affects a child's access to more advanced opportunities and is therefore necessary for creating further capabilities in life. Likewise, we cannot control for changes in the quality of education over time or across different educational transitions. Students of richer families may have greater opportunities to access private education with a smaller number of students per class and better learning techniques. Those two unobserved variables entail that our results will be underestimated. Third, the available 2017 survey data had no weights, which means that the estimation may not be generalizable to the overall Jordanian population. Fourth, the 2017 data does not allow us to assess the inequality of education for Jordanians and non-Jordanians, particularly refugees.

Despite these drawbacks, we focus on three main findings to suggest potential mechanisms to reduce the inequality of education in Jordan. First, our finding that inequality of outcomes is higher in secondary education and above is not surprising given the structure of the educational

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[9] Published by the ERF

[10] Keeping only those who are not enrolled will result in very few observations.

system in Jordan. Secondary education is not compulsory and is subject to passing a state exam, while tertiary education is not only optional, but also not fully subsidized by the government – as are lower levels of education. Richer families are therefore more capable of investing in their children's education at those higher levels. This explains why wealth stands as the most important determinant of inequality at this level; a family's wealth still plays a determining role in inequality of basic education. This is mainly because basic public education is of low quality, and more well-off families can allocate more money to private tutoring (Assaad and Krafft, 2015; Elamin, Rizk, and Adams, 2019), which has been seen as an important reason for progression in school. Particularly before the universalization of KG in 2017, richer families may have been more able to invest more in the pre-school level, and this could have a spillover effect on their completion of basic education. Conditional cash assistance targeting the least advantaged families to help their children progress at school could be a short-term viable solution to overcome the cost-related hurdles that may increase dropout rates for the poorest children. Improving the quality of education and schooling infrastructure will lead to greater access to quality learning and will result in reducing the inequality of education. Coming to the main driver of inequality of education, which is parents' education, the government can design programs to reduce illiteracy rates, particularly for adults, as they potentially help their kids in schoolwork (Krafft and Alawode, 2018). Finally, our findings that girls in Jordan are less likely to complete basic education compared to boys sheds light on a negative phenomenon, which is child marriage or family favoritism to invest more in boys' education rather than than girls' education. Additionally, compared to boys, the probability of girls transitioning from basic to secondary education and above are higher, as boys from the less educated and the poorest families are more likely to drop out earlier from school to support their families (Assaad, Krafft, and Salehi-Isfahani, 2018; Rizk, 2019). Women's participation rate in the Jordanian labor market is considered the lowest in the world, despite their progression in education (Assaad, Krafft, and Caitlyn Keo, 2019). Finding effective ways to incentivize married women in particular to participate in the labor market is therefore necessary to achieve the most benefit out of the investments in Jordanian human development.

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Table 2. Characteristics of the working sample over time (percentages)

	2008				2010				2013				2017			
	No educ.	Basic	Second.	Total	No educ.	Basic	Second.	Total	No educ.	Basic	Second.	Total	No educ.	Basic	Second.	Total
Gender																
Males	58	61	49	56	52	58	50	54	51	57	52	54	51	70	56	62
Female	42	39	51	44	48	42	50	46	49	43	48	46	49	30	44	38
Regions																
Middle	75	61	68	64	59	59	67	60	45	44	50	46	50	44	55	49
North	17	25	23	24	27	27	24	26	35	35	31	34	29	32	24	29
South	8	14	9	12	14	14	10	13	20	21	19	20	21	24	20	22
Wealth quintiles																
1st wealth quintile	45	23	10	18	27	24	12	23	24	24	12	22	42	23	6	22
2nd wealth quintile	24	21	15	19	16	20	11	17	19	19	14	18	22	25	16	22
3rd wealth quintile	20	23	16	20	23	21	20	21	21	20	20	20	16	22	21	20
4th wealth quintile	11	18	23	20	19	17	19	18	20	19	21	20	12	19	22	18
5th wealth quintile	1	16	36	23	15	18	38	21	17	18	32	21	9	12	34	18
Father education																
No educ.	57	22	14	19	12	20	18	17	11	19	17	15	20	20	10	17
Basic	32	48	35	43	51	50	36	48	58	53	43	53	56	59	40	52
Secondary or higher	12	30	52	38	37	30	45	36	31	28	40	32	24	22	50	31
Mother education																
No education	58	35	27	32	16	33	30	26	14	30	32	24	24	27	17	23
Basic	32	41	33	38	48	44	36	44	49	43	36	44	48	53	40	48
Secondary or higher	9	24	41	30	36	23	34	30	37	26	32	32	28	20	43	29
Observations	76	1,985	1,281	3,342	2,879	3,534	1,685	8,098	5,266	5,451	2,763	13,480	1,576	3,404	2,163	7,143

Table 3. D-index and shapely decomposition for basic and secondary education or higher, aged 6-25 (percentages)

	Basic education	Secondary or higher	Basic education	Secondary or higher	Basic education	Secondary or higher	Basic education	Secondary or higher
Year	2008		2010		2013		2017	
D-index	10.4	18.2	6.9	21.0	5.6	17.5	9.7	28.3
St. Deviation	2.7	4.0	2.4	5.0	2.0	3.9	2.0	3.9
Shapely								
sex	8.3	7.5	17.4	7.4	23.1	0.8	33.5	14.6
wealth	50.1	50.8	10.4	56.4	5.8	54.2	16.9	33.3
region	4.7	3.0	1.4	4.0	1.9	4.3	7.3	1.6
Father education	22.6	23.6	17.0	18.6	16.5	25.9	21.0	26.3
Mother education	14.3	15.1	53.8	13.6	52.7	44.8	21.3	24.2

Source: Authors' calculations using Jordanian HIECS for 2008, 2010, 2013 and 2017.

Table 4. Estimates for sequential logit with father's education as variable of interest

Variables	2008 Basic education	2008 Secondary or higher	2010 Basic education	2010 Secondary or higher	2013 Basic education	2013 Secondary or higher	2017 Basic education	2017 Secondary or higher
Gender								
female	1.150	1.560***	0.931	1.50***	0.857***	1.172***	0.560***	2.029***
	(0.298)	(0.127)	(0.052)	(0.116)	(0.037)	(0.070)	(0.034)	(0.128)
Region								
North	2.419***	1.144	0.908	0.974	0.925	0.865**	1.024	0.673***
	(0.784)	(0.117)	(0.060)	(0.090)	(0.045)	(0.060)	(0.0727)	(0.049)
South	5.614***	0.878	0.837**	0.8575	0.982	1.061	1.058	2.278*
	(3.003)	(0.122)	(0.074)	(0.112)	(0.057)	(0.086)	(0.084)	(0.267)
Family Wealth								
2nd wealth quintile	2.775***	1.766***	1.516***	1.184	1.368***	1.526***	2.940***	2.277***
	(0.976)	(0.272)	(0.136)	(0.177)	(0.094)	(0.172)	(0.246)	(0.267)
3rd wealth quintile	2.286***	1.891***	1.860***	2.025***	1.655***	2.080***	4.236***	3.173***
	(0.776)	(0.285)	(0.166)	(0.282)	(0.118)	(0.234)	(0.392)	(0.372)
4th wealth quintile	4.483***	3.067***	1.984***	2.21***	1.744***	2.00***	5.682***	3.562***
	(2.092)	(0.469)	(0 .185)	(0 .315)	(0.124)	(0.225)	(0.588)	(0.426)
5th wealth quintile	27.637***	5.044***	3.282***	3.990***	2.579***	3.296***	8.910***	7.250***
	(28.813)	(0.799)	(0.334)	(0.573)	(0.196)	(0.370)	(1.061)	(0.895)
Mother Education								
Basic education	1.020	0.669***	0.475***	0.591***	1.368***	0.687***	0.643***	0.718***
	(0.326)	(0.078)	(0.040)	(0.064)	(0.093)	(0.060)	(0.054)	(0.062)
Secondary and higher	1.074	0.870	0.317***	0.858	1.655***	0.818**	0.387***	1.232**
	(0.526)	(0.124)	(0.033)	(0.112)	(0.118)	(0.084)	(0.041)	(0.126)
Father Education	2.778***	1.348***	0.941	1.043	1.744***	1.151**	1.104	1.652***
	(0.682)	(0.100)	(0.047)	(0.070)	(0.125)	(0.063)	(0.061)	(0.0899)
Constant	1.654	0.132***	2.668***	0.182***	2.578***	0.173***	1.930***	0.066***
	(0.659)	(0.024)	(0.322)	(0.031)	(0.197)	(0.024)	(0.219)	(0.010)
Decomposition Effect:								
weight	0.0687	0.152	0.245	0.097	0.25	0.108	0.242	.0957
	(0.021)	(0.014)	(0.010)	(0.009)	(0.009)	(0.008)	(0.010)	(0.0081)
at risk	1	0.939	1	0 .7	1	0.7	1	.704
	.	(0.019)	.	(0.020)	.	(0.016)	.	(.019)
variance	0.0571	0.162	0.210	0.139	0.21	0.154	0.208	0.136
	(0.017)	(0.014)	(0.008)	(0.013)	(0.006)	(0.011)	(0.008)	(0.011)
gain	1.2	1	1.17	1	1.19	1	1.16	1
	(0.024)	(.)	(0.019)	(.)	0.017	(.)	(0.016)	(.)
Pr (Passing)	0.939	0.203	0.700	0.166	0.7	0.191	0.704	0.162
	(0.020)	(0.024)	(0.020)	(0.019)	(0.016)	(0.017)	(0.019)	(0.016)

Table 5. Estimates for sequential logit with mother's education as variable of interest

Variables	2008 Basic education	2008 Secondary or higher	2010 Basic education	2010 Secondary or higher	2013 Basic education	2013 Secondary or higher	2017 Basic education	2017 Secondary or higher
Gender								
female	1.169	1.562***	0.933	1.503***	0.857***	1.171***	0.557***	2.018***
	(0.303)	(0.128)	(0.053)	(0.116)	(0.037)	(0.070)	(0.033)	(0.127)
Region								
North	2.392***	1.161	0.914	0.980	0.926	0.865**	1.032	0.668***
	(0.778)	(0 .119)	(0.061)	(0.091)	(0.045)	(0.0599)	(0.073)	(0.048)
South	5.801***	.861	0.855*	0.892	0.999	1.491	1.057	0.874*
	(3.105)	(0.120)	(0.075)	(0.116)	(0.058)	(0 .168)	(0.083)	(.0690)
Family Wealth								
2nd wealth quintile	2.862***	1.690***	1.532***	1.202	1.350***	2.035***	2.962***	2.292***
	(0.961)	(0.260)	(0.138)	(0.180)	(0.092)	(0.228)	(.2482)	(0.268)
3rd wealth quintile	2.232***	1.839***	1.855***	1.968***	1.628***	2.035***	4.259***	3.172***
	(0.761)	(0.276)	(0.165)	(0.271)	(0.116)	(0.227)	(0.395)	(0.371)
4th wealth quintile	4.952***	2.953	1.997***	2.184***	1.737***	1.982***	5.665***	3.512***
	(2.348)	(0.451)	(0.186)	(0.400)	(0.124)	(0.223)	(0.586)	(0.420)
5th wealth quintile	32.93***	4.953	3.243***	3.751***	2.551***	3.220***	8.724***	7.329***
	(34.54)	(0.784)	(0.331)	(0.536)	(0.195)	(0.361)	(1.035)	(0 .905)
Father Education								
Basic education	4.031***	0.942	0.739***	0.655***	0.719***	0.767***	0 .986	0.906
	(1.287)	(0.120)	(0.067)	(0.077)	(0.052)	(0.075)	(0.085)	0.089
Secondary and above	5.213***	1.55	0.805***	0.937	0.856*	1.092	1.198	2.029
	(2.520)	(0.234)	(0.085)	(0.126)	(0.072)	(0.123)	(0.133)	(0.228)
Mother Education	1.013	0.958	0.582*	0.982	0.644***	0.959	0.6233	1.197
	(0.233)	(0.068)	(0.029)	(0.065)	(0.024)	(0.050)	(0.033)	(0.062)
Constant	4.080***	0.202	4.435***	0.197***	3.605***	0.229	3.701	0.103
	(1.542)	(0.035)	(0.525)	(0.032)	(0.335)	(.0302)	(0.419)	(0.0146)
Decomposition Effect:								
weight	0.180	0.107	0.281	0.078	0.286	0.083	0.274	.0658
	(0.036)	(0.014)	(0.007)	(0.009)	(0.006)	(0.007)	(0.005)	(.00673)
at risk	1	0.807	1	0 .584	1	0.58	1	.584
	.	(0.050)	.	(0.0247)	.	(0.020)	.	(.0226)
variance	0.156	0.0307	0.243	0.134	0.244	0.143	0 .243	0.113
			(0.004)	(0.014)	(0.003)	(0.012)	(0.004)	(0.011)
gain	1.16	1	1.16	1	1.17	1	1.13	1
	(0.022)	.	(0.020)	.	(0.017)	.	(0.014)	.
Pr (Passing)	0.807	0.157	0.584	0.159	0.58	0.173	0.584	0.129
	(0.05)	(0.022)	(0.584)	(0.020)	(0.020)	(0.018)	(0.023)	0.014

Table 6. Estimates for sequential logit with wealth as variable of interest

Variables	2008 Basic Education	2008 Secondary and higher	2010 Basic Education	2010 Secondary and higher	2013 Basic Education	2013 Secondary and higher	2017 Basic Education	2017 Secondary and higher
Gender								
female	1.182	1.564***	0.932	1.499***	0.858***	1.171***	0.561***	2.007***
	(0.306)	(0.128)	(0.053)	(0.115)	(0.036)	(0.070)	(0.034)	(0.126)
Region								
North	2.274***	1.144	0.917	0.024	0.930	0.871**	1.035	0.680***
	(0.738)	(0.117)	(0.061)	(0.045)	(0.045)	(0.060)	(.073)	(.049)
South	5.329***	0.837	0.830**	0.980	0.980	1.056	1.064	.861*
	(2.846)	(0.116)	(0.074)	(0.057)	(0.057)	(0.085)	(0.083)	(.068)
Mother Education								
Basic education	0.870	0.709***	0.503***	0.649***	0.478***	0.766***	0.709***	.812**
	(0.287)	(0.084)	(0.044)	(0.073)	(0.033)	(0.069)	(0.060)	(.072)
Secondary and above	1.206	0.895	0.323***	0.885	0.369***	0.864	0.410***	1.320***
	(0.614)	(0.127)	(0.033)	(0.115)	(0.029)	(0.864)	(0.042)	(0.136)
Father Education								
Basic education	3.922***	1.028	0.777***	0.731*	0.795***	0.834*	.998	1.071
	(1.295)	(0.136)	(0.072)	(0.089)	(0.059)	(0.084)	(0.088)	(0.109)
Secondary and above	5.038***	1.634***	0.826*	0.973	0.910	1.153	1.219*	2.240***
	(2.425)	(0.249)	(0.087)	(0.132)	(0.077)	(0.132)	(0.134)	(.254)
Wealth	1.797***	1.460***	1.300***	1.397***	1.233***	1.296***	1.715***	1.514***
	(0.220)	(0.051)	(0.030)	(0.046)	(0.021)	(0.032)	(0.046)	(0.380)
constant	2.611	0.143	2.224***	0.149***	2.174	0.194***	1.532***	.113***
	(0.821)	(0.022)	(0.234)	(0.021)	(0.181)	(0.022)	(0.144)	
								(0.013)
Decomposition Effect:								
weight	.071	0.206	.182	0.17	0.205	0.169	.136	.174
	(0.018)	(0.009)	(.0125)	(0.009)	(.0106)	(0 .007)	(.01)	(0.008)
at risk	1	0.943	1	0.83	1	0.804	1	0.879
	.	(0.016)	.	(0.014)	.	(0.0127)	.	(.010)
variance	0.054	0.218	.141	0.206	0.157	0.21	.107	.198
	(0.014)	(0.009)	(0.009)	(0.010)	(0.007)	0.008	(0.008)	(.009)
gain	1.32	1	1.29	1	1.3	1	1.27	1
	(.027)	.	(0.024)	.	(0.021)	.	(0.020)	.
Pr (Passing)	0.943	0.322	0.83	0.289	0.804	0.299	.879	.272
	(0.016)	(0.026)	(0.014)	(0.024)	(0.013)	0.021	(0.010)	.020

Table 7. Estimates for sequential logit with gender as variable of interest

Variables	2008 Basic Education	2008 Secondary and higher	2010 Basic Education	2010 Secondary and higher	2013 Basic Education	2013 Secondary and higher	2017 Basic Education	2017 Secondary and higher
Gender								
female	1.161	1.558***	0.932	1.501***	0.857***	1.170***	0.557***	2.013***
	(0.301)	(0.127)	(0.052)	(0.116)	(0.036)	(0.070)	(0.034)	(0.127)
Region								
North	2.411***	1.162	0.914	0.988	0.930	0.872**	1.028	0.678***
	(0.784)	(0.119)	(0.061)	(0.092)	(0.045)	(0.061)	(0.073)	(0.049)
South	5.762***	0.860	0.841	0.864	0.982	1.056	1.060	0.861*
	(3.084)	(.1193)	(0.075)	(0.112)	(0.057)	(0.085)	(0.084)	(0.068)
Family Wealth								
2nd wealth quintile	2.898***	1.736***	1.542***	1.218	1.380***	1.524***	2.956***	2.321***
	(0.975)	(0.267)	(0.140)	(0.183)	(0.095)	(0.172)	(0.247)	(0.272)
3rd wealth quintile	2.270***	1.910***	1.874***	2.062***	1.676***	2.109***	4.258***	3.252***
	(0.776)	(0.288)	(0.168)	(0.287)	(0.120)	(0.237)	(0.395)	(0.382)
4th wealth quintile	4.934***	3.022***	1.996***	2.233***	1.754***	2.019***	5.674***	3.613***
	(2.336)	(0.464)	(0.186)	(0.319)	(0.125)	(0.228)	(0.588)	(0.434)
5th wealth quintile	31.874***	4.981***	3.231***	3.878***	2.549***	3.260***	8.820***	7.339***
	(33.43)	(0.791)	(0.330)	(0.562)	(0.195)	(0.367)	(1.051)	(0.909)
Mother Education								
Basic education	0.870	0.710***	0.500***	0.642***	0.473***	0.751***	0.676***	0.811***
	(0.289)	(0.084)	(0.044)	(0.072)	(0.033)	(0.069)	(0.058)	(0.073)
Secondary and above	1.139	0.881	0.324***	0.880	0.367***	0.854	0.392***	1.301**
	(0.573)	(0.126)	(0.033)	(0.115)	(0.029)	(0.089)	(0.041)	(0.135)
Father Education								
Basic education	4.276***	1.056	0.771***	0.074***	0.794***	0.835*	0.955	1.051
	(1.426)	(0.141)	(0.072)	(0.090)	(0 .060)	(0.084)	(0.086)	(0.108)
Secondary and above	5.186***	1.664	0.819*	0.973	0.908	1.149	1.184	2.203***
	(2.484)	(0.255)	(0.087)	(0.132)	(0.077)	(0 .131)	(0.132)	(0.251)
Constant	3.619	0.129***	2.937	0.145***	3.018***	0.198***	4.046***	0.067
	(1.600)	(0.025)	(0.375)	0.030	(0.304)	(0.028)	(0.497)	(0.010)
Decomposition Effect:								
weight	0.178	0.129	.24	0.12	.249	0 .113	0.264	0.082
	(0.028)	(0.0131)	(.0116)	(0.010)	(0.009)	(.0082)	(0.007)	(0.007)
at risk	1	0.818	1	0.726	1	0.706	1	0.643
	.	(0.036)	.	(0.020)	.	(0.017)	.	(0.020)
variance	0.149	0.158	0.199	0.165	0.207	0.16	0.229	0.128
	(0.023)	(0.014)	(0.009)	(0.013)	(0.007)	(0.011)	(0.006)	(0.011)
gain	1.200	1	1.21	1	1.2	1	1.15	1
	(0.024)	.	(0.023)	.	(0.018)	.	(0.016)	.
Pr (Passing)	0.818	0.196	0.726	0.209	0.706	0.2	0.643	0.151
	(0.036)	(0.024)	0.020	0.023	(0.017)	(0.018)	(0.020)	0.016