

What's the Value of a Degree? Evidence from Egypt, Jordan, and Tunisia

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Abstract

The Middle East and North Africa region has the world's lowest returns to education. This paper examines what the value of a degree is using nationally representative labour market surveys from Egypt (2012), Jordan (2010), and Tunisia (2014). Specifically, we estimate Mincer models for levels and years of schooling. We find that returns are highest in Tunisia and lowest in Egypt, although all three countries fall short of the global average. Higher education is where returns are greatest. We also analyse the returns by sub-groups: sex, age group, and sector. The returns are higher for women than men in Egypt. The younger generation has lower returns than the older generation in Egypt. The private sector in Egypt and Tunisia has lower returns than the public sector. One reason for the low returns is that many individuals are overeducated relative to position requirements.

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Introduction

The Middle East and North Africa (MENA) region has made great strides in expanding access to education (Campante and Chor 2012; World Bank 2008). Expanding schooling and thus increasing human capital is expected to generate increased individual wages—as well as contributing to economic growth. However, in MENA there has not been the expected payoff following the rapid expansion in education. GDP growth rates, wages, and female labour force participation have not increased as expected with the accumulation of greater human capital (Assaad et al. 2018; Said 2015; World Bank 2013a). The expansion of schooling in MENA coupled with poor education quality and weak labour market conditions has led to countries creating graduates with irrelevant skills (Campante and Chor 2012; World Bank 2008, 2013a). MENA countries fall short in producing jobs for educated workers at the same rate as they are graduating.

To better understand the returns to schooling in MENA, this paper provides estimates, using new data, of the private return to schooling in three countries: Egypt, Jordan, and Tunisia. The data are informative of the labour market after the Arab Spring in Egypt and Tunisia. The results show important divisions across sector (public versus private), generation, and sex in the labour market. We present returns for both years and levels due to substantial non-linearities. We find that in Egypt, Jordan and Tunisia, returns to education rise substantially starting at the post-secondary level. Overall, Tunisia has the greatest rate of return of 8.1% for an additional year of schooling. Although Tunisia has the greatest returns compared to Jordan and Egypt, all three countries fall short of the global average of 8.8% (Psacharopoulos and Patrinos 2018). Women have greater rates of return than men in Egypt, but this is likely due to women's selective participation in work. Additionally, private sector returns are lower than those in the public

sector in Egypt and Tunisia. The older generation has greater returns than the younger generation, significantly so in Egypt.

The paper is organized as follows. Section 2 reviews the literature on the returns to education globally and in MENA as well as providing background on country education systems. Section 3 describes the methods and data used. Section 4 presents the results. Section 5 discusses and concludes.

Background

Returns to education around the globe

Human capital—the skills, abilities, and knowledge that increase productivity—should pay off in the labour market as higher wages (Becker 1962). The increase in wages from education is typically termed the ‘return to education.’ There are trade-offs in making this investment. Choosing school entails substantial opportunity costs; during that time young people are not working and thus are forgoing income. They (or their families) may also have to make substantial private complementary investments, for instance in tutoring, textbooks, and transportation (e.g. Assaad and Krafft 2015a; Buckner and Hodges 2016; Rizk and Abou-Ali 2016; Sobhy 2012). As well as indicating human capital, education may signal workers’ underlying ability or other favourable characteristics (Weiss 1995). Thus, returns to education may be over-estimated if education is signalling otherwise unobserved characteristics.

The return to education is an important incentive in the decision to forgo work and wages now, while studying, to earn more in the future. The average return to an additional year of schooling internationally is 8.8%. This means that with each additional year an individual attends school, they will, on average, experience an 8.8% increase in wages (Psacharopoulos and

Patrinos 2018). The global return has been falling slightly over time (Montenegro and Patrinos 2014; Psacharopoulos and Patrinos 2004).

Returns to education in MENA

The MENA region suffers from the lowest returns to schooling, most recently estimated at 5.7% (Psacharopoulos and Patrinos 2018). Table 1 presents past studies' comparable estimates of rates of return to education (per year of schooling) for Egypt, Jordan, Tunisia, and the MENA region. Estimates are presented both overall and separated by level. In some cases, estimates are available only for men.

The most recent estimates for returns to education in Egypt were 3.4% using 2010 data (Rizk 2016) and 5.4% from 2006 data (Salehi-Isfahani, Tunali, and Assaad 2009). The estimate for Jordan in 2002 was 8.9%. The estimate for Tunisia in 2001 was 8.5% (Montenegro and Patrinos 2014) and a more recent estimate using 2010 data was a 6.9% return (Rizk 2016). Both Egypt and Tunisia appear to have experienced declining returns over time. Our work uses more recent data, from after the Arab Spring in Egypt and Tunisia. In addition, our study generates comparisons across sexes, sectors, and generations.

Why are returns low in MENA?

Low returns to education in MENA have been attributed to low productivity of education due to a combination of low education quality (Bouhlila 2011; Rugh 2002), high population growth rates, and volatile economies (World Bank 2008). Individuals with similar education in MENA may receive different returns depending on skill (mis)match. Informal employees are often over-educated in their positions and therefore face a lower return to education, despite their attainment (Sadeq 2014).

The quality of education is one factor in low returns. While education enrolment has been expanding in MENA, quality has not kept pace with development (Chapman and Miric 2009;

Heyneman 1997). Both pedagogical challenges, such as rote memorization, and curricular problems, such as irrelevant vocational education, have contributed to low quality (Antoninis 2001; Heyneman and Gill 1997; World Bank 2008). As a result, MENA countries perform very poorly on international assessments of learning (Mullis et al. 2015). Low quality has contributed to diminished returns (World Bank 2008). Decreasing quality over time (Chapman and Miric 2009) may further diminish returns.

Education growth has been very rapid in MENA. Among the twenty countries with the fastest growth in years of schooling from 1980-2010, nine were in MENA. These expansions include a 4.4-year increase in schooling for Egypt and a 4.1-year increase for Tunisia (Campante and Chor 2012). Population growth has also been substantial with the ‘youth bulge’ generation entering the work force, further increasing labour supply pressures (Assaad and Krafft 2015b). The rapid expansion of education and population without complementary economic improvements may be one of the reasons returns are low.

The returns to education are determined by the relative supply and demand for more versus less educated labour. Demand for educated labour, in the human capital framework, should be closely related to any increased productivity conferred by education. However, in the context of MENA, several labour market imperfections may disrupt this relationship. First and foremost is the historical development of the region’s education systems as, primarily, providers of credentials for government bureaucrats. In such a context, credentials, rather than skills, were the key outcome of education. Education was required to access lucrative government employment, leading to a dual labour market structure. Particularly where public sector employment was guaranteed for the educated, queuing in the unemployed state to obtain a government job was the norm (Assaad 2014c, 1997; Salehi-Isfahani 2012). An emphasis on credentials, rather than skills, persists in the education system as a result of this legacy (Assaad,

Krafft, and Salehi-Isfahani 2017; Barsoum 2017). Although public sector employment guarantees no longer exist, the higher pay and substantial benefits of the public sector mean that it remains the preferred employer of the educated (Barsoum 2015; Said 2015).

In the private sector, social connections (*wasta*) play a key role in obtaining employment. In Egypt, 55% of youth report that jobs are obtained by *wasta* 'to a large extent' and only 2% said *wasta* had no role in obtaining jobs (Roushdy and Sieverding 2015). Throughout MENA, the majority of youth agreed that *wasta* is critical to getting a job (Krishnan et al. 2016). Although *wasta*'s role may be greatest among the less educated, social networks play a role in job access even for higher education graduates (Assaad and Krafft 2014; Assaad, Krafft, and Salehi-Isfahani 2017; Barsoum 2004; World Bank 2013a). This labour market dysfunction means that sub-optimal matching of workers and positions is occurring, reducing efficiency especially for skilled jobs. It also means that jobs (and wages) depend less on education.

Education Systems

Most children in Egypt's education system begin at age six, starting with six years of primary schooling followed by three years of preparatory (Figure 1), which together comprise basic education. After completing preparatory, either vocational or general secondary is selected largely based on the student's test scores. Both vocational and general secondary are usually three years in length. Typically, general secondary will provide students with the opportunity to pursue higher education after completion (Assaad 2013). The next step for a vocational secondary graduate is to enter the workforce. Post-secondary institutes (two years), higher institutes (four years, but less prestigious) and university are all higher education options. Not shown in the figure (or subsequent figures) are post-graduate programs (master's and higher), which vary in length. Throughout, these programs are analysed with university education.

Displayed in Figure 1, Jordan's education system begins with ten years of basic education and continues with two years of secondary in academic (more common) or vocational studies. After secondary, a student can attend either a post-secondary institute for two years or a university for four, depending on their secondary scores (Buckner and Hodges 2016).

Tunisia has basic education for children aged 6 to 16. Similar to Egypt, Tunisian basic education students typically enrol in both the primary level (six years) and preparatory level (three years). As illustrated in Figure 1, students choose to enrol in either a vocational or, more commonly, general secondary education where both may pursue higher education upon completion. Higher education is more common for general secondary graduates and may be short-cycle university (two-three years) or long cycle (four years).

Access to education has expanded substantially over time in all three countries. Figure 2 shows the percentage of individuals that achieved each education level by age. We restrict the figure to ages 25-54 so individuals will have achieved their final educational attainment. There is a greater proportion of low education levels for the older age groups. In Egypt, the most common level of education for ages 45 and older is no education (around 30%). In Jordan and Tunisia, having some schooling but less than basic is the most common status among 50-year-olds, approximately 30% in Jordan and 35% in Tunisia. Although lower education levels are dominant in each country, secondary (especially in Egypt) and university levels are more common for younger age groups. For 25-year-olds in Egypt, just over 40% have attained secondary education. In Jordan and Tunisia, basic education is the most common (around 40%) for 25-year-olds. Overall, there have been rapidly increasing levels of education across countries.

Methods & Data

Methods

Initially, we use descriptive statistics to examine the relationship between education and wages. We then use the standard Mincer model (Equation 1) to explain wages as a function of years of schooling and experience. Log hourly wages ($\ln(W)$) for individual i are a function of a constant (α), years of schooling (S), and years of experience (E). Years of experience squared are included to represent the potentially non-linear relationship between experience and wages, since returns to experience tend to diminish. α is the log wage for someone without experience or schooling, and ε_i is the error term—what we cannot observe or explain. We are particularly interested in β , the coefficient on years of schooling, which is interpreted as the return to schooling: the percentage change in wages for an additional year of school. The returns we estimate are private: the individual's wage benefits. Because of data limitations, we cannot estimate the social return (with externalities).

$$\ln(W_i) = \alpha + \beta S_i + \gamma E_i + \delta E_i^2 + \varepsilon_i \quad (\text{Equation 1})$$

The standard Mincer equation (Equation 1) assumes a constant return to each year of school. Estimating this linear model allows us to compare average returns on a global and regional scale. However, returns may vary by level of education.

In the Mincer equation with levels (Equation 2), L_{ij} represents the dummy variable for each level of j levels, for instance, secondary. The dummy variables represent six levels of education: none (the omitted category), less than basic education, basic education, secondary, post-secondary, and university. The β_j coefficient is estimated as the cumulative return to education for a level.

(Equation 2)

$$\ln(W_i) = \alpha + \sum_j \beta_j L_{ij} + \gamma E_i + \delta E_i^2 + \varepsilon_i$$

We also present marginal earnings effects, the return to a level compared to the preceding level. For instance, the marginal earnings effect of secondary versus basic is calculated as $\beta_3 - \beta_2$. The number of years varies within each level, so we annualize marginal earnings effects into rates of return by dividing the marginal earnings effects by the difference in the mean number of years of schooling between the two education levels being compared (Psacharopoulos 1994). Both the linear and levels specifications, as in equations 1 and 2, are standard in the literature (see, for example, Montenegro and Patrinos 2014; Rizk 2016; Salehi-Isfahani, Tunali, and Assaad 2009).⁵ Almost all the studies shown in Table 1 use the Mincer model either in linear or levels terms.

Further, we control for differences between key groups and interact those groups with education to examine how returns vary (Equation 3).

(Equation 3)

$$\begin{aligned} & \ln(W_i) \\ &= \alpha + \sum_j \beta_j L_{ij} + \eta F_i + \theta G_i + \kappa P_i + \sum_j \lambda_j L_{ij} * F_i + \sum_j \mu_j L_{ij} * G_i \\ & \quad + \sum_j \nu_j L_{ij} * P_i + \gamma E_i + \delta E_i^2 + \varepsilon_i \end{aligned}$$

⁵ Although authors sometimes add additional controls to the model, doing so precludes comparable estimates (Montenegro and Patrinos 2014). The Mincerian model is intentionally parsimonious in order to avoid over-correcting for factors that are correlated with education (e.g. occupation).

Here F denotes a dummy for female, G denotes a dummy for the younger generation, and P denotes a dummy for the public sector. The coefficients η , θ , and κ represent the main effect of sex, generation, and sector, namely the effect for the omitted (none) category. The coefficients λ_j , μ_j , and ν_j on the interactions show how returns to different levels vary by sex, generation, or sector, after accounting for the main effects of sex, generation, or sector. If the interactions are near zero or insignificant, this would mean that returns do not vary across sex, generation, or sectors. Keeping the reference category in mind is important for interpretation; here it is an older (prime-age) generation, private sector man with no education.

While the Mincer equation can be used to estimate the private returns to education, the findings are not causal and can be misleading, especially when applied to developing countries (Card 1999; Glewwe 1996). One factor that could lead to overestimated returns is unobserved ability, generating bias due to more able individuals progressing further in school and earning more because of their ability—not necessarily their education. It is also common to find measurement error in years of schooling, especially in developing countries, which leads to an underestimated rate of return for education. Ability bias and measurement error may, in fact, cancel each other out (Krueger and Lindahl 2001). As in our study, data collected on earnings are typically limited to wage-earners and leave out the self-employed. Because the self-employed generally have a lower return, excluding this population may lead to over-estimated returns (Glewwe 1996). Selection into employment may further bias estimates, on top of selection into wage work (Asadullah 2006). Those with higher earning potential may select into employment; this is particularly a problem for women, who have low rates of participation in the labour market in MENA (Assaad, Krafft, and Selwaness 2017). As well as certain groups being excluded from our estimates and thus generating bias, the inclusion of government workers may result in distorted estimates. Wages received by such employees better reflect government salary

policies than individuals' productivity. Although some studies globally have found similar returns to the global average with causal identification strategies (Duflo 2000), other studies, including one from Egypt, find lower returns (Krafft 2018). It is important to keep these multiple potential caveats in mind when considering return estimates.

Data

Three similar surveys are used as data sources for this research: the Egypt Labor Market Panel Survey (ELMPS) of 2012 (OAMDI 2013), the Jordan Labor Market Panel Survey (JLMPS) of 2010 (OAMDI 2014), and the Tunisia Labor Market Panel Survey (TLMPS) of 2014 (OAMDI 2016).⁶ All are nationally representative household surveys, with detailed demographic, education, and labour market data for all individuals within each household. The surveys were carried out by the Economic Research Forum (ERF) in partnership with local implementing statistics agencies.⁷ For our analysis sample, we focus on the age group of 20-54 because these are prime working ages. We include ages 20-25 in this sample to capture early career wages. We included both sexes to compare differences. We only include wage workers, because the return to education is measured based on wage data.⁸

⁶ See Assaad and Krafft (2013) for more information on the ELMPS 2012. See Assaad (2014b) for further details on the JLMPS 2010. See Assaad, Ghazouani, Krafft, and Rolando (2016) for information about the TLMPS 2014.

⁷ All are publicly available from ERF at <http://www.erfdataportal.com/index.php/catalog>

⁸ In our sample of ages 20-54, among men the probability of being a wage worker rises moderately with education, from 61% for those with no education to 75% for university graduates in Egypt, from 49% to 73% in Jordan, and fluctuates in Tunisia, from 52% to 45% from none to university graduates. For

Wages are measured in hourly terms (2012 real PPP international dollars) and include overtime, bonuses, profit sharing, and any other pay. We use real PPP international dollars so that wages can be compared across countries, since the value of local currencies does not translate across country borders. Experience is defined as age minus total years of schooling with six years deducted (the typical age at which a child begins school). Years of schooling is the total number of years an individual completed in school. The level of schooling is the greatest level someone completes, falling into one of six possible categories: none, less than basic, basic education, secondary, post-secondary, or university. We mapped out the educational pathways of the three countries and combined levels to create appropriate sample sizes, and to make comparisons to one another. Specifically, we combined primary and preparatory in Egypt and Tunisia to compare to Jordan's basic education. Additionally, we combined general and vocational secondary into one level to create the secondary level. Individuals with no schooling ('none') are used as the comparison group in our regressions. Individuals characterized as less than basic did not complete any level of formal education (although they did complete at least one year of school). In our sub-group analyses, we examine differences by age group, sex, and sector. Age groups in our sample are divided between the young and prime age. Young are ages 20-34 and prime age are ages 35-54. These age groups roughly indicate those older adults who would have started work before structural reforms and the decline of the public sector, and those younger adults who faced an increasingly privatized and informal landscape (Assaad 2014a;

women, there is a much stronger education gradient, from 3% of women being wage workers if they have no education to 42% if university graduates in Egypt, from 5% to 47% in Jordan, and 6% to 37% in Tunisia.

Assaad and Krafft 2015c). Work falls into two different sectors, public (including state-owned enterprises) or private.

Results

Descriptive Analyses

In Figure 3, we analyse the relationship between hourly wages and years of schooling, and the differences by sex in each country. There is an increase in wages for Jordan and Tunisia past ten years of schooling, which signifies completion of basic and secondary education. In Egypt, however, additional years of schooling do not have a substantially higher wage until completion of tertiary education (around year 14). There is a noticeable decrease in wages for some groups around eight to nine years of schooling, which may reflect individuals who drop out before completing basic education. These are likely individuals who flunk out of school based on their examination scores. Tunisia has the steepest slope beyond basic education, which indicates that the reward for additional education past this level is comparatively large. Wages rise sharply past year 12, starting at the post-secondary level (around year 14); individuals who pursue a university education (around year 16) will almost double their hourly wage (\$8.9) compared to those that stop at post-secondary (\$4.7). In Egypt, the greatest increase in hourly wages is between post-secondary and university going from \$1.8 to \$2.5 on average, although men earn more than women. Jordan's education system has a consistent increase in wages until reaching \$6.5, the hourly wage for individuals obtaining university education. In Jordan, men tend to earn more than women.

In Table 2, we explore the relationship between education and self-reported education requirements of jobs. These data are only available for Egypt and Tunisia. When individuals are overeducated or working at a job that requires less education than their attainment, this may

reduce their returns to education (Hartog 2000; Li, John Morgan, and Ding 2008). Men are more overeducated than women. Approximately half the time males are overeducated in Egypt (52%) and Tunisia (46%), while 17% of females in Egypt and 31% of females in Tunisia are overeducated. This may be because men historically had more access to education than women, or because women select out of work. Individuals with moderate levels of education are particularly likely to be overeducated. More than half of individuals who completed a basic education are overeducated across countries and sex (50%-81%). Those with a university degree have the lowest rate of overeducation (6%-22% across countries and sex).

Standard Mincer model

For international benchmarking purposes and to generate the average return to a year of schooling, we estimate the standard Mincer model in Table 3. Tunisia has the greatest return to education with an 8.1% increase in wages for each additional year of school. Jordan has a 7.7% return, whereas Egypt's return is almost half as much at 4.6%. Recall the global average return to education is around 8.8% and thus all three countries fall short.

Mincer model with levels

In our Mincer models with levels, we present the coefficients of the model, which are the cumulative returns. We also present the marginal earnings effects, comparing a level to the preceding level. Further, we present rate of return estimates by annualizing marginal earnings effects to facilitate comparisons across levels. In Table 4, we first present 'simple' models, with just level and experience (i.e. Equation 2). Then we control for sex, age group, and sector and present their interactions with education level (i.e. Equation 3, the 'interacted model'). Main effects and interactions can be added to assess any combination of characteristics, remembering the underlying reference case of a man with no education, aged 35-54, working in the private

sector, for interpretation.⁹

The lowest marginal earnings effects tend to be found for less than basic versus no education; those coefficients are all statistically insignificant in the simple model. Starting with basic education, all other education level main effects are both significant and increasing with level, as expected. University versus secondary education has the greatest marginal earnings effect with the highest being 87.6% (17.8% annually) in Tunisia for the simple model. Jordan and Tunisia both have rates of return over 10% for an additional year beginning at the post-secondary level. Egypt, however, does not reach a rate of return of 10% for an additional year in the simple model and only has above a 10% return for university in the interacted model.

In Egypt, women earn significantly less (48.3%) than men for the reference case (a prime age, no education, private sector worker). In Egypt, the basic through university female interactions are significant and positive but only partially compensate for the female wage penalty main effect. These interactions mean that women experience larger changes in earnings with increasing education. However, women consistently earn less than men (for the reference case) albeit to a diminishing extent with more education.

⁹ For example, to compare the returns to secondary education across the public and private sector in Tunisia: First, the coefficient on secondary of 0.395 means that a private sector worker with a secondary education earns 39.5% more than a private sector worker who has no education. Second, the coefficient on public of 0.018 means that a worker who has no education earns 1.8% more in the public than private sector. Third, the interaction of 0.465 for secondary and public means that a secondary educated worker in the public sector earns 46.5% more (a higher return) on top of the secondary and public effects. The coefficients can be added; a secondary educated worker in the public sector earns 87.8% more ($0.395+0.018+0.465=0.878$) than a private sector worker with no education.

Only in Egypt is the age (younger) main effect for the reference (no education male in the private sector) significant and positive. Having no education has become less common across generations, so this is an increasingly select group. There are significant negative interactions between age and education in Egypt starting at the secondary level. This result means returns to the younger generation are substantially lower. The rate of return to secondary has decreased 5.0 percentage points across generations (from 6.5% to 1.5% per year) in Egypt. The rate of return to university has decreased 3 percentage points across generations (from 10.5% to 7.5% per year) in Egypt. The lower return for younger Egyptians may reflect shifting public sector pay scales and hiring practices, as there has been massification of secondary education, leaving higher education as the elite degree.

Although the main effect for the public sector in Egypt is negative and statistically significant, meaning that uneducated workers in the public sector earn less, the interactions with education levels demonstrate the lucrative earnings of the public sector for educated individuals in Egypt. Within the public sector, a post-secondary education earns a 68.5% premium. Returns to education in the public sector compared to private are significantly higher in Tunisia as well, but not Jordan. For example, the rate of return to university increases 5.5 percentage points moving from the private to the public sector (from 13.6% to 19.1% per year) in Tunisia.

In the interacted models, while the simultaneous controls help address omitted variable bias, they also mask the effect of compositional changes between categories. For example, because the younger generation in Egypt has less access to public sector jobs (Assaad and Krafft 2015c), they face a steeper decrement in returns compared to the older generation than the full interacted model suggests. Modelling only the generational interactions with education (without sex or sector) demonstrates this (model not shown). Likewise, because women work disproportionately in the public sector (Assaad & Krafft, 2015c), where returns are higher, the

fully interacted model in Egypt shows smaller differentials between sexes than a model interacting only sex with education (without generation or sector) (model not shown). The potential for these sorts of compositional changes must be kept in mind when considering the results of the interactions, which simultaneously control for sex, sector, and generation.

Discussion and Conclusions

This paper examined the returns to education in Egypt, Jordan, and Tunisia. Overall, returns are lower than global averages in all three countries and especially in Egypt, where average returns are half the global average. Returns are non-linear; we found that returns increased substantially starting at the post-secondary level. In Egypt, the older generation has greater returns to education than the younger generation. Women also have greater rates of return than men in Egypt. The public sector has higher returns than the private sector in Egypt and Tunisia, particularly at the secondary and higher education levels.

There are a number of potential limitations to these analyses, limitations common to estimating returns to education. First and foremost, these estimates are not causal. Omitted variables, such as ability or social connections (*wasta*) may be correlated with both education and wages, biasing estimates. Our data rely on wage workers, who are a select group in the labour market. Selection into wage work is likely driving the results for women, as educated women who face low wages select out of the labour market. Thus, despite increases in education, female labour force participation in MENA remains the lowest of any region (Assaad et al. 2018; World Bank 2013b). Our estimates are only as good as the data; measurement error in education

can bias, likely attenuate, estimated returns.¹⁰ However, since the vast majority of the returns to education literature suffers from these same problems, the relative returns in MENA may nonetheless be informative.

Our estimates are notably low compared to global estimates, although consistent with low and declining returns from past studies (Table 1). Why are returns to education in the region persistently low? One possible explanation is the unique evolution of the supply and demand for skilled workers in the MENA region. The supply of educated workers expanded rapidly while the demand for educated workers remained relatively stagnant. As a result, while wages for uneducated workers remained relatively constant, wages for educated workers fell, reducing the return to education.

The MENA region experienced rapid increases in access to education, with Egypt, Jordan, and Tunisia among the top 20 countries for growth in years of schooling from 1980-2010 (Campante and Chor 2012). In other contexts, shifts in the supply of skilled labour have been shown to depress the returns to education (Manacorda, Sanchez-Paramo, and Schady 2010; Pritchett 2001). However, increases in education and the supply of skilled workers do not necessarily mean that wages must fall. In fact, returns to education may rise even as education expands. The change in returns depends on labour demand and how demand for educated (skilled) labour relates to shifts in supply (Birdsall, Ross, and Sabot 1995). Skill-biased technological change, where production tends towards increasingly skilled labour, could increase returns even during education expansions (Acemoglu and Autor 2011).

¹⁰ However, comparisons of education reporting across ELMPS waves show at least good consistency for the classifications we use (Assaad, Krafft, and Yassin 2018).

However, in the countries we examine it appears that the educated labour supply has outpaced demand. Egypt, in particular, appears to be struggling with declining returns to education across generations with increases in supply of educated labour without equivalent demand (Assaad and Krafft 2015b; c; Krafft 2018). As education access increases, without increases in demand for educated labour, education loses value. This problem of overeducation has occurred in other countries, including the West Bank and Gaza (Angrist 1995), and China (Li, John Morgan, and Ding 2008).

Given the low (and in Egypt, declining) returns observed in MENA, what actions should policymakers take? Initially, there should be an adjustment in education investment policy. Further expansion of education, without demand for educated labour, will only generate lower returns. Recently, rapid expansion of higher education, without labour demand for the highly educated in Tunisia led to an unemployment crisis (Assaad, Ghazouani, and Krafft 2017; Assaad and Krafft 2016). Instead of focusing on expanding education systems, there should be a shift in focus to improving education quality, and particularly its relevance to the labour market. While they are over-educated, MENA youth also lack both the hard and soft skills sought by employers (World Bank 2013a). Reforms are necessary to address this mismatch between graduates' skills and the demand for skills in the labour market. However, shifting the skills conferred by the education system will only improve returns to the extent that there is unmet labour demand for those skills.

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Tables

Table 1. Past studies' returns to education estimates (rates of return, percentages)

	Study	Survey year	Returns			
			Total	Primary	Secondary	Tertiary
MENA region	Montenegro & Patrinos (2014)	Multiple	7.3	16.0	4.5	10.5
	Psacharopoulos & Patrinos (2018)	Multiple	5.7			
Egypt	Wahba (2001)	1988	7.8			
	Psacharopoulos & Patrinos (2004)	1997	5.2			
	World Bank (2008)	1988§		5	6	9
	Salehi-Isfahani, Tunali, & Assaad (2009)	1988§	5.2			
	World Bank (2008)	1998§		5	6	8
	Salehi-Isfahani, Tunali, & Assaad (2009)	1998§	4.9			
	Salehi-Isfahani, Tunali, & Assaad (2009)	2006§	5.4			
	Rizk (2016)	2010	3.4	2.1	3	9.2
Jordan	World Bank (2008)	1997§		3	4	7
	Psacharopoulos & Patrinos (2018)	2001	6.7			
	World Bank (2008)	2002§		2	4	9
	Montenegro & Patrinos (2014)	2002	8.9	10.3	4.2	8.4
Tunisia	Psacharopoulos (1994)	1980	8		13#	27#
	Montenegro & Patrinos (2014)	2001	8.5	12.3	8.1	17.4
	Rizk (2016)	2010	6.9	4.7	1.2	9.7

Source: Studies are noted with the year of their publication. Year of survey data noted in 'survey year'

Notes: Estimates are generated using the Mincer equation (total) or the extended Mincer equation (levels), unless otherwise noted

§ Males only

'Full' method private returns

Table 2. Percentage of Wage Workers Overeducated Relative to their Job Requirements, by Level of Education, Sex and Country, Ages 20-54

	<u>Egypt</u>		<u>Tunisia</u>	
	Male	Female	Male	Female
None	0.0	0.0	0.0	0.0
Less than basic	82.5	77.6	66.8	64.6
Basic	80.6	70.8	56.5	49.8
Secondary	57.4	12.7	34.7	19.4
Post-Secondary	53.3	41.7	28.5	23.8
University	22.1	9.5	10.1	5.5
Total	52.1	17.2	46.0	30.6
N	7466	1658	1654	520

Source: Authors' calculations based on ELMPS 2012, TLMPS 2014

Table 3. Standard Mincer Model, Ages 20-54

	Egypt	Jordan	Tunisia
Years of School	0.046*** (0.002)	0.077*** (0.003)	0.081*** (0.005)
Experience	0.030*** (0.003)	0.014*** (0.004)	0.035*** (0.007)
Experience sq./100	-0.032*** (0.006)	0.001 (0.011)	-0.042** (0.013)
Constant	-0.616*** (0.031)	-0.040 (0.057)	-0.292** (0.096)
N	9107	4491	1329
R-squared	0.093	0.111	0.210

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, TLMPS 2014

Notes: *p<0.05; **p<0.01; ***p<0.001

Robust (Huber/White/sandwich estimator) standard errors in parentheses

Table 4. Mincer models with levels: coefficient estimates, marginal earnings effects, and rates of return, by country, ages 20-54

	<i>Egypt</i>		<i>Jordan</i>		<i>Tunisia</i>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
Education level (None omit.)						
Less than Basic	0.024 (0.033)	0.016 (0.051)	0.172 (0.092)	0.255* (0.123)	0.059 (0.062)	0.065 (0.085)
Basic	0.135*** (0.031)	0.116* (0.056)	0.331*** (0.090)	0.291* (0.120)	0.222** (0.071)	0.212* (0.090)
Secondary	0.305*** (0.028)	0.386*** (0.051)	0.455*** (0.092)	0.392** (0.127)	0.612*** (0.083)	0.395* (0.164)
Post-Secondary	0.426*** (0.040)	0.432*** (0.083)	0.607*** (0.094)	0.659*** (0.140)	1.074*** (0.092)	1.034*** (0.164)
University	0.669*** (0.030)	0.801*** (0.060)	0.965*** (0.091)	1.147*** (0.129)	1.488*** (0.102)	1.065*** (0.184)
Experience	0.038*** (0.003)	0.018*** (0.004)	0.018*** (0.004)	0.013** (0.005)	0.049*** (0.007)	0.039*** (0.010)
Experience sq./100	-0.052*** (0.006)	-0.002 (0.008)	-0.022 (0.012)	-0.015 (0.013)	-0.073*** (0.014)	-0.050** (0.017)
Female (male omit.)						
Female		-0.483*** (0.087)		0.244 (0.310)		-0.207 (0.108)
Female int.						
Less than Basic # Female		-0.075 (0.149)		-0.518 (0.320)		-0.041 (0.144)
Basic # Female		0.308* (0.130)		-0.676* (0.316)		-0.091 (0.126)
Secondary # Female		0.326***		-0.437		0.091

	<u>Egypt</u>		<u>Jordan</u>		<u>Tunisia</u>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
		(0.094)		(0.320)		(0.148)
Post-Secondary # Female	0.263*		-0.373		0.201	
	(0.114)		(0.317)		(0.158)	
University # Female	0.308***		-0.271		0.048	
	(0.093)		(0.313)		(0.186)	
Age group (35-54 omit.)						
20-34	0.208***		0.027		0.032	
	(0.056)		(0.155)		(0.128)	
Age 20-34 int.						
Less than Basic # 20-34	-0.006		-0.087		0.168	
	(0.066)		(0.174)		(0.133)	
Basic # 20-34	-0.056		-0.057		0.123	
	(0.066)		(0.156)		(0.135)	
Secondary # 20-34	-0.261***		0.015		0.020	
	(0.059)		(0.161)		(0.183)	
Post-Secondary # 20-34	-0.239**		-0.116		-0.256	
	(0.085)		(0.166)		(0.187)	
University # 20-34	-0.379***		-0.192		-0.020	
	(0.066)		(0.162)		(0.209)	
Public (private omit.)						
Public	-0.512***		0.202		0.018	
	(0.081)		(0.181)		(0.135)	
Public int.						
Less than Basic # Public	0.341**		-0.029		-0.092	
	(0.105)		(0.194)		(0.156)	
Basic # Public	0.462***		0.147		0.081	

	<u>Egypt</u>		<u>Jordan</u>		<u>Tunisia</u>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
		(0.099)		(0.185)		(0.164)
Secondary # Public		0.561***		0.045		0.465*
		(0.085)		(0.190)		(0.187)
Post-Secondary # Public		0.685***		-0.000		0.315
		(0.106)		(0.193)		(0.181)
University # Public		0.600***		-0.202		0.735***
		(0.089)		(0.188)		(0.219)
Constant	-0.531***	-0.418***	0.362***	0.337*	-0.090	-0.022
	(0.035)	(0.065)	(0.094)	(0.133)	(0.098)	(0.180)
N (Observations)	9106	9106	4491	4491	1319	1284
R-squared	0.102	0.128	0.118	0.162	0.252	0.319

Marginal Earnings Effects

	<u>Egypt</u>		<u>Jordan</u>		<u>Tunisia</u>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
Education level (None omit.)						
Less than Basic vs. None	0.024	0.016	0.172	0.255	0.059	0.065
Basic vs. Less than Basic	0.111	0.100	0.159	0.036	0.163	0.147
Secondary vs. Basic	0.170	0.270	0.124	0.101	0.390	0.183
Post-Secondary vs. Secondary	0.121	0.046	0.152	0.267	0.462	0.639
University vs. Secondary	0.364	0.415	0.510	0.755	0.876	0.670
Female int.						
Less than Basic vs. None		-0.075		-0.518		-0.041
Basic vs. Less than Basic		0.383		-0.158		-0.050
Secondary vs. Basic		0.018		0.239		0.182
Post-Secondary vs. Secondary		-0.063		0.064		0.110
University vs. Secondary		-0.018		0.166		-0.043

Age 20-34 int.

	<u>Egypt</u>		<u>Jordan</u>		<u>Tunisia</u>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
Less than Basic vs. None		-0.006		-0.087		0.168
Basic vs. Less than Basic		-0.050		0.030		-0.045
Secondary vs. Basic		-0.205		0.072		-0.103
Post-Secondary vs. Secondary		0.022		-0.131		-0.276
University vs. Secondary		-0.118		-0.207		-0.040
Public int.						
Less than Basic vs. None		0.341		-0.029		-0.092
Basic vs. Less than Basic		0.121		0.176		0.173
Secondary vs. Basic		0.099		-0.102		0.384
Post-Secondary vs. Secondary		0.124		-0.045		-0.150
University vs. Secondary		0.039		-0.247		0.270

Rates of return

	<u>Egypt</u>		<u>Jordan</u>		<u>Tunisia</u>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
Education level (None omit)						
Less than Basic vs. None	0.006	0.004	0.030	0.044	0.013	0.014
Basic vs. Less than Basic	0.031	0.028	0.037	0.008	0.054	0.049
Secondary vs. Basic	0.041	0.065	0.052	0.042	0.080	0.038
Post-Secondary vs. Secondary	0.066	0.025	0.102	0.179	0.165	0.229
University vs. Secondary	0.092	0.105	0.132	0.196	0.178	0.136

Female int.

Less than Basic vs. None		-0.019		-0.089		-0.009
Basic vs. Less than Basic		0.107		-0.037		-0.017
Secondary vs. Basic		0.004		0.099		0.037
Post-Secondary vs. Secondary		-0.034		0.043		0.039
University vs. Secondary		-0.005		0.043		-0.009

Age 20-34 int.

	<u><i>Egypt</i></u>		<u><i>Jordan</i></u>		<u><i>Tunisia</i></u>	
	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>	<i>Simple</i>	<i>Interacted</i>
Less than Basic vs. None		-0.002		-0.015		0.036
Basic vs. Less than Basic		-0.014		0.007		-0.015
Secondary vs. Basic		-0.050		0.030		-0.021
Post-Secondary vs. Secondary		0.012		-0.088		-0.099
University vs. Secondary		-0.030		-0.054		-0.008
Public int.						
Less than Basic vs. None		0.089		-0.005		-0.020
Basic vs. Less than Basic		0.034		0.041		0.058
Secondary vs. Basic		0.024		-0.042		0.079
Post-Secondary vs. Secondary		0.068		-0.030		-0.054
University vs. Secondary		0.010		-0.064		0.055

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, TLMPS 2014

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

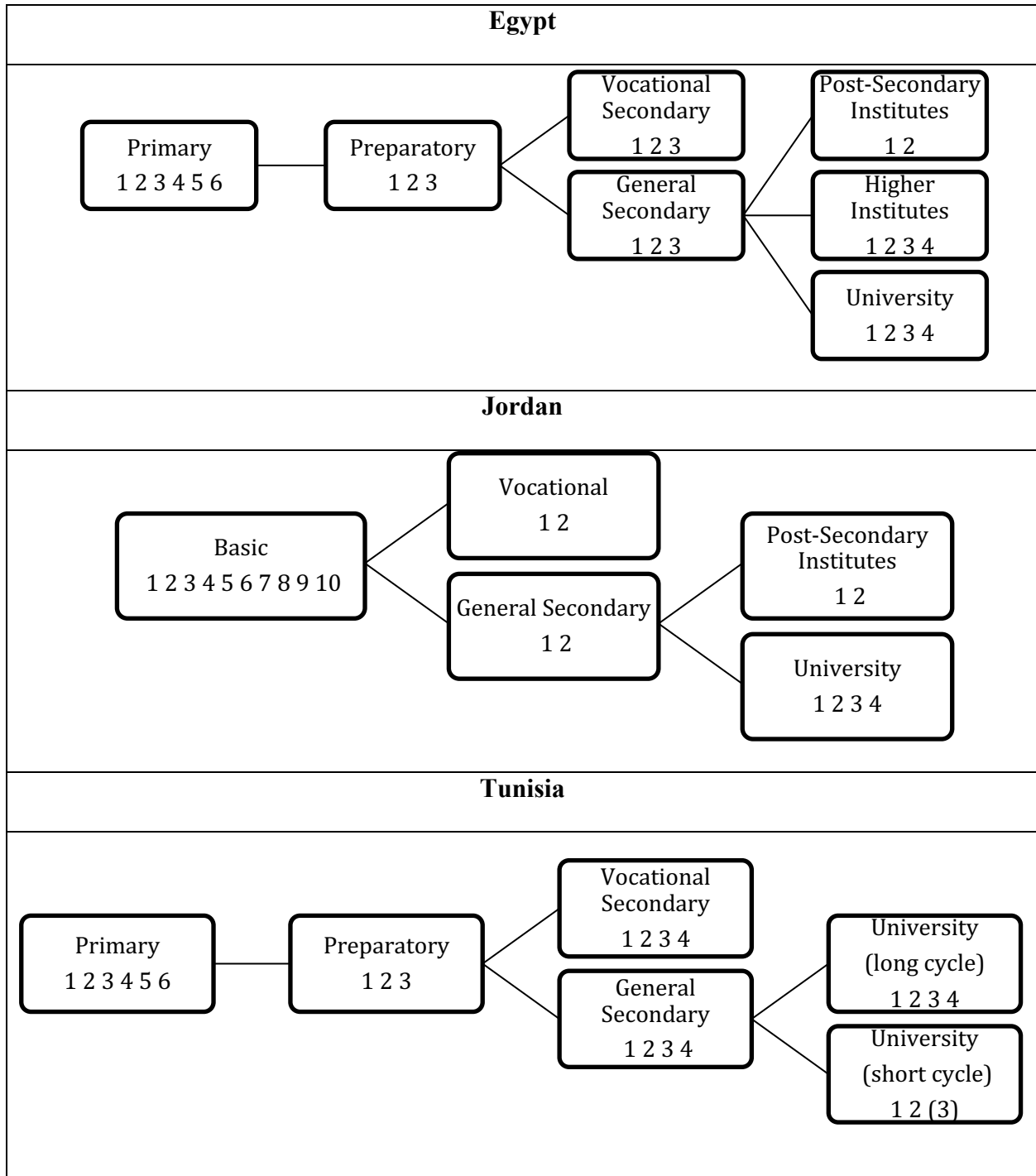
Robust (Huber/White/sandwich estimator) standard errors in parentheses

Light shading in rates of return indicates $\text{return} > 0.05$ and $\text{return} \leq 0.10$

Dark shading in rates of return indicates $\text{return} > 0.10$

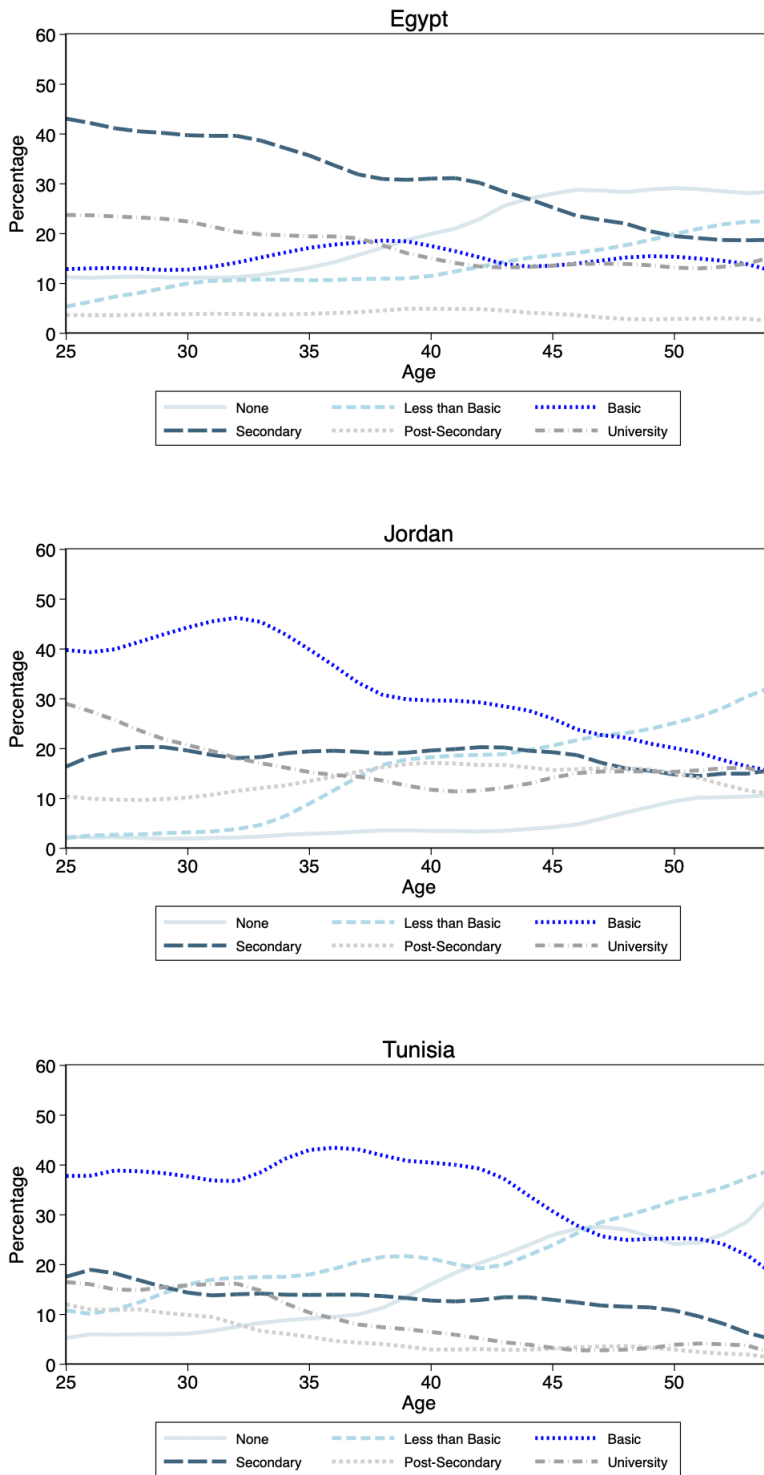
Figures

Figure 1. Egypt, Jordan, and Tunisia’s Education Systems



Source: Authors’ creation

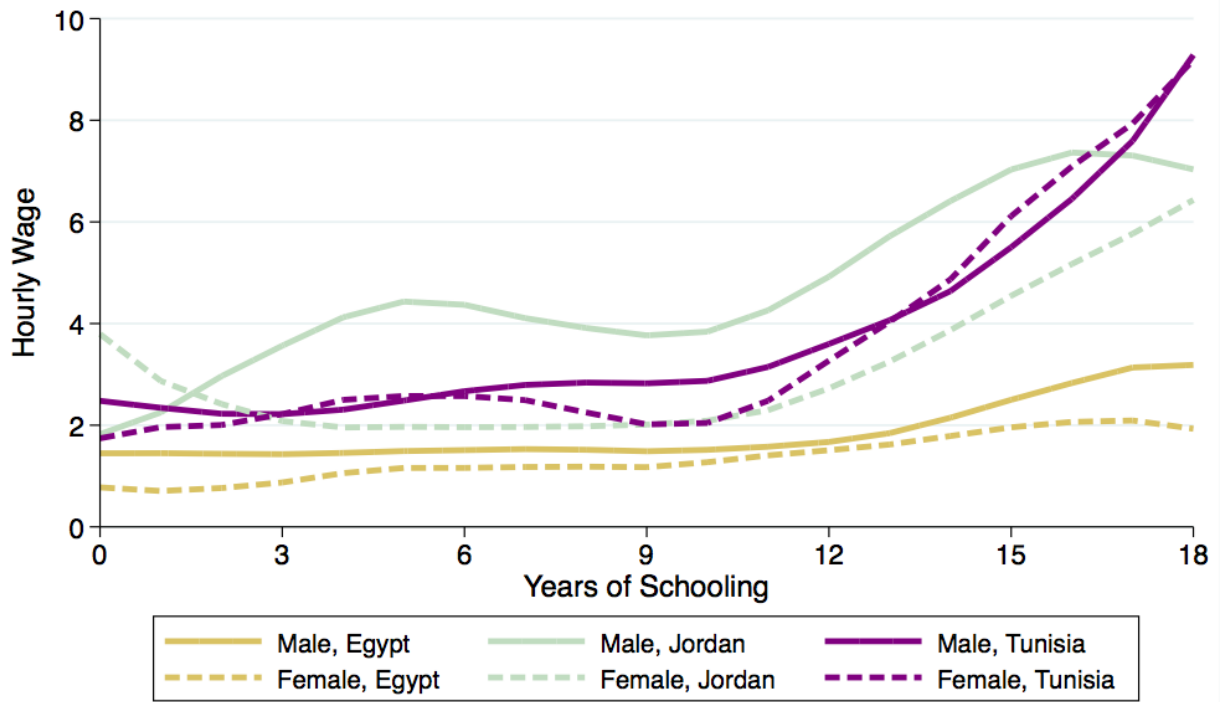
Figure 2. Education Levels by Age and Country, Ages 25-54 (Percentages of Population)



Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, TLMPS 2014

Notes: Lowess smoothed with bandwidth 0.3

Figure 3. Hourly Wage by Years of Schooling, Sex, and Country, Ages 20-54



Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, TLMPS 2014

Notes: Lowess smoothed with bandwidth 0.5