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# Private Returns to University Studies, Educational Choices and Youth (Un)Employment: The Case of Tunisia

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41350

The private returns to education in the Middle East and North Africa have been found to be the lowest worldwide. Considering the low monetary gains associated with university-level studies, why do Arab youth continue to invest so much in their education? Using the most recent data available, I show that the returns to university education in Tunisia are indeed very low. However, my survey data indicates that Tunisian high school students do not overestimate the returns to higher education. An investigation of other potential reasons for the persistently high private investment in education suggests that the desire to obtain a stable public sector job is only a minor motivation for Tunisian students' personal investment in education. Instead, the prospect of successful emigration, intellectual curiosity, and the social status associated with a diploma seem to be the driving forces behind the students' educational choices. Given these findings, I conclude with policy recommendations for improving the efficiency of the skills allocation process.

Keywords: Returns to education, Mincer earnings regression, Tunisia, Middle East and North Africa, development, unemployment, labor market, vocational training, emigration

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# Le rendement privé de l'éducation universitaire, les choix éducatifs et l'emploi des jeunes : Le cas de la Tunisie

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Le rendement privé de l'éducation au Moyen-Orient et en Afrique du Nord est le plus bas à l'échelle mondiale. Vu que les gains monétaires associés à la poursuite de leurs études au niveau universitaire sont aussi bas, pourquoi les jeunes Arabes continuent-ils à investir autant dans leur éducation ? En analysant les plus récentes données de sondage disponibles, je montre que le rendement de l'éducation universitaire en Tunisie est effectivement très bas. Cependant, mes données de sondage suggèrent que les lycéens tunisiens ne surestiment pas le rendement de l'éducation. Qu'est-ce qui peut alors expliquer un investissement aussi important dans l'éducation supérieure ? Je constate que, contrairement à ce qui a été proposé par la littérature pertinente à ce sujet, le désir d'obtenir un travail stable dans le secteur public ne semble pas être la motivation principale pour les choix éducatifs des jeunes tunisiens. Ce sont plutôt la perspective d'un salaire plus élevé et d'une émigration réussie, ainsi que la curiosité intellectuelle et le statut social associé à un diplôme universitaire qui les poussent à poursuivre leurs études. Je conclus avec des recommandations politiques visant à mieux aligner le système éducatif avec les besoins du marché de travail.

Mots clés : Rendements de l'éducation, équation de Mincer, Tunisie, Moyen-Orient et Afrique du Nord, développement, chômage, marché de travail, formation professionnelle, émigration  
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## Terms and abbreviations

While I tried to be as clear and precise as possible in my writing, I often felt that the English translations of the terms were not precise enough or did not do the content justice. Therefore, throughout this thesis, I resorted to using a very limited number of terms in French and in Tunisian Arabic. I made sure to introduce them when used for the first time. Please find a list of all relevant terms and other abbreviations I used for later referral:

**at-tekwyni التكوين المهني in Arabic:** the name of the vocational training program in Tunisian Arabic; note that the entry requirements may vary according to the specific program and students may apply after 9 – 11 years of schooling; the name at-tekwyni refers to the physical school as well as the general concept of vocational training

**arabization:** refers to the gradual change from French-language to Arabic-language school system after Tunisian independence; a similar tendency can be observed in most other MENA countries

**baccalauréat:** *here:* Tunisian high school diploma which requires passing a national exam after 13 years of education; short form: bac

**bac+3:** French name for a first undergraduate university degree, which is completed within three years of university studies after the baccalauréat, and typically sanctioned by a licence (bachelor's degree)

**BMD system:** bachelor - master - PhD system as introduced by the Bologna process in Europe and adopted by Tunisia in 2005 (French: système licence – master – doctorat)

**GATT:** General Agreement on Tariffs and Trade

**ILO:** International Labor Office, the permanent secretariat of the International Labor Organization

**INS (Institut national de la statistique):** Tunisian National Institute of Statistics

**ISSET (Institut supérieur des études technologiques):** Tunisian Superior Institute of Technological Studies, a university institute which focuses on delivering tertiary education in applied fields of study such as technology, management, among others.

**licence:** French equivalence of a bachelor's degree and the most commonly used term in Tunisia

**lycée:** French for “high school”; in Tunisia, the last four years of secondary education which are called “première” (10th grade), “seconde” (11th grade), “troisième” (12th grade) and “baccalauréat” (13th grade) are spent at a lycée.

**lycée pilote:** a special feature of the Tunisian school system which is also referred to as “élite school”. Lycées pilotes accept only those students who passed a certain threshold score on the national entry exams and distinguish themselves by a higher study pace and specially trained teachers. Most lycées pilotes offer specializations in science and mathematics but recently, more literary courses have been created, too. Normal lycées will be referred to as “lycées” in the following.

**MENA:** commonly used acronym for “Middle East and North Africa”. While MENA generally comprises the countries of the Arabic-speaking world, the precise definitions can differ. The countries included in the definition of MENA within the scope of this thesis are Algeria, Bahrein, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, the United Arab Emirates, and Yemen.

**PISA:** acronym of the “Program for International Student Assessment”

**RDI:** acronym for "Regional Development Index"

**tekwyni:** see “at-tekwyni”

**tertiary education:** tertiary education is defined as higher education, which is most typically pursued at universities, ISET, medical schools and engineering schools in Tunisia. The term is used interchangeably with “university education” within the scope of this thesis.



**TLMPS:** acronym for “Tunisian Labor Market Panel Survey”, the first and most recent survey on labor market and household characteristics in Tunisia dating from 2014

**TND (“dinar tunisien”, DT or دينار تونسي in Arabic):** Tunisian dinar, the national currency of Tunisia; in April 2019, 1 euro was worth roughly 3.4 TND. 1 Tunisian dinar corresponds to 1,000 millimes.

**TIMSS:** acronym of the “Trends in International Mathematics and Science Studies”

**WB:** World Bank

**UNDP:** United Nations Development Program

**university education:** see “tertiary education”

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## Introduction

Education is a policy area of crucial importance for the Middle East and North Africa (MENA) – a region where the share of young people is higher than ever before and higher than anywhere else in the world. Between 1980 and 2010, the average years of schooling in most MENA countries increased tremendously; 7 MENA countries figured in the list of the 25 countries which increased average schooling the most. Tunisia was one of them (Assaad et al., 2019). A young working-age population is generally considered an extremely valuable resource for an economy, but high youth unemployment rates in the whole region indicate that something is wrong (Dhillon and Yousef, 2009). With 29.7 percent, youth unemployment in MENA reached more than double the world average in 2014 (UNDP, 2016). The reasons for high youth unemployment rates are complex and include a reduction in the public sector employment offer, labor market rigidity, economic dependence on resource exports and the resulting volatility of national income, political instability and conflict, as well as poor quality of education. Across the region, those with the highest educational attainment face the highest risk of unemployment. The standard economic model suggests that economic agents take these factors into account when making their educational investment decisions (e.g. Becker, 2019). Is this really the case? I questioned the applicability of the standard economic model to educational investment decisions in the MENA region: Why are low returns to education not matched by low educational investment from the part of Arab youth? Do Arab youth overestimate the returns to education and if not, what motivates their educational investment?

The lack of economic growth and employment opportunities in North Africa and the Middle East is worrisome for several reasons, and especially for the young generation. First, unemployment decreases immediate well-being. Being unemployed is strongly associated with psychological vulnerability which may become manifest in anxiety, depression and low self-esteem (UNDP, 2016). Second, unemployment carries sociological implications, particularly for the youth. In the Arab world, it comes at the cost of important delays in marriage which, in the context of a family-centered culture, are associated with a prolonged “childhood” and dependence on parental support, as well as sexual frustrations. Third, the failure to enter the job market immediately after completing one’s education can lead to a depreciation of human capital. In the MENA countries, new job market entrants on average spend two to three years looking for a job (Dhillon and Yousef, 2009). Increasing the efficiency of the labor market is thus desirable, from an individual as well as from a societal and even from a purely efficiency-oriented perspective.

The case of Tunisia is particularly preoccupying. Akkari in Attia (2018) argues that the solution to wide-spread youth unemployment in Tunisia may not only lie in structural reforms of the job market but could also involve policy measures targeting the offer of education: "It will be necessary to ask whether the Tunisian labor market is able to absorb the thousands of youth who graduate from the universities every year . . . One has to know that there are as many students in Tunisia as in Morocco, but with a three times smaller population. It may be inevitable to consider limiting access to university"<sup>1</sup>. Educational outcomes are closely intertwined with frictions in the labor market integration process and therefore should be core concerns for the current policymakers.

Young people's frustration with the economic situation of the country was not only one of the key triggers of the Tunisian revolution but could also pose a threat to the stability and sustainability of the new political and social order. Campante and Chor (2012) argue that the countries which were at the center of the Arab spring are all characterized by a recent mass expansion of education and important gains in human capital, which however were not accommodated by better labor market prospects. After the self-incineration of the street vendor Mohammed Bouazizi in December 2010, which started the Tunisian revolution, the rumor that he was a long-term unemployed university graduate quickly spread across the country and the whole MENA region. Admittedly, Bouazizi had never attended a university but the anecdote is telling of the wide-spread desperation about the lack of job opportunities for university graduates in the Arab world. Campante and Chor (2012) explore correlations and not causalities. Their narrative nevertheless paints a dim picture of the current situation and cautions that unmet expectations can become more than a private misfortune: They can have important implications for a country's political and economic development.

The apparent contradiction between high educational investment and low monetary returns to education is going to be the red thread of this thesis, which, given the methodological difficulties in assessing the returns to education and educational investment in a cross-country context, will focus on the case of Tunisia. Not only was it the Tunisian youth who inspired the Arab spring in 2011 with their dreams and aspirations, Tunisia is also the only Arab country which has embarked on a rapid path of democratization and it has become a model for the rest of the region since. This provides an idea of the farther-reaching interest of this research project.

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1. Cited from Attia (2018). Abdelajij Akkari is professor of educational sciences at the University of Geneva. Original citation in French: « Mais il faudra également se demander si le marché du travail tunisien est capable d'absorber les milliers de jeunes diplômés sortis chaque année des universités. [...] Il faut savoir qu'il y a autant d'étudiants en Tunisie qu'au Maroc, mais avec trois fois moins de population. Il faut se poser la question de la limitation de l'accès à l'université. »

The main results of this study are three-fold: first, a majority of Tunisian students declares wanting to continue their studies at the university level. Second, this is not due to an overestimation of the returns to university education; the students have a very good appreciation of the returns to education on average. Third, there are important non-monetary drivers behind the students' educational decisions, most notably the prospect of emigration, intellectual curiosity and the social status associated with a university degree. Furthermore, university education is perceived to be of higher quality than the competing offer of vocational training. In contrast to what has been suggested by previous literature, the prospect of obtaining a public sector job only plays a minor role and most students declare wanting to work in the private sector.

Relative to prior research in the area, the field work presented within this thesis has the merit of shifting the focus on the role of individual incentives and decision-making for educational investment and the associated labor market dynamics. To my best knowledge, no major survey has previously tried to assess the expected returns to education and their influence on educational investment decisions in Tunisia. Most importantly, my findings on the motivation behind students' educational investment question whether the persisting focus of both academia and donors on the youth's public sector preference and the sectoral segmentation of the economy as causes for the high unemployment rates among university graduates is appropriate. In the light of these findings, some educational policies but also some employment programs in Tunisia and in donor countries ought to be re-evaluated as I argue in chapter 5.

This thesis is structured as follows: Chapter 1 introduces the topic, provides a review of related literature and crucial background information on education and labor market dynamics in Tunisia. In chapter 2, I estimate the returns to tertiary education in Tunisia using Mincer earnings regression and show that they are low in a worldwide comparison. Chapter 3 is my main empirical contribution: I present and analyze my own survey data which yields new insights on the determinants of educational investment in Tunisia and above all, shows that this high investment in university education is not related to the youth holding wrong expectations with respect to the returns to education. Chapter 4 presents potential explanations for the low returns to education in Tunisia and links them to my empirical findings which allows me to formulate specific policy recommendations in chapter 5 before concluding.

# 1 Literature review and background information on Tunisia

Section 1.1 briefly explains how this paper relates to the canonical literature on the returns to education. Section 1.2 narrows the focus down to the case of Tunisia and the MENA countries in general. Sections 1.3 – 1.5 provide a literature review and background information on educational policy, unemployment and the intersection of expectations and educational investment in Tunisia.

## 1.1 On methodology: Estimating the returns to education

The economic literature on the returns to education is extensive. The issue has received a lot of attention in academia and became a core focus of the World Bank research under George Psacharopoulos, former chief of the World Bank education research division. One of Psacharopoulos's main contributions was to show that the returns to education quite consistently tend to be higher in countries with lower GDP. The returns to education appear to be negatively correlated with a country's development level and decrease as a country gets richer. Furthermore, they used to be the highest for primary education, and higher for secondary education than for vocational training. Yet, nowadays, most economists agree that, at least if measured at the global level, the returns to tertiary education are higher than the returns to primary education. In general, women have higher returns to education than men (Montenegro and Patrinos, 2014; Patrinos, 2016; Psacharopoulos, 1994, 1985, 1981).

There is a large number of studies on the returns to education with a surprisingly wide range of results. Two main reasons explain the disparities observed in the literature. The first reason is the sampling technique: many studies rely on small samples which are neither random nor representative of the whole population. For instance, it is easier to conduct interviews in urban settings, which is why many studies use samples where urban dwellers are overrepresented. However, the returns to education may vary between urban and rural areas and the estimations may not be comparable if the samples are not balanced. The second reason is of methodological nature: even though the Mincer earnings equations is widely used, many different versions exist. For example, some researchers include additional controls such as regional dummies, which render the comparison of the resulting estimates cumbersome. As a result, different studies often propose quite different estimated returns to education simply due to the sampling or estimation method (see Montenegro and Patrinos, 2014 for a more extensive discussion of these issues).



## 1.2 The returns to education in Tunisia and MENA

Most studies agree that the returns to education in North Africa and the Middle East are the lowest or among the lowest worldwide: 7.3 percent per year for the total sample, 11.1 percent for women and 6.5 percent for men, according to Montenegro and Patrinos (2014, see table 1). This is much lower than in Sub Saharan Africa, for instance, where estimated returns to education reach 12.4 percent per year of schooling according to the same study.

Table 1 – Private returns to schooling (by region, in percent)

Region	Average returns to schooling			Average years of schooling			
	Total	Male	Female	Total	Male	Female	N
High income economies	10	9.5	11.1	12.9	12.7	13.1	33
East Asia and Pacific	9.4	9.2	10.1	10.4	10.2	10.7	13
Europe and Central Asia	7.4	6.9	9.4	12.4	12.2	12.7	20
Latin America and Caribbean	9.2	8.8	10.7	10.1	9.5	10.9	23
Middle East and North Africa	7.3	6.5	11.1	9.4	9.2	11	10
South Asia	7.7	6.9	10.2	6.5	6.5	6.4	7
Sub-Saharan Africa	12.4	11.3	14.5	8	8.1	8.1	33
All economies	9.7	9.1	11.4	10.4	10.2	10.8	139

[Source: Montenegro and Patrinos (2014, table 3a, p. 11)]

Yet, the total picture is heterogeneous: table 5 (appendix B.1.3) evidences that the returns to primary education in MENA tend to be high, 16.0 percent for the total population and 21.4 percent per year for women – the highest returns to primary education worldwide. By contrast, the returns to secondary education are the lowest worldwide with only 4.5 percent. Finally, the returns to tertiary education are estimated to be about 10.5 per year, the lowest returns to tertiary education observed, with the notable exception of Europe and Central Asia.

Some authors have estimated the returns to education in Tunisia in particular. Table 6 in appendix B.1.3 provides an overview of the most recent studies and their results. The estimated returns to education of secondary and tertiary education as reported in table 6 are not directly comparable, neither among each other nor with the estimations I will propose in the following, as the authors use different estimation methods. Zouari-Bouatour et al. (2014) use the illiterate population as a reference group. By contrast, I am going to use the population with less than secondary education as a reference group. Given the almost universal primary school completion rates and the very high secondary school completion rates, this is a reasonable choice which accounts for the fact that educational attainment in Tunisia has increased substantially between 1980 when Zouari-Bouatour et al.’s first round

of data was raised and 2014 when the panel data I use was collected. Furthermore, Zouari-Bouatour et al. (2014) list the total returns to completing secondary and tertiary education while I, as Montenegro and Patrinos (2014), Barouni (2016) and Limam and Ben Hafaied (2018) compute the returns to secondary and tertiary education per year<sup>2</sup>. I follow the latter approach because it allows for a better comparison of the returns to education across countries and is more common in the literature, but I test for non-linearity in the returns to education and a sheepskin effect of diploma years of education. Despite the difficulty to compare results in absolute terms, Zouari-Bouatour et al.’s (2014) estimations are interesting in relative terms as they show a considerable decline in the returns to education between 1980 and 1999, which is especially pronounced for women. Considering this, I will provide estimates by sex using the most recent data available in section 2.2.2.

**The influence of the public sector** At the global level, the returns to education are found to be higher for individuals working in the private than for individuals working in the public sector (Psacharopoulos and Patrinos, 2018). In the context of Tunisia and in the MENA countries, however, the public sector has often been criticized for placing an exaggerated “premium” on university education and creating distortive incentives (see for example Bouas-sida and Lahga, 2018). Within my own estimations of the returns to education in Tunisia, I am therefore going to test whether the returns to tertiary education differ for individuals employed in the private and in the public sector. Based on previous research such as Ben Halima et al. (2010), I expect that the returns to secondary and especially tertiary education are higher for Tunisians working in the public sector. Previous estimations of the returns to education have focused surprisingly little on this question which is also going to play a role in my later analysis of the expected returns to education and the larger labor market dynamics in Tunisia (see sections 2.2.2, 3.4 and 4.3).

In the Arab world, the incentive to find work in the public sector is even higher for women than for men. Trying to promote the constitutional principle of gender equality, the public sector has historically been an important employer for women. This applies in particular to women with higher education. Recent studies have indeed found Tunisian women to hold a strong preference for working in the public sector<sup>3</sup>. Therefore, I am also

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2. Zouari-Bouatour et al. (2014) assume a duration of 12 years for secondary education and an additional 4 years for tertiary education.

3. Reasons include more generous dispositions with regards to maternity leave (see Ben Ayed Mouelhi and Goaid, 2017), and for instance the uniform application of the “*séance unique*” in the public sector. Passed into law in 1956, the “*séance unique*” imposes shorter working hours on Tunisian administrations during two or three months of the summer, which tend to coincide with school vacations. Private sector businesses do not have to respect the “*séance unique*”.

going to evaluate whether the returns to working in the public sector differ across gender.

### 1.3 Expenditure on and access to education

Tunisia is exceptional among other MENA countries in many respects. Since independence, Tunisia has spent a smaller share of its GDP on the military than any other MENA country<sup>4</sup>. Instead, education has been a political priority for Tunisia since the presidency of Habib Bourguiba. Figure 1 illustrates that, since the early 1980s, Tunisia has consistently spent more than 5 percent of GDP on education. This is considerably above the OECD country average.

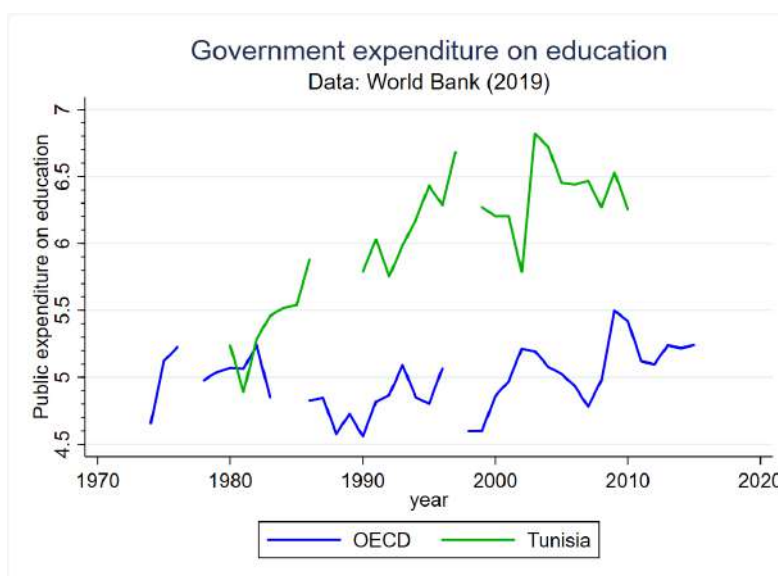


Figure 1 – Total government expenditure on education as percentage of GDP

### 1.4 Youth (un)employment and labor market integration

Unemployment rates are high in the MENA countries in general. The total unemployment rate in Tunisia even exceeds the MENA average as is visible in figure 2. The risk of being unemployed is heterogeneous with regards to educational attainment, as illustrated by figure 3.

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4. Analyzing the average military expenditure of MENA countries based on data provided by the Stockholm International Peace Research Institute (2019) data, I find that between 1960 and 2018, Tunisia has spent on average 1.9 percent of GDP on its military.

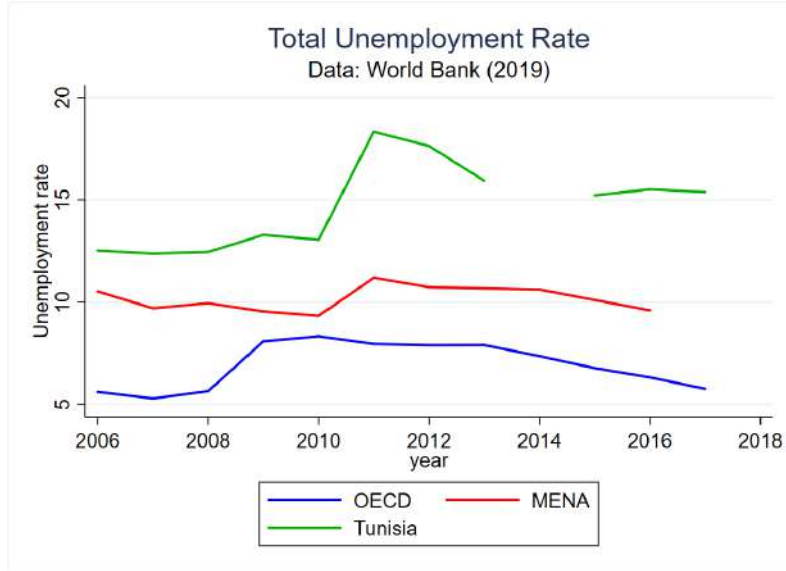


Figure 2 – Unemployment rate as percent of total labor force

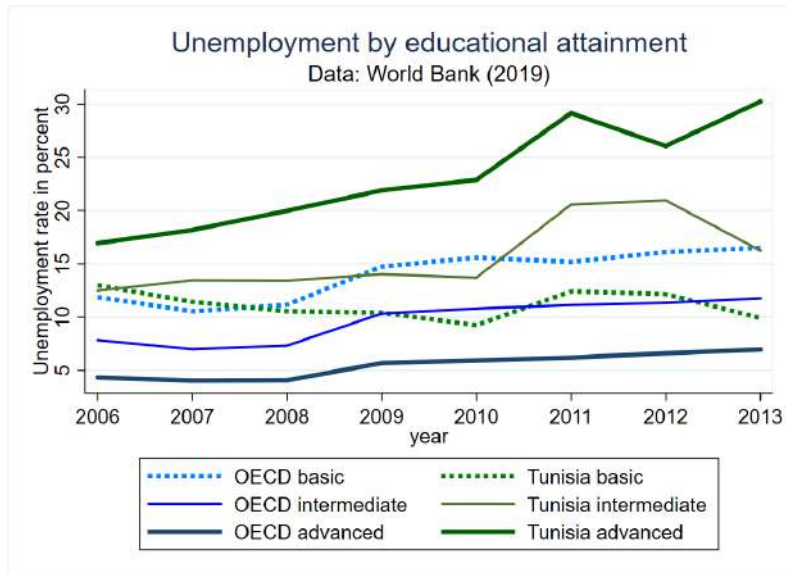


Figure 3 – Unemployment rate by educational attainment as percent of total labor force  
 [Note: The WB data does not include the unemployment rates of individuals with tertiary education in Tunisia after 2013.]

Figure 3 points out two important observations: first, other than for the OECD country average, educational attainment in Tunisia is *positively* associated with unemployment. Second, unemployment among the most educated in Tunisia was increasing even before the 2011 revolution, and there is an observable spike after 2011. It seems therefore likely that the risk of unemployment influences the returns to education. I try to take this into account in my estimations of the returns to education in appendix B.2.2. Considering that the probability of being employed is often not accounted for in the estimation of the

returns to education, this is an important contribution.

Recent OECD estimates suggest that young Tunisians need 6 years on average to successfully enter the job market. This is a transition period which is considerably longer than in most OECD and most other middle-income countries, and which even exceeds the MENA average (ILO, 2015). According to the 2014 ETVA survey, 65 percent of young Tunisians want to work in the public sector. 22 percent report wanting to work in the private sector and 10 percent declare preferring an independent job. A public sector job is commonly viewed as the incarnation of a “decent job”, which in the imagery of the youth, is mainly defined by high job security and relatively generous social benefits (ILO, 2015)<sup>5</sup>.

The International Labor Office (ILO) estimates however, that more than 77 percent of young Tunisians finally enter the job market via the informal sector. Seasonal jobs in the tourism sector are a typical example of relatively well-paid but unstable and informal jobs competing with formal, but badly paid jobs in the manufacturing sector. In the regions bordering Libya and Algeria and most importantly in the governorate of Kasserine, smuggling and contraband are commonplace informal sector activities. Anecdotal evidence suggests that informal work is often viewed as a possibility to gain some extra money. However, the resulting incomes tend to be too low to allow for financial independence or even marriage. The testimonies of the young Tunisians interviewed by the ILO suggest that it is the insecurity and constant stress connected to these activities that makes them strive for a stable and as “decent” perceived job in the public sector (ILO, 2015). My estimates in section 2.2.2 confirm that a public sector job in Tunisia offers a wage premium. Yet, my own survey results as presented in chapter 3 put the idea of a prevalent public sector preference among the Tunisian youth into perspective.

## 1.5 Expectations and educational investment

Jensen (2010) finds that in the Dominican Republic, private investment in education is likely to be below the optimal level because Dominican youth underestimate the returns to education. He implements a treatment and shows that correcting beliefs through informing Dominican schoolchildren about the real returns to education can increase school enrollment and school completion rates. Previous economic research hence suggests that there is a direct channel linking expected returns to education with educational investment. Uwaifo Oyelere

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5. The public sector has historically hired a majority of university graduates in Tunisia. The estimated share of public sector employees was 20.2 percent in 2005 and 26.6 percent of the total employed population (World Bank, 2019).

(2010) establishes a link between decreasing returns to education and declining school enrollment rates in Nigeria in the 1990s, for instance. Likewise, Kwenda and Ntuli (2014) show that between 1995 and 2003, the returns to university education in Zimbabwe fell by 40 to 50 percent due to a severe economic crisis. According to the authors, this dramatic decrease in returns to education appears to be a plausible explanation for the subsequent mass exodus of Zimbabwean university graduates.

Following this reasoning and assuming that they form correct expectations, we may worry that Tunisian high school students could therefore not find it worthwhile to invest a lot in tertiary education. The Tunisian enrollment and school completion data, however, tells a slightly different story: Despite low expected returns to tertiary education, 32.1 percent of Tunisian students enrolled in university in 2017 and the enrollment rate reached 41.2 percent for female students (UNESCO, 2019).

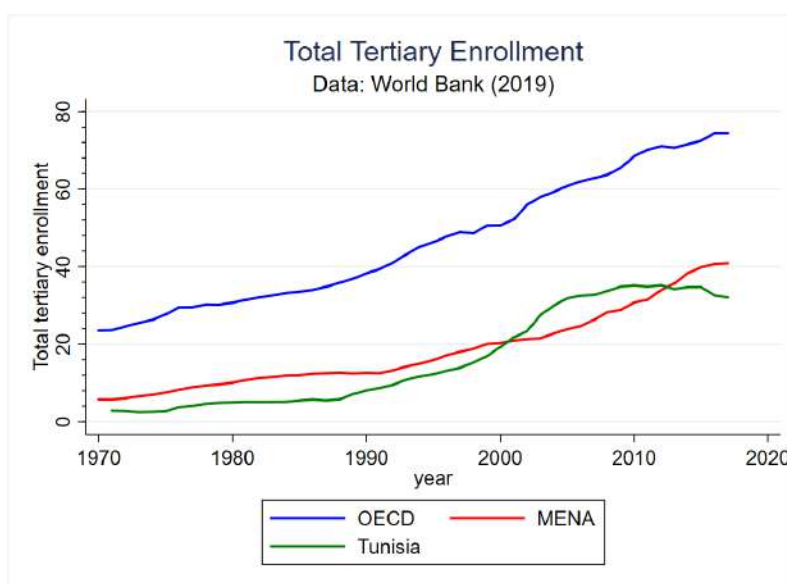


Figure 4 – Total tertiary enrollment rate

As evidenced in figure 4, in contrast to the region-wide university enrollment rate, the university enrollment rate in Tunisia seems to be stagnating since 2010/2011, however, and may have started to decrease. This also true for female tertiary school enrollment rates, which had been exemplary within the MENA region (see appendix B.1.2)<sup>6</sup>.

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6. Upon my request, the Ministry of Education replied that this decrease in enrollment rates is mostly attributed to the demographic transition that has started earlier in Tunisia than in other parts of the Arab world.

Following the spirit of Jensen's (2010) approach, I test whether Tunisian students expect exaggeratedly high returns to education and therefore invest a lot in their education. To my best knowledge, no comparable study has been conducted in Tunisia and my survey results as reported in chapter 3 therefore present an innovative approach to analyzing the link between individual expectations and educational investment.

## 2 What are the monetary returns to tertiary education in Tunisia?

The main focus of this thesis lies on the field work presented in chapter 3. But considering the heterogeneity in the methodology and results of previous studies, I will provide my own estimates of the monetary returns to tertiary education in this chapter. Furthermore, I explore the importance of a number of other factors, such as public sector employment, which allows for a better understanding of the monetary value which is attributed to higher education in Tunisia. Finally, I compute the returns of tertiary relative to secondary education based on the most recent data available. This is a prerequisite for my comparison to the expected returns to education as presented in chapter 3 and a contribution to the existing literature. I mainly base my working hypotheses for the estimation of the returns to tertiary education in Tunisia on Montenegro and Patrinos's (2014) findings on the returns to education in the whole MENA region as reported in table 1 and 3. First, I expect the returns to tertiary education in Tunisia to be low in worldwide comparison. Second, I expect them to be higher for women than for men. I am going to test these hypotheses in section 2.3<sup>7</sup>.

### 2.1 Data: The Tunisian Labor Market Panel Survey 2014

The Economic Research Forum (ERF) in Cairo kindly granted me access to the Tunisian Labor Market Panel Survey (TLMPS), the first and the only survey on household income and characteristics in Tunisia so far which was conducted jointly by the ERF and the Tunisian National Institute of Statistics (INS) in 2014. The dataset contains 12,514 adult observations<sup>8</sup>.

For the purpose of my analysis, I decided to restrict the sample to subjects older than 25 but younger than 65 years. I chose this relatively high lower bound in order to avoid recording unreasonably low incomes for individuals who are still enrolled in school. This would risk introducing a downwards bias into my estimates of the returns to tertiary

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7. Within the scope of this thesis, I am going to focus on the monetary returns to education. Naturally, there are non-monetary returns to education, especially the numerous positive social externalities of education which may take the form of female empowerment, better health outcomes, lower rates of fertility and higher political and financial literacy, to name just a few of them. Undeniably, the social returns to education are more informative for policy advice (Psacharopoulos, 1995). Yet, in the available literature, researchers have typically controlled for the social costs of education without being able to adequately account for the social benefits of education, which is why, if computed, the social returns to education tend to be lower than the private returns (Psacharopoulos and Patrinos, 2018). This is an important pitfall in the literature and another hint to the fact that the results of different studies should be interpreted carefully and in general, taken with a grain of salt. Assessing the social returns to education requires more data than is commonly available. Moreover, within the scope of this thesis, I am mostly trying to understand the individual decision-making process with respect to educational investment. A focus on the private returns to education therefore appears adequate and realistic considering the data restrictions.

8. For details on the creation of TLMPS (2014) and the challenges the survey team encountered, please refer to Assaad et al. (2016).



education. Imposing this restriction on the age range of the sample leaves me with 8,128 observations. However, mainly because of an issue of non-response in the survey, not all these observations have complete data on wages and educational attainment, which is why I generally have to rely on a smaller sample size. This will decrease statistical power. See table 11 in appendix B.2.3 for summary statistics.

TLMPS (2014) only collected data on wage workers. Therefore, the earnings of self-employed or independent workers cannot be included. This seems to be a common problem in the estimation of returns to education (for instance, Montenegro and Patrinos, 2014, also only use data on employed workers for their estimates). The dataset also lacks precise information on the sector of occupation. I can match some observed wages with public or private sector occupation, but there is a large number of missing observations. It would have been desirable to have precise information on the wages associated with informal sector occupation, which is commonplace in Tunisia (see for instance Mongi, 1997). Given the data limitations, I unfortunately cannot analyze the wage differences between the formal and the informal sector (see however section 4.3, for a discussion of the general labor market segmentation in Tunisia).

The ensuing analysis will focus on the returns to tertiary education relative to the returns to secondary education. I do not distinguish between the different types of university degrees. For example, I do not differentiate between the returns to university education of subjects who have completed a bachelor's degree and subjects who have completed a master's degree or a doctorate. This means that the group of university graduates is quite heterogeneous, but this analytical choice allows me to maximize the sample size, which is advisable given data limitations, and also standard in the field.

## 2.2 Estimating the monetary returns to education

### 2.2.1 Simplified estimation

Psacharopoulos (1995) describes a simplified estimation method, which can provide a crude but straight-forward estimation of the returns to education to serve as a first benchmark for the ensuing analysis. A main advantage is that it does not need a lot of data and can be used even when individual data is missing. I use the following formula:

$$RTE_u = \frac{\overline{wage_u} - \overline{wage_s}}{years_u * \overline{wage_s}} \quad (1)$$

Here and in the following,  $RTE_u$  stands for "returns to university education".  $\overline{wage_u}$

and  $\overline{wage_s}$  represent the average wages associated with tertiary and secondary education.  $years_u$  represents the time investment necessary to obtain a university degree. Hence, the denominator represents the opportunity cost of obtaining a university degree in terms of lost working revenues with secondary education.

This approximation has clear disadvantages: it imposes a linear relationship between education and wage and does not reflect potential wage increases over the years. Furthermore, it only includes the opportunity cost of education, neglecting all potential direct costs. This, however, is the standard approach. Even though the total cost of education will be underestimated, resulting in an overestimation of the returns to education, this method is still interesting for my study due to three reasons. First, on average, the opportunity cost of education is larger than any direct costs of education and this is especially true for university education (OECD, 2009). Second, I do not include potential scholarships and study subsidies either, which are a relatively important factor in Tunisia, as explained in appendix B.1.1. Some of the effect of omitting direct costs will therefore cancel out. Third, this simple way of estimating the returns to university education is not unlikely to come close to the thought process of the young Tunisians I interviewed and could therefore be quite informative as a first benchmark result in this context.

Using the means from the TLMPS (2014) data as reported in table 8 and 9 (appendix B.2.3), I compute the returns to university education in Tunisia:

$$\widehat{RTE_u} = \frac{(6.582 - 3.002)}{(16.581 - 10.525) * 3.002} \approx 0.197$$

Based on the TLMPS (2014) data, this estimation method thus suggests returns of 19.7 percent per year to tertiary education compared to secondary education. This estimate is broadly in the range suggested by previous literature (e.g. Barouni 2016, see also table 6). Admitting a shorter duration of university as aimed for with the adoption of the Bologna reform and assuming that this reduction of study time does not affect the expected wage for university graduates, the returns to tertiary education could be higher.

Furthermore, I estimate the returns to university education separately by sex. To account for potential differences in studying time, I use the average time needed to complete university education by sex:

This yields the following estimated returns to one year of tertiary education for men:

$$\widehat{RTE}_u^m = \frac{(5.598-3.119)}{(16.527-10.568)*3.119} \approx 0.133$$

and for women:

$$\widehat{RTE}_u^f = \frac{(7.754-2.509)}{(16.630-10.469)*2.509} \approx 0.339$$

These estimations suggest that the returns to tertiary education are 33.9 percent per year of tertiary education for women and 13.3 percent for men. This supports my second hypothesis: Tunisian women have considerably more to gain from university education than men. I consider these results as a first benchmark, but I caution that they may not be reliable: the returns to tertiary education for females seem upwards-biased. The very high returns to education for women probably reflect a strong selection effect favoring particularly able women and should therefore not be interpreted as an estimate of the effect of tertiary education on an average woman's expected earnings. This is why in the next section, I am going to explore the determinants of wages and the returns to education in Tunisia in more detail.

### 2.2.2 Mincer earnings estimation

As is standard in the field, I am going to use the Mincer earnings equation in order to estimate the returns to education more rigorously using individual level data. It is a semi-logarithmic earnings equation, regressing individual wage on years of schooling and other variables, most commonly labor market experience. The method was developed by Becker (1962; 1975) and Mincer (1974; 1984). The basic idea is to equalize the stream of expected income resulting from educational investment with the associated cost of obtaining this education. Education is thus modeled as an investment decision and each individual chooses their investment such as to maximize expected income. The Mincer earnings equation is simple and can easily be extended by including other variables, which explains why it has become the most popular method for estimating the returns to education in the economic literature (Patrinos, 2016). Again, this means foregoing all the direct costs of education and therefore, strictly speaking, rather represents an estimation of the wage premium associated with educational attainment, than an estimation of the actual returns to education. Given that tertiary education in Tunisia is predominantly public and the direct costs tend to be relatively low compared to other middle-income countries, applying the Mincer estimation does not seem out of place, though.

While the Mincer earnings estimations allow me to assess the relationship between education and earnings, this does not necessarily imply causality. Major drawbacks of the method are the failure to control for innate ability, which will introduce some bias into my estimates. Individuals of higher ability invest more into their schooling on average. This creates a selection bias which will likely result in my estimate of the returns to higher education being upwards-biased. More educated individuals also tend to work longer hours. This would further upwards bias the estimated returns to education if I used monthly or annual earnings for the Mincer earnings regression (Patrinos, 2016). In order to avoid this, I use the TLMPS (2014) data on hourly wages rather than monthly wages. Likewise, it is unlikely that the marginal returns to education are constant, as implied by the basic linear model. I will tackle this issue by introducing squared terms, checking for a sheepskin effect and accounting for differential returns to different levels of schooling in the following subsections.

A major problem with existing literature is that it often relies on decade-old evidence. Given rapid technological change, it is reasonable to assume that the returns to education change over time (Patrinos, 2016). For actual policy advice, it is therefore preferable to use the most recent data, which is a contribution of my thesis<sup>9</sup>. Despite this, using the Mincer earnings estimation requires assuming that the current cohort of students bases their educational investment decisions on their observation of current workers' incomes. This is a simplifying assumption since direct costs of education and relative incomes change over time and students may anticipate these changes (Psacharopoulos and Patrinos, 2018). Especially in the context of a middle-income country undergoing major political transformations like Tunisia, a stable economic environment and certain future earnings streams may be a strong assumption. On the other hand, it is not technically feasible to follow students over decades and document their educational choices and life-time earnings. Using the Mincer earnings estimations and the most recent available data therefore appears to be the most adequate identification strategy.

**The basic model** I first use a standard Mincer earnings equation including the following variables:

$$\ln W_i = \alpha + \beta S_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \epsilon_i \quad (2)$$

$\ln W_i$  is the log of gross hourly wages of an individual  $i$ ,  $S_i$  refers to the years of schooling completed by  $i$ ,  $EXP_i$  denominates job experience in years,  $EXP_i^2$  its square, and  $\epsilon_i$  is the error term. Including the experience variable allows me to model earning differentials

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9. TLMPS (2014) is the most recent data available. A follow-up survey round is planned for 2020.

among different age cohorts and the square term allows me to model decreasing returns to experience. Given the negative correlation between experience and schooling (at a given age, an individual with more schooling will have less work experience than an individual with less schooling), and the positive correlation of both schooling and experience with income, and assuming that unemployment affects both the more and the less educated in the same way, omitting experience would cause a downwards bias in the estimated returns to education.

I use robust standard errors to control for heteroskedasticity of the error term in all the following OLS regressions. For the regression results by sex, I drop 114 observations which were coded as “missing” for sex.

The first regression as reported in column (I) of table 12 in appendix B.2.3 suggests that, all else equal, one additional year of education is associated with an increase of 6.9 percent in expected wages in Tunisia. This is below the most recent world average of 9.7 percent as reported by Psacharopoulos and Patrinos (2018).

The estimation yields a negative  $\widehat{\gamma}_2$  and thus suggests that there are diminishing marginal returns to experience given that the coefficient on experience squared is negative. Hence, a person with the average amount of experience (ca. 11 years in the TLMPS sample), would see their wage increase by 1.6 percent on average if they gained one additional year of experience ( $\exp(0.022 - 2 * 0.029 * 11/100) \approx 1.016$ ).

**Non-linearity in the returns to education** Previous literature suggests that not only the returns to work experience but also the returns to schooling may be non-linear (see for instance Limam and Ben Hafaiedh, 2018). There are several ways of accounting for this in a model, the easiest being to introduce a square term,  $S_i^2$ , as in equation 3.

$$\ln W_i = \alpha + \beta_1 S_i + \beta_2 S_i^2 + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \epsilon_i \quad (3)$$

The regression as reported in column (II) of table 12 in appendix B.2.3 yields a positive  $\widehat{\beta}_2$  which suggests that the wage returns to schooling in Tunisia increase exponentially with the level of schooling. Holding experience fixed, an individual with the average amount of schooling (ca. 6.1 years in the TLMPS sample), would see their wage increase by 5.4 percent on average if they went to school for one year longer ( $\exp(0.019 + 2 * 0.273 * (6.1/100)) \approx 1.054$ ).

Considering that  $\widehat{\beta}_2$  is positive, the returns to education are likely to be heterogeneous for different educational attainments and higher for more advanced levels of education. According to Limam and Ben Hafaiedh (2018), this is a typical pattern in a country like Tunisia where the public sector has institutionalized a “premium on higher education and certification” via the large-scale absorption of university graduates into the public sector (see sections 3.4 and 4.3). Another less country-specific explanation for this observation is self-selection: more able students are more likely to reach higher schooling and consequently better job outcomes, especially in an educational system which is as heavily based on selection as the Tunisian one. Not controlling for ability may therefore lead to upwards-biased estimated returns to higher levels of education. I will try to find out more about the relationship between educational attainment and the returns to education in the next sections.

**Signaling: a sheepskin effect?** The economic literature agrees on the existence of a positive relationship between education and income. More recent economic theories have refined our understanding of this relationship. For instance, Spence (1973) argues that higher educational attainment mostly signals higher ability from the part of the employees. The theory of signaling is the core idea behind the so-called “sheepskin effect”, which becomes manifest in a higher wage premium associated with diploma years relative to “normal” years of education. Following the approach suggested by Limam and Ben Hafaiedh (2018), I can test for the existence of a “sheepskin effect” in the TLMPS (2014) data by adding dummy variables for diploma years.

$$\ln W_i = \alpha + \beta S_i + \beta_1 S1_i + \beta_2 S2_i + \beta_3 S1_i * S3_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \epsilon_i \quad (4)$$

$S1_i$  is a dummy variable for completing the 13th year of education (equivalent to obtaining the baccalauréat and graduating from high school in Tunisia) and  $S2_i$  is a dummy variable for completing the 17th year of education (roughly corresponding to obtaining a licence and graduating from university). I define  $S3_i$  as “years of schooling – 13” and generate  $S1_i * S3_i$ , an interaction of  $S1_i$  and  $S3_i$ .

$\beta_3$  describes the return to education of schooling beyond the baccalauréat level but before the obtention of a college degree. That implies that I can compute the returns to year 14, 15 and 16 of an individual’s education separately. I expect the return to completing year 13 and year 17 to be higher than the returns to completing years 14 through 16 since, on

average, completing year 13 and year 17 should be equivalent to obtaining the baccalauréat, and respectively, a licence. According to Spence (1973), obtaining a certificate of higher education will signal higher ability to potential employers and should thus yield higher returns in terms of wage income on the labor market than a generic year of schooling. I therefore expect the coefficients on  $S1_i$  and  $S2_i$  to be positive and higher in absolute value than the coefficient on  $S1_i * S3_i$ <sup>10</sup>.

The regression results are reported in column (III) of table 12 in appendix B.2. The coefficients on  $S1_i$  and  $S2_i$  have the expected sign and are significant at the 0.5% significance level, providing evidence for the existence of a sheepskin effect. The regression results can be interpreted as follows: For the first twelve years of schooling, the marginal effect on wages of one additional year of instruction is ( $\hat{\beta} \approx 0.034$ ), hence a return to education of about 3.4 percent per year. The marginal effect of the 13th year of education on wages is estimated to be higher ( $\hat{\beta} + \hat{\beta}_1 \approx 0.034 + 0.348 \approx 0.382$ ), roughly 38.2 percent. This suggests that the obtention of a baccalauréat diploma comes with important gains in expected salary. The marginal effect of the 14th through 16th year of education drops to about 4.3 percent ( $\hat{\beta} + \hat{\beta}_3 \approx 0.034 + 0.009 \approx 0.043$ ) while the 17th year of education yields a marginal effect of an estimated 50.4 percent ( $\hat{\beta} + \hat{\beta}_2 + \hat{\beta}_3 \approx 0.034 + 0.461 + 0.009 \approx 0.504$ ), according to the regression results.

This yields two main insights: first, the signaling value of a diploma in Tunisia appears to be very important. Second, according to my estimation results, the expected value in terms of wage gains, which can be interpreted as the relative signaling value, seems to be higher for a college degree than for the baccalauréat. The students' responses (see section 3.4 on their motivation for continuing studies at university level) seem to confirm this finding: they frequently list the “*prestige*” of the diploma as a motivation for going to university. Note however that the difference between the estimated returns to graduating from high school and graduating from university is not statistically significant at conventional levels of statistical significance.

**By educational level** I have shown that the returns to education in terms of years of schooling are not linear and that there is a sheepskin effect in the TLMPs (2014) data which

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10. Even though the normal length of a licence is three years, this was not necessarily the case before the adoption of the European bachelor's-master's-doctorate system and many degree programs, such as medical school, will take considerably longer to complete. This is why I coded  $S2_i$  as “*yearsofschooling*  $\geq 17$ ” rather than as “*yearsofschooling*  $\geq 16$ ”. This choice is supported by the TLMPs (2014) data. I checked for a sheepskin effect after 18 and 19 years of education but there was no evidence for such an effect in the data.

seems larger in absolute terms for university completion than for high school completion. There seems to be a wage premium for tertiary education in Tunisia, which is in line with previous literature (e.g. Zouari-Bouatour et al., 2014). Hence, I expect that the returns to education in Tunisia differ across education levels and school types and that the estimated coefficient on university is larger in absolute value than the coefficients on secondary education and vocational training.

$$\ln W_i = \alpha + \beta_1 sec_i + \beta_2 vocat_i + \beta_3 univ_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \epsilon_i \quad (5)$$

In equation 5, I add binary variables for completed secondary education, vocational training and university education. I choose to not include a dummy for primary education. My reference group is thus made up by the observations with primary education or less and the binary variables represent the additional monetary gain associated with completing an additional level of education. Considering that primary education is compulsory and primary school completion has been almost universal in Tunisia for a few decades, this seems a reasonable choice for the specification (see appendix B.1.2 for a graph tracing the development of the primary enrollment rates in Tunisia). It is also supported by Barouni (2016) who finds it impossible to provide reliable estimates of the returns to primary education in Tunisia since the counterfactual outcome of not completing primary education has become so rare. Furthermore, my main interest lies not in estimating the returns to primary education but in estimating the returns to university education relative to secondary education which I do using formula (6), following Psacharopoulos (1995):

$$RTE_u = \frac{\beta_3 - \beta_1}{S_u - S_s} \quad (6)$$

Where  $S_u$  is the number of years required to complete tertiary education and  $S_s$  is the number of years required to complete secondary education.

The results are reported in column (IV) of table 12 in appendix B.2.3. As expected, the gains to tertiary education are the highest, followed by secondary education and then vocational training. Computing  $\widehat{\beta}_3 - \widehat{\beta}_1 \approx 0.686$ , I note that the expected return to university education is about 68.6 percentage points higher than that of secondary school education. This difference is statistically significant at the 0.5% significance level.



As an illustration of these regression results, I would expect an individual with completed university education but without work experience to earn  $\exp(0.991 + 0.346) \approx 3.808$  TND per hour, which amounts to a monthly wage of about  $4 * 40 * 3.808 \approx 609.3$  TND. With only secondary education all else equal, they would be expected to earn  $\exp(0.304 + 0.346) \approx 1.916$  TND per hour, which amounts to a monthly wage of about  $4 * 40 * 1.916 \approx 306.6$  TND<sup>11</sup>.

Based on these regression results and on the mean years of schooling as reported in table 9, I can provide a first estimate of the returns to tertiary education in Tunisia, which I report in table 10 (both in appendix B.2.3). Following the analytical choice of Zouari-Bouatour et al. (2014), I also estimate the returns to university education in Tunisia assuming only 4 years of studies. Assuming that the returns to a university diploma are not affected by this shorter study period, I obtain a theoretical upper bound estimate. I estimate the returns to university education in Tunisia to lie between 11.3 percent and 17.2 percent per year. However, I expect them to be closer to the lower than to the upper bound since a 4-years average time of study seems quite a low estimate.

**By sex** I estimate the relationship separately for female and male respondents in order to account for the fact that previous studies on the returns to education in Tunisia and MENA countries have found the returns to education to differ for the two sexes. Based on these studies and on my own benchmark estimates as reported in section 2.2.1, I expect the returns to university education to be higher for women (Barouni, 2016; Ben Ayed Mouelhi and Goaid, 2017; Limam and Ben Hafaiedh, 2018; Montenegro and Patrinos, 2014; Zouari-Bouatour et al., 2014).

However, note that the results of the Mincer earnings regression by sex should be taken with a grain of salt. There may be bias due to a smaller sample size, inaccurate measurement of experience, or lower and discontinuous female labor market participation, for instance. Many women withdraw from the labor force in order to take care of their family and household. Yet, the opportunity cost of doing so increases with a woman's skill level, so I expect a woman to be more likely to continue working the higher her educational attainment. Indeed, using data from the 1990s, Zouari-Bouatour et al. (2014) show that economically active women on average have higher educational achievement than economically active men in Tunisia. This selection effect is likely to cause an upwards bias in the estimations of the returns to tertiary education for women: among the older generations represented in the

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11. In April 2019, 1 euro was worth roughly 3.4 TND.

sample, only the most capable women continued to study and entered the labor force (Patrinos, 2016). Considering that female enrollment rates have been relatively high in Tunisia, though, it is not clear how important this bias is, though.

The hypothesis of heterogenous returns to education by sex seems to hold at first sight: When I estimate equation 5 separately by sex, the results indeed suggest that Tunisian women have higher returns to secondary and especially to university education than men. In order to test for the statistical significance of these results, I introduce a binary variable for sex and generate interaction terms with the levels of educational achievements in equations (7) and (8). I then test whether the binary variables are statistically significantly different from zero.

$$\ln W_i = \alpha + \beta_1 sec_i + \beta_2 vocat_i + \beta_3 univ_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \gamma_3 male_i + \epsilon_i \quad (7)$$

I report the estimation results in column (V) of table 13 in appendix B.2.3. When estimating equation 7, I find that the  $\widehat{\gamma}_3$  has the expected sign. It is positive, which would suggest that, with the same experience and educational attainment, a man could expect to earn about 7.9 percent more than a woman. However, the coefficient is not statistically significant at conventional levels of statistical significance.

$$\ln W_i = \alpha + \beta_1 sec_i + \beta_2 vocat_i + \beta_3 univ_i + \beta_4 sec_i * male_i + \beta_5 vocat_i * male_i + \beta_6 univ_i * male_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \gamma_3 male_i + \epsilon_i \quad (8)$$

I make the same observation when estimating equation 8, reported in column (VI) of table 13. The estimated coefficients have the expected sign but the interaction terms and the male dummy are not significant at conventional levels of statistical significance. When I run an F-test of joint significance, I fail to reject the null hypothesis that the male dummy and the interaction terms together are equal to 0.

Testing the coefficients by themselves, I find that only the male dummy is marginally significant at the 10% significance level while the interaction terms are not statistically significant at all. Hence, a priori, the TLMPs (2014) data does not allow me to conclude that the returns to secondary and tertiary education differ across sexes. I also test for the statistical significance of the male dummy when introducing it into the basic model with years of schooling as a regressor and the basic model with years of schooling and years

of schooling squared. Likewise, I generate an interaction term between male and years of schooling. I report all results in columns (I) - (IV) of table 13 in appendix B.2.3. The sign of the coefficients suggests that the returns to schooling are higher for women but again, I find that the difference is generally not significant at conventional levels of statistical significance.

In column (VII) table 13, I introduce controls for coastal and rural geography. This affects the main regression results only in a minor way, but the interaction term of being male and having university education is now negative and statistically significant at the 10% level while the male dummy stays positive and statistically significant at the 0.5% significance level .

Thus, when controlling for “coastal” and rural geography, there is evidence that the returns to university education may be higher for women than for men in the TLMPs (2014) data while overall, men can expect higher wages. This could point to the fact that the returns to education differ across sex depending on regional development. The geography dummies may indeed capture another feature of the data: unemployment. I coded most of the governorates which exhibited above-average unemployment rates in 2014 as “*non-coastal*” governorates<sup>12</sup>. The unemployment rates are notoriously higher in the rural and interior areas of Tunisia. This is why I expected that unemployment may affect men and women – and their respective expected wages and returns to tertiary education – differently. Please see appendix B.2.3 for my analysis of the influence of geographical location and the probability of being employed on the returns to education.

**The public sector** In order to test the hypothesis that the returns to education are higher in the public than in the private sector, I first introduce a public sector dummy in equation 7, then interaction terms with level of education and the public sector dummy, and triple interactions with level of education, the public sector dummy and the male dummy.

The estimated regressions which are reported in table 16 in appendix B.2.3 indeed generally yield a positive and statistically significant coefficient on the public dummy. The wage returns to working in the public sector are likely to be positive in Tunisia. Following the regression results reported in column (V) and holding experience and educational attainment

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12. With 26.2 percent for the total population, 19.0 percent for men and 42.7 percent for women, Gafsa led the 2014 unemployment statistics by governorate as published by the INS (2015). By contrast, unemployment was lowest in the governorate of Monastir, with 9.3 percent for the total population, 7.4 percent for men and 12.6 percent for women (INS, 2015). Most of the governorates suffering from high unemployment rates (such as Gafsa, Kasserine and Jendouba) also perform relatively badly on the regional development index, which is why I coded them as “non-coastal”. By contrast, Monastir, Sousse and most other governorates with low unemployment rates have a relatively high score on the regional development index and are coded as “coastal”.

constant, I expect an individual working in the public sector to have a 25 percent higher salary than an individual working in another sector.

All estimated coefficients on the public dummy and the interaction terms are positive and, with the exception of the public x vocational training interaction, statistically significant at least at the 5% level. The gains in the returns to education associated with working in the public sector are also economically significant, especially for university-educated individuals.

The estimation results reported in column (VII) of table 16 confirm that the returns to working in the public sector are higher for women in general. However, I am unable to reject the hypothesis that the returns to working in the public sector differ among female and male *university* graduates. In contrast, there is evidence that for individuals with *secondary* education, the returns to working in the public sector may be higher for men than for women.

Why do the returns to university education not differ across sex for individuals working in the public sector? A potential explanation is that the women with tertiary education in the TLMPS (2014) sample are likely to be more able on average than their male peers due to selection. As a result, they may be able to find equally attractive job opportunities outside the public sector. The anecdotal evidence pointing to a strong preference for public sector work among women may be related to other, non-wage benefits offered by a public sector job. A second potential explanation is a combination of sample size issues and again, selection bias: the number of women with university education in the TLMPS (2014) data is very restricted and the sample becomes even smaller when I exclude those working outside the public sector. A third and maybe the most compelling explanation is that the public sector has a rigid salary policy, allowing for little individual wage variation.

As a conclusion, the returns to education in Tunisia tend to be higher for individuals working in the public sector. This is true for secondary and tertiary education, but the effect size is larger for university graduates. While it seems that men with secondary education have more to gain from a public sector job than women with equivalent qualifications, contradicting my initial hypothesis, there is no evidence for such a gender divide with respect to the returns to university education.

## 2.3 Preliminary conclusions

My analysis of the TLMPS (2014) data confirms that the returns to education in Tunisia are heterogenous and that there is a sheepskin effect. Adding dummies for different educational levels seems thus justified and is inevitable for estimating the returns to university education relative to secondary education. For my final specification, I do not retain the controls for coastal and rural location and the public sector. I have shown that these factors play an important role in determining wage earnings and, up to a certain extent, the private returns to education. However, they may be “bad controls” in the sense of Angrist and Pischke (2009). For my estimators to be unbiased, I need to assume that my controls were fixed at the time when the regressor of interest – schooling – was determined. This may not be the case: individuals face an economic incentive to migrate to the regions where their investment in schooling is rewarded more. In exemplum, they may leave the interior of Tunisia and move to the coastal areas if the expected returns of their educational investment there are higher.

Likewise, even though I have demonstrated that working in the public sector has a statistically significant impact on the expected returns to education, the probability of obtaining a public sector job is likely to be endogenous to the achieved level of schooling (see Pellicer, 2018). The fact that the public sector rewards skills relatively more than the private and especially the informal sector in Tunisia will play a crucial role in my ensuing analysis of the labor market dynamics and Tunisian students’ educational choices, though (see sections 3.4 and 4.3). But in the sense of Montenegro and Patrinos (2014), keeping the regression as simple as possible is beneficial to the comparability of my results. This will tend to upwards bias my estimated returns to tertiary education. Finally, given the methodological difficulties in correcting for the probability of being employed and the small sample size, I refrain from doing so in this result section for the sake of simplicity and comparability with previous studies.

Therefore, I retain the estimation of equation 5 for my result section and estimate the returns to tertiary education in Tunisia to lie between 11.4 percent and 17.3 percent per year, which is a relatively low estimate. Barouni (2016) finds the returns to university education to be between 17 and 24 percent. Limam and Ben Hafaiedh (2018) estimate the returns to tertiary education relative to *intermediate* education to be close to 23 percent. Note however, that using their regression results, I obtain returns to university education of about 13 percent per year if I compute the difference between university and *secondary* education. My regression results are thus reasonably close to the results of previous studies.

For completeness, I also report the basic model estimating the returns to education per year of schooling. In addition, I estimate both equation 2 and equation 5 separately by sex and report the lower and upper bound estimates. See table 2 below for my final regression results.

Table 2 – Main estimation results: Returns to one year of education in percent

	One year of schooling			One year of tertiary education					
	All	Male	Female	All		Male		Female	
				LB	UB	LB	UB	LB	UB
Mincer	6.9	6.3	8.0	11.4	17.3	9.8	14.6	14.7	22.6

My final results using the Mincer earnings equation confirm that the returns to tertiary education are higher than the returns to a generic year of schooling. While I provide both upper and lower bounds estimates, I retain that the true returns to tertiary education are likely to be closer to the lower than to the upper bounds as assuming an average study time of 4 years, as I did for the upper bound estimate, is likely to underestimate the true opportunity cost of going to university. Finally, confirming my initial hypothesis and even though the differences are often not statistically significant, the returns to tertiary education are likely to be at least as high for women as for men.

Table 3 – Returns to education in other middle-income countries

		One year of schooling		One year of tertiary education		
Country	Year	All		All	Male	Female
Colombia	2012	11.0		19.6	19.3	21.4
Dominican Republic	2011	9.4		15.8	15.2	18.1
Malaysia	2010	12		22	21.8	23.1
Mauritius	2012	15.1		21.5	20.9	24.7
Turkey	2010	10.7		14.7	14.5	17
Tunisia (LB)	2014	6.9		11.4	9.8	14.7
Tunisia (UB)	2014	6.9		17.3	14.6	22.6

[Source: Montenegro and Patrinos (2014); *Tunisia*: Own estimates]

When compared to the estimated returns of education in other middle-income countries as reported in table 3, the returns to tertiary education in Tunisia are rather low. In addition, there is still reason to suspect that my estimates are upwards-biased as I will explain in the following section.

## 2.4 Limitations and comparison to previous studies

There is a number of biases which I have not been able to tackle: most importantly, innate ability. Kjellström (1997) suggests that the estimated returns to education may drop by about 20 percent if a control for innate ability is included. I therefore acknowledge that there will be an upward bias in my estimations, which I am unable to adequately control for given the limitations of my dataset. There is a large literature trying to solve this issue, most notably by using IV regressions (for example, the timing of the introduction of compulsory schooling or the distance to the next school can be used as an IV). Prominent publications in the field using IV specifications include Duflo (2001) and Angrist and Krueger (1991). Instrumental variables present other inconveniences, however. In many cases, the exclusion restriction may not hold. Most IV estimates are higher than the corresponding OLS estimates, which may be due to the fact that they measure the local average treatment effect (LATE), only looking at a certain sub-population which is subject to treatment.

While using IV would be an interesting extension to this analysis, especially with respect to measuring the impact of emigration prospects on educational investment decisions (see section 5.4), I leave it to future research because of data restrictions. Notwithstanding this, the general idea conveyed by my estimations is reinforced: my estimates, which are already low, are likely to overstate the true returns to tertiary education in Tunisia.

Finally, a major inconvenience of using TLMPS (2014) and Mincer earnings regression to estimate the returns to university education is that I rely on a sample of people aged 25 to 65 whose wages and educational attainments may not be good predictors of the returns to university education that expect the current cohort of Tunisian lycée students. For instance, gender disparities may have decreased and ongoing technological changes may impact the earnings distribution. Regional and international labor mobility may have increased. By contrast, it does not seem unlikely that Tunisian students make their educational investment decisions based on observing their older siblings', parents', extended families' and even grandparents' labor market outcomes. This justifies my solution approach and prepares

the ground for the next chapter in which I am going to contrast the previous findings with my own survey data on the *expected* returns to education.



### **3 How do Tunisian high school students perceive the private returns to university education?**

Given the overall rather low returns to tertiary education, do young Tunisians pursue their studies hoping for better jobs in the public sector and thus disregard the low expected monetary returns to education and a high risk of unemployment? This was my working hypothesis, based on the studies cited above, personal experience, and the striking differences in the educational outcomes observed in Tunisia and the Dominican Republic, as documented in Jensen (2010). To my best knowledge, there has been no major survey on the expected returns to education and educational choices in Tunisia and hence, I decided to collect my own data. In contrast to what I initially expected, however, my survey results indicate that Tunisian youth today are more aware of their professional prospects than the previous literature suggests and do not ignore the fact that public sector jobs have become rare (see section 3.4). They also display an excellent appreciation of the monetary returns to university education as I will show in section 3.4.

This chapter presents my own survey on the returns to education as perceived by Tunisian high school students. Sections 3.1 and 3.2 contain a detailed description of my field study and hypotheses. Section 3.3 offers a comparison with the most relevant previous study on the perceived returns to education, Jensen’s (2010) work on the Dominican Republic. Please consult appendix A.4-6 for copies of all relevant documents and questionnaires and appendix B.3.1 for the power simulation I used for planning the survey and additional information on the survey technique and data. In the results section 3.4, I will show that in my sample, the students’ estimated returns to education are surprisingly close to the actual returns to education as computed using TLMPs (2014). My results also strongly suggest that there are important non-monetary drivers behind their schooling decisions, which may explain why educational investments have remained relatively high. Section 3.5 provides preliminary conclusions on my findings.

#### **3.1 Data: The field study**

I collected the data used in this section in Tunisia between April 11 and April 26, 2019. I contacted and visited the Tunisian Ministry of Education beforehand, in order to obtain official permission for conducting the survey in public institutions of secondary education. I was granted research permission by the General Director for Secondary Education in Tunisia, Mr. Hatem Amara. Please see appendix A.4 for a scan of the sealed and signed

document.

The timing of my visit was not perfect since the baccalauréat examinations had already initiated in some schools. However, travelling to Tunisia in April allowed me to avoid the Ramadan festivities in May and the final exam period in June. Thanks to the support of the school administrations and teachers, I was able to interview a large sample of students. I visited lycées, lycées pilotes, a school for vocational training and a private language school in Tunis, Cité Ezzouhour, Kalâa Kebira, Sousse and Bizerte<sup>13</sup>.

The questionnaires were in French, with some expressions specified in Tunisian Arabic, when helpful for the students (see appendix A.5.1 for the original version of the questionnaire and appendix A.5.2 for a translation to English). The earnings-related questions follow the spirit of Jensen (2010) but they are adapted to the Tunisian context. Like Jensen, I separately asked the students to name a *perceived average* income and an *expected own* income given either high school or university education. The former allowed Jensen to obtain an estimation of the returns to education which was supposed to be free of expected discrimination and should not include the students' appreciation of their own ability or other fixed determinants of expected income (Jensen, 2010). Given the different social context of Tunisia, I did not expect the students to anticipate wage discrimination but still included the question in order to test for optimism bias and potential gender differences with regards to expected income (see section 3.2). Basing myself on relevant literature on the aspirations of Arab youth and on my personal experience and knowledge of the socio-political context, I came up with further questions on the students' motivation to continue studying and the perceived quality of the educational offer in Tunisia (see section 3.4).

In the beginning of the interview sessions, I introduced the survey as part of my master thesis on education and the labor market in Tunisia and stressed my intention to obtain the personal opinions of the students. The vast majority of the students were very interested and collaborative and filled in the survey diligently. The teachers and I were present to clarify the questions in French and translate to Tunisian Arabic whenever necessary. In some cases, students worked on the answers with their classmates, but this happened quite rarely. I mostly observed students explaining questions to fellow students who were less fluent in French.

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13. Please see appendix B.1 for more information on the different school types and the general structure of the educational system in Tunisia. I also provide a map indicating the location of the schools in my sample in appendix B.3.3

Appendix B.3.2 and B.3.3 provide more information on the schools included in my sample and an account of the "lessons learned". In total, I interviewed 554 subjects with a two-page written questionnaire and punctually used individual oral interviews in order to obtain additional information. I subsequently restricted the sample to an age range of 15 – 29 which leaves me with 538 observations.



Figure 5 – At Lycée Al Canal, Bizerte, April 22, 2019  
Picture: Karima Ferjani



Figure 6 – At Lycée Bach Hamba, Bizerte, April 24, 2019

Table 20 reports summary statistics. The mean age of the students in my sample is 18.1 years. A majority of 58.7 percent of the students are female. I hypothesize that this is partly owed to higher drop-out rates among male students and partly to the fact that male students were more likely to be skipping classes at the time when I was conducting the survey<sup>14</sup>. The students in my sample have 2.1 siblings on average and their parents have completed more than secondary education on average<sup>15</sup>. 39 percent of the students in my sample attend a lycée pilote and 48 percent attend a normal lycée<sup>16</sup>. About 4 percent of the students in my sample attend at-tekwyni (vocational training) and about 9 percent attend a private language school. Note that I used the at-tekwyni and the language school students only for a few analyses, my main sample being the set of lycée students.

### 3.2 Hypotheses

The main purpose of my field work was to find out why, despite moderate monetary returns, university education is so attractive for young Tunisians and whether they hold exaggerated expectations in terms of future wages. I particularly wanted to find out whether they attend university hoping for well-paid public sector jobs and therefore tend to disregard alternative educational offers such as vocational training.

These were my main working hypotheses when designing the survey:

1. The relatively high demand for university education in Tunisia is related to high expected returns to education (for instance in comparison with Jensen, 2010, see section 3.4).
2. Given its historical importance and the generous benefits associated with public sector employment, the public sector is attractive to a high percentage of students even though they expect average wages to be higher in other sectors (for instance ILO, 2015, see section 3.4).
3. Another important motivation for choosing to go to university is the prospect of emigration (see sections 3.4 and 5.4). I formed this hypothesis mainly based on anecdotal evidence, personal experiences and the historical importance of labor migration from

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14. Tunisia was very successfully participating in the 2018/2019 edition of the Arab Club Champions Cup and Étoile Sportive du Sahel, the football team of Sousse, won the tournament on April 18, 2019. It was the most important athletic success in the club's recent history and caused some minor disruptions to my research in Sousse and the neighboring town of Kalâa Kebira.

15. For evaluating both the mother's and the father's educational attainment, I coded "no education" as 0, "primary education" as 1, "secondary education" as 2, "vocational training" as 3 and "university education" as 4. I also asked the students for their parents' professions or jobs, which allowed me to check their understanding of the question on parental educational attainment. I did not detect any major inconsistencies in their answers.

16. See appendix B.1.1 for further information on the Tunisian school system.

the Maghreb countries to Europe.

4. Vocational training, *at-tekwyni*, has a bad reputation among the students and they tend to be not very well-informed about the program (see sections 3.4 and 5.3). I formed this hypothesis based on anecdotal evidence and personal accounts by Tunisian friends and colleagues. Vocational training has a rather bad reputation in the Arab world in general (UNDP, 2016).

There were a few additional hypotheses I wanted to test for:

5. There are important socio-economic differences between students at *lycée* and *lycée pilote* (see sections 3.4 and 5.2). I based this hypothesis both on my previous understanding of the Tunisian educational system (see appendix B.1 for an overview of the Tunisian educational system and its historical development) and economic research which suggests that parents' educational achievement is positively correlated with their children's school performance (for instance Holmlund et al., 2011).
6. *Lycée pilote* students are better at estimating monetary returns to university education (see section 3.4). I formed this hypothesis assuming that, given their above-average performance at school, *lycée pilote* students may be more interested and better informed about labor market dynamics and education in general.
7. *Lycée pilote* students expect higher returns to education (see section 3.4). Considering that they are selected based on their exam performance and that the returns to education have been shown to be positively correlated to innate ability (for instance Kjellström, 1997), it seems reasonable that *lycée pilote* students may expect relatively high returns to education.
8. *Lycée pilote* students give a better evaluation of educational quality in Tunisia (see section 3.4). I formed this hypothesis based on the observation that, within the Tunisian school system, *lycée pilote* students receive special treatment and are likely to enjoy better schooling conditions (see appendix B.1).
9. I expected optimism bias, assuming that students tend to expect higher earnings for themselves than for an average person (i.e. because they assume that they are of higher ability than the average population; this hypothesis is based on evidence from behavioral economics, see for example Law, 2016; see section 3.4 and the additional tables reported in appendix B.3).
10. I expected the optimism bias to be stronger among boys than among girls. This hypothesis is based on several studies in experimental economics which suggest that men tend to be more overconfident about their own ability than women (see for example Niederle and Vesterlund, 2007 and see section 3.4 for the results).

### 3.3 Comparison to Jensen (2010) and limitations

Other than Jensen (2010), I conducted my survey with a written questionnaire rather than interviewing each student individually. This presents both advantages and disadvantages. The wording of my questions was less formal and lengthy than Jensen's and unsurprisingly, the response rate was higher. Only 6 out of 554 students did not completely fill in the expected salary section of the questionnaire, which is a much lower percentage than in Jensen's study where 10 percent of the subjects did not answer the earnings-related questions. In contrast to Jensen, I explicitly asked for an *average* salary and most students seemed to have a good understanding of this concept. However, some obvious problems persist. For instance, I cannot account for inflation (an important factor in Tunisia, where the inflation rate reached 7.1 percent in March 2019 and 6.9 percent in April 2019). Furthermore, I am unable to evaluate the students' expectations of how their lifetime earnings will develop and their perception of how their earnings may vary depending on occupation, economic situation etc. A few students considered at least some of these factors and named an interval of possible expected earnings rather than a specific amount, though. This being said, I think that it is unlikely that the students would have been able to adequately picture the influence of more abstract factors such as inflation on their earnings profile and the resulting uncertainty about the results is unfortunately part of the survey method.

In contrast to Jensen (2010) and given my financial and time constraints, I could not visit the students' families and ask their parents about their monthly income and other socio-economic household characteristics. Anticipating that the students themselves may not be able or willing to reveal this information, I limited myself to inquiring the number of siblings, their parents' educational attainment and current jobs. This certainly limits the possibilities for analyzing their socio-economic background. However, the responses I obtained were almost all complete. Most students seemed well-informed about their parents' educational achievements and their current jobs and did not hesitate to disclose this information. Even basing myself on this very limited information, I am able to draw some strong conclusions with respect to the socio-economic background of the students in the different school types which I briefly discuss in section 3.4.

Other than Jensen (2010) who focuses on the returns of *secondary* education relative to primary education, I decided to focus my analysis on the returns of *tertiary* education relative to secondary education. This choice seems natural considering the contextual differences of my survey conducted in Tunisia in 2019 and Jensen's study, which was conducted in the Dominican Republic in the early 2000s. As an illustration: in Jensen's sample only 13

percent of the respondents reported that they wanted to attend a university (Jensen, 2010, p. 530). In my sample, by contrast, 72.9 percent of the respondents reported that they wanted to attend university<sup>17</sup>. Given the close to universal secondary school enrollment rates and the relatively high university enrollment rates (see appendix B.1.3), evaluating the expected returns of secondary relative to primary education in Tunisia today would not be very instructive. Hence, it seemed preferable to target an older age group: other than Jensen who only surveyed 8th graders, I mainly interviewed students at Tunisian lycées, which comprise students from grade 10 to grade 13. While Jensen’s sample has a mean age of 14.3 years, my subjects are 18.1 years old on average. I consider this to be beneficial to the internal and external validity of my study because the students were more mature and showed a good understanding of my questions and the socio-economic context of their country.

Furthermore, Jensen’s study limits itself to the educational choices of Dominican boys, mainly because Dominican girls at the time of the study, on average, considered it unlikely that they would do wage work outside the household. The situation looks very different in Tunisia today. 58.7 percent of my sample is female which is telling of the overall very high secondary school enrollment and completion rates of Tunisian girls. In 2016, Tunisian girls were almost 10 percentage points more likely to be enrolled in high school than their male counterparts (97.9 percent vs. 88.1 percent) and even 17 percentage points more likely to enroll in university (41.2 percent vs. 24.1 percent) (Assaad et al., 2019; UNESCO, 2019). Indeed, at least in my mostly urban sample, “I do not think that I am going to work”, an answer option which I included after taking into consideration Jensen’s study, was one of the least commonly checked answers in my questionnaire<sup>18</sup>.

A major concern for the validity of my findings is that the survey respondents did not give honest answers or copied answers from their neighbors. I was present at all survey rounds in Tunis, Cité Ezzouhour, Kalâa Kebira, Sousse and Bizerte and, the latter was certainly a minor problem. I had insisted on the fact that I was interested in the students’ personal opinions and that there were no “wrong” answers and most students filled in the questionnaire individually. There were some “spillover” effects, (i.e. students copying “*I want to study medicine*” from their neighbor when they really did not know what they wanted to study) but this is of minor concern to my survey results as I mainly rely on the other sections of the questionnaire and included these questions mostly as a means of testing the

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17. Only 5.3 percent of the respondents replied that they did not want to attend university and the others ticked “maybe” or “I do not know yet”)

18. “I do not think that I am going to work” was checked 8 times in total (which amounts to roughly 1.5 percent of all respondents) and out of the 8 respondents who checked it, 5 were male.

logical coherence of the students' replies. Given the fact that they were interviewed during regular class time and that their teachers were present, however, some students seemed to hesitate to give a sincere evaluation of the quality of Tunisian high schools. Therefore, I strongly suspect that the average appreciation of high school quality is upwards-biased in my sample. By contrast, I do not have any major concerns about the accuracy of the replies to other sections of the questionnaire.

Relative to previous work, a disadvantage of my survey is that it was not conducted in the students' first language, Tunisian Arabic, but in their second language, French. This is of course mainly due to my own language limitations. Yet, Tunisian students study French from an early age on and, on average, have a very good knowledge of the French language by the time they reach the upper grades of the lycée. Furthermore, scientific subjects are often taught in French and Tunisian students are used to doing math in French, which is why I consider that a potential language barrier poses only minor limitations to the validity of my findings.

The most obvious difference between Jensen (2010) and my survey is that I did not include a treatment. Jensen informed part of his sample about the real monetary returns to education and he was able to show that this information increased secondary school completion rate significantly among the least credit-constraint students. I did not implement any similar treatment in the framework of this study. This is mainly due to time and resource constraints and could be done in a follow-up study. Given my results, it would be interesting to evaluate whether revealing the real – relatively low - monetary returns to university education could increase the relative attractiveness of the vocational training program at-tekwyni. First, it would be crucial to scrutinously evaluate the monetary private returns to vocational training in Tunisia, though, which is not an easy task given that there are few vocational training centers and only a very small fraction of Tunisian students enroll. TLMPS (2014) does not include enough observations with vocational training for a reliable analysis of the current returns to at-tekwyni.

I tried to obtain a fairly representative sample of answers. Tunis, Bizerte, Kalâa Kebira and Sousse are all relatively rich coastal cities and may not be fully representative of the whole population of Tunisia. Like Jensen (2010), I have a very urban sample, with only 10 out of 554 families deriving most of their income from agriculture or fishery. This is not representative of the overall sectoral employment distribution in Tunisia, where 14 percent of the active population work in agriculture and fishery according to the most recent population



survey of the Tunisian National Institute of Statistics (INS, 2019a). However, I succeeded to visit some schools in very marginalized areas (i.e. Lycée Sijoumi in Cité Ezzouhour and Lycée Al Canal in Bizerte), which increases the external validity of my findings.

Finally, I do not exclude the possibility that my results are up to a certain extent driven by experimenter bias. I visited the schools myself and introduced myself as a graduate student from a European university before handing out the survey. This may have influenced the students' answers to some of the questions up to a certain extent, i.e. with respect to emigration. My questionnaire concluded two questions evaluating first, whether emigration is a motivation for pursuing university studies, and second, whether the students can imagine applying for a job abroad. Both questions yield similar results, which at least indicates logical coherence, and all professionals I spoke with confirmed the importance of the emigration channel for the current generation of Tunisians. I therefore retain that even though it may be present, experimenter bias seems insufficient to explain the entirety of my findings.

### 3.4 Results

**Summary statistics: socio-economic variables** Table 21 in appendix B.3.3 includes summary statistics on the students' self-reported socio-economic background. These summary statistics allow me to evaluate to what extent the family background between the students attending the different school types differs.

I first compare the mean age by grade between lycée and lycée pilote students. For 12th graders, I am able to reject the null hypothesis of equality of mean age at the 0.5% significance level: the students at the lycées are significantly older on average, which may represent suggestive evidence for the recurrent staying back at the lycée, often criticized in the literature. With 38.7 percent of students repeating a grade or more during their schooling, Tunisia indeed has a very high national average of grade repetition (International Alert, 2015). The mean age by grade is also higher for boys than for girls in all grades except the 12th grade. The difference is statistically significant at the 0.5% significance level for the 10th and 13th grade and statistically significant at the 5% significance level for the 11th grade. This suggests that Tunisian boys on average are more likely to stay back or start school later than girls.

The means of mothers' and fathers' educational achievement differ between lycée and lycée pilote. The difference is significant at the 0.5% significance level in both cases. Students enrolled in lycées pilotes have better educated parents on average. This seems

intuitive given that admission to the selective lycée pilote is based on exam performance. Even though the relative importance of the concrete channels of transmission is disputed, the existence of a positive association between children’s academic performance and their parents’ educational achievement is well-established in the economic literature (Holmlund et al., 2011). A recent study on the determinants of educational achievement in Tunisia suggests that children whose mother has higher education are 35.9 percentage points more likely to reach university education than children whose mother is illiterate (Krafft and Alawode, 2018).

Furthermore, the mean number of siblings differs at the 0.5% significance level. The students attending lycée pilote have fewer brothers and sisters on average. In the TLMPS (2014) data, the number of children in a household is negatively and statistically significantly correlated with income. Given the evidence cited above, the students at lycée pilote are likely to come from more privileged families on average. Hence, even my very limited data suggests that the recent reports in the Tunisian press which deplore the socio-economic segregation of the school system are not unfounded <sup>19</sup>.

The means of mothers’ and fathers’ educational attainments also differ between the lycée and the at-tekwyni student sample. The difference between mothers’ education is significant at the 0.5% level whereas the difference between fathers’ education attainment is significant at the 5% level. The number of siblings between at-tekwyni and lycée students differs at the 0.5% significance level. Given the very small sample of at-tekwyni students, this is clearly driven by the large difference in means.

In conclusion, the summary statistics provide suggestive evidence that first, lycée pilote students have a more educated family background than students at the regular lycée and at at-tekwyni. This is intuitive given that admission to lycée pilote is based on entry exam test scores and student performance has been shown to be positively correlated to parents’ educational achievement and income. It is nonetheless an important finding, considering that, within the MENA region, Tunisia is generally known for providing high equality of opportunities in education (Assaad et al., 2019) <sup>20</sup>. Second, my sample of at-tekwyni students seems to come from larger and less educated families on average. The difference relative to the lycée students is both statistically and economically significant. I note however, that the sample of at-tekwyni students is older on average and certainly not randomly selected. The

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19. The Tunisian educational system has been depicted as a multi-speed educational system, “*système éducatif à plusieurs vitesses*” (see for example Attia, 2018).

20. See section 5.2 for potential policy implications of this apparent lack of social mobility in education.

external validity of this finding is therefore limited.

**Expected returns to education** As of March 2019, the minimum wage (*salaire minimum inter-professionnel garanti*) in Tunisia was 1.866 TND per hour in the 40-hour regime and 1.820 TND per hour in the 48-hour regime (INS, 2019b). This yields a legally guaranteed monthly wage of about 298.560 TND or 349.440 TND<sup>21</sup>. The students' responses indicate that some of them may have been aware of this legal provision and perceived it as a benchmark value for the average monthly wage.

I compare the average expected returns to tertiary education to the corresponding wage differentials between respondents with secondary and tertiary school attainment from the TLMPS (2014) data. There are some methodological difficulties when comparing the mean average income as computed with the TLMPS (2014) data and the means obtained from the students' survey replies. The respondents in the TLMPS (2014) survey needed 6 years on average to complete their university education. In the survey, I explicitly asked the students to think about the returns to a 3-year licence (Bac+3). Therefore, in order to compute the returns to tertiary education per year, I divide the means obtained with my survey data by 3. For the TLMPS (2014) means, I provide both the means assuming 3 and 6 years of study. The resulting estimates should be taken as indicative of an upper and lower bound. Given that TLMPS (2014) was conducted almost five years earlier than my study, I adjust for the wages changes as reported by the Tunisian statistical office for the private non-agricultural sector (table 22 in appendix B.3.3 shows the official data on wage inflation in Tunisia)<sup>22</sup>.

As a robustness test, I first compute the perceived average monthly wage including all observations (see table 23 which is reported in appendix B.3.3 as are the following tables). In a second step, I exclude outliers in the data I collected, that is, I exclude estimated salaries >10,000 TND. These salaries seem very exaggerated estimates considering that, when assuming a 40-hours work week, only 1 out of 1,345 recorded hourly wages was high enough to yield a monthly income superior to 6,160 TND in the TLMPS (2014) data. Table 4 presents the results corrected for outliers in the survey data<sup>23</sup>.

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21. When the study was conducted in April 2019, 1 euro was worth roughly 3.4 TND. The legally guaranteed monthly wage thus lies between 87.81 euros and 102.78 euros.

22. Wages increased by ca. 34.88 percent from 2014 to 2018.

23. *Note:* In this section, I limit the comparison of the real and the expected returns to education to a comparison of means since the survey method does not allow me to account for the influence of experience etc. as in chapter 2.

Table 4 – Expected returns to education in TND, excluding outliers

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	478.643 [n=242]	645.690 [n=242]	708.285 [n=522]	1086.360 [n=522]
Tertiary	1039.402 [n=165]	1402.153 [n=165]	1224.444 [n=522]	1902.941 [n=522]
Tertiary - Secondary	560.758	756.463	516.159	816.581
RTE [UB]	0.391	0.391	0.243	0.251
RTE [LB]	0.195	0.195		

*Note:* Column (I) is the measured average monthly wage computed based on TLMPS (2014), not controlling for sex, age, experience and other variables. In column (II), I correct for wage inflation using the official estimates of wage inflation between 2014 and 2018 as reported in table 22. Column (III) lists the students' perceived average monthly wage and column (IV) the expected average monthly wage for the respondent themselves. All numbers are in TND.

This simple comparison of means allows me to draw some preliminary conclusions: First, the returns to education as estimated by the students lie within the bounds suggested by the TLMPS (2014) data. Overall, the returns to education as perceived by the students seem to be realistic. This represents a stark contrast to Jensen's findings: Dominican school-boys severely underestimated the returns to education. Jensen focuses on secondary and not tertiary education and the comparability of the two studies may be limited for several reasons as explained in section 3.3. Still, the accurateness of the students' reply is impressive and suggests that they are well-informed about the local labor market and the relative monetary value it attributes to secondary and tertiary education.

Second, after correcting for outliers, students still tend to expect substantially higher earnings for themselves than for an average Tunisian in absolute terms. The differences between the mean perceived and expected wages as reported in column (III) and (IV) are significant at the 0.5% level. However, while there is evidence for optimism bias, this does not seem to affect the students' appreciation of the relative returns to education. While they expect higher salaries for themselves than for an average person, they do not expect university education to yield higher returns for themselves than for the average person in relative terms. This would be a reasonable assumption if they considered themselves to be of higher ability than the average person (as discussed in sections 2.2 and 2.4, the returns to education tend to be higher for more able individuals).

I analyze the survey data on expected returns to education with respect to the respondents' sex. For this purpose, I also use the earnings averages by sex computed based on TLMPs (2014). The results are reported in appendix B.3.3. As stated earlier, my initial hypothesis was that male respondents expect higher salaries on average. The data shows that this is true, with the notable exception of the expected salaries for the respondent themselves under the hypothesis that university education has been achieved. At conventional levels of statistical significance, however, I find that none of these differences are significant.

I thus fail to reject the hypothesis that the expected returns to university education are the same for both sexes. This could be related to the size of or selection issues within my sample. As previously mentioned, earlier literature suggests that the returns to university education for women in Tunisia are higher than for men (e.g. Barouni, 2016). If this is true, my results would indicate that Tunisian girls may not be sufficiently aware of their relatively higher returns to university education. Yet, this may mean disregarding selection issues: the university-educated women surveyed in earlier studies are unlikely to be representative of the average female student today because going to university was an unlikely outcome before and the marginal female student was likely to be of higher ability than the marginal male student. Furthermore, I was myself unable to reject the hypothesis that the returns to tertiary education are equal across sexes for all my specifications (see section 2.2.2). Therefore, I conclude that my data again provides little evidence for the stereotypical gender divide with regards to educational achievement and expected income.

Next, I verify whether the expected returns to education differ among school types. This seems a reasonable hypothesis, given that the allocation of students to the different school types is done based on performance and therefore far from random. As explained in section 3.2, I expect lycée pilote students to name a higher expected wage than students at regular lycées.

Indeed, most average expected incomes are higher among lycée pilote students, which is intuitive given their previous above-average school performance and their, on average, more privileged family background. However, I find that only the difference between the expected salary with university education for themselves is statistically significantly higher for pilote students at the 5% significance level. All other differences in means are not statistically significant.

I also test for differences between the returns to education as expected by lycée

students and at-tekwyni students. As anticipated, at-tekwyni students expect lower wages across the board (see table 29). Despite the small sample of at-tekwyni students, the effect size is large enough to make the differences statistically significant at the 0.5% significance level for all measures. I interpret this difference as the likely result of a learning or frustration effect as most of the at-tekwyni students had already spent some time working or unsuccessfully looking for a job. I make two interesting observations: first, the at-tekwyni students report very low expected returns to education, especially for themselves. They are the only subgroup whose expected returns to education are below the lower threshold suggested by the TLMPS (2014) data averages. This may be related to their previous, as I found out in personal interviews, often negative, labor market experience (see appendix B.3.4). Second, all the average wages as reported by the at-tekwyni students are below the averages as suggested by the TLMPS (2014) data even in *absolute* terms. It is the only sub-group for which I make this observation. Given the high inflation rates in Tunisia between 2014 (when the TLMPS data was collected) and 2019 (when I surveyed the students), this result is surprising<sup>24</sup>.

I also find that children whose parents have university education tend to expect higher salaries on average. Since parents' educational achievement has been found to be positively associated with children's educational achievement and future salaries, this is intuitive (Holmlund et al., 2011). It also suggests that the observation of parents' incomes could be one of the channels through which students form their wage expectations. The difference is statistically significant at the 0.5% significance level only for own expected returns to university education, though.

**Perceived quality of educational offer** Following the predictions of the standard model and given that the expected return depends on the quality of the educational offer, educational investment should increase with the perceived quality of education. My survey results seem to be consistent with this prediction. On average, the students perceive the quality of tertiary education to be better than the quality of both vocational training and secondary education. The belief that university education in Tunisia is of better quality than vocational training is therefore likely to be a factor behind the educational decisions I observe.

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24. Since they were currently enrolled in a vocational training program, I would like to compare their expected returns to post-secondary education to the data on the returns on vocational training. However, the TLMPS (2014) data contains only a very limited number of observations with vocational training. When I nevertheless analyzed the data, I found that within the TLMPS (2014) survey, individuals with vocational training on average earn less than subjects with secondary education. The subject pool is very limited and anecdotal evidence suggests that, in the past, vocational training had been associated with failure in the regular school system. Hence, given that I cannot control for ability and given that the vocational training system in Tunisia has undergone important changes, this data unfortunately does not provide important insights about the potential returns to vocational training today. There is a lot of room for further study in this area and I would like to collect more data from at-tekwyni students for future research.

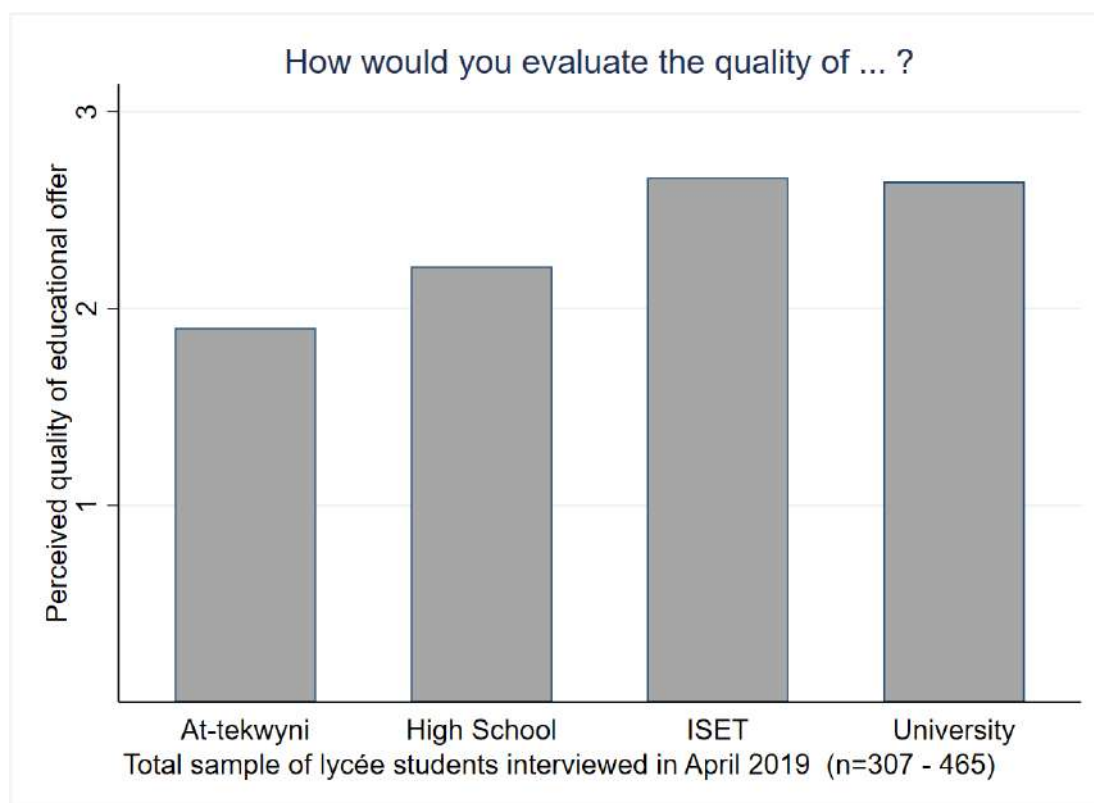


Figure 7 – "How do you evaluate the quality of the following educational programs in your municipality, city or gouvernorate?"

Table 30 reports all result by student group. Using the average evaluation of the educational offer and pooling the responses of the different school types, I reject the null hypothesis that the perceived quality is equal for all possible pairs at the 0.5% significance level, with the exception of ISET and university. This seems intuitive as ISET and university are competing tertiary education offers and many students were not aware of the differences between the two types of institutions.

I find that female students tend to give a more positive judgement of the quality of the educational offer, but the gender difference is only statistically significant for the evaluation of the quality of secondary education.

Lycée pilote students have a statistically significantly more negative judgement of the quality of secondary education, ISET and especially of at-tekwyni. This clearly contradicts my initial hypothesis. It seems that, even though they receive special treatment, lycée pilote students are more critical of the educational offer in Tunisia. Their bad opinion of the

quality of at-tekwyni may up to a certain extent reflect the opinions of their families who, on average, do not have a lot of personal experience with vocational training (in my sample, a vast majority of lycée pilote students' parents are themselves university graduates).

At-tekwyni students themselves have a statistically and economically significantly more positive opinion of the quality of at-tekwyni than the lycée students (2.95/4 vs. 1.99/4 on average). This difference in means is significant at the 0.5% significance level. While there is no statistically significant difference in the evaluation of lycée and ISET quality, at-tekwyni students evaluate Tunisian universities much more negatively than the high school students I interviewed. This may be related to the fact that many of them are university dropouts as I found out in personal interviews. They also confirmed that most Tunisians hold a negative opinion of at-tekwyni and that they did so, too, before learning more about it and starting the program (see the section “At-tekwyni: Qualitative evidence” in appendix B.3.4 for excerpts from the qualitative interviews I conducted in Sousse). These anecdotes suggest that at-tekwyni may deserve a better reputation than it currently has. Given that my sample of at-tekwyni students is quite small, I will refrain from drawing firmer conclusions, though.

**Motivation for continuation of studies** The survey answers suggest that Tunisian students hold surprisingly accurate expectations of the returns to university education. On average, they do not seem to overestimate the monetary gains associated with pursuing their studies at the university level. Which other factors motivate them to continue their studies at the university level?



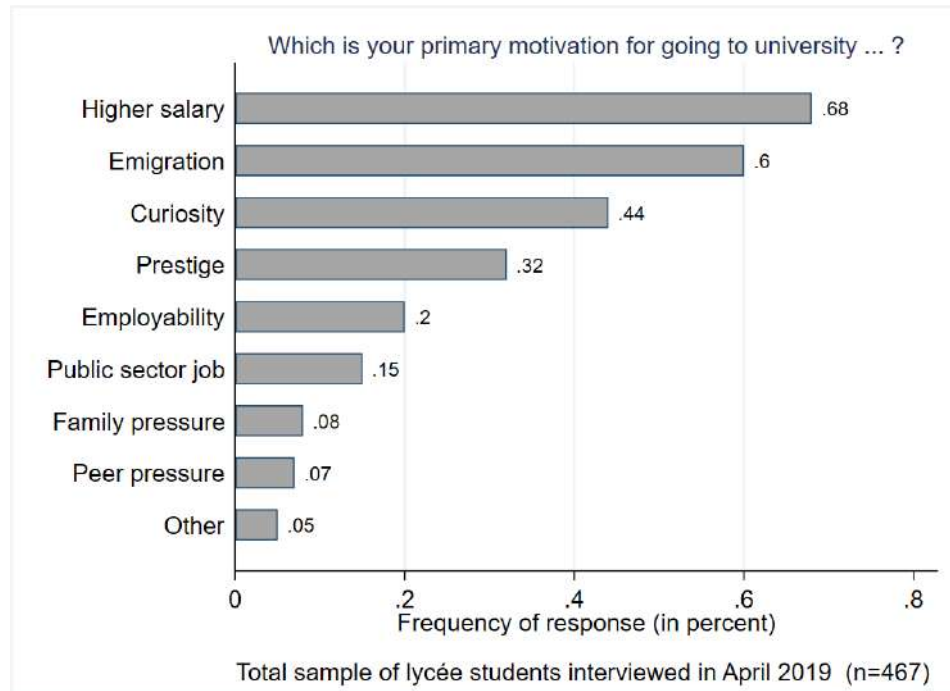


Figure 8 – "If you are considering enrolling in a university program, which of the following are your primary motivations?"

Table 31 in appendix B.3.3 includes a detailed break-down of the survey answers according to sub-groups. Admittedly, the differences between the respective sub-groups are quite small, but I will point out some key findings. I first focus on column I, the total sample of lycée students, which is also reported in figure 8. The students' answers confirm that wage considerations are an important reason for them to continue their education. The most often named motivation is the prospect of earning a higher salary (68.3 percent), followed by being able to work abroad (59.5 percent), intellectual curiosity (44.4 percent) and the social status associated with a diploma (32.1 percent). A lower risk of being unemployed (20.1 percent), job prospects in the public sector (15.0 percent), family pressure (7.7 percent) and peer pressure (7.1 percent) seem to play a minor role by contrast.

The survey answers differ only marginally between female and male respondents. Girls are a little more likely to name social status and intellectual curiosity as a motivation (statistically significant at the 5% significance level) but otherwise, I find no statistically significant differences across sexes.

The differences between lycée pilote and lycée are larger: students at lycée pilote are much more likely to name intellectual curiosity as a motivation (statistically significant

at the 0.5% significance level). They are less likely to name public sector jobs, peer pressure, prestige or family pressure (statistically significant at the 0.5%, 0.5%, 5% and 5% significance level). There is suggestive evidence that lycée pilote students are more likely to name a higher salary as a motivation (statistically significant at the 10% significance level). By contrast, the answers concerning the importance of employability and emigration as a motivation do not differ between lycée pilote and lycée students in a statistically significant way.

**The public sector** The finding that only a minority of the students consider employment opportunities in the public sector as a major motivation for pursuing tertiary education is a very important result. The inflated public sector has been a major concern for policymakers and donors in Tunisia and all over the MENA region and the stereotypical narrative is that instead of working in the private sector, Arab youth rather wait for comfortable public sector jobs (see for instance Stampini and Verdier-Chouchane, 2011 and ILO, 2015; also section 1.2). Arguably, the most recurrent answer “a higher salary” could be associated with a “decent” public sector job in the minds of some of the students.

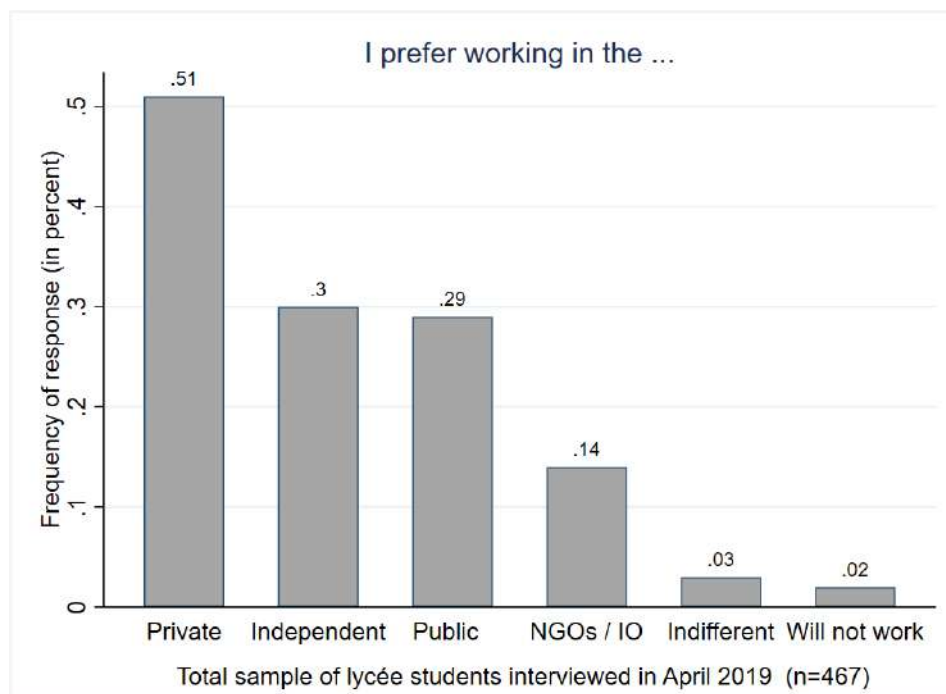


Figure 9 – "In the future, I would prefer working in ..."

However, when asked about their preferred sector, 50.7 percent of the lycée students list the private sector as one of their preferred sectors and 30.4 percent declare that they

would like to work independently. Table 32 reports a detailed breakdown of the answers by subgroup. Only 29.3 percent list the public sector as one of their preferred options. The public sector is especially unpopular among lycée pilote students and at-tekwyni students. My survey results therefore shed some doubts on the narrative that the current generation of Arab youth are willing to wait for years to obtain a public sector job.

A possible interpretation is that this is first evidence for a recently occurring shift in preferences, most likely a generational change. The fact that the share of respondents with a preference for working in the public sector is the highest among the students at the private school, the oldest age group, also points into this direction.

The students' answers regarding which sector offers the best wage perspective given their expected educational attainment (reported in table 36 in appendix B.3.3) look very similar to the previous question. When asked to focus on the monetary advantages offered by the respective sector, the students show an even stronger preference for the private sector.

**Emigration** The possibility of working abroad is clearly a major push factor behind Tunisian students' educational decisions. Given that the interviews were conducted by a foreign graduate student in the students' first foreign language, French, there likely is some experimenter bias and I expect the results to be slightly upwards-biased. However, the fact that in a follow-up question, 296 out of 466 lycée students (63.5 percent) answered that they considered applying for jobs abroad and only 28 (6.0 percent) declared that they did not, provides additional evidence for the hypothesis that job opportunities abroad are a driving force for young Tunisians' investments in education. See table 33 for the detailed results. In addition, all the teachers and professionals working in the field of education who I spoke with in Tunisia confirmed this observation.

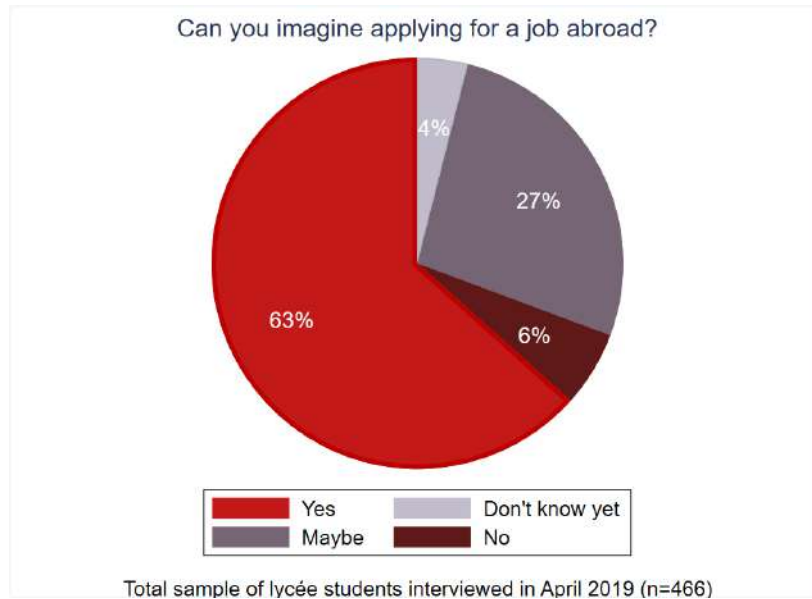


Figure 10 – "I am considering applying for a job abroad"

The finding that the prospect of emigration is a strong motivation behind private investment in education, most likely stronger than public sector employment opportunities in Tunisia, has far-reaching implications: there is no consensus in development economics on the question whether developing countries suffer most from a so-called “brain drain” or whether emigration can also lead to a “brain gain”. Some authors argue that the prospect of emigration can accelerate human capital accumulation. It may encourage human capital accumulation despite low returns to education within the national borders, thus resulting in an overall increase in human capital for the country. Several factors may push in this direction: the expected returns to education are likely to be higher abroad and the mere possibility of emigration therefore increases the expected value of education. Furthermore, if family members or friends have already emigrated, remittances from abroad may ease credit constraints and contribute to higher investments in education (Beine et al., 2001). This could fit the case of Tunisia: as of 2014, the Tunisian diaspora in France was estimated to be more than 721,000. Italy has been the second destination for Tunisian emigrants with a diaspora of about 200,000 followed by Germany with more than 90,000 (Ministère des affaires sociales, 2014). Within the TLMPs (2014) survey, 56.7 percent of respondents declared that, while working abroad, they regularly or irregularly sent remittances home<sup>25</sup>. Admittedly, the returns to tertiary education relative to secondary education in Western Europe have not been much higher than in Tunisia (Montenegro and Patrinos, 2014). However, wages

25. When asked the question “Did you send remittances (monetary or in-kind) to your family while abroad?” in TLMPs (2014), 20 respondents replied “Yes, regularly”, 38 replied “Yes, irregularly”, 1 replied “Yes, regularly and irregularly” and 45 replied “No”.

in the destination countries of Tunisian emigration are higher in absolute terms and the wage differential has considerably increased recently, following the rapid depreciation of the Tunisian dinar since the revolution (Ghanmi, 2019).

My survey results suggest that young Tunisians expect the likelihood of successful emigration to increase with educational attainment. Indeed, empirical evidence for a positive correlation between the completion of higher education and the likelihood of emigration exists (Bedasso et al., 2018). David and Marouani (2018) argue that Tunisian emigrants with higher education have better labor market outcomes abroad, i.e. they are more likely to find employment in the formal sector and even without the help of family members and friends. The students' belief that education is crucial for the success of their emigration plans seems therefore well-founded, and even more so if we consider the recent orientation of the European immigration policy vis-à-vis the Maghreb countries<sup>26</sup>.

By contrast, there is little published research on the monetary returns to migration by educational attainment. Using US data for the period from 1979 to 2002, Knapp et al. (2013) demonstrate that the returns to migration are higher for college-educated individuals. Unfortunately, the TLMPs (2014) data does not allow me to determine whether schooling is a determinant of the likelihood of emigration in the Tunisian case. Only 109 respondents in the survey (less than 2 percent of the total sample) declared that they had migrated for work reasons and given this very restricted sample, I cannot find any statistically significant differences with respect to their schooling attainment.

**Educational choices** Finally, I report the survey results with respect to educational choices. I only use the responses from the lycée sample for this section. Table 34 in appendix B.3.3 reports my survey results concerning the prospect of enrolling in a university program. See figure 11 for a summary of the educational choice for the total sample of lycée students.

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26. Given the increase in the number of asylum seekers in Europe since 2014 and the rise of right-wing populist parties in many EU countries, many governments have proposed legal reforms aiming to restrict asylum demands, especially from the Maghreb countries Morocco, Tunisia and Algeria, which were declared “safe countries of origin” by the German Bundestag in January 2018. Asylum seekers had been depicted as relatively low-skilled “economic migrants” by populist parties and mass media. Note that pending approval of the Bundesrat, this legal provision has not come effective at time of writing (Spiegel Online, 2019). At the same time, there has been a move towards favoring high-skilled immigration. For instance, France passed a large immigration reform package in September 2018. Among many other dispositions, employees of “innovative companies” as well as anybody “susceptible of contributing to the international stature of France” (*“susceptible de participer au rayonnement de la France”*) became eligible for applying for a the renewable 4-year residence permit “*pasport talent*” (Direction de l’information légale et administrative, 2018). In June 2019, the German Bundestag also passed an immigration reform package which is supposed to favor high-skilled immigration following the Canadian model (Creutzburg, 2019).

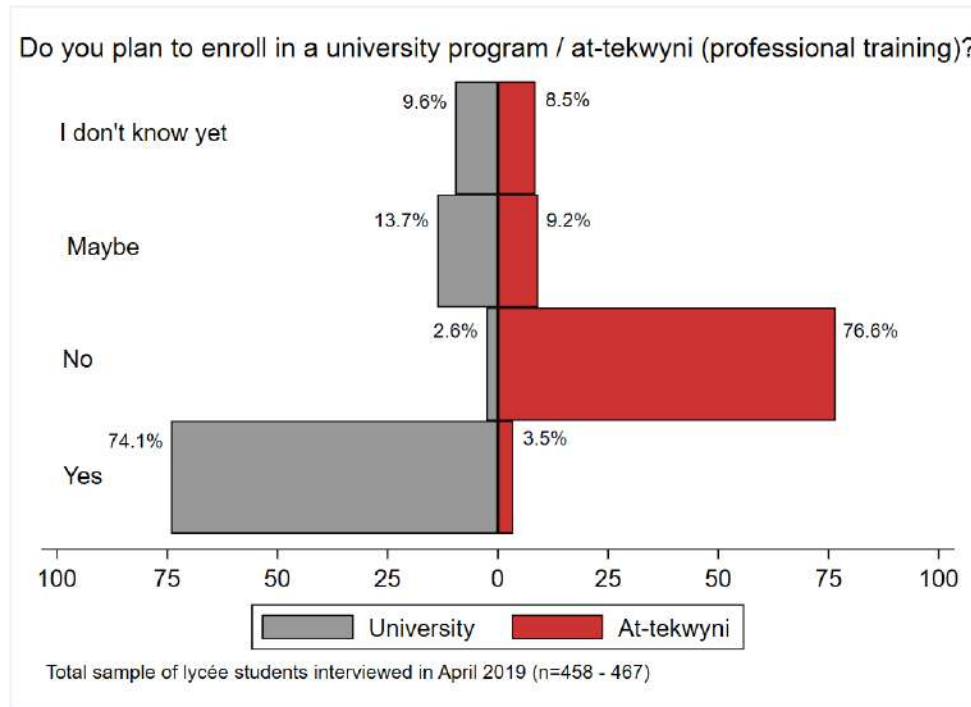


Figure 11 – "Have you considered enrolling in ...?"

My hypotheses seem to hold. As expected, lycée pilote students are more likely to report that they want to enroll in university. The difference is statistically significant at the 0.5% significance level. However, the share of students ticking “yes” is also very high in the other lycées. Furthermore, female students report more often that they want to attend university than male students. The difference is statistically significant at the 0.5% significance level and reflects the overall higher tertiary enrollment rates among female students in Tunisia.

Table 35 in appendix B.3.3 provides an overview of the students’ responses to the question whether they consider applying for vocational training, at-tekwyni. My main hypothesis with regards to at-tekwyni holds. The share of students who report wanting to apply for at-tekwyni is extremely low and it is the lowest for lycée pilote students (the difference is statistically significant at the 5% significance level), which seems coherent, considering first, that they were chosen based on above-average test results, and second, that among all the groups of students, they were the ones who had the most negative perception of the quality of at-tekwyni. By contrast, the share of students declaring that they do not know at-tekwyni is lower than I expected. While the students may not be well-informed about the actual course offer, they seem to be aware of the existence of the program.

### 3.5 Preliminary conclusions

A clear majority of the lycée students indeed declare that they want to continue their education at the university level. Yet, my survey results suggest that my working hypothesis of public sector employment being a major driving force behind the educational investments of young Tunisians does not hold. The expectation to earn a higher salary, the desire to work abroad and intellectual curiosity seem to play a more important role in the students' educational choices. An expected higher salary may be correlated with working in the public sector in theory, but a considerably higher percentage of students declare wanting to work in the private rather than in the public sector in a follow-up question. The differences I observe between female and male respondents' answers are very small. Considering the widespread stereotypes about gender differences in MENA countries, this may come as a surprise to some readers but there is further evidence suggesting that gender only plays a minor role in educational attainment in Tunisia (e.g. in contrast to their Egyptian peers, young Tunisian women are not less likely to reach university level education than men according to Krafft and Alawode, 2018). However, I observe important differences between the two major school types, lycée pilote and lycée. These differences are likely to be related to the different socio-economic background of these student populations which I evidenced in section 3.4.

One finding that emerges indirectly from personal interviews and the students' reactions to the questions but which I did not directly test for in the questionnaire is that the perceived opportunity cost of tertiary education is low. This may be related to non-existing or low tuition fees but also to cultural factors: going to university is perceived as the "default option" by many students. As I have shown, the returns to university education are low in Tunisia and most of the students seem to be aware of this. However, the monetary returns to secondary education are also low and the risk of unemployment is relatively high, even after completing only secondary education. As a result of the low expected wage income given secondary education, the opportunity cost of going to university is not very important.

The student' reasoning seems even more rational when considering the results on the perceived quality of the educational offer in Tunisia reported in section 3.4: the university programs are perceived to be of better quality than the competing offer of vocational training, which provides an additional push factor towards more personal investment in university education. From a policy-perspective this "nothing-to-lose" reasoning risks to cause inefficiencies in the human capital accumulation process and the labor market due to a potential overinvestment in tertiary education as I will discuss in more detail in chapter 5. Yet, from an individual perspective, this reasoning is logically coherent.

## 4 Why are the returns to university education in Tunisia so low?

This chapter provides a survey of additional literature on labor market dynamics in Tunisia, allowing to link the findings of chapter 2 and 3 to the socio-economic situation in the country as outlined in chapter 1. By putting the previous findings into a political economy perspective, it prepares the grounds for an analysis of the resulting policy implications and opportunities for further research which will be presented in chapter 5.

### 4.1 Quantity of education

Since the 1980s and following an important expansion of the schooling offer world-wide, the returns to education seem to have decreased in general (Montenegro and Patrinos, 2014). Likewise, the returns to education appear to be lower in countries with a higher share of well-educated people, i.e. Europe and North America. According to Maguain (2007), the returns to education tend to be higher in countries where the private expenditure for education is high (i.e. the US and the UK). He argues that the mechanism is a “rarity premium” on education. If we follow this reasoning, the political push for generalizing access to secondary and tertiary education and low entry barriers to university in Tunisia could have contributed to decreasing the returns to education.

Pellicer (2018) indeed argues that a large part of the low (and apparently decreasing) returns to education in MENA and Tunisia can be attributed to a decrease in selectivity and the massive expansion of education in the recent past. He takes an innovative approach to the topic, estimating the probability of obtaining a “decent” public sector job for each age cohort rather than computing the monetary returns to education. His results suggest that the probability of obtaining a public sector job has decreased by about one third for the age cohort born in the 1970s relative to the age cohort born in the 1950s<sup>27</sup>. Hence, there is evidence for the hypothesis that the quantity of skilled labor in Tunisia has increased faster than the demand for it. To put it in a nutshell: the current offer of skilled labor in Tunisia seems to be high and it may at times exceed the demand for skilled labor.

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27. However, Pellicer (2018) confirms that, even though a decrease relative to past values can be observed, the returns to education in terms of increasing the likelihood of a public sector job placement are still positive and statistically significant as of today.



## 4.2 Quality of education: skills mismatch

According to the World Bank's "systemic country diagnosis" (2015), two main factors are contributing to a skills mismatch on the Tunisian labor market: First, the students' own educational choices may limit their future employability. The dominance of public sector employment in Tunisia and in the MENA countries in general created a sufficient number of well-paying jobs for university graduates up until the 1980s. A negative long-term consequence of the government's generous hiring policy is that universities adjusted their programs to the needs of the public sector, resulting in a focus on humanities and social sciences at the graduate level and underenrollment in scientific disciplines (David and Nordman, 2017; UNDP, 2016). Policy analysts often deplore that the large number of social scientists graduating from Tunisian universities do not dispose of the skills demanded by the labor market and the private sector in particular<sup>28</sup>.

Second, the quality of education at all levels has been subject to criticism. A main problem seems to be the reliance on outdated pedagogical formats such as memorization (UNDP, 2016). The most recent results of the PISA and TIMSS study indeed suggest that Tunisian secondary students perform rather poorly by international standards. This finding is also reflected in employer surveys in which firms name the "skill inadequacy" of the labor force as the top constraint on their investment in Tunisia. Their concern about the labor force's skills is topped only by worries about political uncertainty (World Bank, 2015).

## 4.3 Segmentation of the labor market

Bouassida and Lahga (2018) argue that the segmentation of the Tunisian labor market into the public vs. the private and the formal vs. the informal sector creates dysfunctions. According to their estimations, almost one in three Tunisians works in the informal sector. Among the working population aged 15 to 24, the share of informal employment is as high as 70 percent. They show that the mobility between different sectors is extremely low, i.e. a person working in the informal sector has a very low likelihood of finding a job in the formal sector. Furthermore, the pay and benefits differ a lot between the different sectors. Public sector employees are generally better paid than those working in the private and especially in the informal sector (Ben Halima et al., 2010). Bouassida and Lahga (2018)

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28. Most of the students I interviewed in spring 2019 seemed to be aware of the needs of the labor market, though. When asked about their preferred field of study, medicine, engineering and business were the most recurrently listed disciplines. This finding is in line with my results on the perceived returns to education: the students seem to be well-informed about labor market demands.

also show that the variance of wages in the public sector is significantly smaller than in the private sector. Their analysis thus confirms the existence of a “public sector premium”. The gender wage gap, virtually nonexistent in the public sector and small in the formal private sector, is large in the informal private sector (Bouassida and Lahga, 2018). Considering the low mobility between sectors and the attractiveness of the public and the formal private sector, it may be a rational choice for university graduates to wait for a public sector job or at least a job in the formal private sector instead of accepting a job in the informal sector. Hence, prolonged periods of economic inactivity and unemployment may result and will decrease the overall returns to education. The segmentation of the Tunisian labor market is therefore likely to decrease the efficiency of skill allocation and the returns to education.

TLMPS (2014) includes the question “At what monthly income would you accept a job in the public / formal private / informal sector?”, which allows me to tentatively assess the extent of the public sector preference in the sample (see appendix B.4.2). Holding a reservation wage above 10,000 TND can be interpreted as a refusal to work in the given sector<sup>29</sup>. Following this interpretation, the data clearly shows that the percentage of respondents who refuse to work in the private or public sector is negligible while it reaches more than 11 percent for the informal sector.

Likewise, 1,659 out of 2,405 respondents (69 percent) in the TLMPS (2014) survey declared that, given equal salaries and similar jobs, they would prefer working in the public sector over working in the private sector. Therefore, my analysis of the TLMPS (2014) data supports Bouassida and Lahga’s (2018) findings: the reservation wages for working in the informal sector are high and there is empirical evidence that (older) Tunisians prefer working in the public rather than in the private formal sector. This can indeed lead to inefficiencies in the labor market and a misallocation of skills, which may negatively impact the returns to education.

#### 4.4 Lack of high-skilled job creation

According to Ben Sedrine (2009), there is both structural and frictional unemployment in Tunisia. He argues that structural unemployment is the result of the Tunisian economy’s incapacity of generating well-paying jobs for high-qualified job market entrants.

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29. Expecting a monthly wage of more than 10,000 TND is indeed extremely unrealistic in the local context. Assuming a 40-hour work week, only 1 out of 1,345 hourly wages in the TLMPS (2014) data is high enough to yield a monthly income which exceeds 6,160 TND.

This is often attributed to a thin tissue of small and medium enterprises, a lack of private investment, clientelism, bureaucracy, and an overall rather unfavorable business environment which does not attract a lot of FDI. Zouari-Bouatour et al. (2014) argue that Tunisia experienced an important restructuring of the industrial tissue in the 1990s, which resulted in the loss of many relatively well-paying jobs for skilled workers. At the same time, the agricultural sector was expanding, so job creation was centered around lower-skilled jobs in the rural areas. Accompanied by a reduction in job offers from the public sector, this would lead to a decrease in demand for skilled labor and consequently, a reduction in the returns to higher education.

Tunisia joined the GATT in 1990 and signed a trade association agreement with the EU in 1995. The integration of the country into the world economy was accompanied by liberalizations, as well as by the slow demise of the state-owned companies. FDI rates stayed comparably low and most foreign companies operating in Tunisia have focused on low value-added industries such as textile production and industrial assembling. These industries do not offer many jobs for high-skilled labor. Furthermore, facing strong competition from South East Asia and other countries with lower production costs, Tunisia has only been able to retain its foreign investors by compressing wages (UNDP, 2016). The revolution and the terrorist attacks in Tunis and Sousse in 2015 further decreased FDI, especially in tourism, which is a crucially important sector for the Tunisian economy. But even the recent recovery of the tourism sector is unlikely to favor high-skilled labor, as most jobs created by the tourism sectors are low-skilled, and often even within the informal sector (Marzouk, 2019). The private sector's failure to create jobs for high-skilled workers results in low demand for high-skilled labor which, if matched by a massification of education, may result in an excess supply of high-skilled labor (section 4.1). It also increases the relative attractiveness of the public sector, thus reinforcing the segmentation of the Tunisian labor market (section 4.3) resulting in structural unemployment.

On the other hand, frictional unemployment is the consequence of a lack of information and coordination in the labor market and is the second factor which may help explain why the unemployment rate increases with educational attainment in Tunisia. Ben Sedrine (2009) identifies an insufficient articulation between the educational system and the labor market and the absence of a system of professional orientation as the main causes of these frictions. Donors, NGOs and the Tunisian National Employment Agency have implemented active labor market programs such as the SIVP, which are meant to target frictional unemployment (see appendix B.4.1). The lack of communication and coordination between

different programs is a recurrent problem, though, and the impact of these programs has often not been thoroughly evaluated (UNDP, 2016).

## 5 Policy implications

In chapter 2, I showed that the private returns to university education in Tunisia are low. However, as I evidenced in chapter 3, in contrast to the Dominican students Jensen (2010) interviewed in the early 2000s, Tunisian students seem to have a surprisingly accurate appreciation of the returns to university education. The failure to control for innate ability is likely to cause the returns to education as estimated with the TLMPs (2014) data to be upwards-biased, though. Considering this and taking into account the low costs associated with going to university in Tunisia, it is possible that students overinvest in university education. From the viewpoint of conventional economics, an excess demand for university education could result in a high number of university graduates, exceeding the available job opportunities and leading to high unemployment among young college graduates. The high unemployment rates among young university graduates in Tunisia suggest that this may be the case. What are the potential implications for education and labor market policies in Tunisia?

### 5.1 Reassess the social returns to university education

In the recent past, there have been many publications on the returns to education. The scientific consensus is that government spending on human capital is efficient from a private and also from a social point of view (Psacharopoulos and Patrinos, 2018). Estimating the returns to education is an important exercise as it allows policymakers to evaluate which educational offers yield the highest returns and therefore should be emphasized on the development agenda. From a social welfare perspective, public resources should be directed towards those investments that yield the highest benefits for society. According to the seminal work by Psacharopoulos, this justifies a focus on primary education in most contexts because primary education yields the highest benefits for the poor and the most vulnerable population groups (see for instance Jimenez and Patrinos, 2003).

Towards which educational programs should Tunisia direct its public and private investments? As mentioned earlier, in comparison to other MENA countries, Tunisia has successfully reduced the inequalities in access to education at the primary and secondary level (Assaad et al., 2019; UNDP, 2016). My estimates as reported in chapter 2 confirm that, as suggested by previous literature, the private returns to university education in Tunisia are rather low. Furthermore, Krafft and Alawode (2018) argue that access to university education in Tunisia does not provide the social mobility that it was supposed to provide.

They claim that “[f]ree higher education [...] primarily benefits the rich” (p. 242) because, on average, students from marginalized families are much less likely to reach university. From a policy point of view, it may therefore be advisable to reassess the social returns to university education in Tunisia in order to determine whether generic large-scale public investments into free university education are justified or whether there are more targeted uses of public funds.

This does not necessarily mean that public funding for university education should be reduced. But investments in the quality of primary and secondary education are inevitable and the adequacy of the university admission procedure may have to be re-examined. If necessary to maintain the quality of teaching and learning and to allow students to have a perspective of finding a job upon graduation, restricting the access to university education should be considered a valid policy measure, as long as it is complemented by an increase in the offer of alternative educational programs, such as the vocational training program *at-tekwyni*. The educational offer could be diversified and a stronger focus on vocational training may be justified, as I will argue in section 5.3.

## 5.2 Focus on assuring social mobility

Gruber and Kosack (2014) find that countries which privilege public spending on tertiary education instead of primary and secondary education tend to exhibit higher inequality in times of enrollment expansion. This may be related to the effect of private tutoring, which is a common means for families to improve their children’s learning opportunities despite underfunded primary and secondary schools. Increasing reliance on private tutoring may in fact reinforce inequality as wealthy families are more likely to get private tutors for their children. This becomes particularly problematic when families pay the classroom teacher for extra tutoring, who may later be induced to be more generous towards those who frequent additional classes. This is indeed a common issue in MENA countries<sup>30</sup>. Neglecting the more basic levels of education is therefore a road not to take for policymakers and this is the main argument put forward by those who advocate for more public spending on primary and even pre-primary education (see for example Krafft, 2015).

In any case, it is necessary to determine the reasons for this apparent lack of social mobility in the Tunisian context. The results of my field study provide suggestive and anecdotal evidence that the current dual *lycée pilote* – *lycée* system may be one of the factors

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30. When asked whether they receive private tutoring *from the classroom teacher*, 55 out of 138 respondents (39.9 percent) answered with “yes” in the TLMPS (2014) survey.

inhibiting social mobility in the Tunisian secondary school system. Admittedly, forming a national elite has been the very *raison d'être* of the duality in the secondary school system in Tunisia. Yet, commentators' concerns about the equity of the system and its ability to promote social mobility and meritocracy in Tunisia seem justified. High school graduates are granted admission to a certain university cursus based on their preferences but mainly based on their final test results (Ben Sedrine, 2009). This will likely favor lycée pilote students who have enjoyed privileged learning conditions. According to Krafft and Alawode (2018), access to university education in Tunisia is less equal than in Egypt and Jordan, a surprising result given that the share of private tertiary education is much higher in these two countries than in Tunisia. To what extent the rigid tracking system in Tunisia has affected social mobility should be evaluated by future research. The question has already reached the highest levels of Tunisian politics: in 2018, the current Minister of Education, M. Hatem Ben Salem, put the future of the dual lycée system up to discussion (Labassi, 2018).

### 5.3 Invest in vocational training and quality of education

My survey results show that students on average believe that at-tekwyni is of worse quality than the other educational programs in Tunisia and the share of those who consider applying is very low. Given the low returns to university education in Tunisia and the country's ambition to attract more foreign investment, especially in manufacturing, vocational training seems a valid alternative to tertiary education, though. Policymakers may find it worthwhile to focus on improving the offer of at-tekwyni, which is still fairly limited<sup>31</sup>. Providing information at high schools and targeting the students who are less interested in the theoretical dimension of university studies, would potentially be a very efficient intervention to decrease the number of university drop-outs while improving the efficiency of skill allocation in the educational system and on the labor market in the spirit of Jensen (2010). It could also help to improve the reputation of at-tekwyni, which should not be considered a "last resort" option given that it can be well-tailored to the needs of the private sector.

In general, the policy focus may have to be shifted from providing quantity to quality. General investments in teacher training and school infrastructure at all levels are advisable. Investing into the quality of public education is not only needed for better labor

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31. The personal interviews I conducted with at-tekwyni students yield some further insights: some suggested that the admission process had been fairly intransparent and could be improved. The students also expressed dissatisfaction with the quality of some courses and especially with the technical learning equipment provided by the school. Most importantly, they deplored that they found out about at-tekwyni only very late, often after having enrolled in university programs and subsequently dropped out. See appendix B.3.4 for excerpts from the qualitative interviews.

market outcomes but also crucial for improving the students' learning outcomes and personal satisfaction with the learning environment.

#### 5.4 Shift attention towards the social externalities of emigration

“Migration is a symptom of the exclusion of highly skilled youth from their societies.”<sup>32</sup>

High educational attainment combined with a lack of job opportunities, population growth and last but certainly not least, the aspirations of its youth make Tunisia a country of emigration. There has been a decade-long discussion about the consequences of emigration for developing economies and so far, no scientific consensus has emerged. This is mainly due to the fact that emigration affects a sending country through a vast array of different channels, including human capital formation and remittances, but also diaspora effects on trade, FDI, innovation and technology adoption and institutional development (Docquier and Rapoport, 2012).

What is the overall impact of emigration on Tunisia and which role does human capital accumulation play? A major challenge for using economic models to assess the impact of emigration is that the probability of successful emigration is endogenous to human capital accumulation. Docquier and Rapoport's (2012) model of emigration suggests that, in order for a net brain gain to take place, the wage premium for skilled occupation has to be *sufficiently high* to induce workers to invest into their human capital while the probability of emigration has to be *sufficiently low* to prevent a mass exodus of skilled labor.

Beine et al. (2008) suggest that brain drain is more likely to be beneficial for countries with low initial levels of human capital whose low-skilled workers emigrate. This is unlikely to fit the case of Tunisia. While TLMPs (2014) does not allow me to analyze the supply side of migration with regards to educational attainment, the demand side (that is, the destination countries), have increasingly privileged immigrants with university education. Not surprisingly, the OECD countries saw the number of high-skilled immigrants increase by over 70 percent during the 1990s, whereas the number of immigrants with lower skills only increased by 30 percent over the same period (Docquier and Rapoport, 2012). David and Marouani (2018) confirm that the return probability for high-skilled Tunisian emigrants is particularly low. Hence, it seems likely that the Tunisians who emigrate successfully tend to

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32. Cited from UNDP, 2016, p. 155.



have higher than average human capital and educational attainment. According to Beine et al. (2008), the consequences of brain drain are not as devastating for Tunisia as for many Latin American middle-income countries, but the authors' estimates confirm that Tunisia figures among the countries having experienced a detrimental brain drain.

Even though working in Europe may maximize the private returns to education from an individual perspective, increasing levels of high-skilled emigration may not be desirable for Tunisia from a social perspective. Di Maria and Stryszowski (2009) show that emigration prospects can distort the accumulation of human capital in countries of origin and direct it towards careers which are sought-after in immigration countries.

My survey results indeed suggest that students know that medical personnel and engineers are looked for, not only in Tunisia, but especially in Europe and their answers to the question which profession they want to have in the future reflect this awareness. Medicine and engineering are by far the fields of study which are the most frequently named by the students. According to the Tunisian Medical Association (*"Ordre national des médecins"*), 45 percent of those who registered as new physicians in 2017 left the country in the same year. The association reports that not only recent medical school graduates but also more experienced practitioners have been leaving Tunisia, mostly for France and Germany (Samoud, 2018). This development becomes especially critical in a context where there is a shortage of medical personnel in Tunisia. Admittedly, using a cross section of more than 50 African countries, Clemens (2007) argues quite convincingly that the general exodus of African physicians can be compensated by increasing enrollment rates in medical schools. However, even if this were the case in Tunisia, the direct costs associated with the emigration of high-skilled workers should be taken into account. Depending on the major, Tunisia dedicates between 5 and 10 thousand TND per year to each university student's education (Labassi, 2017).

In fact, Docquier and Rapoport's (2012) model implies that, when facing high levels of skilled emigration, the government will have to decrease the subsidization level of education and / or increase taxes. Some other policy strategies are thinkable, such as privatizing higher education or encouraging students to complete their education abroad. These strategies represent an opportunity to decrease the social cost of education by shifting it towards the individual. However, a major drawback of this approach is that it may further decrease social mobility by reducing access to education for the more vulnerable parts of the population. While the policy implications of Docquier and Rapoport's model (2012) depend on a country's development level and an array of other factors, it predicts that a developing

country can benefit from positive – but not too high – rates of “brain drain”. Reducing their citizens’ international mobility is therefore a priori not an attractive policy alternative for countries of high-skilled emigration like Tunisia but the issue should become a key concern on the policymakers’ agenda.

## **5.5 Expectations are unstable and so is human capital accumulation**

Especially the potential long-term consequences of emigration should receive more attention from policymakers and researchers. While the possibility of emigration may motivate the current generation of students to pursue their studies, the medium and long-term consequences are not clear. Beine et al. (2008) show that human capital accumulation is highly elastic with respect to the probability of emigration. This means that an increase in the probability of emigration is likely to result in an increase in human capital accumulation, but conversely, a decrease in the probability of emigration could cause human capital accumulation to slow down. If the returns to education remain low in Tunisia and if the EU, the main destination of Tunisian emigration, continues tightening its immigration policies, the expected returns to education in Tunisia may decrease. Evidence from Sub Saharan Africa suggests that lower expected returns to education can lead to a reduction of individual investment in education (Kwenda and Ntuli, 2014; Uwaifo Oyelere, 2010). In this case, expanding the educational offer may no longer suffice as a policy incentive to increase human capital. Hence, even though Tunisian students and their parents seem to value education for more than just its monetary returns, there is reason for policymakers to be cautious.

## Concluding remarks

Within the scope of this thesis and using the standard Mincer earnings estimation, I have shown that the monetary returns to tertiary education are low in Tunisia, especially for young men. While the returns to higher education may be higher for individuals working in the public sector and in some regions of the country, the overall results – 11.4 percent per year of tertiary education for all, 9.8 percent for men and 14.7 percent for women - still compare unfavorably to the returns to higher education in comparable middle-income countries. Despite this and despite the public awareness about the high unemployment rates among young university graduates, private investment in tertiary education in Tunisia remains relatively high. Using my own survey data, I show that this is not due to the students holding wrong expectations with regards to the potential monetary payoff of their educational investment. Their expected wages and perceived returns to education match the actual wage distribution remarkably closely. I find that a vast majority of the students declare wanting to enrol in university, but this is only to a lesser degree related to the desire to obtain a stable and well-paying job in the public sector. The students are more likely to name a potentially higher salary, the prospect of emigration, intellectual curiosity and the social status associated with a diploma as the reasons for them to enrol in university. Likewise, the students perceive the quality of university education in Tunisia to be better than the alternative offer of vocational training, *at-tekwyni*. Their educational choices – privileging university education over other educational offers such as vocational training - hence appear to be rational from an individual point of view.

In contrast to what has been found by previous studies, the students in my sample are significantly more likely to declare wanting to work in the private sector rather than in the public sector. There is thus reason to hypothesize that we are observing a generational shift in preferences. One conclusion that emerges from this and which allows for some optimism: in contrast to the common stereotype, the young Tunisians currently finishing their secondary education are willing to work in the private sector and they do not seem to hold unrealistic expectations with regards to their future pay. If translated into real labor market dynamics, this could have beneficial consequences for the overall employment rate.

On the other hand, looking at the larger picture, if human capital accumulation in Tunisia has been high, this seems to be partly due to the prospect of emigration which increases the expected returns to education, and which has been high enough to encourage human capital investment. This is not a reassuring finding for policymakers, given that

young Tunisians' emigration probability is largely exogenous and depends on many factors, including international security, the labor demand of the European economies and domestic policy issues in Europe. Tunisian policymakers' scope of controlling these factors is limited. Therefore, in order to maintain high levels of human capital accumulation and to allow for sustainable economic and political development in the medium and long run, the educational offer in Tunisia has to be matched by job offers that value the created human capital even *within* the country's borders.

My thesis gives a tentative answer to one question and raises many new. Especially the determinants of emigration and its impact on Tunisia are a crucially important topic for future research. Within Tunisia, what is the concrete impact of emigration on youth employment, human capital accumulation, the returns to education and economic growth? To what extent does higher educational achievement increase the likelihood of successful emigration and what are the monetary returns to education among the first and second generation of Tunisian emigrants? In general, what must be done for the country to make better use of its human capital and to create jobs that correspond to its population's high human capital level?

Tunisia's socio-economic situation resembles that of Algeria and Morocco in many ways and the country shares many features with Egypt and Lebanon, which also have very young populations, high youth unemployment and high emigration pressure. Studying the dynamics of human capital accumulation, employment and economic development in Tunisia could therefore help improve educational and economic outcomes not only in Tunisia but in other MENA countries as well. The aspirations, ambitions and dreams of its youth will play a fundamental role in shaping Tunisia's future socio-economic and political development. A major contribution of this paper hence lies in exposing the need for more research on the interaction between international labor market dynamics, education and individual expectations in Tunisia, North Africa and the Middle East.

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## A Appendix

### A.1 Data

Chapter 2 is primarily based on the TLMPS (2014) survey data which the ERF generously granted me access to:

Tunisia - Labor Market Panel Survey, TLMPS 2014  
OAMDI, 2016. Labor Market Panel Surveys (LMPS), <http://erf.org.eg/data-portal/>. Version 2.0 of Licensed Data Files; TLMPS 2014. Egypt: *Economic Research Forum (ERF)*.

Chapter 3 on the perceived returns to education in Tunisia is based on data I collected myself in April 2019 with the permission of the Tunisian Ministry of Education as explained in section 3.1. The data is available on request.

For adjusting measured and expected wages to wage inflation, I used the data on the yearly evolution of the salary level in the private non-agricultural sector in Tunisia as provided by the Tunisian Statistical Office:

Taux d'évolution du salaire moyen dans le secteur privé non agricole, Taux d'évolution annuelle, *Tunisie Statistiques*, 2019, URL: <http://www.ins.nat.tn/fr/themes/salaires#sub-3671>  
Accessed 22.11.2019.

In order to compute the MENA countries' average military expenditure, I used the SIPRI (2019) Data on military expenditure, which is available online:

Database on Military Expenditure (1948 - 2018). *Stockholm International Peace Research Institute (SIPRI)*, 2019. URL: <https://www.sipri.org/databases/milex>  
Accessed 24.06.2019.

I used the most recent World Bank (2019) data on unemployment rates in Tunisia, the MENA region and the OECD country average, as well as a few other measures of socio-economic development:

World Bank, 2019. URL: [data.worldbank.org](http://data.worldbank.org)

- Unemployment, total (% of total labor force)
- Unemployment with basic education (% of total labor force with basic education)

- Unemployment with intermediate education (% of total labor force with intermediate education)
- Unemployment with advanced education (% of total labor force with advanced education)
- Public Sector Employment as a Share Of Total Employment
- Share of youth not in education, employment or training, female (% of female youth population)
- Share of youth not in education, employment or training, male (% of male youth population)
- School enrollment, primary (% gross)
- School enrollment, primary (% net)
- School enrollment, secondary (% gross)
- School enrollment, secondary, female (% gross)
- School enrollment, secondary, male (% gross)
- School enrollment, tertiary (% gross)
- School enrollment, tertiary, female (% gross)
- School enrollment, tertiary, male (% gross)
- Secondary education, vocational pupils
- Government expenditure on education, total (% of GDP)

Accessed 01.07.2019

## A.2 Code

I used Excel for the digitalization of the paper questionnaires and Stata for the analysis of the survey data. The analysis of the TLMPs (2014) data and all additional data sources was also done in Stata. My do-files are available upon request.

### A.3 Figures

All pictures were taken by the author, unless indicated otherwise.

Figure 20, Political map of Tunisia, with names of the governorates, is available for free download from D-maps and can be accessed under the following URL: <https://d-maps.com>

Accessed 11.07.2019.

Figure 24, Location of the schools included in the sample, was created by the author using Google MyMaps.

#### A.4 Ministerial permission for data collection in Tunisian secondary schools

الجمهورية التونسية  
وزارة التربية

تونس، 2019/04/25

الإدارة العامة للمرحلة الإعدادية  
والتعليم الثانوي  
إدارة التدريس بالمرحلة الإعدادية  
والتعليم الثانوي العام

إلى السيّدة  
كريستينا هوزر

09583

الموضوع : حول الترخيص لكم بتمرير "استجواب" بين عدد من التلاميذ بالمدارس الإعدادية والمعاهد.  
المرجع : المراسلة عدد 05324 بتاريخ 15 أفريل 2019.

وبعد، في إطار إعدادكم لبحث علمي في مجال العلوم السياسي بين جامعتي العلوم السياسية بباريس و معهد التجارة بستوكهولم بالسويد، وتبعا لمطلبكم عدد 14289، بتاريخ 12 أفريل 2019 حول طلب الترخيص لكم في تمرير "استجواب" في بعض المدارس الإعدادية و المعاهد الراجعة بالنظر إلى المندوبيات الجهوية للتربية بسوسة وتونس والقصرين والقيروان وباجة وبنزرت، أشرف بإعلامكم أنّه تمّ الترخيص لكم في إجراء المطلوب، سواء مباشرة بتقديمه للتلاميذ أو عن طريق من ينوبكم أو عن طريق الإدارة العامة للمرحلة الإعدادية والتعليم الثانوي، وذلك بداية من 12 أفريل 2019.

و السلام .

م/ك.

المدير العام

للمرحلة الإعدادية والتعليم الثانوي

حاتم عمارة



العنوان البريدي: شارع باب بنات 1030 تونس-رقم الهاتف: 71.568.815-رقم الفاكس: 71.575.556  
العنوان الإلكتروني الموحد للوزارة: [ministere@minedu.edunet.tn](mailto:ministere@minedu.edunet.tn)  
[www.education.gov.tn](http://www.education.gov.tn)

## A.5 Questionnaires

### A.5.1 Original version [French]

Christina Sarah HAUSER  
MSc. Economics  
Stockholm School of Economics



#### Questionnaire : Les rendements de l'éducation secondaire et universitaire en Tunisie<sup>1</sup>

##### Données socio-économiques :

S'il vous plaît, indiquez votre genre :

<input type="radio"/> Féminin	<input type="radio"/> Masculin
-------------------------------	--------------------------------

J'ai \_\_\_\_\_ ans.

J'ai \_\_\_\_\_ frères et sœurs.

J'habite à [ville] : \_\_\_\_\_

Je fréquente le lycée suivant : \_\_\_\_\_

##### Niveau d'éducation le plus élevé atteint par ma mère :

<input type="radio"/> Primaire (école)	<input type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input type="radio"/> Universitaire (université / ISET)
--	---	---	---

##### Niveau d'éducation le plus élevé atteint par mon père :

<input type="radio"/> Primaire (école)	<input type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input type="radio"/> Universitaire (université / ISET)
--	---	---	---

##### Situation professionnelle de ma mère :

<input type="radio"/> Ma mère travaille principalement comme _____	<input type="radio"/> Ma mère ne travaille pas / plus
--	---

##### Situation professionnelle de mon père :

<input type="radio"/> Mon père travaille principalement comme _____	<input type="radio"/> Mon père ne travaille pas / plus
---	--

##### Rendements de l'éducation secondaire et tertiaire :

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu le *baccalauréat* ? \_\_\_\_\_ TND

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu une *licence* (3 ans après le bac) ou un diplôme universitaire équivalent ? \_\_\_\_\_ TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu le *baccalauréat* et travailliez à temps plein dans votre commune aujourd'hui ? \_\_\_\_\_ TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu une *licence* (3 ans après le bac) ou un diplôme universitaire équivalent et travailliez à temps plein dans votre commune aujourd'hui ? \_\_\_\_\_ TND

<sup>1</sup> Les résultats de ces entretiens seront entièrement anonymisés en suivant strictement les dispositions de la loi suédoise et me serviront uniquement à la rédaction de mon mémoire de fin d'études. Ils ne seront pas publiés ailleurs.





Avez-vous prévu de vous inscrire à l'université ou bien à l'ISSET (Institut supérieur des études technologiques) ?

<input type="radio"/> Oui	<input type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.

Si oui, pour quelle spécialisation / filière ?

Si vous avez prévu de vous inscrire à l'université, laquelle est votre motivation principale ? [Choisissez les trois options qui correspondent le mieux et ordonnez-les de 1 à 3, 1 étant la raison la plus importante.]

<input type="radio"/> Curiosité intellectuelle	<input type="radio"/> Risque de chômage moins élevé
<input type="radio"/> Prestige du diplôme	<input type="radio"/> Pouvoir travailler dans le secteur public
<input type="radio"/> Ma famille le veut	<input type="radio"/> Pouvoir travailler à l'étranger
<input type="radio"/> Un salaire plus élevé	<input type="radio"/> Autres (précisez ci-dessous, s'il vous plaît) :
<input type="radio"/> Rester avec les copains du lycée	

Avez-vous envisagé de vous inscrire à un programme d'enseignement technique et professionnel (التكوين المهني) ?

<input type="radio"/> Oui	<input type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.
<input type="radio"/> Je ne sais pas ce que c'est.	

Comment évaluez-vous la qualité des suivants programmes d'éducation dans votre municipalité, ville ou gouvernorat ? [S'il vous plaît, choisissez seulement une option par programme.]

	Très bien	Bien	Moyen	Plutôt mauvais	Très mauvais	Je ne sais pas.
École secondaire / Lycée						
Université						
ISSET						
Programme d'enseignement technique et professionnel						

Dans le futur, je voudrais travailler comme [profession] :

Dans le futur, je préfère travailler dans [cochez les cas qui correspondent le mieux, deux au maximum] :

<input type="radio"/> Le secteur privé
<input type="radio"/> Le secteur public
<input type="radio"/> L'agriculture
<input type="radio"/> En tant qu'indépendant (entrepreneur, auto-employé etc.)
<input type="radio"/> Autres (organisations non-gouvernementales, internationales, etc.)
<input type="radio"/> Je suis indifférent(e).
<input type="radio"/> Je ne pense pas que j'aille travailler.

D'après moi, pour le niveau d'éducation que je prévois d'atteindre, le secteur suivant offre les meilleures perspectives salariales :

<input type="radio"/> Le secteur privé
<input type="radio"/> Le secteur public
<input type="radio"/> L'agriculture
<input type="radio"/> Un travail en tant qu'indépendant (entrepreneur, auto-employé etc.)
<input type="radio"/> Autres (organisations non-gouvernementales, internationales, etc.)
<input type="radio"/> Je ne sais pas.

J'envisage de postuler pour un travail hors de Tunisie dans le futur.

<input type="radio"/> Oui	<input type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.

## A.5.2 English translation of the original questionnaire

Christina Sarah HAUSER  
MSc. Economics  
Stockholm School of Economics



### Questionnaire: Returns to secondary and tertiary education in Tunisia<sup>1</sup>

#### Socio-economic background:

Indicate your sex, please:

<input type="radio"/> female	<input type="radio"/> Male
------------------------------	----------------------------

I am \_\_\_\_\_ years old.

I live in [city]: \_\_\_\_\_

I attend the following school: \_\_\_\_\_

My mother completed:

<input type="radio"/> Primary education ( <i>école</i> )	<input type="radio"/> Secondary education ( <i>lycée</i> )	<input type="radio"/> Vocational training (التكوين المهني)	<input type="radio"/> University (université / ISET)
--	--	--	--

My father completed:

<input type="radio"/> Primary education ( <i>école</i> )	<input type="radio"/> Secondary education ( <i>lycée</i> )	<input type="radio"/> Vocational training (التكوين المهني)	<input type="radio"/> University (université / ISET)
--	--	--	--

My mother's job:

<input type="radio"/> My mother mainly works as a _____	<input type="radio"/> My mother does not work (anymore)
---	---

My father's job:

<input type="radio"/> My father mainly works as a _____	<input type="radio"/> My father does not work (anymore)
---	---

#### Returns to secondary and tertiary education:

What do you think is the monthly average income of a person working full time in your municipality and having obtained the *baccalauréat*? \_\_\_\_\_ TND

What do you think is the monthly average income of a person working full time in your municipality and having obtained a *licence* or an equivalent university degree? \_\_\_\_\_ TND

What monthly income would *you* expect if you had already obtained the *baccalauréat* and were working full time in your community today? \_\_\_\_\_ TND

What monthly income would you expect if you had already obtained a *licence* or an equivalent university degree and were working full time in your community today? \_\_\_\_\_ TND

<sup>1</sup> The results of this survey will be anonymized in correspondence with Swedish law and will only be used for my master thesis. They will not be published anywhere else.



Have you considered enrolling in a university program?

<input type="radio"/> Yes	<input type="radio"/> No
<input type="radio"/> Maybe	<input type="radio"/> I do not know yet.

If yes, for which degree / faculty?

---

If you are considering enrolling in a university program, which of the following is your primary motivation? [Tick the answers which correspond best, maximal three].

<input type="radio"/> Intellectual curiosity	<input type="radio"/> Lower risk of unemployment
<input type="radio"/> Prestige of the degree	<input type="radio"/> Possibility to work in the public sector
<input type="radio"/> My family wants me to continue school	<input type="radio"/> Possibility to work abroad
<input type="radio"/> A higher salary	<input type="radio"/> Other (specify, please):
<input type="radio"/> Stay with my friends from high school	

Have you considered enrolling in a technical and professional education program (التكوين المهني) ?

<input type="radio"/> Yes	<input type="radio"/> No
<input type="radio"/> Maybe	<input type="radio"/> I do not know yet.
<input type="radio"/> I do not know what that is.	

How do you evaluate the quality of the following educational programs in your municipality, city or gouvernorate? [Only tick one answer per program, please.]

	Very good	Good	Average	Rather bad	Very bad	I don't know.
Secondardy school / Lycée						
University						
ISET						
Vocational training (التكوين المهني)						

In the future, I would prefer to work in [tick the answers which correspond best, maximal two]:

<input type="radio"/> The private sector
<input type="radio"/> The public sector
<input type="radio"/> As an independent (entrepreneur, self-employed etc.)
<input type="radio"/> Other (NGOs, international organizations, etc.)
<input type="radio"/> I am indifferent.
<input type="radio"/> I do not think that I will work.

I think that the following sector offers the best wages given my expected educational level:

<input type="radio"/> The private sector
<input type="radio"/> The public sector
<input type="radio"/> Work an independent (entrepreneur, self-employed etc.)
<input type="radio"/> Other (NGOs, international organizations, etc.)
<input type="radio"/> I do not know.

I am considering looking for a job outside of Tunisia in the future:

<input type="radio"/> Yes	<input type="radio"/> No
<input type="radio"/> Maybe	<input type="radio"/> I do not know yet.

## A.6 Sample responses

### A.6.1 Example 1

2304 BZPIL 203

Christina Sarah HAUSER  
MSc. Economics  
Stockholm School of Economics



#### Questionnaire : Les rendements de l'éducation secondaire et universitaire en Tunisie<sup>1</sup>

##### Données socio-économiques :

S'il vous plaît, indiquez votre genre :

<input type="radio"/> Féminin	<input checked="" type="radio"/> Masculin
-------------------------------	---

J'ai 16 ans.

J'ai 2 frères et sœurs.

J'habite à (ville) : Bizerte

Je fréquente le lycée suivant : Lycée pilote de Bizerte

Niveau d'éducation le plus élevé atteint par ma mère :

<input type="radio"/> Primaire (école)	<input checked="" type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input type="radio"/> Universitaire (université / ISET)
--	--	---	---

Niveau d'éducation le plus élevé atteint par mon père :

<input type="radio"/> Primaire (école)	<input checked="" type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input type="radio"/> Universitaire (université / ISET)
--	--	---	---

Situation professionnelle de ma mère :

<input type="radio"/> Ma mère travaille principalement comme _____	<input checked="" type="radio"/> Ma mère ne travaille pas / plus
--	--

Situation professionnelle de mon père :

<input type="radio"/> Mon père travaille principalement comme <u>(en anné) :</u>	<input type="radio"/> Mon père ne travaille pas / plus
--	--

##### Rendements de l'éducation secondaire et tertiaire :

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu le baccalauréat ? 600 TND

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu une licence (3 ans après le bac) ou un diplôme universitaire équivalent ? 700 TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu le baccalauréat et travailliez à temps plein dans votre commune aujourd'hui ? 600 TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu une licence (3 ans après le bac) ou un diplôme universitaire équivalent et travailliez à temps plein dans votre commune aujourd'hui ? 800 000 \* TND

<sup>1</sup> Les résultats de ces entretiens seront entièrement anonymisés en suivant strictement les dispositions de la loi suédoise et me serviront uniquement à la rédaction de mon mémoire de fin d'études. Ils ne seront pas publiés ailleurs.



Avez-vous prévu de vous inscrire pour un cursus universitaire / l'ISSET ?

- ☒ Oui ☐ Non  
☐ Peut-être ☐ Je ne sais pas encore.

Si oui, pour quelle spécialisation / filière ?

Domaine d'informatique / ou médecine (je sais c'est très rigoureux)

Si vous avez prévu de vous inscrire à l'université / l'ISSET, laquelle est votre motivation principale ? [Choisissez les trois options qui correspondent le mieux et ordonnez-les de 1 à 3, 1 étant la raison la plus importante.]

- ☐ Curiosité intellectuelle ☐ Risque de chômage moins élevé  
☐ Prestige du diplôme ☐ Pouvoir travailler dans le secteur public  
☐ Ma famille le veut ☐ Pouvoir travailler à l'étranger  
☐ Un salaire plus élevé ☒ Autres (précisez ci-dessous, s'il vous plaît) :  
☐ Rester avec les copains du lycée

Apprendre les connaissances pour avoir plus d'in part dans la société.

Avez-vous envisagé de vous inscrire à un programme d'enseignement technique et professionnel

(التكوين المهني) ?

- ☐ Oui ☒ Non  
☐ Peut-être ☐ Je ne sais pas encore.  
☐ Je ne sais pas ce que c'est.

Comment évaluez-vous la qualité des suivants programmes d'éducation dans votre municipalité, ville ou gouvernorat ? [S'il vous plaît, choisissez seulement une option par programme.]

	Très bien	Bien	Moyen	Plutôt mauvais	Très mauvais	Je ne sais pas.
École secondaire / Lycée			<input checked="" type="checkbox"/>			
Université			<input checked="" type="checkbox"/>			
ISSET			<input checked="" type="checkbox"/>			
Programme d'enseignement technique et professionnel (التكوين المهني)				<input checked="" type="checkbox"/>		

Dans le futur, je voudrais travailler comme [profession] : medecin / ingénieur (technologie)

Dans le futur, je préfère travailler dans [cochez les cas qui correspondent le mieux, deux au maximum] :

- ☐ Le secteur privé  
☐ Le secteur public  
☒ En tant qu'indépendant (entrepreneur, auto-employé etc.)  
☐ Autres (organisations non-gouvernementales, internationales, etc.)  
☐ Je suis indifférent(e).  
☐ Je ne pense pas que j'aille travailler.

D'après moi, pour le niveau d'éducation que je prévois d'atteindre, le secteur suivant offre les meilleures perspectives salariales :

- ☐ Le secteur privé  
☒ Le secteur public  
☐ Un travail en tant qu'indépendant (entrepreneur, auto-employé etc.)  
☐ Autres (organisations non-gouvernementales, internationales, etc.)  
☐ Je ne sais pas.

J'envisage de postuler pour un travail hors de Tunisie dans le futur.

- ☐ Oui ☐ Non  
☒ Peut-être ☐ Je ne sais pas encore.

*l'élève n'est pas libre. On prépare un prototype*

*les centres ne sont pas répandus dans tout le pays - Pas d'investissement - Très classique*

*besoin d'être mis à jour*

## A.6.2 Example 2

Christina Sarah HAUSER  
MSc. Economics  
Stockholm School of Economics



7204B2CAN126

### Questionnaire : Les rendements de l'éducation secondaire et universitaire en Tunisie<sup>1</sup>

#### Données socio-économiques :

S'il vous plaît, indiquez votre genre :

<input type="radio"/> Féminin	<input checked="" type="radio"/> Masculin
-------------------------------	---

J'ai 19 ans.

J'ai 0 frères et sœurs.

J'habite à [ville] : Bigate

Je fréquente le lycée suivant : lycée canal

Niveau d'éducation le plus élevé atteint par ma mère :

<input type="radio"/> Primaire (école)	<input checked="" type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input type="radio"/> Universitaire (université / ISET)
--	--	---	---

Niveau d'éducation le plus élevé atteint par mon père :

<input type="radio"/> Primaire (école)	<input checked="" type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input type="radio"/> Universitaire (université / ISET)
--	--	---	---

Situation professionnelle de ma mère :

<input type="radio"/> Ma mère travaille principalement comme _____	<input checked="" type="radio"/> Ma mère ne travaille pas / plus
--	--

Situation professionnelle de mon père :

<input type="radio"/> Mon père travaille principalement comme <u>Militaire</u>	<input type="radio"/> Mon père ne travaille pas / plus
--	--

#### Rendements de l'éducation secondaire et tertiaire :

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu le *baccalauréat* ? 2000 / 3000 impôts et taxes (2011) TND

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu une *licence* (3 ans après le bac) ou un diplôme universitaire équivalent ? 1000 TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu le *baccalauréat* et travailliez à temps plein dans votre commune aujourd'hui ? 9000 TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu une *licence* (3 ans après le bac) ou un diplôme universitaire équivalent et travailliez à temps plein dans votre commune aujourd'hui ? 2000 TND

La moitié (impôts et taxes)

<sup>1</sup> Les résultats de ces entretiens seront entièrement anonymisés en suivant strictement les dispositions de la loi suédoise et me serviront uniquement à la rédaction de mon mémoire de fin d'études. Ils ne seront pas publiés ailleurs.





Avez-vous prévu de vous inscrire à l'université ou bien à l'iset (Institut supérieur des études technologiques) ?

<input type="radio"/> Oui	<input type="radio"/> Non
<input checked="" type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.

Si oui, pour quelle spécialisation / filière ?

Si vous avez prévu de vous inscrire à l'université, laquelle est votre motivation principale ? (Choisissez les trois options qui correspondent le mieux et ordonnez-les de 1 à 3, 1 étant la raison la plus importante.)

<input type="radio"/> Curiosité intellectuelle	<input type="radio"/> Risque de chômage moins élevé
<input checked="" type="radio"/> Prestige du diplôme	<input type="radio"/> Pouvoir travailler dans le secteur public
<input type="radio"/> Ma famille le veut	<input checked="" type="radio"/> Pouvoir travailler à l'étranger
<input checked="" type="radio"/> Un salaire plus élevé	<input type="radio"/> Autres (précisez ci-dessous, s'il vous plaît) :
<input type="radio"/> Rester avec les copains du lycée	

Avez-vous envisagé de vous inscrire à un programme d'enseignement technique et professionnel (التكوين المهني) ?

<input type="radio"/> Oui	<input checked="" type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.
<input type="radio"/> Je ne sais pas ce que c'est.	

Comment évaluez-vous la qualité des suivants programmes d'éducation dans votre municipalité, ville ou gouvernorat ? [S'il vous plaît, choisissez seulement une option par programme.]

	Très bien	Bien	Moyen	Plutôt mauvais	Très mauvais	Je ne sais pas.
École secondaire / Lycée	<input checked="" type="radio"/>			<input checked="" type="radio"/>		
Université				<input checked="" type="radio"/>		
ISSET				<input checked="" type="radio"/>		
Programme d'enseignement technique et professionnel				<input checked="" type="radio"/>		

Dans le futur, je voudrais travailler comme [profession] : Homme d'affaires

Dans le futur, je préfère travailler dans (cochez les cas qui correspondent le mieux, deux au maximum) :

<input checked="" type="radio"/> Le secteur privé
<input type="radio"/> Le secteur public
<input type="radio"/> L'agriculture
<input type="radio"/> En tant qu'indépendant (entrepreneur, auto-employé etc.)
<input type="radio"/> Autres (organisations non-gouvernementales, internationales, etc.)
<input type="radio"/> Je suis indifférent(e).
<input type="radio"/> Je ne pense pas que j'aille travailler.

D'après moi, pour le niveau d'éducation que je prévois d'atteindre, le secteur suivant offre les meilleures perspectives salariales :

<input checked="" type="radio"/> Le secteur privé
<input type="radio"/> Le secteur public
<input type="radio"/> L'agriculture
<input type="radio"/> Un travail en tant qu'indépendant (entrepreneur, auto-employé etc.)
<input type="radio"/> Autres (organisations non-gouvernementales, internationales, etc.)
<input type="radio"/> Je ne sais pas.

J'envisage de postuler pour un travail hors de Tunisie dans le futur.

<input type="radio"/> Oui	<input checked="" type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.

### A.6.3 Example 3

2304 BZPIL 315

Christina Sarah HAUSER  
MSc. Economics  
Stockholm School of Economics



#### Questionnaire : Les rendements de l'éducation secondaire et universitaire en Tunisie<sup>1</sup>

##### Données socio-économiques :

S'il vous plaît, indiquez votre genre :

<input checked="" type="radio"/> Féminin	<input type="radio"/> Masculin
--	--------------------------------

J'ai 15 ans.

J'ai 3 frères et sœurs.

J'habite à (ville) : Sousse

Je fréquente le lycée suivant : lycée pilote 15 octobre 1963 Sousse

Niveau d'éducation le plus élevé atteint par ma mère :

<input type="radio"/> Primaire (école)	<input type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input checked="" type="radio"/> Universitaire (université / ISET)
--	---	---	--

Niveau d'éducation le plus élevé atteint par mon père :

<input type="radio"/> Primaire (école)	<input type="radio"/> Secondaire (collège et lycée)	<input type="radio"/> Formation professionnelle	<input checked="" type="radio"/> Universitaire (université / ISET)
--	---	---	--

Situation professionnelle de ma mère :

<input type="radio"/> Ma mère travaille principalement comme <u>ophtalmologue</u>	<input type="radio"/> Ma mère ne travaille pas / plus
---	---

Situation professionnelle de mon père :

<input type="radio"/> Mon père travaille principalement comme <u>entraîneur de sport (football)</u>	<input type="radio"/> Mon père ne travaille pas / plus
---	--

##### Rendements de l'éducation secondaire et tertiaire :

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu le *baccalauréat* ? 600 TND

D'après vous, quel est le revenu moyen mensuel d'une personne travaillant à temps plein dans votre commune et ayant obtenu une *licence* (3 ans après le bac) ou un diplôme universitaire équivalent ? 1500 TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu le *baccalauréat* et travailliez à temps plein dans votre commune aujourd'hui ? 600 TND

Quel revenu mensuel attendriez-vous si vous aviez déjà obtenu une *licence* (3 ans après le bac) ou un diplôme universitaire équivalent et travailliez à temps plein dans votre commune aujourd'hui ? 2000 TND

<sup>1</sup> Les résultats de ces entretiens seront entièrement anonymisés en suivant strictement les dispositions de la loi suédoise et me serviront uniquement à la rédaction de mon mémoire de fin d'études. Ils ne seront pas publiés ailleurs.





Avez-vous prévu de vous inscrire pour un cursus universitaire / l'iset ?

<input checked="" type="radio"/> Oui	<input type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.

Si oui, pour quelle spécialisation / filière ?

Medecine

Si vous avez prévu de vous inscrire à l'université / l'iset, laquelle est votre motivation principale ? [Choisissez les trois options qui correspondent le mieux et ordonnez-les de 1 à 3, 1 étant la raison la plus importante.]

<input checked="" type="radio"/> Curiosité intellectuelle	<input checked="" type="radio"/> Risque de chômage moins élevé
<input checked="" type="radio"/> Prestige du diplôme	<input type="radio"/> Pouvoir travailler dans le secteur public
<input type="radio"/> Ma famille le veut	<input checked="" type="radio"/> Pouvoir travailler à l'étranger
<input checked="" type="radio"/> Un salaire plus élevé	<input type="radio"/> Autres (précisez ci-dessous, s'il vous plaît) :
<input type="radio"/> Rester avec les copains du lycée	

Avez-vous envisagé de vous inscrire à un programme d'enseignement technique et professionnel

(التكوين المهني) ?

<input type="radio"/> Oui	<input checked="" type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.
<input type="radio"/> Je ne sais pas ce que c'est.	

Comment évaluez-vous la qualité des suivants programmes d'éducation dans votre municipalité, ville ou gouvernorat ? [S'il vous plaît, choisissez seulement une option par programme.]

	Très bien	Bien	Moyen	Plutôt mauvais	Très mauvais	Je ne sais pas.
École secondaire / Lycée		<input checked="" type="radio"/>				
Université	<input checked="" type="radio"/>					
ISCT						<input checked="" type="radio"/>
Programme d'enseignement technique et professionnel (التكوين المهني)						<input checked="" type="radio"/>

Dans le futur, je voudrais travailler comme [profession] :

medecin (chirurgienne)

Dans le futur, je préfère travailler dans [cochez les cas qui correspondent le mieux, deux au maximum] :

<input checked="" type="radio"/> Le secteur privé
<input type="radio"/> Le secteur public
<input type="radio"/> En tant qu'indépendant (entrepreneur, auto-employé etc.)
<input checked="" type="radio"/> Autres (organisations non-gouvernementales, internationales, etc.)
<input type="radio"/> Je suis indifférent(e).
<input type="radio"/> Je ne pense pas que j'aille travailler.

en fait l'enseignement technique dans notre pays n'est pas considéré comme un choix très raisonnable.

D'après moi, pour le niveau d'éducation que je prévois d'atteindre, le secteur suivant offre les meilleures perspectives salariales :

<input checked="" type="radio"/> Le secteur privé
<input type="radio"/> Le secteur public
<input type="radio"/> Un travail en tant qu'indépendant (entrepreneur, auto-employé etc.)
<input type="radio"/> Autres (organisations non-gouvernementales, internationales, etc.)
<input type="radio"/> Je ne sais pas.

J'envisage de postuler pour un travail hors de Tunisie dans le futur.

<input checked="" type="radio"/> Oui	<input type="radio"/> Non
<input type="radio"/> Peut-être	<input type="radio"/> Je ne sais pas encore.

## B Additional material

### B.1 Beyond chapter 1

#### B.1.1 The educational system in Tunisia

**“Tunisification”: The historical development of the Tunisian system of education** After independence and in the context of increasing social welfare spending in the quickly growing MENA region, Tunisia’s first president Habib Bourguiba firmly committed to a very progressive education policy (Dhillon and Yousef, 2009). In 1960, only four years after Tunisia gained independence, the University of Tunis was founded to replace the Institut des Hautes Études de Tunis, the first institute of higher education in Tunisia under the French protectorate. At the same time, within President Bourguiba’s general effort to modernize and secularize the country, the influential University of the Ez-Zitouna Mosque was transformed into a theological faculty and integrated into the University of Tunis. In order to “tunisify” the educational system, the Tunisian government invested heavily in education: between 1962 and 1971, educational investment amounted to 6.6 percent of total national investments, more than in most other Arab countries (Galal, 2008).

The “Tunisification” of the educational system became manifest not only in the rapidly increasing number of Tunisian nationals who got enrolled and who progressively replaced the formerly French majority among the students, but also in an increasing number of students sent abroad, mainly to France, to pursue their studies in areas which were not yet covered by the Tunisian university system. In the 1960s, French-style licences (bachelor’s degrees) were created and in the 1970s, first doctoral programs were added to the university offer. In 1976, the so-called cycles courts were created. These are shorter study programs leading to technical degrees, for instance in the areas of textile or agro-alimentary production. While initially focused on the Greater Tunis area, in the late 1970s and 1980s, the educational offer quickly expanded outside the capital. However, until today the relatively wealthy coastal cities of Tunis, Sousse, Monastir and Sfax remain not only the economic but also the educational centers of the country. The institutes of higher education which were progressively created in the Tunisian interior mostly focus on the specific technical skills required for local production. For instance, the Institut supérieur technologique des industries et des mines de Gafsa was the first technological institute of higher education created in the governorate of Gafsa in 1981 (see Siino, 2004). The local economy is mainly centered on the exploitation of the local phosphate mines. Strong regional inequalities in the access to education hence persist and increase the direct cost of education for the students

in the rural areas of Tunisia.

Not only the offer but also the demand for education grew exponentially. The reasons for this development are twofold: already in 1960, a ministerial decree established that university education was to be tuition-free. Furthermore, the government created scholarship programs based on social criteria and invested into student housing and amenities. In 1970, more than 50 percent of Tunisian university students benefited from a scholarship. Hence, the direct costs of education on average decreased considerably. In addition, the political effort to promote a merit-based economic system seems to have affected individual preferences. Education has increasingly been viewed as a means of social ascension (Siino, 2004).

This continues to be the case after the revolution and the adoption of the new constitution. Article 39 of the constitution of 2014 sanctions the right to free education at all levels. School is compulsory until the age of 16 (Constitution de la République Tunisienne, 2014). The state still heavily subsidizes tertiary education, e.g. by providing funding to student residences and university canteens. Roughly one third of university students receive scholarships, mainly based on social criteria. Likewise, there is a considerable number of merit-based scholarships for students wishing to pursue their studies abroad (Baklouti et al., 2017).

## **The structure of the Tunisian educational system**

**Primary education** Primary education in Tunisia comprehends the "premier cycle", the first six years of elementary education and the "second cycle", the following 3 years. Children generally start school at age 6 in Tunisia and since 1991, school has been compulsory until age 16 (Limam and Ben Hafaiedh, 2018). After independence, primary schools have progressively been arabized but some core subjects such as mathematics and sciences continue to be taught in French.

**Secondary education** Secondary education in Tunisia consists of the "enseignement secondaire général", a 2-year common program (tronc commun) and a 2-year pre-specialization program (cycle de pré-spécialisation). The *baccalauréat*, a national final exam, sanctions the completion of secondary school and is the main criterion for accessing university education. A special feature of the Tunisian education system is the *lycée pilote*, a selective but public secondary school program which is only accessible to the best-performing students, chosen based on their results on a national examination. Lycées pilotes allow their students

to specialize early on. Students receive additional guidance from specifically trained teachers; the declared main objective of the program being to form a national élite. The first lycées pilotes were created in the 1980s and have now spread to all major cities of the country. By contrast, private secondary schools are still rare in Tunisia and mainly concentrated in the greater Tunis area (Attia, 2018).

**Tertiary education** I define tertiary education as the completion of a university program of at least 3 years, equivalent to a European bachelor’s degree (French: *licence*) or an even more advanced degree. Tertiary education in Tunisia is both dispensed at universities and at technological institutes, the *Instituts supérieurs des études technologiques* (ISET) (Ben Sedrine, 2009). The latter are particular of the Tunisian educational system and generally offer shorter programs in the areas of technology, business and trade. ISETs were meant to provide a more applied education and ease job market entry frictions (Ben Sedrine, 2009). Since the introduction of the European bachelor’s-master’s-doctorate system in 2005, ISETs grant applied bachelor’s degrees (*diplôme de licence appliquée*) which allow the recipient to apply for a master’s program at a university in an equivalent area of study.

**Vocational education and training – At-tekwyni** Vocational training is called *at-tekwyni* in Tunisian Arabic. There are several different types of vocational education programs, such as the *Certificat d’aptitude professionnelle* (CAP), which can be obtained after 9 years of basic education. The *Brevet de Technicien Professionnel* (BTP) can be obtained either after the CAP or after completing grade 11 of the general secondary school track. Alternatively, students having obtained a CAP or having completed grade 11 of the general secondary school track can also take an examination to pass the *baccalauréat professionnel*. Students holding a BTP may be eligible to take this examination as well (Limam and Ben Hafaiedh, 2018).

At-tekwyni does not attract more than 5 percent of Tunisian students and has historically been viewed as an option of last resort for those who did not succeed in the general education system (Limam and Ben Hafaiedh, 2018). Given the high unemployment rate among young university graduates and increasing dissatisfaction with the traditional education system, some anecdotal evidence and the most recent numbers provided by the World Bank (see figure 12 below) suggest that this negative attitude towards at-tekwyni may have started to change (ILO, 2015).

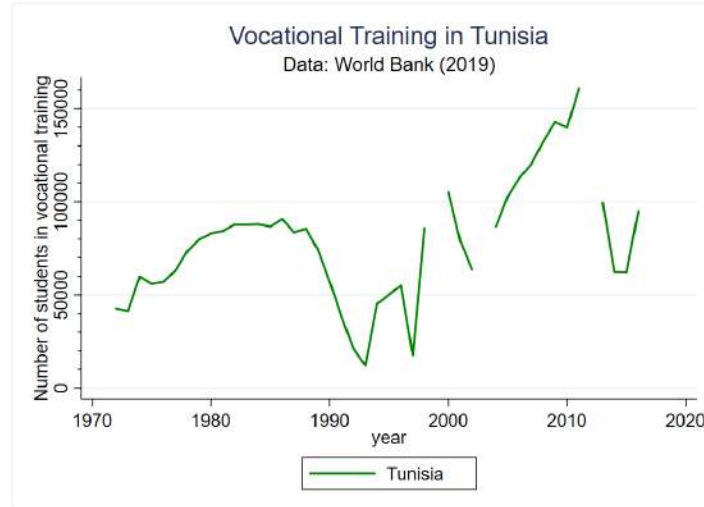


Figure 12 – Total number of students in vocational training in Tunisia

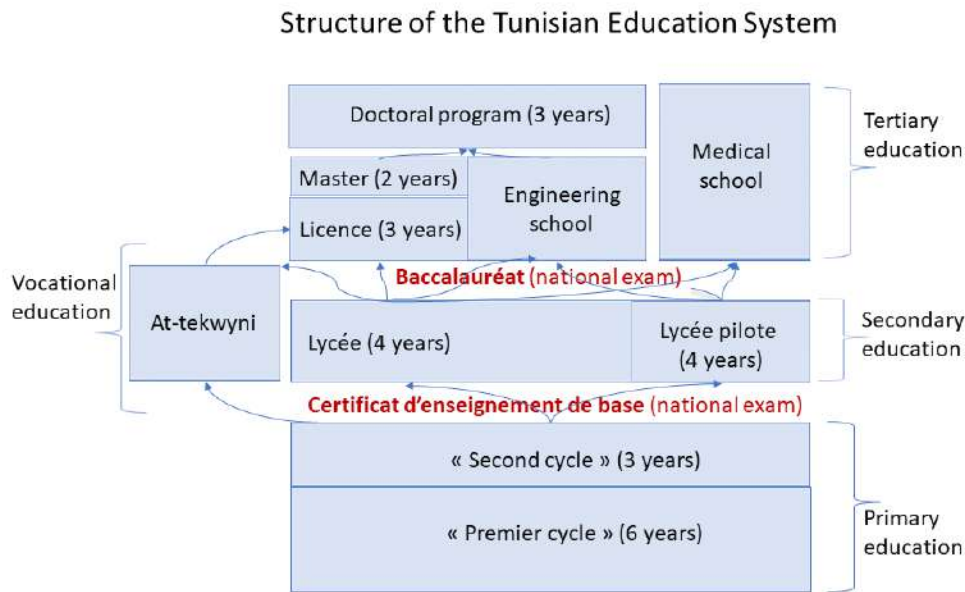


Figure 13 – Structure of the Tunisian educational system  
(By the author)

**Funding of the education system** Tunisia is exceptional among the MENA countries when it comes to the funding of education: in contrast to Lebanon, Kuwait and Jordan, Tunisia has not implemented a large-scale privatization of education (Galal, 2008). But even though the Tunisian school system is almost entirely publicly financed, private expenditure on education

has increased. In 2014/2015, 8.9 percent of elementary and secondary schools (589 out of a total of 6,600) were private. The share reached 23.1 percent for institutes delivering tertiary institutions (61 out of a total of 264) (Limam and Ben Hafaiedh, 2018).

### B.1.2 Enrollment data

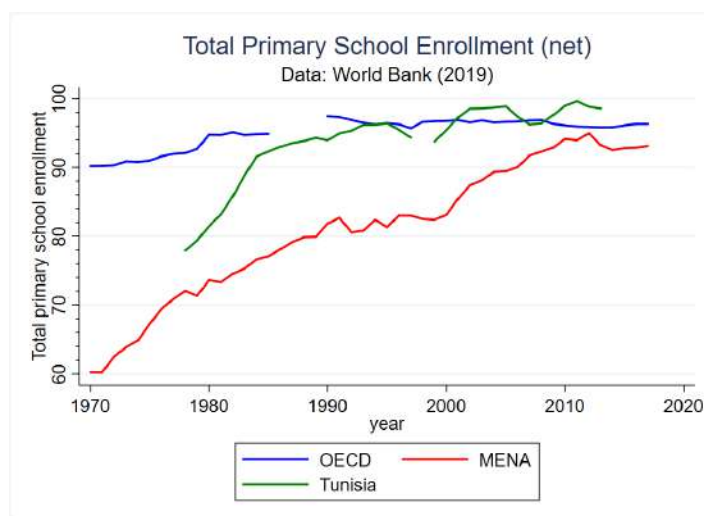


Figure 14 – Total primary school enrollment rate

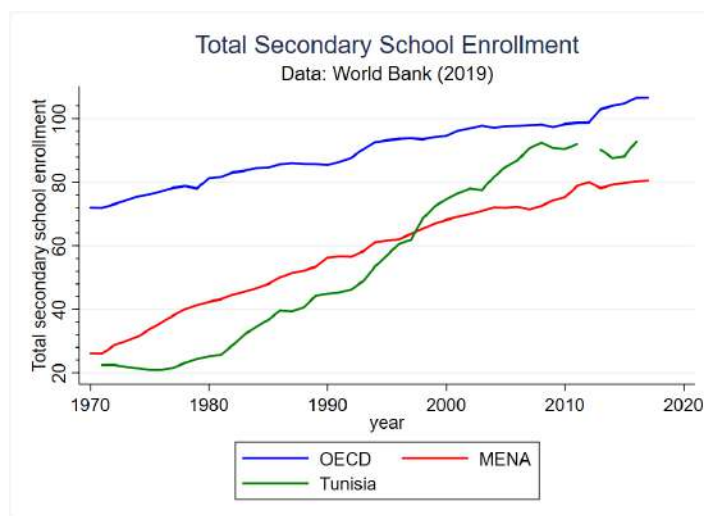


Figure 15 – Total secondary school enrollment rate

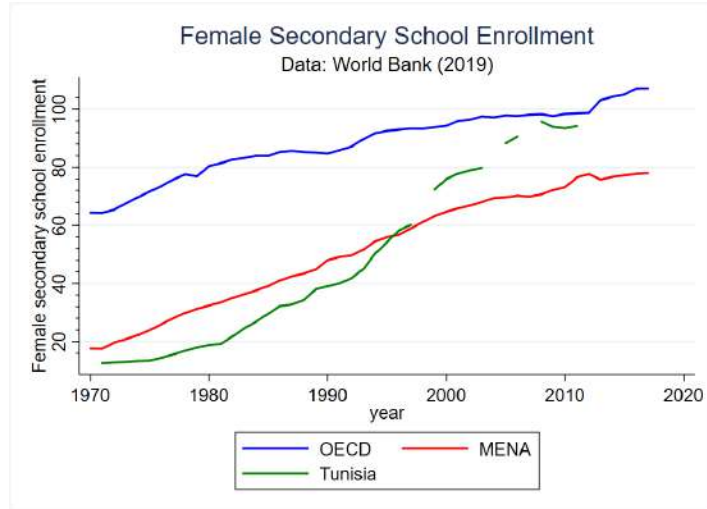


Figure 16 – Female secondary school enrollment rate

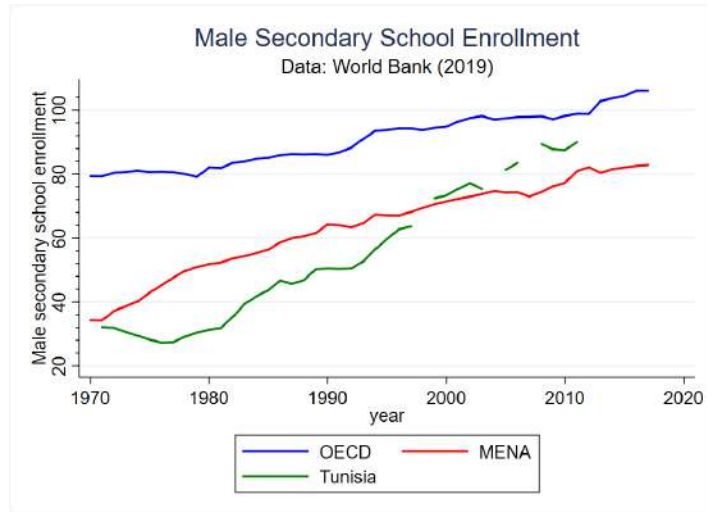


Figure 17 – Male secondary school enrollment rate

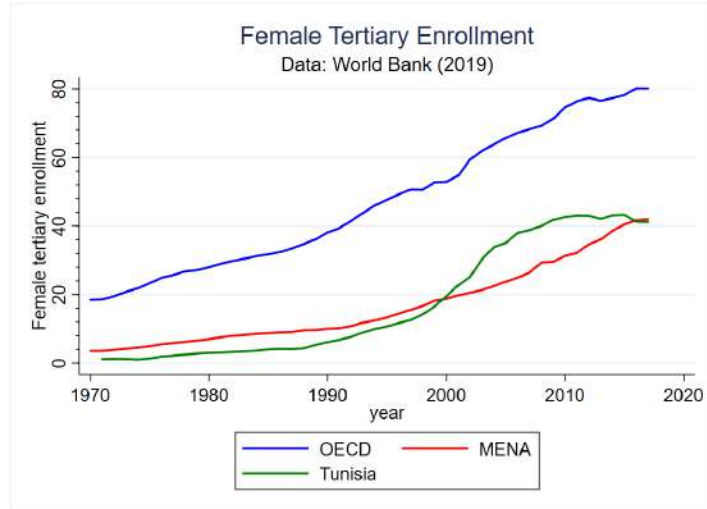


Figure 18 – Female tertiary school enrollment rate

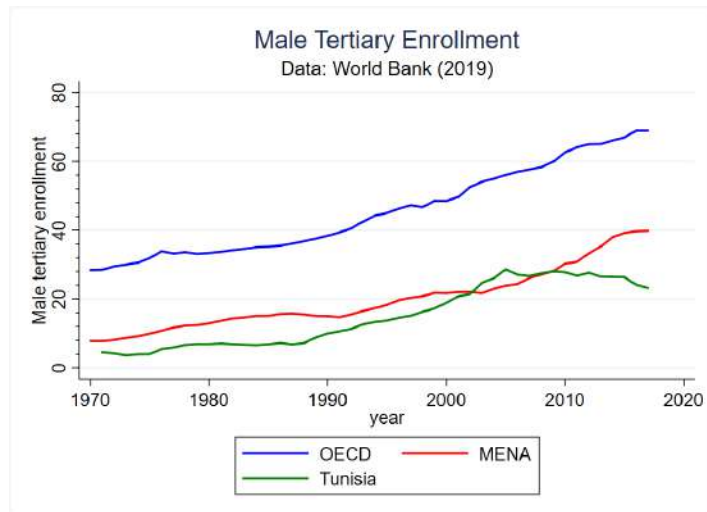


Figure 19 – Male tertiary school enrollment rate



### B.1.3 Additional tables and figures

Table 5 – Average returns to schooling by region and level of schooling in percent

Region	Total			Male			Female		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
High income economies	4.9	6.6	11.1	3.3	7.5	10.7	7.2	5.2	12.3
East Asia	13.6	5.3	14.8	12.6	5.8	15	9.5	6.4	15.8
Europe and Central Asia	13.9	4.7	10.3	12.1	4.2	9.8	11.9	6.4	12.2
Latin America	7.8	5.4	15.9	7.9	5.3	15.7	8.7	6.5	17.4
Middle East and North Africa	16	4.5	10.5	12.7	4.3	10.2	21.4	7.4	13.5
South Asia	6	5	17.3	4.7	3.9	16.6	4.8	6.2	23.3
Sub-Saharan Africa	14.4	10.6	21	12.5	10.1	21	17.5	12.7	21.3
All economies	11.5	6.8	14.6	10.1	6.7	14.4	13.2	8.2	16.1

[Source: Montenegro and Patrinos (2014), table 3b p. 12]

Table 6 – Comparison to previous literature: Returns to education in percent

Study	Year	Schooling			Secondary			Tertiary		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
Zouari-Bouatour et al. (2014)	1980	9.5	8.8	12.9	90.9	83.2	138.4	157.8	148.2	209.3
Zouari-Bouatour et al. (2014)	1999	5.9	5.9	6.4	52.1	51.2	55.6	107.2	105.9	114.3
Montenegro and Patrinos (2014)	2001	8.5			8.1	7.9	8	17.4	16.7	18.7
Barouni (2016)	2010				12	11	13	27	27	28
Limam and Ben Hafaied (2018)	2014	7.3			10.3			23.1		

[I rounded the results to the first decimals except for Barouni (2016) who only reports single digit estimates. Most authors do not provide the standard deviations of their estimates.]

## B.2 Beyond chapter 2

### B.2.1 Sidenote regarding the opportunity costs of education

The opportunity cost of education is considered the most important cost of education and tends to be much higher than all direct costs (Patrinos, 2016). Not including the opportunity cost of education will lead to an overestimation of the returns to education. Appleton (2000) cautions that most estimated returns to university education are too high because many students need more than the regular study duration to complete their university degree. Hence, it is important to evaluate which opportunity cost is the most appropriate for my estimations.

Barouni's (2016) approach to solving this issue is straight-forward: he first calculates the average schooling of those who do not reach the respective degree and then subtracts this number from the expected number of years necessary to complete the degree. As an illustration, in order to compute the opportunity cost of completing secondary education, I would calculate the mean time of schooling in years of those who have "less than secondary education", (that is those who have completed Kindergarten, kottab, preliminary, old primary, basic, vocational, or preparatory education). In exemplum, completing secondary education in Tunisia today takes 13 years. Those who did not complete the lycée in the TLMPS (2014) data have on average 5.7 years of education. According to Barouni's method, I would therefore assume that  $13 - 5.7 = 7.3 \approx 7$  years are the opportunity cost of secondary education in terms of foregone working time.

By contrast, when calculating the opportunity cost of tertiary education, I am going to assume that it is represented by the full time spent studying at university, as the students could have worked right away after the baccalauréat instead of going to university. Completing a Tunisian licence should take 16 years (counting 13 years of primary and secondary schooling and 3 years of university). Assuming that those who complete university could also have worked with only their baccalauréat,  $16 - 13 = 3$  years are the opportunity cost of tertiary education in terms of lost working time. However, 3 years opportunity cost is a very low estimate as students often need more time to complete their degree, and medical and engineering schools require a longer study period in general. The TLMPS (2014) data even suggests that the average time for completing tertiary education is slightly more than 6 years for the total sample<sup>33</sup>. Therefore, I choose an opportunity cost of 4 years instead of 3

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33. This includes longer programs such as medical school but also students who continue to a PhD program. Moreover, most of the survey respondents studied before the adoption of the European Bologna reform, when average study times tended to be longer.

years, following the analytical choice of Zouari-Bouatour et al. (2014). For my estimations of the returns to tertiary education in chapter 2, I use both 4 and 6.1 years of average studies (the average length computed based from the TLMPS sample) in order to obtain realistic lower and an upper bound estimates.

### B.2.2 Additional analysis of the TLMPs (2014) data

**By geographical area** Based on previous literature and the structure of the Tunisian labor market, I expect the returns to education to be higher in non-rural areas. Hence, I first estimate equation 5 by rural or urban geography and then include interaction terms for secondary, vocational education and university graduates working in rural areas in order to test for the statistical significance of my findings. See table 14 in appendix B.2.3 for the regression results.

The data does not confirm my initial hypothesis. The returns to secondary and even to university education appear to be higher in rural areas. Even when I control for public sector employment, the returns to secondary and tertiary education seem to be considerably higher in rural areas. Indeed, internal migration may be another channel through which selection bias affects my results: only those who manage to find a job stay in the rural areas whereas a certain percentage of those who do not will migrate to the urban centers. Zouari-Bouatour et al. (2014) confirm that the supply of labor in general has increased much more in the urban areas of Tunisia since the 1970s and this despite an overall higher population growth rate in the rural areas. An excess supply of skilled workers in the urban areas may decrease the wage premium for workers with secondary or tertiary education. Furthermore, a recent study on the determinants of university education in Tunisia suggests that young Tunisians growing up in rural areas are 6.4 percentage points less likely to attend university than their peers in the urban areas (Krafft and Alawode, 2018). Hence, again there is reason to expect selection bias: since students in rural areas are overall less likely to attend university, the marginal student getting enrolled may be of higher ability than in the urban areas. The higher returns to education in the rural zones of Tunisia could thus also reflect higher innate ability, something I do not control for in the Mincer earnings equations, as already mentioned.

Including interaction terms offers a clearer picture. I find that on average, individuals working in the rural areas of Tunisia can expect to earn a between 5 and 8 percent lower wage, depending on the specification. However, the returns to secondary education in rural areas seem to be higher than in urban areas. By contrast, I fail to reject the hypothesis that the returns to vocational training and university education do not differ across rural and non-rural areas.

In conclusion, I cannot confirm Zouari-Bouatour et al.'s finding (2014) that the returns to higher education are generally higher in the urban than in the rural areas of Tunisia based on TLMPs (2014). This may be due to sampling technique, selection bias, the obser-

vation period (1980 and 1999 for Zouari-Bouatour and 2014 for the TLMPS data), migratory movements, urbanization and other socio-economic changes which may affect the returns to education as mentioned briefly in the introduction of this chapter. The TLMPS (2014) data in fact provides some evidence that the returns to education, especially for secondary education, are higher in rural than in urban areas.

**By human development** The evidence presented above on the influence of rural geography is rather inconclusive. This is why I decided to try a slightly different approach to modeling the influence of geography on wages and the returns to education in Tunisia. Based on TLMPS (2014), I construct a “coast” dummy by coding those governorates which have above average human development scores (almost exclusively the coastal regions) as “1” and all others as “0”. Tunisia is characterized by strong regional disparities. In the past and especially under the regime of Ben Ali, the coastal areas benefited from a lot of public investment relative to the interior areas in the West of the country (see for example Ben Jelloul, 2015). According to Bouassida and Lahga (2018), the labor market segmentation is especially strong in the latter, where employment opportunities are limited to well-paying public sector jobs and mostly informal jobs in the agricultural sector. Please see table 18 in appendix B.2.3 for an overview of the regional development indicator by governorate as computed by the Tunisian Ministry of Regional Development and Planification. Column (III) documents my coding of the “coast” dummy. I also include a political map of Tunisia with the names of the governorates in appendix B.2.3.

The governorates I coded as “coastal” tend to perform better with respect to employment, education, public health and judicial development. I therefore expect that “coastal” geography will have a positive impact on expected wage income, the returns to education, and even more so for women than for men. To test for these hypotheses, I re-estimate the returns to education by level of education first, including a coast-dummy, second, including a coast x male-interaction term, and third, including triple interactions with coast x male x educational level.

The regression results are reported in table 15 in appendix B.2.3. As expected, “coastal” geography is positively associated with earnings in the sample and highly significant. Holding experience and educational attainment constant, I would expect an individual working in a “coastal” region of Tunisia to earn up to 20 percent more than an individual working in a “non-coastal” region. However, I fail to reject the null hypothesis that the

influence of "coastal" geography does not depend on sex. The evidence on a potentially heterogeneous influence of "coastal" geography on the returns to education by educational level is also inconclusive.

Finally, I retain that geography, which, in the Tunisian context, is closely correlated with economic and human development, impacts average income. Individual expected wages seem to be higher in areas with higher levels of economic activity. The influence of gender is not very clear and it also appears that the returns to education across regions converge for individuals with the same level of education.

**Controlling for the probability of being employed** The returns to education by educational level will be affected by the probability of being employed. Given that the unemployment rates in Tunisia tend to be the highest for university graduates, I expect that controlling for the probability of employment will decrease the returns to tertiary education. In the economic literature, this problem is described by the concept of “incidental truncation”: wages are only observed when they are positive. Hence, the returns to education as estimated so far are likely to be upwards-biased because I do not account for the fact that an individual may *not* enter the labor force upon finishing her or his education. Essentially, we face a selection bias: the sample of individuals earning a positive wage is not randomly selected from the whole population.

The best-established identification approach to solving the problem of incidental truncation is the Heckman (1976) procedure, a two-step model which implies adding an explicit selection equation (10) to the model:

$$y = x * \beta + u \tag{9}$$

$$s = 1[z\gamma + v \geq 0] \tag{10}$$

$y$  can be interpreted as the gross hourly individual wage, however, as in the previous specifications, it is only observed for a selected group of individuals, which indeed are employed. The second equation is my selection equation:  $s = 1$  if and only if a positive  $y$  is observed and  $s = 0$  otherwise. In other words,  $s = 1$  implies that I can use the observation in my returns to education analysis, which I cannot if  $s = 0$ . Both error terms  $u$  and  $v$  are assumed to be normally and independently distributed.

$$\text{corr}(u, v) = \rho$$



The value of  $\rho$  represents the value of the correlation between the two error terms. If  $\rho \neq 0$ , it is likely that some omitted variables determine both an individual's wage and the probability to participate in the labor force and in this case, estimating equation 9 with standard techniques will produce biased results. By contrast, applying the two-step Heckman method will yield consistent and asymptotically efficient parameters.

In a first step, I estimate the probability that  $s = 1$  given  $z$  using a probit model.

$$P(s = 1|z) = \phi(s\gamma) \quad (11)$$

This yields an estimated  $\widehat{\gamma}_h$  which allows me to determine the inverse Mills ratio

$$\widehat{\lambda}_i = \lambda(z_i * \widehat{\gamma}_i) \quad (12)$$

for every  $i$ . In a second step, using only the selected sample (the observations for which  $s_i = 1$ ), I can then estimate

$$y = x\beta + \rho\widehat{\lambda} + u \quad (13)$$

This procedure should yield a  $\widehat{\beta}$  which is unbiased and consistent. I fit the model as in equation 5:

$$\ln W_i = \alpha + \beta_1 sec_i + \beta_2 vocat_i + \beta_3 univ_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \epsilon_i \quad (14)$$

assuming that a positive wage is observed if:

$$\delta_0 + \delta_1 EXP_i + \delta_2 EXP_i^2 + \delta_3 sec_i + \delta_4 vocat_i + \delta_5 univ_i + \delta_5 children + \epsilon_i > 0 \quad (15)$$

In this specification, I assume that wage is determined by experience and educational attainment whereas the likelihood of labor market participation as computed by the selection equation is determined by experience, educational attainment and the number of children living in the household. This is necessary for the validity of the specification:  $x$  has to be a strict subset of  $z$ . I need to include at least one variable into the selection equation which is not included in the first equation to avoid multicollinearity. The challenge is to find such an “instrument” which influences the likelihood of being employed but which does not have an influence on the wage. I also fit the model on the basic model (equation 2) with years of schooling as independent variable.

I report the estimated regression results in table 17 in appendix B.2.3. Table 7 below

reports the estimated returns to education in Tunisia using the Heckman correction and number of children in the household as an instrument. I obtain returns to education of 10.0 percent per year of schooling. This is higher than in the basic model, thus contradicting my initial hypothesis that controlling for the likelihood of employment would decrease the returns to education. Likewise, the regression by levels of education suggests returns to university education of between 12.1 and 18.3 percent per year of university education. However, the estimated coefficients are not statistically significant at conventional significance levels.

Table 7 – Returns to education with and without Heckman correction in percent

Method	One year of schooling			One year of tertiary education					
	All	Male	Female	All		Male		Female	
				LB	UB	LB	UB	LB	UB
Mincer	6.9	6.3	8.0	11.4	17.3	9.8	14.6	14.7	22.6
Heckman	10.0	10.0	9.5	12.1	18.3			14.9	22.9

*Note:* Experience and experience squared are included as the only controls; number of children in the household is used as instrument. Due to a lack of observations for the estimation of the selection equation, the Heckman procedure does not allow for an estimation of the returns to tertiary education for the subsample of men.

Moreover, my inverse Mills ratio  $\widehat{\lambda}_i$  is not statistically significant, which could mean that there is no sample selection problem in the data. However, I strongly suspect that this is rather related to the fact that the number of children in the household is not a good predictor of male employment. The coefficient on years of schooling is statistically significant at the 0.5% significance level and suggests that the returns to one year of schooling are 10.0 percent per year, but I cannot make any reliable estimations on the returns to schooling by educational level for men. The  $\chi^2$ -value of the model as reported in table 17 is low, suggesting that a Heckman correction may not be justified in this case.

Even though the number of children in the household is a fairly good predictor of female labor market participation, the Heckman correction does not yield statistically significant coefficients on a female only sample either. This appears to be due to insufficient sample size.

I try using the existence of children younger than 12 in a household as an alternative “instrument”. There are not enough male observations to allow for a separate estimation, but

I can estimate the returns to education for the whole sample and for the female subsample. For the whole sample, this yields estimated returns to schooling of 8.7 percent per year (statistically significant at the 1% level) and estimated returns to tertiary education of 20.8 – 31.5 percent per year. These values are clearly driven by the female observations, as only a very small number of male observations has information on the chosen instrument “small children in the household”. Lacking a more suitable instrument for assessing male returns to university education, I refrain from drawing firm conclusions based on these estimations.

### B.2.3 Additional tables and figures

Table 8 – Mean hourly wages by education

Mean hourly wages	All observations	Male	Female
Secondary education	3.002	3.119	2.509
Tertiary education	6.582	5.598	7.754

*Note:* For the sake of comparability with the later estimates by sex, I drop observations for which I am missing information on sex. All wages are measured in Tunisian dinar (TND).

Table 9 – Mean years of schooling by education

Mean years of schooling	All observations	Male	Female
Secondary	10.525	10.568	10.469
Tertiary	16.581	16.527	16.630

Table 10 – Returns to university education (per year of study)

	All observations	
Method	LB	UB
Mincer regression	0.113	0.172

*Note:* These estimates slightly differ from the estimates presented in the final results section as, not estimating separately by sex, I did not drop observations coded as "missing" for sex.

Table 11 – Summary statistics of the variables used for the Mincer earnings regressions

Variable	Number of observations	Mean	Standard Deviation	Minimum	Maximum
Hourly wage	1,345	3.021	3.908	0.167	104.019
Log of hourly wage	1,345	0.844	0.652	-1.792	4.645
Sex (male=1, female=0)	8,014	0.459	0.498	0	1
Age	8,128	43.718	11.472	25	65
Age squared/100	8,128	20.429	10.273	6.25	42.25
Experience	7,666	11.189	14.131	0	59
Experience squared/100	7,666	3.248	5.357	0	34.81
Years of schooling	7,259	6.105	5.298	0	35
Years of schooling squared / 100	7,259	0.653	0.883	0	12.25
Less than primary education	8,128	0.003	0.058	0	1
Primary education	8,128	0.267	0.442	0	1
Secondary education	8,128	0.140	0.347	0	1
Vocational education	8,128	0.021	0.144	0	1
University education	8,128	0.076	0.265	0	1
Number of children in household	2,462	2.481	1.692	0	40
Works in Public sector (yes=1, no=0)	8,128	0.092	0.289	0	1
Has worked abroad for 6 months or more (yes=1, no=0)	5,494	0.020	0.139	0	1
Lives in rural area (yes=1, no=0)	8,128	0.554	0.497	0	1
Structurally favored governorate (yes=1, no=0)	8,128	0.609	0.488	0	1

*Note:* Hourly wage, age, number of children, experience and years of schooling are directly taken from the TLMPS (2014) dataset.

Table 12 – Mincer earnings estimation with log hourly wage as dependent variable

	(I)	(II)	(III)	(IV)
Years of schooling	0.069*** [19.48]	0.019 [1.36]	0.034*** [7.53]	
Experience	0.022*** [4.82]	0.026*** [5.39]	0.027*** [6.01]	0.029*** [ 6.42]
Experience squared/100	-0.029*** [-2.74]	-0.037*** [ -3.40]	-0.039*** [-3.79]	-0.046*** [-4.39]
Years of schooling squared/100		0.273*** [3.24]		
S1			0.348*** [6.07]	
S1*S3			0.009 [0.54]	
S2			0.461*** [3.76]	
Secondary				0.304*** [7.66]
Vocational				0.204*** [2.80]
University				0.991*** [5.85]
Constant	0.038 [0.70]	0.162*** [2.79]	0.159*** [2.95]	0.346*** [7.70]
$n$	1,304	1,304	1,304	1,345
$R^2$	0.272	0.296	0.327	0.214

*Note:* These and all the following regressions were estimated using robust standard errors. t-statistics are reported in squared parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 13 – Mincer earnings estimation by sex with log hourly wage as dependent variable

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Years of schooling	0.069*** [19.27]	0.078*** [11.07]	0.018 [1.21]	-0.006 [-0.28]			
Years of schooling squared/100			0.281*** [3.18]	0.454*** [3.40]			
Experience	0.022*** [4.57]	0.022*** [4.66]	0.024*** [5.07]	0.025*** [5.25]	0.028*** [5.99]	0.028*** [5.99]	0.031*** [6.65]
Experience squared/100	-0.029*** [-2.66]	-0.031*** [-2.86]	-0.036*** [-3.28]	-0.037*** [-3.46]	-0.046*** [-4.28]	-0.046*** [-4.35]	-0.053*** [-5.05]
Secondary					0.300*** [7.53]	0.257*** [2.65]	0.241** [2.45]
Vocational					0.197*** [2.64]	0.293* [1.95]	0.268 [1.63]
University					1.006*** [15.69]	1.122*** [9.73]	1.111*** [9.79]
Male	0.033 [0.73]	0.151* [1.99]	0.065 [1.41]	0.054 [0.58]	0.076 [1.62]	0.111* [1.88]	0.152*** [2.69]
Male x Years of Schooling		-0.013* [-1.68]		0.030 [1.09]			
Male x Years of Schooling squared/100				-0.227 [-1.42]			
Male x Secondary						0.051 [0.48]	0.028 [0.26]
Male x Vocational						-0.127 [-0.74]	-0.106 [-0.58]
Male x University						-0.204 [-1.51]	-0.246* [-1.85]
Coast							0.150*** [4.38]
Rural							-0.108*** [-3.36]
Constant	0.023 [0.37]	-0.057 [-0.71]	0.134** [2.16]	0.145* [1.67]	0.307*** [5.89]	0.284*** [4.72]	0.210*** [3.11]
$n$	1,284	1,284	1,284	1,284	1,324	1,324	1,324
$R^2$	0.272	0.274	0.297	0.301	0.216	0.219	0.241

*Note:* These and all the following regressions were estimated using robust standard errors. t-statistics are reported in squared parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 14 – Mincer earnings estimation with log hourly wage as dependent variable, controlling for rural geography

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Years of schooling	0.068*** [18.88]	0.016 [1.18]	0.075*** [14.70]	0.068*** [18.55]			
Years of schooling squared/100		0.280*** [3.38]					
Experience	0.023*** [4.94]	0.026*** [5.58]	0.023*** [5.08]	0.022*** [4.67]	0.030*** [6.65]	0.030*** [6.56]	0.028*** [6.07]
Experience squared/100	-0.030*** [-2.86]	-0.038*** [-3.57]	-0.032***	-0.030*** [-2.78]	-0.048*** [-4.59]	-0.047*** [-4.50]	-0.047*** [-4.39]
Secondary					0.289*** [7.23]	0.211*** [3.75]	0.198*** [3.48]
Vocational					0.203*** [2.85]	0.246** [2.22]	0.230** [2.13]
University					0.964*** [15.43]	0.913*** [10.86]	0.924*** [10.69]
Rural x Years of Schooling			-0.015** [-2.24]				
Rural x Secondary						0.155** [2.02]	0.165** [2.14]
Rural x Vocational						-0.081 [-0.57]	-0.079 [-0.55]
Rural x University						0.114 [0.95]	0.119 [0.96]
Rural	-0.0652* [-2.09]	-0.078** [-2.53]	0.054 [0.93]	-0.073** [-2.30]	-0.129*** [-4.08]	-0.168*** [-4.38]	-0.185*** [-4.79]
Male				0.044 [0.98]			0.102* [2.20]
Constant	0.080 [1.35]	0.215*** [3.48]	0.004 [0.07]	0.064 [0.99]	0.412*** [8.51]	0.440*** [8.70]	0.397 [7.05]
$n$	1,304	1,304	1,304	1,284	1,345	1,345	1,324
$R^2$	0.275	0.299	0.278	0.274	0.224	0.226	0.230

*Note:* These and all the following regressions were estimated using robust standard errors. t-statistics are reported in squared parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



Table 15 – Mincer earnings estimation with log hourly wage as dependent variable, controlling for regional development (*coast* dummy)

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Years of schooling	0.067*** [18.57]	0.015 [1.01]	0.065*** [10.48]	0.068*** [18.34]			
Years of schooling squared/100		0.286*** [3.28]					
Experience	0.024*** [5.13]	0.027*** [5.75]	0.024*** [5.12]	0.023*** [4.87]	0.032*** [7.00]	0.032*** [7.01]	0.031*** [6.57]
Experience squared/100	-0.032*** [-3.06]	-0.041*** [-3.80]	-0.032*** [-3.05]	-0.032*** [-3.00]	-0.052*** [-4.96]	-0.052*** [-4.97]	-0.052*** [-4.89]
Secondary					0.283*** [7.15]	0.317*** [4.63]	0.313*** [4.54]
Vocational					0.201*** [2.86]	0.133 [1.10]	0.116 [0.94]
University					0.973*** [15.50]	1.018*** [7.82]	1.039*** [8.03]
Coast x Years of Schooling			0.005 [0.63]				
Coast x Secondary						-0.049 [-0.61]	-0.052 [-0.64]
Coast x Vocational						0.112 [0.77]	0.128 [0.86]
Coast x University						-0.065 [-0.44]	-0.071 [-0.48]
Coast	0.091*** [2.72]	0.112*** [3.35]	0.058 [1.01]	0.097*** [2.84]	0.162*** [4.86]	0.174*** [4.50]	0.184*** [4.76]
Male				0.041 [0.89]			0.093** [2.02]
Constant	-0.016 [-0.27]	0.102* [1.70]	0.002 [0.03]	-0.038 [-0.59]	0.232*** [4.58]	0.225*** [4.33]	0.169*** [2.89]
<i>n</i>	1,304	1,304	1,304	1,284	1,345	1,345	1,324
<i>R</i> <sup>2</sup>	0.277	0.303	0.277	0.276	0.229	0.229	0.232

*Note:* These and all the following regressions were estimated using robust standard errors. t-statistics are reported in squared parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 16 – Mincer earnings estimation with log hourly wage as dependent variable, controlling for public sector employment

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Years of schooling	0.063*** [17.51]	0.019 [1.43]	0.035*** [7.77]	0.063*** [17.21]			
Years of schooling squared/100		0.246*** [3.13]					
Experience	0.021*** [4.61]	0.024*** [5.15]	0.018*** [4.17]	0.020*** [4.23]	0.027*** [6.01]	0.025*** [5.68]	0.023*** [5.13]
Experience squared/100	-0.028*** [-2.66]	-0.035*** [-3.26]	-0.022** [-2.25]	-0.027** [-2.52]	-0.044*** [-4.09]	-0.039*** [-3.76]	-0.038*** [-3.62]
Secondary					0.272*** [7.05]	0.211*** [4.96]	0.250** [2.21]
Vocational					0.183** [2.57]	0.164* [1.89]	0.147 [1.47]
University					0.885*** [14.14]	0.582*** [6.43]	0.503** [2.59]
Public	0.207*** [5.82]	0.182*** [5.01]	-0.277*** [-4.15]	0.213*** [5.81]	0.247*** [6.61]	0.134*** [2.76]	0.569*** [4.59]
Male				0.054 [1.21]			0.252*** [4.20]
Public x Years of Schooling			0.058*** [8.58]				
Public x Secondary						0.196** [2.33]	-0.239 [-1.16]
Public x Vocational						0.073 [0.50]	-0.090 [-0.36]
Public x University						0.533*** [4.49]	0.415* [1.69]
Male x Public x Secondary							0.530** [2.35]
Male x Public x Vocational							0.199 [0.64]
Male x Public x University							0.069 [0.25]
Male x Public							-0.526*** [-3.91]
Male x Secondary							-0.0611 [-0.50]
Male x Vocational							-0.017 [-0.13]
Male x University							0.121 [0.56]
Constant	0.036 [0.67]	0.148*** [2.60]	0.246*** [4.42]	0.013 [0.23]	0.306*** [6.88]	0.349*** [7.81]	0.187*** [3.07]
$n$	1,304	1,304	1,304	1,284	1,345	1,345	1,324
$R^2$	0.293	0.311	0.341	0.293	0.244	0.261	0.282

*Note:* These and all the following regressions were estimated using robust standard errors. t-statistics are reported in squared parentheses. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

Table 17 – Mincer earnings regression with log hourly wage as dependent variable; correcting for the probability of being employed using the Heckman procedure

	All		Female		Male	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Years of schooling	0.100** [2.06]		0.095 [1.64]		0.100*** [3.43]	
Experience	0.068 [0.43]	-0.036 [-0.26]	0.071 [0.36]	-0.036 [-0.23]	-0.044 [-0.51]	-0.028 [-0.24]
Experience squared/100	-0.151 [-0.40]	0.108 [ 0.33]	-0.188 [-0.36]	0.150 [0.37]	0.102 [0.56]	0.001 [0.00]
Secondary		0.179 [0.84]		0.149 [0.66]		-0.109 [-0.32]
Vocational		0.407 [1.03]		0.440 [1.00]		-0.174 [-0.22]
University		0.910 [1.22]		1.063 [1.33]		0.912 [1.61]
Constant	-0.584 [-0.19]	1.836 [0.75]	-0.266 [-0.08]	1.576 [0.61]	0.655 [0.32]	1.939 [0.87]
$\lambda$	0.140 [0.12]	-0.682 [-0.70]	-0.042 [-0.03]	-0.599 [-0.59]	0.021 [0.02]	-0.272 [-0.23]
$\rho$	0.202	-0.737	-0.061	-0.688	0.041	-0.396
$\sigma$	0.694	0.925	0.697	0.870	0.516	0.687
$n$	2,366	2,462	2,233	2,318	106	115
$n$ selected	184	189	150	152	32	34
$n$ excluded	2,182	2,273	2,083	2,166	74	81
Wald $\chi^2$	77.29	42.7	58.21	45.06	40.14	14.62

Note: z-statistics are reported in squared parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

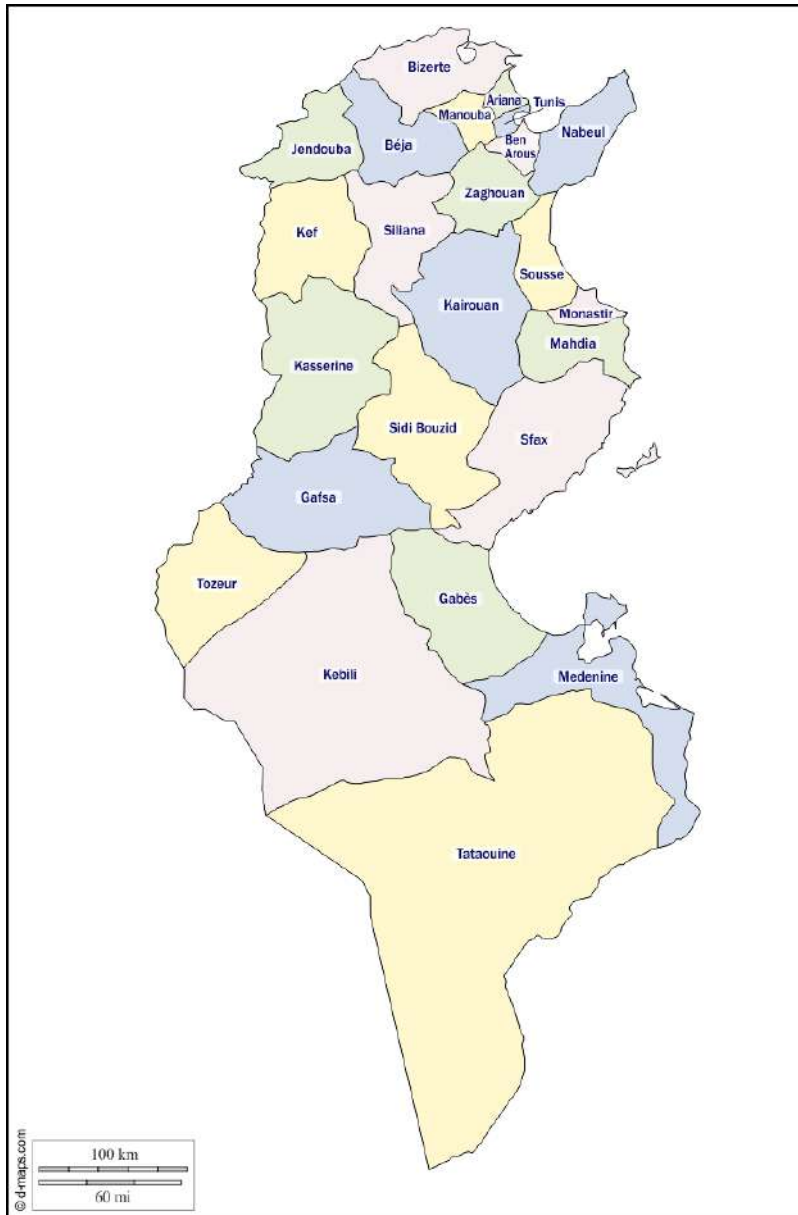


Figure 20 – Political map of Tunisia with governorates  
(Source: D-Maps 2019)

Table 18 – Constructing the *coast* dummy

Rank	Governorate	RDI	Coast
1	Tunis	0.76	1
2	Ariana	0.69	1
3	Ben Arous	0.66	1
4	Monastir	0.64	1
5	Sousse	0.62	1
6	Nabeul	0.57	1
7	Sfax	0.56	1
8	Tataouine	0.55	1
9	Manouba	0.53	1
10	Gabès	0.53	1
11	Tozeur	0.51	1
12	Kébili	0.5	1
13	Médénine	0.5	1
14	Bizerte	0.49	0
15	Mahdia	0.42	0
16	Gafsa	0.41	0
17	Le Kef	0.4	0
18	Béja	0.39	0
19	Zaghouan	0.39	0
20	Siliana	0.36	0
21	Jendouba	0.31	0
22	Sidi Bouzid	0.28	0
23	Kairouan	0.25	0
24	Kasserine	0.16	0
Mean RDI		0.48	

*Note:* For the respective governorates' Regional Development Index (RDI), I rely on the « Baromètre du développement régional » (2012) of the Tunisian Ministry of Regional Development and Planification (Institut Tunisien de la Compétitivité et des Études Quantitatives, 2012). The RDI is based on measures of employment, wealth, education, public health, and judicial development of the respective governorate.

## B.3 Beyond chapter 3

### B.3.1 Power simulation

When planning the field work, I implemented several power simulations in order to estimate the number of observations I would need to collect to test my hypotheses.

My null hypothesis was that the measured average wage based on the TLMPS (2014) survey data as reported in column (II) of table 4 (which equals 1402.153 TND per month) was equal to the average perceived and expected wage. The alternative hypothesis was that the students on average do not correctly assess the mean wage. I assumed that the students were likely to overestimate the mean wage by 10, 20, 30 or 40 percent.

I used the statistical software to determine how many observations would be necessary to achieve a given power conditional on a certain standard deviation (see figure 21 for an illustration). Considering the simulation and assuming that the standard deviation of the survey responses would be roughly in line with the standard deviation of wages in the TLMPS (2014) sample, I concluded that a sample size of at least  $n=300$  would be desirable and planned the field work accordingly.

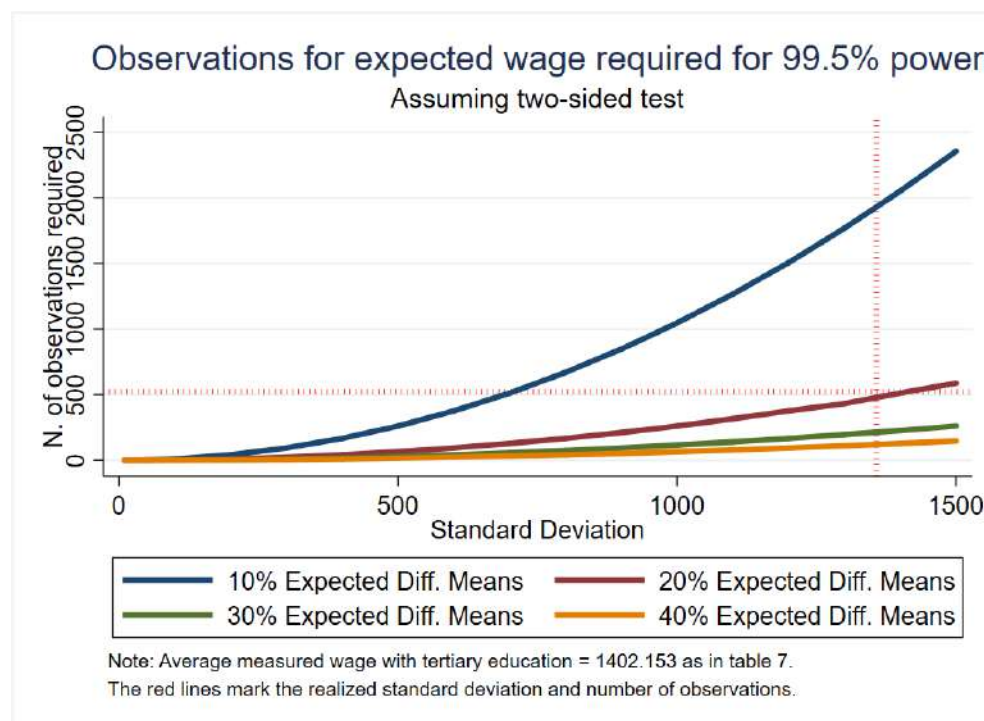


Figure 21 – Power simulation for 99.5 percent power

As reported in table 4 in chapter 3.4, the expected mean average wage in my main sample is 1902.94 TND per month, which lies 35.7 percent above the measured mean wage, hence inbetween the green and the yellow line on the graph. The realized standard deviation is 1356.696. The sample I obtained contained 522 observations and was therefore larger than the minimum sample required for the power I aimed for. I achieved a power of more than 99.5 percent for my study.

### **B.3.2 Lessons learned during the field research**

Some students had troubles understanding the questions on expected monthly salary. I reexplained the idea in easy language and tried to illustrate the difference between the different questions. The students at the lycées pilotes did not encounter this problem, which was probably related to a better mastery of the French language and more practice with abstract thinking.

A few students, most notably in the Centre sectoriel de formation en Soudure, Outillage et Plasturgie de Sousse, apparently out of personal experience, hesitated to fill in the question on expected revenue with secondary education, deploring that “In Tunisia you do not find a job with a high school diploma” (“En Tunisie, on ne trouve pas de travail avec le bac”). The conviction that secondary education alone is not enough to find a job is telling of the sometimes year-long frustration of unsuccessfully trying to find a job. I encouraged them to nevertheless list a positive amount.

Some students wrote amounts like “1,000,000 TND” or “1,500,000 TND” when asked to estimate average monthly earnings. It is commonplace in Tunisia to measure prices in “millimes” rather than in dinar (one Tunisian dinar corresponds to 1,000 millimes). I accordingly interpreted these answers as “1,000 TND” and “1,500 TND”. Some students also did not give one specific amount but a minimum and maximum amount. In these cases, I recorded the average of the two values.

Whenever applicable (ELIT Sousse and Centre sectoriel de formation en Soudure, Outillage et Plasturgie de Sousse), I asked participants to check “oui” if they were planning on continuing their studies at university or at ISET or when they had already studied at one of these institutions. I decided to not use these answers for the analysis as in contrast to the high school students in my main sample, many of these students had already attended and

sometimes graduated from tertiary educational institutions.

The questionnaire originally asked students to list their three main motivations to continue their studies, their most important motivation being “1”, followed by “2” and “3”. A vast majority of the students did not follow these instructions closely and only checked their three preferred options which is why I decided to drop the ranking in the ensuing analysis. Some students checked more than 3 answer options. In these cases I recorded their answers as “non applicable”.

Many students first only filled in the high school part of the “quality of education program” question and left the other lines blank, the reason being that they felt they could only assess the quality of the programs they had already gone through. In these cases, I explained them individually that opinions were what I was mainly interested in and that they could try to form a judgement based on what they had heard from friends, family, neighbors etc.

When asked about which sector they want to work in in the future, a considerable number of students ticked the option “Others (NGOs, international organizations) (*“Autres (organisations non-gouvernementales, internationales etc.”*)”. In hindsight, I think that there was a bit of confusion with some students interpreting this option as indicating the desire to work abroad, so I renounce to further interpretations. By contrast, none of the students exhibited any problems understanding the difference between “public sector” and “private sector”. I interpret this as further anecdotal evidence pointing to the fact that young Tunisians are very much aware of the importance and historical attractiveness of the public sector and the sectoral segregation of the Tunisian economy.

Some students, mostly at Lycée Sijoumi and Lycée Al Canal, had issues with the more sophisticated vocabulary used in some of the questions. I tried to replace the terms the students encountered problems with (*e.g. envisager, cursus universitaire, filière universitaire, prévoir, curiosité intellectuelle . . .*) with more straight-forward terms. For instance, several students were confused by the question on “*cursus universitaire*”. I explained the question and replaced it with the expression “go to university” which was easier to understand. Many students also did not know the abbreviation “ISET”. I added the term “*Institut supérieur des études technologiques*” in a later version of the questionnaire but even then, some students did not seem to be familiar with the concept of ISET.



Most of the students finished filling in the questionnaire in about 15 – 30 minutes. I quickly checked whether they had answered all questions and kindly asked them to fill in missing fields if applicable.



Figure 22 – At Lycée Ali Bourguiba, Kalâa Kebira, April 19, 2019



Figure 23 – At the Centre Sectoriel de Formation en Soudure, Sousse, April 20, 2019

### B.3.3 Additional tables and figures



Figure 24 – Location of the schools included in my survey sample  
[by the author, using Google MyMaps]

Table 19 – Information on the schools included in the survey

School	Information	<i>n</i>
Lycée Sijoumi Rue 4048, Cité Ezzouhour	Grade 12 and 13 Interviewed during German classes on April 15, 2019	55
ELIT Sousse Avenue Mohamed Maarouf, Sousse	Private language school Interviewed during German classes on April 18, 2019	50
Lycée Ali Bourguiba Avenue République, Kalâa Kebira	Grade 13 Interviewed during German classes on April 19, 2019	28
Centre Sectoriel de Formation en Soudure, Outillage et Plasturgie de Sousse Route Ettafala, Sousse	First-year plasturgie class and second year electromechanics class Interviewed on April 20, 2019	21
Lycée Al Canal Avenue Menzel Abderrahmen, Bizerte	Grade 11; Grade 12 and 13 (mixed) Interviewed on April 22, 2019 during French class	73
Lycée pilote 15 octobre 1963 3 Rue Bach Hamba, Bizerte	Grade 10, 11, 12 and 13 Interviewed on April 23 and 24, 2019 during French and German classes	110
Lycée Bach Hamba Rue Bach Hamba, Bizerte	Grade 10, 11, 12 and 13 Some interviewed outside of the classroom (classes were interrupted during a teachers' strike) Interviewed on April 24, 2019 during French and social sciences classes	99
Lycée pilote Bourguiba Avenue Habib Thameur, Tunis	Grade 12 and 13 Interviewed on April 16, 2019 and April 25, 2019 during German classes	102

Table 20 – Field study: Summary statistics

Variable	Mean	Standard Deviation	Min	Max	N
Age	18.097	2.726	15	29	538
Male	0.413	0.493	0	1	538
Number of siblings	2.084	1.293	0	14	534
Mother's education	2.800	1.118	0	4	531
Father's education	2.932	1.053	1	4	536
Lycée pilote	0.394	0.489	0	1	538
At-tekwyni	0.039	0.194	0	1	538
Private	0.093	0.291	0	1	538

Table 21 – Socio-economic characteristics (by sex and school type)

	All	Male	Female	Lycée pilote	Lycée (non-pilote)	At-tekwyni
Age	17.459 [1.732]	17.884 [2.101]	17.166 [1.351]	17.184 [1.172]	17.251 [1.369]	22.762 [1.972]
Male	0.408 [0.492]	1 [0]	0 [0]	0.368 [0.483]	0.4 [0.491]	0.905 [0.301]
Number of siblings	2.031 [1.255]	2.202 [1.561]	1.913 [0.975]	1.735 [0.876]	2.119 [1.182]	3.952 [2.747]
Mother's education	2.799 [1.118]	2.827 [1.146]	2.780 [1.100]	3.564 [0.839]	2.232 [0.915]	1.857 [1.062]
Father's education	2.955 [1.052]	2.965 [1.019]	2.948 [1.076]	3.697 [0.657]	2.386 [0.929]	2.381 [1.071]
Lycée pilote	0.434 [0.496]	0.392 [0.489]	0.464 [0.500]	1 [0]	0 [0]	0 [0]
At-tekwyni	0.043 [0.203]	0.095 [.295]	0.007 [.083]	0 [0]	0 [0]	1 [0]
Number of observations	488	199	289	212	255	21

*Note:* I exclude observations from the private school. Standard deviations are reported in square brackets. For evaluating both the mother's and the father's educational attainment, I coded "no education" as 0, "primary education" as 1, "secondary education" as 2, "vocational training" as 3, and "university education" as 4.

Table 22 – Salary evolution in Tunisia (2008 - 2018)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Salary evolution (in procent)	5.4	5.8	5.78	6.23	7.22	5.96	5.47	6.47	6.2	6.7	6

*Note:* Data for the private non-agricultural sector only. Source: Tunisian Statistical Office (2019).

Table 23 – Expected returns to education, robustness test including all observations

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	478.643 [n=242]	645.690 [n=242]	710.134 [n=537]	1121.914 [n=533]
Tertiary	1039.402 [n=165]	1402.153 [n=165]	1222.251 [n=533]	2480.850 [n=535]
Tertiary - Secondary	560.758	756.463	512.117	1358.936
RTE [UB]	0.391	0.391	0.240	0.404
RTE [LB]	0.195	0.195		

*Note:* In this and all following tables, column (I) is the measured average monthly wage computed based on TLMPS (2014), not controlling for sex, age, experience and other variables. In column (II), I correct for wage inflation using the official estimates of wage inflation between 2014 and 2018 as reported in table 22. Column (III) lists the students' perceived average monthly wage and column (IV) the expected average monthly wage for the respondent themselves. All numbers are in TND. In order to obtain the upper bound estimates of the returns to tertiary education, I divide the difference in returns to tertiary education by 3 as I explicitly asked the students to provide an estimation of the returns to a licence (*Bac +3*), which is the standard way of referring to a 3-years bachelor in Francophone educational systems. For the lower bound estimates, I divide the difference in returns to tertiary education by 6, given that this is the mean time needed for completing a university degree in the TLMPS (2014) data. This value should be considered as a lower benchmark for the comparison with the perceived returns to education.

Table 24 – Expected returns to education, male respondents only

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	499.078 [n=193]	645.690 [n=242]	721.351 [n=211]	1116.825 [n=211]
Tertiary	895.651 [n=87]	1402.153 [n=165]	1198.223 [n=211]	1941.114 [n=211]
Tertiary - Secondary	396.572	756.463	476.872	824.289
RTE [UB]	0.265	0.391	0.220	0.246
RTE [LB]	0.132	0.195		

Table 25 – Expected returns to education, female respondents only

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	401.457 [n=46]	645.690 [n=242]	699.421 [n=311]	1065.691 [n=311]
Tertiary	1240.649 [n=73]	1402.153 [n=165]	1242.235 [n=311]	1877.042 [n=311]
Tertiary - Secondary	839.192	756.463	542.814	811.351
RTE [UB]	0.697	0.391	0.259	0.254
RTE [LB]	0.348	0.195		

Table 26 – Expected returns to education, lycée students

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	478.643 [n=242]	645.690 [n=242]	742.060 [n=454]	1144.119 [n=454]
Tertiary	1039.402 [n=165]	1402.153 [n=165]	1287.467 [n=454]	2014.394 [n=454]
Tertiary - Secondary	560.758	756.463	545.408	870.275
RTE [UB]	0.391	0.391	0.245	0.254
RTE [LB]	0.195	0.195		

*Note:* Based on lycée students' responses, excluding lycée pilote.

Table 27 – Expected returns to education, lycée pilote students

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	478.643 [n=242]	645.690 [n=242]	748.519 [n=206]	1143.932 [n=206]
Tertiary	1039.402 [n=165]	1402.153 [n=165]	1279.612 [n=206]	2151.262 [n=206]
Tertiary - Secondary	560.758	756.463	531.093	1007.330
RTE [UB]	0.391	0.391	0.237	0.294
RTE [LB]	0.195	0.195		

Table 28 – Expected returns to education, all lycée students

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	478.643 [n=242]	645.690 [n=242]	742.060 [n=454]	1144.119 [n=454]
Tertiary	1039.402 [n=165]	1402.153 [n=165]	1287.467 [n=454]	2014.394 [n=454]
Tertiary - Secondary	560.758	756.463	545.408	870.275
RTE [UB]	0.391	0.391	0.245	0.254
RTE [LB]	0.195	0.195		

Table 29 – Expected returns to education, at-tekwyni students

	Measured wage	Measured wage, corr.	Perceived wage	Expected wage
Secondary	478.643 [n=242]	645.690 [n=242]	461.500 [n=20]	672.500 [n=20]
Tertiary	1039.402 [n=165]	1402.153 [n=165]	725.000 [n=20]	950.000 [n=20]
Tertiary - Secondary	560.758	756.463	263.500	277.500
RTE [UB]	0.391	0.391	0.190	0.138
RTE [LB]	0.195	0.195		

Table 30 – Perceived quality of educational offer

	All respondents	Male	Female	Lycée pilote	Lycée (non-pilote)	Lycée (total)	At-tekwyni
Lycée	2.222 (n=486)	2.177 (n=198)	2.253 (n=288)	2.151 (n=212)	2.269 (n=253)	2.215 (n=465)	2.381 (n=21)
Université	2.602 (n=417)	2.488 (n=170)	2.680 (n=247)	2.516 (n=190)	2.763 (n=207)	2.645 (n=397)	1.750 (n=20)
ISSET	2.657 (n=312)	2.617 (n=133)	2.687 (n=179)	2.423 (n=123)	2.836 (n=177)	2.667 (n=300)	2.417 (n=12)
At-tekwyni	1.970 (n=328)	1.978 (n=137)	1.963 (n=191)	1.635 (n=137)	2.118 (n=170)	1.902 (n=307)	2.952 (n=21)

I asked the students to evaluate the respective offer on the following scale: “very good” (coded as 4), “good” (coded as 3), “average” (coded as 2), “rather bad” (coded as 1), “very bad” (coded as 0). They also had the option to tick “I don’t know” which I coded as “NA”.



Table 31 – Motivation for continuation of studies

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
Motivation	Lycée total (n=467)	Lycée male (n=180)	Lycée female (n=287)	Lycée pilote (n=212)	Lycée non-pilote (n=255)	At-tekwyni (n=21)	Lycée and at-tekwyni (n=488)	Private (n=50)	Total (n=538)
(a) Curiosity	207	68	139	135	72	3	210	15	235
	0.443	0.378	0.484	0.637	0.282	0.143	0.430	0.300	0.437
(b) Prestige	150	48	102	59	91	1	151	6	157
	0.321	0.267	0.355	0.278	0.357	0.048	0.309	0.120	0.292
(c) Family pressure	36	16	20	10	26	4	40	3	43
	0.077	0.089	0.070	0.047	0.102	0.190	0.082	0.060	0.080
(d) Higher salary	319	125	194	153	166	11	330	25	355
	0.683	0.694	0.676	0.722	0.651	0.524	0.676	0.500	0.660
(e) Peer pressure	33	17	16	7	26	1	34	0	34
	0.071	0.094	0.056	0.033	0.102	0.048	0.070	0.000	0.063
(f) Employability	94	36	58	48	46	6	100	16	116
	0.201	0.200	0.202	0.226	0.180	0.286	0.205	0.320	0.216
(g) Public sector job	70	29	41	14	56	4	74	6	80
	0.150	0.161	0.143	0.066	0.220	0.190	0.152	0.120	0.149
(h) Emigration	278	108	170	131	147	13	291	30	321
	0.595	0.600	0.592	0.618	0.576	0.619	0.596	0.600	0.597
(i) Other	25	13	12	13	12	1	26	3	29

*Note:* The rows report the absolute number of responses and below the percentage. These percentages do not necessarily add up to 1 as the respondents were allowed to tick up to 3 responses. The table is therefore to be interpreted as follows (column Ia): 207 out of 467 surveyed lycée students named “intellectual curiosity” as one of their three main motivations for continuing their studies. This is equivalent to saying that 44.3 percent of all lycée students named “intellectual curiosity” as one of their three main motivations for continuing their studies.

Table 32 – Preferred economic sector

Preferred sector	Lycée total (n=467)	Lycée male (n=180)	Lycée female (n=287)	Lycée pilote (n=212)	Lycée non-pilote (n=255)	At-tekwyni (n=21)	Lycée and at-tekwyni (n=488)	Private (n=50)	Total (n=538)
(a) Private	237 0.507	86 0.478	151 0.526	112 0.528	125 0.490	14 0.667	251 0.514	16 0.320	267 0.496
(b) Public	137 0.293	55 0.306	82 0.286	35 0.165	102 0.400	3 0.143	140 0.287	22 0.440	162 0.301
(c) Independent	142 0.304	58 0.322	84 0.293	112 0.528	30 0.118	4 0.190	146 0.299	18 0.360	164 0.305
(d) NGO / IO	64 0.137	20 0.111	44 0.153	47 0.222	17 0.067	3 0.143	67 0.137	5 0.100	72 0.134
(e) Indifferent	15 0.032	3 0.017	12 0.042	8 0.038	7 0.027	0 0.000	15 0.031	0 0.000	15 0.028
(f) Will not work	7 0.015	5 0.028	2 0.007	2 0.009	5 0.020	0 0.000	7 0.014	1 0.020	8 0.015

*Note:* The rows report the absolute number of responses and below the percentage. The percentages do not necessarily add up to 1 as the respondents were allowed to tick up to 2 responses. The table is to be interpreted as follows [column 1, (a)]: 237 out of 467 lycée students who were surveyed declared that they prefer working in the private sector later. This is equivalent to saying that 50.7 percent of all lycée named the private sector as one of the two sectors where they would like to work in the future.

Table 33 – Can you imagine applying for a job abroad?

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
Answer	Lycée total	Lycée male	Lycée female	Lycée pilote	Lycée non-pilote	At-tekwyni	Lycée and at-tekwyni	Private	Total
(a) Yes	(n=466) 296 0.635	(n=179) 125 0.698	(n=287) 171 0.596	(n=212) 118 0.557	(n=254) 178 0.701	(n=21) 16 0.762	(n=487) 312 0.641	(n=50) 43 0.860	(n=537) 355 0.661
(b) No	28 0.060	10 0.056	18 0.063	9 0.042	19 0.075	1 0.048	29 0.060	2 0.040	31 0.058
(c) Maybe	124 0.266	38 0.212	86 0.300	77 0.363	47 0.185	4 0.190	128 0.263	5 0.100	133 0.248
(d) Don't know yet	18 0.039	6 0.034	12 0.042	8 0.038	10 0.039	0 0.000	18 0.037	0 0.000	18 0.034

Table 34 – Do you plan to enroll in a university program or at ISET?

	(I)	(II)	(III)	(IV)	(V)
Answer	Lycée total	Lycée male	Lycée female	Lycée pilote	Lycée non-pilote
	(n=467)	(n=180)	(n=287)	(n=212)	(n=255)
(a) Yes	346 0.741	122 0.678	224 0.780	174 0.821	172 0.675
(b) No	12 0.026	4 0.022	8 0.028	2 0.009	10 0.039
(c) Maybe	64 0.137	31 0.172	33 0.115	17 0.080	47 0.184
(d) I don't know	45 0.096	23 0.128	22 0.077	19 0.090	26 0.102

Table 35 – Have you considered enrolling in a vocational training program, at-tekwyni?

	(I)	(II)	(III)	(IV)	(V)
Answer	Lycée total	Lycée male	Lycée female	Lycée pilote	Lycée non-pilote
	(n=458)	(n=176)	(n=282)	(n=210)	(n=248)
(a) Yes	16 0.035	7 0.040	9 0.032	3 0.014	13 0.052
(b) No	351 0.766	131 0.744	220 0.780	178 0.848	173 0.698
(c) Maybe	42 0.092	18 0.102	24 0.085	13 0.062	29 0.117
(d) I don't know	39 0.085	15 0.085	24 0.085	15 0.071	24 0.097
(e) I don't know at-tekwyni	10 0.022	5 0.028	5 0.018	1 0.005	9 0.036

Table 36 – Which economic sector offers the best wage perspective?

Sector	(I) Lycée (total) (n=467)	(II) Lycée (male) (n=180)	(III) Lycée (female) (n=287)	(IV) Lycée (pilote) (n=212)	(V) Lycée (non pilote) (n=255)	(VI) At-tekwynni (n=21)	(VII) Lycée and at-tekwynni (n=488)	(VIII) Private (n=50)	(IX) Total (n=538)
(a) Private	217 0.465	77 0.428	140 0.488	95 0.448	122 0.478	11 0.524	228 0.467	12 0.240	240 0.446
(b) Public	83 0.178	35 0.194	48 0.167	15 0.071	68 0.267	3 0.143	86 0.176	10 0.200	96 0.178
(c) Independent	78 0.167	34 0.189	44 0.153	54 0.255	24 0.094	4 0.190	82 0.168	14 0.280	96 0.178
(d) NGOs / IOs	30 0.064	14 0.078	16 0.056	21 0.099	9 0.035	0 0.000	30 0.061	4 0.080	34 0.063
(e) Don't know	35 0.075	11 0.061	24 0.084	17 0.080	18 0.071	0 0.000	35 0.072	1 0.020	36 0.067

### B.3.4 At-tekwyni: Qualitative evidence

Excerpts from qualitative interviews conducted with students in vocational training in Sousse on April 20, 2019.

Khalil, 24, from Bizerte, 1st year student in the “plasturgie” program at the Center for vocational training in Sousse: “I studied law and English at Université El Manar in Tunis for two years. I switched from one school to the other, then there were administrative problems and I realized that the time investment was too big. I decided to go for something shorter. It’s easier to have a professional degree, you have more opportunities. At-tekwyni has a bad reputation but people underestimate it. I was at university before but if I had been better informed, I would have come here directly. Of course, your salary would be higher if you graduated from university, but you have better chances of finding a job after the professional degree. At-tekwyni focuses on things that you are going to use in the future whereas in university, you do a lot of things that you will never use. The problem is that there is no counselling after school so most of the time, you find out yourself after trying hard and after failing ... It’s not a good feeling because you are financially dependent on your family.”



Figure 25 – At the Centre Sectoriel de Formation en Soudure, Sousse, April 20, 2019

Sana, 31, from Mahdia and Amal, 24, from Kairouan, 1st year students in the “plasturgie” program at the Center for vocational training in Sousse: “High school students believe that university is better than at-tekwyni but afterwards, they realize that it is hard

to find a job. [...] It is not harder for women with vocational training to find a job than for men because they are paid less. Either you accept the salary they offer, or you don't work."

## B.4 Beyond chapter 4

### B.4.1 Policy measures against youth unemployment in Tunisia

The Tunisian government reacted to the “frictional unemployment” described in section 4.4 by creating the so-called SIVP, “stage d’initiation à la vie professionnelle” in 2009. Participants in the SIVP program can complete internships of a length of up to 24 months in participant private companies and receive a compensation of 150 TND per month from the Tunisian National Employment Agency. The private company has to pay a compensation of at least 150 TND per month and can only repeatedly benefit from the program if it recruits at least half of the past interns (République Tunisienne: Ministère de la formation professionnelle et de l’emploi, 2009). The potential benefits of this policy measure are threefold: helping young university graduates enter the job market, increasing companies’ productivity by enhancing their human capital and decreasing the public wage bill by creating alternative job opportunities for university graduates. Other policy measures include the promotion of micro-credit programs and self-employment, partly within the frame of the “*pôles technologiques*”, specially designated industrial zones.

The focus on micro-enterprises and empowerment of university graduates is supposed to help alleviate pressures on the labor market and create alternative sources of income for university graduates (Ben Sedrine, 2009). The basic idea of the SIVP is to incentivize the private sector to hire more young professionals. The private sector and especially foreign companies primarily base their competitiveness on the low cost of the factors of production. Subsidizing the employment of university graduates could therefore induce them to switch from low-skilled to high-skilled labor in order to benefit from the subsidy. The effectiveness of this policy has not thoroughly been evaluated, though (Ben Sedrine, 2009).



### B.4.2 Reservation wages

Table 37 – Assessing reservation wages: “At what monthly income would you accept a job in the public / formal private / informal sector?”

Sector	Public	Private	Informal
Mean reservation wage	466.641	498.167	1580.690
Standard deviation	523.538	719.143	3119.095
Minimum	70	70	100
Maximum	9999	9999	9999
Number of high reservation wage (above 10,000 TND)	1	2	49
Occurrence of high reservation wages (in percent)	0.23	0.46	11.26
Observations	435	435	435

Reservation wages above 10,000 TND are simply coded as “above 10000” in the TLMPS (2014) dataset. The maximum value “9999” which I report in the table is not the code for missing data but the way the program treats the string variable “above 10,000”. This complicates the interpretation of the data. Interpreting the means requires making the assumption that reservation wages of more than 10,000 TND per month and more can be approximated by a reservation wage of 9,999 TND. By computing the mean of the survey responses, I find that the average reservation wage for working in the public sector is the lowest. The reservation wage for working in the informal sector is more than three times as high, which is telling of the high reluctance to accept an informal sector job among a large share of the survey respondents. The difference between the mean reservation wage for formal private and public sector jobs is not statistically significant, but the difference between the mean reservation wage for working in the informal sector vs. working in the formal private or public sector is significant at the 0.5% significance level.

I test whether the preference for the public over the private sector differs in the data across levels of schooling and gender lines. I find no evidence of different preferences across levels of schooling, but I find that the “public sector preference” is statistically significant for male respondents at the 5% significance level while it is not statistically significant for female respondents. Given that recording the observations coded “above 10000” as “9,999” probably means underestimating the reservation wages of these respondents, I am likely to understate the extent of the public sector preference and the respondents’ dislike of informal sector work.