WORKING PAPER

OVER-EDUCATION IN THE TUNISIAN LABOUR MARKET
Characteristics and determinants

Wajdi KTHIRI[1]

Abstract

This study analyses the incidence and determinants of over-education amongst workers graduating from Tunisian universities. Over-education refers to a job match in which a worker possesses a level of education in excess of what is required for their job. Using data from the most recent National Survey on Population and Employment of 2013 and a PROBIT model, we investigate the factors underlying over-education. The econometric analysis confirms that both individual and job characteristics play a major role in explaining the over-education of graduates. Our finding shows that a significant proportion of the Tunisian workforce is over educated for their job (19.8%). By gender, the proportion of over-educated men (41.2%) is slightly higher than the proportion of women (40.3%). Further findings indicate that the proportion of over-educated workers is high amongst workers with bachelor degrees in Literature, Social Sciences, Exact Sciences, Economics, Management and Law.

Keywords: Over-education, Skill mismatch, PROBIT model.

JEL codes: I20, J23, J24, J41

---

[1] **Wajdi KTHIRI** *is a Ph D in Economics, Chief Economist at the Tunisian Institute of Competitiveness and Quantitative Studies. E-mail: wajdi.kthiri@itceq.tn.*

Introduction

The mismatch between the job and education or skills of workers has occupied a high level of interest from such international organisations as the International Labour Organisation (ILO), OECD Quintini, 2011) and the World Economic Forum (2014). Educational or skills mismatch in labour markets of developing countries has become a persistent and growing trend[2](ILO, 2013). One such mismatch is over-education, which refers to a job match where a worker's educational level exceeds the educational requirements of a job.

In Tunisia, in particular, graduates from universities are highly vulnerable to the risk of job mismatch and long-term unemployment. Since 2011, the Tunisian economy has not managed to create enough jobs compared to the high number of tertiary graduates due to the economic crisis. However, young university graduates have been encountering many hardships and have been battling with a lengthy transitional period to decent work. Today, the rate of unemployed graduates is one of the highest in the MENA region; it reached 30% in 2018. Besides, the gap between supply and demand of graduates from universities has created a stronger competition and, therefore, has increased the chances of over-education.

Recently, there has been extensive literature on the microeconomic determinants of over-education (Leuven and Oosterbeek, 2011; Clarck et al., 2012; Quintini, 2011). The objective of this paper is to contribute to this literature, by examining the microeconomic determinants of over-education in the Tunisian labour market.

This paper is structured as follows: Chapter 2 provides a brief review of the literature on over-education. Chapter 3 analyses the incidences of over-education among graduate workers. Chapter 4 introduces the econometric framework and describes the employed data and variables. Chapter 5 reports and discusses the empirical results. Finally, a conclusion and recommendations are presented in Section 6.

---

2 "Over-education of youth in advanced economies increased by 1.5 percentage points in the period 2002 to 2010, reflecting in part increases in educational attainment" (ILO, 2013).

Chapter 2: Literature review

Different explanations of the over-education problem are represented in the literature. The Human Capital Theory (Becker, 1964) assumes that individuals invest in education to maximise their utility and wages and firms try to fully utilise workers' skills to get the maximum productivity from them. Accordingly, HCT considers over-education as a temporary mismatch due to the imperfect information between the needs of workers and firms. After a short period, the worker will look for a matched job outside, or rather the firm will adapt the worker's education to fully utilise his skills. As an extension of the HCT, Matching theory (Jovanovic, 1979), also supported the view that over-education is a temporary phenomenon. For this theory, over-education is an indication of a poor job match related to asymmetric information between labour supply and demand.

Rather differently, Job Competition Theory (Thurow, 1975), assumes that over-education is a permanent phenomenon. This theory assumes that the characteristics of worker play a major role in the allocation process. In this model, all individuals have the same job preferences and the job characteristics determine workers' job allocation. Therefore, for a particular job, individuals with the best characteristics will get the job. Nevertheless, even workers with good characteristics might be over-educated if there are no jobs that match their education level. In this situation, over-education can become quite a permanent state if no new high-skilled jobs are on offer.

The career job mobility theory (Sicherman & Galor, 1990), views that workers are over-educated because they are not able to demonstrate their knowledge and skills and they are lacking work experience. Over-education is a short or a long phenomenon; it depends on the capacity of the worker to clearly demonstrate his skills to the employer. Hence, this theory makes individuals responsible for the mismatch, ignoring the role of job characteristics in the over-education phenomenon. Also, for the career job mobility theory, firms and individuals with a high level of education generate job-worker mismatch in the short term, but good career prospects in the long term.

Finally, for the assignment theory (Sattinger, 1993) over-education arises when workers are not allocated to jobs in which they have a comparative advantage. Hence over-education is a form of allocative inefficiency, whereby skills are under-utilised. Consequently, over-education is a temporary problem until the matching process becomes efficient or there are government policies to reduce inefficiencies.

Since the study of Freeman (1976), over-education has started to be widely analysed in academic literature. These studies have addressed the following broad issues: size and cross-country determinants of over-education, incidence and individual determinants of over-education and return, in terms of earnings of over-education.

The assessment of the individual determinants of over-education is one of the most important subjects treated in econometric analysis. The aim of these studies is to assess the impact of a number of individual characteristics on the probability of being over-educated. Table 1 provides a summary of the most recent studies on the incidences and determinants of over-education. The first finding shows that the incidence of over-education is in considerable variation with the chosen indicator of over-education (objective vs subjective approach). Results show that the share of over-education among graduates in EU countries is varying between 10% and 30%. Furthermore, these studies have demonstrated that the incidence of over-education is strongly related to the job and to individual characteristics at the same time. The empirical assessments report that the individual determinants of over-education

are: gender (a higher prevalence among women than men), age, field of study, level of education, type of contracts and employment sector.

Table 1: Selected studies on the incidence and individual determinants of over-education.

Authors and Year	Data, period, countries	Indicator of over-education	Incidence of over-education	Individual determinants of over-education
Meroni and Vera-Toscano (2017)	REFLEX (2005) A survey that interviews graduates from higher education five years after their graduation (14 EU countries)	Indirect Self-Assessment	Apparent over-education (13.58%) Genuine over-education (12.14%)	Gender, age, field of study, type of contracts
Alpin et al.(1998)	**Labour Force Survey (1995) Great Britain**	**Job Analysis** **Realised Matches**	**27%** **37.5%**	**Gender (high probability of over-education for women), ethnicity, age, field of study** **Gender (high probability of over-education for men), age, field of study**
Barone and Ortiz (2011)	REFLEX Survey (2005) Graduates of the age year 1999/2000. IT, ES, AT, DE, NL, FI, NO, CZ	Self-Assessment Realised Matches	- IT: 12.4%; ES: 17.1%; DE: 12.6% - IT: 8.9%; ES: 24.8%; DE: 3.8%	Gender, social origin, type of tertiary degree, field of study
Betti et al,(2011)	AlmaLaurea (2011) Graduates of 2004 from the University of Siena (Italy)	Self-Assessment	74%	Gender, work experience during higher education, type of tertiary degree, field of study, employment sector (public, private), firm size
Caroleo and Pastore (2013)	Alma Laurea (2010) Pre-reform graduates of 2005. Italy	Self-Assessment	16.5% one year after graduation 11.5% five years after graduation	Gender, social origin, field of study, graduation mark, time to degree, geographical area
Boll et al. (2016)	REFLEX (2005) and HEGESCO (2008). Graduates of the Age and Year 2000 and 2003: AT, BE, CZ, EE, FI, FR, DE, HU, IT,	Self-Assessment	IT: 14.7%, ES: 18.5%, DE: 5.9%	Gender, social origin, field of study, duration of first job search, work experience during higher education, skill

	LT, NL, NO, PO, ES, SI, CH, UK.			level
Verhaest et Van der Velden (2013)	Reflex (2005). Graduates of the Aage and Year 1999/2000: IT, ES, AT, DE, NL, FI, NO, CZ, FR, UK, NO, PT, BE, JA, CH	Self-Assessment	- IT: 38% six months after graduation; 19.3% five years after graduation - ES: 45% six months after graduation; 26.7% five years after graduation - DE: 15.1 six months after graduation; 13.8% five years after graduation	Gender, age, field of study, graduation mark

The academic literature of the incidence and the individual determinants of over-education show that this issue is only covered in EU countries. However, in the following section, we aim to contribute to the academic literature by analysing this phenomenon in the Tunisian labour market.

Chapter 3: Over-education in Tunisia

3.1 Measures of over-education

There are two approaches to measure education/job mismatch, such as objective and subjective methods (Groot and-Maassen van den Brink 2000a). Over-education can be assessed subjectively by asking the respondent to give information on the minimum requirements of the job and then compare their feedback with the individual's acquired level of education. Alternatively, we can simply ask the respondent whether he or she is over-educated or not. The first method is called the *Indirect Self-Assessment (ISA)* whilst the second is termed the *Direct Self-Assessment (DSA)*.

Over-education can also be estimated objectively by using information provided by professional job analysts (such as in the Standard National Occupational Classification System or the National Dictionary of Occupational). This strategy helps us to determine the 'required' level of education for certain professions and compare it with the level of education of workers (Kiker, Santos and Mendes de Oliveira 1997; Chevalier 2003). This method is called the *Normative Job Analysis method (NJA)(Table 2)*.

A second objective measure of over-education is drawn from the distribution of the workers' education (or skill) levels within each occupation, to infer the required level for the job. Based on this distribution, the means or mode of education level is calculated. Mismatch situations are identified when the individual's education (or skill) level deviates from the means or mode by more than some ad hoc value, often one standard deviation.

Each approach and method has advantages and disadvantages. The Normative Job Analysis method (NJA) is conceptually relevant to the other approaches presented below because it is based on the definition made by the job analysis of the educational level required for each socio-professional category (Flisi S. et al., 2014).

Table 2 : The Normative Job analysis method (NJA). The correspondence table between graduates degree and socio-professional categories proposed by Joêlle AFFICHARD (1981)

|	Senior Manager	University Professor	Secondary teacher, Engineer	Intermediate profession	Qualified employee	Technician	Unqualified employee	Qualified worker	Unqualified worker
PhD			Over-educated	Over-educated	Over-educated	Over-educated	Over-educated	Over-educated	Over-educated
Master			Over-educated	Over-educated	Over-educated	Over-educated	Over-educated	Over-educated	Over-educated
Engineer				over-educated	Over-educated	Over-educated	Over-educated	Over-educated	Over-educated
Bachelor degree (Bac +4)					Over-educated	Over-educated	Over-educated	Over-educated	Over-educated
Licence (Bac +3)						Over-educated	Over-educated	Over-educated	Over-educated
Senior Technician						Over-educated	Over-educated	Over-educated	Over-educated

Source: *Emmanuelle et Tomasini (2002), « Diplôme et insertion sur le marché du travail : approches socioprofessionnelle et salariale du déclassement », Economie et statistiques, N°354, page 31*

3.2 Incidence and characteristics of over-education in Tunisia

Based on the data from the National Survey on Population and Employment[3] of 2009, 2010, 2011 and 2013 we try to analyse over-education among graduate workers. We used the Normative Job Analysis method (NJA) to measure over-education.

Figure 1 illustrates the evolution of over-education in Tunisia. It is clear that the percentage of over-educated workers has remained stable, with the exception of an increase of 7.8 points in 2011. That year, the unemployment rate of unskilled workers increased. That can explain the rise in the over-education rate (from 12.5% in 2010 to 18.3% in 2011). Skilled workers are diminishing the number of unskilled jobs and unskilled workers will be unemployed. In general, there is a low incidence of over-education amongst graduate workers, averaging around 20%[4].

Figure 1 : Evolution of over-education rate
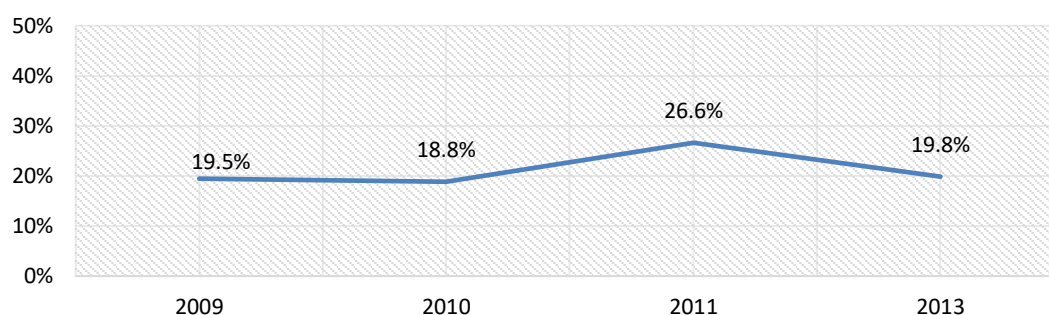
Source: Author's calculation[5], National Survey on Population and Employment 2009, 2010, 2011 and 2013.

The existence of such a level of over-education is due to the quantitative gap between supply and demand for employment in certain level of education and types of field. For many types of field the labour demand represents 10% of labour supply of skilled workers. Consequently, young graduates accept low-skilled jobs in order to avoid being unemployed for a long period of time. Moreover, analysing the incidences of over-education by worker characteristics can offer further insights. As shown in figure 2, over-education is negatively correlated with age. Over-education is a phenomenon that affects all ages, in particular those

---

3 The National Survey on Population and Employment was conducted at the beginning of the second quarter of each year, covering a sample of 132,000 households spread over 5,280 representative districts of all governorates.

4 There are different studies that have found the same level of incidence of over-education. For example, according to the study of Boll et al. (2016) of 25 European countries, the average proportion of over-educated highly skilled workers is 27%.

5 We calculate the proportion of over-educated workers amongst occupied workers in the National Survey of Population and Employment by using the Normative Job Analysis method. The sample is composed only of occupied workers that are tertiary graduates. We used the National Dictionary of Occupation and Professions of Tunisia in order to define the required level of education for each occupation. If the worker has an educational level that exceeds the required level of education for a job, he is defined as over-educated.

aged between 20 and 34 years. Young workers are more likely to be over-educated because of the low number of opportunities in the labour market.
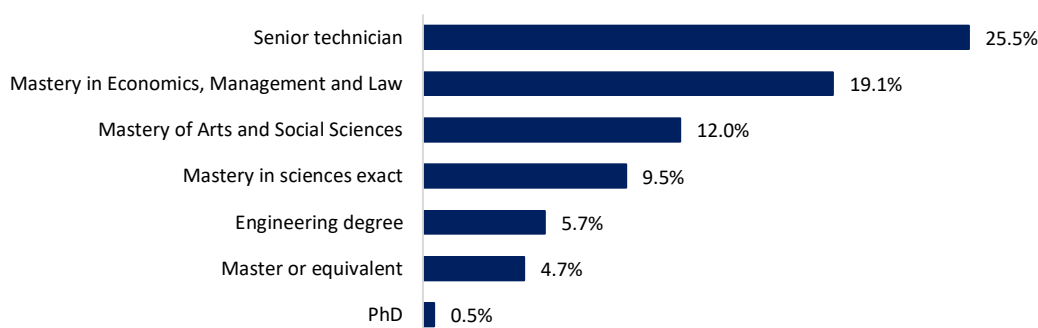
Figure 2 : Over-education rate by age
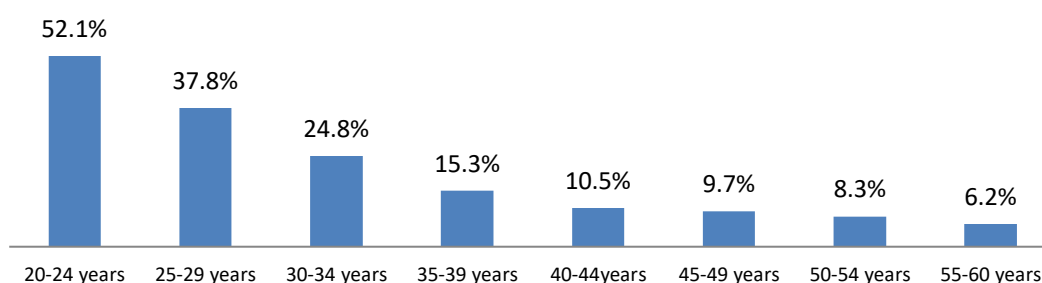
Source: Author's calculation, National Survey on Population and Employment 2013.

Figure 3, shows the over-education rate by education level and types of field. The highest over-education rate is amongst senior technicians; equal to 25.5%. Also, 19.1% of graduates who hold a bachelor's degree in Economics, Management and Law are over-educated. This can be explained by the increase in the number of students holding these degrees. This increase has led to "a diploma inflation". Therefore, the competition for jobs between these graduates has increased and it has led to the prevalence of over-education.

Davia et al. (2016) conducted an international comparison of 25 European countries, and they found out that educational expansion is associated with over-education. In fact, the ratio between labour supply and demand by types of field has an important role in increasing over-education.

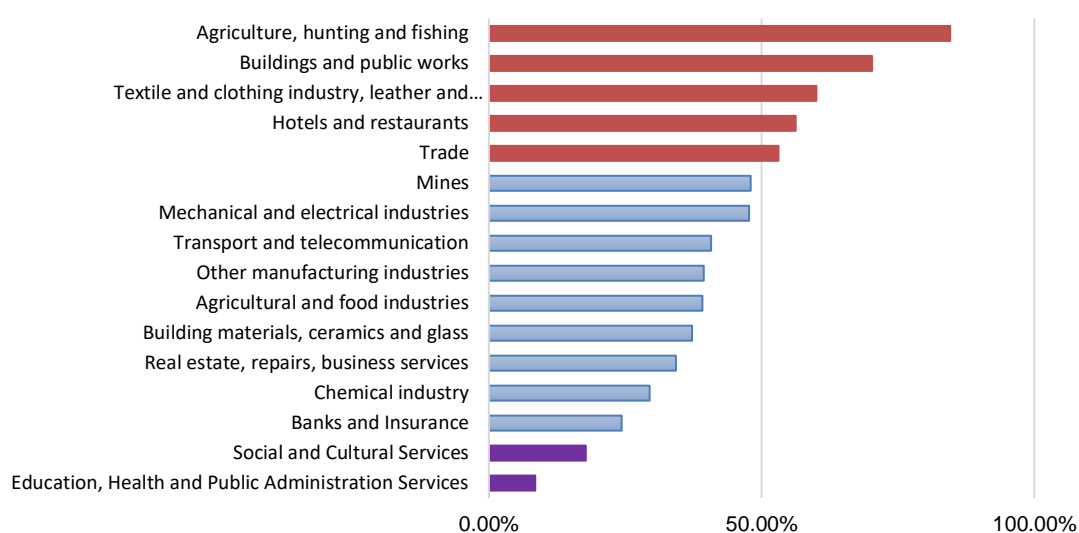**Figure 3: Over-education rate by education level and types of field**

Source: Author's calculation, National Survey on Population and Employment 2013.

As shown in figure 4, the risk of being over-educated varies disproportionally between economic sectors. The over-education rate is high in the Agricultural and in some Services sectors. This is due to the quality of jobs offered by these sectors, which do not generally require high qualifications. Indeed, amongst graduate workers, the rate of over-education in Agriculture is equal to 81%, in Construction 57%, and in Trade 48.5%.

However, Education, Health, Public Administration Services, Banks and Insurance sectors have the lowest over-education levels. Generally, these sectors require high qualifications and they capitalise on knowledge, hence they offer high quality jobs.

Figure 4: Over-education rate by sectors

Source: Author's calculation, National Survey on Population and Employment 2013.

Amongst university graduates, the percentage of over-educated men and over-educated women is very high. Besides, Figure 5 shows that the percentage of over-educated men (41.2%) is slightly higher than the corresponding proportion of women (40.3%). A possible explanation is that women are more likely to participate in the labour force in the agricultural sector.

Figure 5 : Over-education rate by gender

Men

Women

Over-education
rate ; 41.2%

Over-education
rate; 40.3%

Best matching ; 58.8%

Best matching;
59.7%
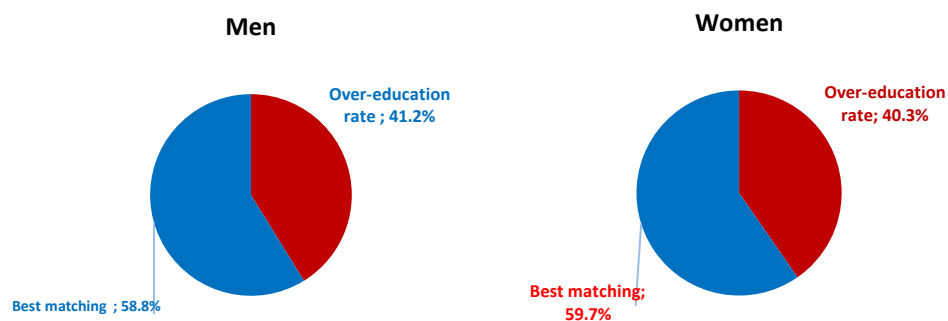
Source: Author's calculation, National Survey on Population and Employment 2013

The role of gender differences in the over-education risk has received attention in the recent literature. Despite the observation made in many countries, there is no affirmation of significant effects that the proportion of over-educated workers amongst women is higher than amongst men. A few studies found that the effect of gender on the over-education risk is insignificant (Büchel and Pollmann-Schult, 2001; Groot and van den Brink, 2003; Frenette, 2004; Green and McIntosh, 2007; Capsada-Munsech, 2015). Similar to our results, Alba-Ramirez (1993), Groot (1996) and European Commission (2012) reached the conclusion that male employees face a slightly higher over-education risk, an effect which in all cases, however, is hardly significant.

Chapter 4: Determinants of over-education at the individual level

4.1 Econometric model

Many studies have used binary outcome models (Logit or Probit) to examine the determinants of over-education at the individual level (Leuven and Oosterbeek, 2011). In this paper, a PROBIT model is used in order to estimate the probability of being over-educated. The equation concerning the probability of being over-educated is as follows:

$$P(Y_i = 1/X = x_i) = P_i = \frac{e^{B'X_i}}{1 - e^{B'X_i}} \quad (1)$$

$\boldsymbol{X}$ refers to the vector of covariates whereas $\boldsymbol{\beta_I}$ is the vector of coefficients linked to the explanatory variables. The dependent variable is a dichotomous variable that takes the values 1 or 0.

Y$_i$ = 1 If worker i is over-educated, $Y_i^* > 0$
Y$_i$ = 0 If worker i is in a suitable match, $Y_i^* = 0$

The latent variable (Y_i^*) is linked through a linear function to a set of statistical variables so that:

$$Y_i^* = \beta_0 + \beta_1 x_1 + x_2 \beta_1 + \cdots . + \beta_n x_n + \varepsilon_i = \beta_i' X_i + \varepsilon_i \quad (2)$$

Where ε_i is a normally and independently distributed error term (NID).

Consequently, we have:

$$P(Y_i = 1 \backslash x) = P(Y_i^* > 0 \backslash x) = P(\beta_i' X_i + \varepsilon_i > 0 \backslash x) = P(-\varepsilon_i \leq \beta_i' X_i) = F(\beta_i' X_i) \quad (3)$$

Where F is the distribution function for ε_i, which in the case of the Probit model, is a standard normal distribution function(Baum, 2006).

4.2 Data and variables

Data from the National Survey on Population and Employment of 2013 (NSPE)6 is used to identify possible determinants of over-education. According to Leuven and Oosterbeek (2011,) typically there is little motivation as to why some variables are included as controls and not others. However, more findings across studies use two categories of covariates, such as individual and job characteristics. Furthermore, it is possible to find conclusions on the relation between over-education and some micro variables, such as gender, age, marital status, level of education and types of field and economic sector of the work etc.(Boll and al., 2016)

---

6 The NSPE is an annual representative survey of households and people living in Tunisia. The survey aims to estimate the demographic and educational characteristics of the population. It also makes it possible to calculate the indicators relating to the economic characteristics of the population, such as the number of working people, the additional demands for jobs, the number of employees and their characteristics, the number of job creations, the characteristics of the unemployed and the unemployment rate.

INDIVIDUAL CHARACTERISTICS

Gender: Studies show that women tend to be more educated than men. The key factor is related to the dependence on the man's salary as the main source of income (Carroll, D., Tani, M., 2013). Thus, he is entitled to take important decisions, such as location and childcare, in order for him to maximise his job opportunities. Women are not given such prerogative when it comes to their chances in the labour market. Most of the time, they are forced to settle for a part-time job that doesn't match their high level of education – thus, leading to over-education.

Age: Based on the previous and ongoing literature, one notices that there is a common consensus about the link between the decrease of over-education and the age factor. Multiple labour market theories account for this relationship. McGuinness and Wooden (2009) propound that labour market theories speculate that the type of job matches increases throughout the career. On the other hand, young inexperienced workers tend to be over-educated because their high education makes up for their limited experience (Baert, S., Cockx, B., Verhaest, D., 2013). Last but not least, theories of career mobility propound that the skills learned by someone who is over-educated may qualify the worker for more promotions. In this respect, over-education is perceived as a favourable asset at the start of a person's career (Leuven and Oosterbeek, 2011).

Marital status: We attempt to gauge if there is a higher rate of over-education amongst married women than men. This stems from the problem of dual job search for couples, which is much more difficult to optimise than single job search. Here, for several reasons husbands tend to first optimize their individual job search. Women's job search is undertaken upon the condition that the husband's job search is optimised (The theory of differential over-qualification, developed by Robert Frank (1978)).

Education level and types of field: The link between a field of study and labour market outcomes has been confirmed through multiple empirical studies. Ortiz and Kucel (2008), using the European Union Labour Force Survey 2003-2005, prove that field of expertise determines the probability of being over-educated in Spain and in Germany. They stress the difference between the fields that are occupationally focused, such as Engineering and Medicine, and highlight that graduates from such fields are less likely to be over-educated than their counterparts in Social Sciences. In the same vein, Dolton and Vignoles (2000), relying on the National Survey of Graduates and Diplomats of U.K. reached the conclusion that graduates from Social Sciences, Arts and Languages tend to be over-educated when compared to Engineering, Technical, and Medicine graduates.

Governorate of residence: Employment opportunities are determined at a regional level, as most people tend to look for work in the local (regional) labour market(Büchel, F., & van Ham, M. (2003). Besides, for the young, job availability is determined by two factors: Firstly, the size of the regional labour market in terms of employment opportunities; Secondly, the location of their residence in relation to the spatial configuration of employment opportunities. Hence, the lack of opportunities and the small size of the regional labour market are two factors that increase the over-education risk.

JOB CHARACTERISTICS

Economic sectors: The likelihood of being over-educated significantly differs among economic sectors. Perceived over-education is a more serious problem in sectors with more unskilled jobs and less sophisticated hiring practices: trade, accommodation, and food service activities compared with other economic sectors. The probability of university graduates being over-educated in these sectors is high (Kupets O., 2016).

Working institution: The public sector is characterised by a defined career structure and better promotion prospects compared with the private sector. Moreover, public sector work is considered to be more successfully matched between the employment and skills. Consequently, the likelihood of being over-educated increases in the private sector, relative to working in the public sector (Linsly I., 2005).

Types of contract: Previous studies demonstrate that the case of over-education is related to both job characteristics and contract types (Ghignoni E., 2011). Due to the transitory nature of fixed-term jobs, workers are less concerned about qualification levels, as they tend to view these matches as being more temporary solutions on route to more favourable permanent positions. We attempt to test if there is no over-education risk amongst workers in permanent positions.

Chapter 5: Results and Interpretation

Table 3 reports PROBIT estimates of the probability of being over-educated. All the results provide unsurprising explanations of over-education.

Table 3: Dependant variable is over-education (equal to 1 if over-educated)

	Coef.	Std. Err.	Z	P>z
Constant	.7224575	.2741249	-2.64	0.008***
0.Gender (ref.Man)	-.2144578	.0305428	7.02	0.000***
Age (ref. 15-24 years)				
25-34 years	-.1856144	.0641639	-2.89	0.004***
35-44 years	-.3291449	.0732164	-4.50	0.000***
45-54 years	-.473192	.0835864	-5.66	0.000***
55-64 years	-.5714608	.1108402	-5.16	0.000***
Marital status (ref. Single)				
Married	.4253974	.0359206	-11.84	0.000***
Divorced	.4689511	.2349069	-2.00	0.046**
Widow	.2423079	.1664523	-1.46	0.145
Sectors of activity (ref. Agricultural)				
Industrial sector	-.8218305	.1611054	-5.10	0.000***
Services sector	-1.02907	.1585131	-6.49	0.000***
Employment contract (ref.fixed-term contract)				
Permanent contract	-.4816442	.0767916	-6.27	0.000***
Without a contract	.9501807	.2728879	3.48	0.000***
Work place (ref. *Public establishment*)				
Public company	.6820719	.0641804	10.63	0.000***
Tunisian private company	.6203625	.0429169	14.45	0.000***
Private joint company	1.095525	.0549552	19.93	0.000***
Agricultural exploitation	2.526227	.2054976	12.29	0.000***

Education level and Types of field (ref.Ph.D)				
Senior Technician	.967328	.2022054	4.78	0.000***
Bachelor in Literature and Social Sciences	.6600259	.2045551	3.23	0.001***
Bachelor in Economics, Management and Law	.8699839	.2037944	4.27	0.000***
Bachelor in Exact Science	.5188769	.2076479	2.50	0.012**
Engineer's degree	-.231834	.2147704	-1.08	0.000***
Medicine or Pharmacology	-.0568188	.2585193	-0.22	0.026**
Master's degree or equivalent	.2591267	.2175815	1.19	0.234
Governorate of residence (ref, Kebili)	(ref. Kebli)			
Tunis	.3221664	.097143	-3.32	0.001***
Ariana	.3910661	.0989806	-3.95	0.000***
Ben Arous	.4144853	.0993486	-4.17	0.000***
Manouba	.1929205	.1087483	-1.77	0.076*
Nabeul	.0886693	.106754	0.83	0.406
Zaghouan	.0910679	.1086801	0.84	0.402
Bizerte	.0303239	.1065165	-0.28	0.776
Béja	.0393346	.1209738	0.33	0.745
Jendouba	.2219006	.1238386	-1.79	0.073*
Le Kef	.0686931	.1143083	-0.60	0.548
Siliana	.079514	.1129959	0.70	0.482
Sousse	.0928561	.0968015	0.96	0.337
Monastir	.3855249	.1013097	3.81	0.000***
Mahdia	.0524774	.1115331	0.47	0.638
Sfax	.2486231	.0996204	-2.50	0.013**
Kairouan	.0549336	.1247792	-0.44	0.660

Kasserine	.1189878	.1218151	-0.98	0.329
Sidi Bouzid	.4429792	.1400728	-3.16	0.002***
Gabes	.1313935	.113391	-1.16	0.247
Medenine	.0428127	.1113204	0.38	0.701
Tataouine	.0646283	.1241326	0.52	0.603
Gafsa	.1352983	.1117956	1.21	0.226
Tozeur	.2434606	.1192651	2.04	0.041**

-*, **, *** statistically significant at the 10%, 5% and 1% levels

The first factor that can play a major role in explaining the probability of being over-educated is gender. The results show that - compared to men - women are less likely to be over-educated. Reasons behind this are possibly that women generally enter the labour market late on, because they prefer to pursue their studies after obtaining their bachelor degree.

Our statistical analysis has shown that the quality of job matches increases with age. Indeed the probability of being over-educated is high amongst workers aged between 20 and 34 years (figure 2). Accordingly, the results of estimation reveal that the likelihood of being over-educated decreases with age. As shown in Table 1, compared to the groups aged 15-24, the probability of being over-educated decreases for other groups.

Marital status can also play a role in explaining over-education. The results show how being married increases the likelihood of being over-educated, compared to workers who are singles. According to the theory of differential of over-qualification (Frank, 1978), job mismatch is regarded as a result of joint decisions by couples. In other words, workers living as a couple are likely to be constrained in their job search by the opinion of their partner. Generally, if the man tends to optimise his job match, the quality of job match for the woman is less important.

An additional factor potentially explaining over-education is the education level and types of field. The results show that – compared to those omitted workers with a PhD degree - workers who have obtained a degree as a Senior Technician, Bachelor degree in Literature and Social Sciences, Economics, Management and Law, and Exact Sciences are more likely to be over-educated. Similarly, workers with a degree in Engineering, Medicine and Pharmacology are not likely to be over-educated. This result can be explained by the specificity of these professions.

In addition, the results show how the probability of being over-educated is lower for workers with permanent contracts, compared to their colleagues with fixed term contracts. Generally, this is consistent with the idea that workers with a permanent contract have better job matching prospects than workers with a fixed term contract or without a contract (informal job).

Another factor explaining the likelihood of being over-educated amongst highly educated workers is the economic sector. The probability of being over-educated is significantly different amongst economic sectors. So the results show that – compared to workers in the Agricultural sector – workers in the Services and Industrial sectors are less likely to be over-educated. These results can be explained by the different quality of jobs offered in these sectors.

Furthermore, an additional variable of control is the sector of employment or work place. The likelihood of workers being over-educated in a public company, a private company and an agricultural company is higher than the workers in a public establishment.

Finally, the regional disparity in Tunisia can explain the probability of being over-educated. Table 1 shows that the probability of being over-educated – compared to the omitted governorate "Kebelli" – increases in governorates which have developed Industrial and Services sectors like Tunis, Ben Arous, Ariana, Mannouba, Sousse and Sfax. These governorates have more job opportunities in the Construction and Trade sectors than the Agricultural sector. Consequently, the probability for being over-educated increases in the labour market of these governorates.

Chapter 6: Conclusion and recommendations

This paper analyses the incidence and determinants of over-education in the Tunisian labour market. The findings reveal that the proportion of over-educated workers is equal to 19.8% in 2013 and it has remained stable between 2009 and 2013. Among university graduates, the proportion of men who are over-educated is slightly higher than the corresponding proportion of women. The risk of over-education is high for the 20-24 year age group and decreases progressively. Also, the proportion of over-educated workers is high in the Agricultural (81%), Construction (57%) and Trade (48.5%) sectors.

Moreover, the econometric analysis confirm that both individual and job characteristics play a major role in explaining the over-education of graduates. The probability of being over-educated decreases with age. The effect seems significant amongst all age groups of worker. Another important dimension that could affect the persistence of over-education is the field of study. The expansion in the number of bachelor degrees in Senior Technician and Economics, Management, Law and Social Sciences increased the probability of being over-educated. Besides this, the economic sector plays an important role in increasing the risk of over-education. The results show that workers in Industrial and Services sectors are less likely to be over-educated than those in the Agricultural sector.

Additionally, for most workers, when the job seeker is restricted to the regional market, the access to suitable employment depends on the size of this market. The results show that when the region is characterised by low industrial investment, like in the governorates of Kebilli, Sidi Bouzid, Gafsa and Tozeur, most graduate workers are relegated to working in the Agricultural sector (where the proportion of over-educated workers is 81%). But, in the governorates of Tunis, Ben Arous, Ariana, Sousse and Sfax, graduate workers only find jobs in the Construction and Trade sectors (where the proportion of over-educated workers respectively are 57% and 48.5%).

Today, over-education is potentially costly to the economy, the firm and the individual. Based on the results of this study, we provide some guidance to policy makers in order to avoid the problem of over-education. Firstly, we find that over-education is prominent in certain levels of education and types of field, like in Economics, Management, Social Sciences and Law. The reason behind this is the method of university orientation, which leads to a "massification" of students in these types of field, creating an oversupply. So, we recommend changing the method of orientation which is based on "the score", because the majority of students having low scores will be oriented to the same types of field.

Secondly, we identify that graduates only find jobs in the Agricultural, Trade and Construction sectors. The Tunisian economy doesn't create enough decent work in relation to the number of graduates. Tunisian policy makers should promote investment in sectors that require a higher level of education. For example[7]: the Pharmaceutical Industry, Financial Activities, Telecommunications, the Paper and Cardboard Industry, Mechanical and Electrical Industries, Chemical Industries, Health and Business Services.

Thirdly, in order to reduce the mismatch between labour supply and demand, we suggest that the government and its social partners (UGTT and UTICA) define a new

---

[7] The choice of this sectors is based on the knowledge intensity index by sector developed by ITCEQ in 2017

Dictionary of Occupational Titles. In this dictionary, works, jobs, and occupations must be well defined, in details, across all sectors. The actual national nomenclature of professions is generalised and it doesn't exact54qw939ly specify the skills required to perform the work. This new dictionary can play an important role in establishing skills and training requirements. Also, it can be used as a reference document for universities, in order to update their training and types of courses.

Last but not least, to reduce information asymmetry and the mismatch between labour supply and demand, it is suggested that improvement should be made to the intermediation efficiency of public employment offices. These offices require new human resources, especially coaching experts, and not just advisors for guidance, as well as orientation and monitoring throughout the process of placement.

References

1. Allen, J., Van der Velden, R., (2001):"Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on-the-job search", Oxford Economic Papers, 53 (3), 434–452.

2. Alpin C., J.R. Shackleton and S. Walsh (1998):"Over and Under- education in the UK Graduate Labour Market", Higher Education, 23(1):17-34.

3. Baert, S., Cockx, B., Verhaest, D., (2013):"Over-education at the start of the career: stepping stone or trap?", Labour Economic, 25, 123–140.

4. Baert, S., Verhaest, D., (2014): "Unemployment or over-education: which is a worse signal to employers?", IZA Discussion Paper No. 8312.

5. Barone C. and Ortiz L. (2011): "Over-education among European University Graduates: A Comparative Analysis of its Incidence and the Importance of Higher Education Differentiation", Higher Education, 61(3).

6. Betti G. and Antonella A. and Laura N. (2011):"Educational Mismatch of Graduates: A Multidimensional and Fuzzy Indicator", Social Indicators Research 103(3):465-480.

7. Battu, H., Belfield, C.R., Sloane, P.J., (1999):"Over-education among graduates: a cohort view",Journal of Education Economics, 7 (1), 21–38.

8. Battu, H., Belfield, C.R., Sloane, P.J., (2000): "How well can we measure graduate over-education and its effects?", National Institute Economic Review 171(1), 82-93.

9. Baum, C. F. (2006). An introduction to modern econometrics using Stata. College Station, Texas: Stata Press.

10. Büchel, F., and van Ham, M. (2003):"Over-education, regional labour markets, and spatial flexibility", Journal of Urban Economics, 53(3), 482-493.

11. Boll, C.; Leppin, J.; Schömann, K. (2016b): "Who is over-educated and why? Probit and dynamic mixed multinomial logit analyses of vertical mismatch in East and West Germany",Journal of Education Economics.

12. Boll, C., Leppin, J. (2014a): "Over-education among graduates: An overlooked facet of the gender pay gap? Evidence from East and West Germany", SOEP papers on Multidisciplinary Panel Data Research No. 627.

13. Boll C., Leppin J., Rossen A., Wolf A.(2016): "Over-education -New Evidence for 25 European Countries", Hamburg Institute of International Economics, ISSN 1861-504X.

14. Carroll, D., Tani, M., (2013):"Over-education of recent higher education graduates: new Australian panel evidence", Economic Education Review. 32, 207–218.

15. Caroleo F.N. and Pastore F. (2013)," Over-education at a Glance: Determinants and Wage Effects of the Educational Mismatch, Looking at the AlmaLaurea Data, Institute for the Study of Labour, IZA DP No. 7788.

16. Chevalier, A., (2003):"Measuring over-education", Economica, 70 (279), 509–531.

17. Clark, B., Joubert, C., Maurel, A.,(2017) : " The career prospects of over-educated Americans", Journal of Labour Economics, 6 (1), 3.

18. Dolton, P., Vignoles, A., (2000):"The incidence and effects of over-education in the UK graduate labour market". Economic Education Review, 19 (2), 179–198.

19. Davia, M. A., McGuinness, S., & O'Connell, P. J. (2016):"Determinants of regional differences in rates of over-education in Europe",Social Science Research.

20. Duncan, G.J., Hoffman, S.D., (1981):"The incidence and wage effects of over-education",Economics of Education Review, vol. 1, issue 1, 75-86

21. European Commission, Directorate-General for Employment, Social Affairs and Inclusion (2012): report on Employment and Social Developments in Europe 2012, Brussels.

22. Flisi, S., Goglio, V., Meroni, E.C., Rodrigues, M., Vera-Toscano, E., (2017):"Measuring occupational mismatch: over-education and over-skill in Europe — evidence from PIAAC". Social Indicators Research, 131 (3), 1211–1249.

23. Frank, Robert H. (1978):"Why Women Earn Less: The Theory and Estimation of Differential Over-qualification", American Economic Review, 68 (3), pp 360-373.

24. Frei, C., Sousa-Poza, A., (2012):"Over-qualification: permanent or transitory?"; Applied Economics, 44 (14), 1837–1847.

25. Hartog, J., (2000):"Over-education and earnings: where are we, where should we go?", Economic Education Review, 19 (2), 131–147.

26. Hartog, J., Oosterbeek, H., (1988):"Education, allocation and earnings in The Netherlands: over-schooling?",Economic Education Review, 7 (2), 185–194.

27. Ichino, A., Mealli, F., Nannicini, T., (2008:"From temporary help jobs to permanent employment: what can we learn from matching estimators and their sensitivity?" Journal of Applied Economics, 23 (3), 305–327.

28. Korpi, T., Tåhlin, M., (2009):"Educational mismatch, wages, and wage growth: over-education in Sweden, 1974–2000", Labour Economics, 16 (2), 183–193.

29. Kupets, O. (2015):"Skill mismatch and over-education in transition economies",IZA World of Labour (224).

30. Kupets O., (2016):"Education-job mismatch in Ukraine: Too many people with tertiary education or too many jobs for low-skilled?",Journal of Comparative Economics, 2016, vol. 44, issue 1, 125-147

31. Leuven, E., Oosterbeek, H., (2011):"Over-education and mismatch in the labour market", Handbook of the Economics of Education, 4. Elsevier, pp. 283–326.

32. Meroni E.C. and Vera-Toscano E. (2017): "The persistence of over-education among recent graduates", Labour Economics, Vol. 48, p. 120-143.

33. McGuinness and Wooden (2009):"Over-skilling, Job Insecurity and Career Mobility", Industrial Relations, 2009, 48(2), 265-286.

34. Sattinger, M. (1993): "Assignment Models of the Distribution of Earnings", Journal of Economic Literature, 31, 831-880.

35. Verhaest D., R. Van der Velden (2013), "Cross-country differences in graduate over-education", European sociological review, 29 (3) (2013), pp. 642-653.

About EMNES

The Euro-Mediterranean Network for Economic Studies (EMNES) is a network of partner and associate research institutions and think tanks working on the Mediterranean region. EMNES aims to provide a renewed vision for socio-economic development in the Mediterranean region, mainly focusing on employment creation, social inclusion, and sustainable development.

EMNES' areas of research include the role of institutions and institutional reforms, macro-economic policies, private sector and micro, small and medium sized enterprises and employment creation, role of education, innovation, skill mismatch and migration, finance, regulation and the real economy and regional integration.

EMNES will produce books, studies, scientific and policy papers and will disseminate through the organisation of annual conferences, and workshop meetings in the region, bringing together leading senior and junior researchers, academics, policy makers and representatives in civil society, to discuss and debate optimal policies for the future of the region.

EMNES is built on four core principles: independence, excellence, policy relevance and deep knowledge on Euro-Mediterranean affairs.

EMNES' Network Partners
Centre for European Policy Studies (CEPS) (Belgium)
Euro-Mediterranean University (EMUNI) (Slovenia)
Free University of Berlin (FUB) (Germany)
Institut Tunisien de la Compétitivité et des Etudes Quantitatives (ITCEQ) (Tunisia)
Institut des Hautes Etudes Commerciales (IHEC) (Tunisia)
Euro-Mediterranean University of Fes (UEMF) (Morocco)
Institut Agronomique et Vétérinaire Hassan II (IAV) (Morocco)
University of Cairo- Faculty of Economics and Political Science (FEPS) (Egypt)
Yarmook University (YU) (Jordan)
Euro-Mediterranean Economists Association (EMEA) (Spain)
Forum for Euro-Mediterranean Innovation in Action (FEMIA) (France)
Institute of Computers and Communications Systems - E3M lab, National Technical University of Athens (ICCS) (Greece)
Istanbul Policy Center - Sabanci University (IPC) (Turkey)
Institute of Studies for the Integration of Systems (ISINNOVA) (Italy)
University of Barcelona Regional Quantitative Analysis Group (UB-AQR) (Spain)
Centre International de Hautes Etudes Agronomiques Méditerranéennes - Istituto Agronomico Mediterraneo di Bari (CIHEAM) (Italy)
Fondazione Eni Enrico Mattei (FEEM) (Italy)
International Institute for Cooperatives Alphonse & Dorimène Desjardins at HEC Montreal (Canada)

EMNES funding: European Commission and EMNES' partners.

Disclaimer
The EMNES' documents are produced with the financial assistance of the European Union within the context of the EU project "Support to economic research, studies and dialogue of the Euro-Mediterranean Partnership" under contract number ENPI/2014/354-488. The contents of EMNES' documents are the sole responsibility of the authors and can under no circumstances be regarded as reflecting the position of the European Union.