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EMPLOYMENT PROSPECTS FOR TUNISIAN HIGHER EDUCATION GRADUATES: CHALLENGES AND SOLUTIONS

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Abstract
The transition from an elitist education system to massification, often likened to the McDonaldization of higher education, has significantly impacted the professional insertion of Tunisian graduates. This transition has led to a substantial increase in student enrollment, with the student population surging from 96,101 in 1993 to a staggering 336,017 in 2010. Similarly, the number of graduates seeking to enter the labor market has followed this upward trajectory, rising from 11,654 in 1993 to 86,035 in 2010 [1]. However, the rapid expansion of the higher education system has given rise to a fundamental challenge: the labor market's inability to absorb the influx of highly qualified graduates. This, in turn, has resulted in alarmingly high unemployment rates among higher education graduates. In 1997, unemployment affected 17,100 higher education graduates, a figure that grew to encompass 66,200 graduates in 2005 and a staggering 160,000 in 2010 [2].
The massification of higher education not only exacerbates the issue of unemployment among graduates but also poses a significant qualitative concern in terms of their labor market insertion.

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This paper seeks to delve into this qualitative dimension by focusing on the phenomenon of over-education. Over-education occurs when the skills acquired during education significantly exceed the requirements of the job market, and it has become increasingly prevalent in recent years.

Introduction

The transition from an elitist system to a massification even a Mcdonalisation creates a problem of professional insertion relating to the graduates of Tunisian higher education. Indeed, the student population passed from 96101students in 1993 to 336017 students in 2010. Graduates ready to integrate the labor market have followed the same tendency passing, for this same period, from 11654 graduates to 86035 in 2010 [1]. Taking into account the growing number of graduates leaving higher education system, labor market cannot absorb the surge of highly qualified labor force. Direct consequences would be strong unemployment rates among higher education graduates. In 1997, Unemployment touched 17100 higher education graduates reaching the sample of 66200 graduates in 2005 and 160000 in 2010[2].

Mass higher education affects not only the labor market insertion of higher education graduates but also the qualitative aspect of this insertion. In this paper, we analyse this qualitative aspect through studying the phenomenon of over-education. Defined as a situation where the required skills for a job are less than those obtained during the formation, overeducation becomes more and more frequent.

The over-education phenomenon is far from being a recent phenomenon.

The problem was the subject of two works, “The Great Training Robbery” of Berg (1970) and “The Overeducated American” of Freeman (1976). Research on overeducation developed in the 70s after the generalization of the higher education access. Nevertheless the higher education graduates labor market equilibrium prevented the emergence of this phenomenon. Indeed, according to Krueger (1993), technical progress went hand in hand with a high qualified labor force demand. The emergence and the diffusion of new technologies during the 80s-90s had considerable effects on the organization of the tasks and the requalification of employment in many sectors, thus contributing to reinforce the mutual adequacy between education level and employment. According to Groot and Van Der Brink (2000), it was only at the beginning of the 90 that these evolutions highlighted the question of the overeducation.

The economic theories propose several explications to the emergence and the time persistence of overeducation. The human capital theory presents the overeducation as a temporary phenomenon.

The theory of the signal explains the over-education at the first job by the higher education diplomas devaluation in the labor market. The diplomas rank in the hierarchy of certifications represents its value on the labor market. The inflation of the diplomas leads to an irreversible devaluation of the school titles if initial training does not affect individual aptitudes.

Job competition theory presents initial training as an input card for employment, but it announces the individual employability and not the productivity. The contribution of Thurrow's theory is the consideration of fields of study in the explanation of the training-employment relationship.

The main objective of this work is the study of the labor market reaction to the mass higher education through analysing the nature of the correlation between the labor market needs of qualifications and the obtained competences. We propose specifically the assessment of over-education phenomenon among higher education graduates and its principal determinants.

The **first section** presents the principal measurments of over-education used in the empirical study which are: normative, self asseessment and that related to wages. **The second section** is a summary of the data and the methodology of the econometric model. **The third section** presents the principal results.

Over-Education Measurments

According to Forgeot and Gautié (1997), Fondeur (1999) and Battu and al (2000), there are four measurements of over-education: the job analyst, the statistic approach, the self-assessment and the wage related over-education. Using the doctionnary of titles; job analyst approach defines the skill/educational requirement for each occupation, as available in the United States (Dictionary of Titles). This objective definition is based on the assumption that all jobs with the same title have the same educational level. So we should keep in mind that a dictionary of titles is lengthy to compile and the information collected mightnot be up to date by the time of release especially in a rapidly changing work envirement [3].

The self-assessment measure was used by Battu et al. (2000) and it represents the workers' judgment of the job regarding their qualification.

This measurement can be affected by classification error. With the statistical appraoch "the distribution of education is calculated for each occupation; employees who depart from the mean [4] or mode [5] by more than some ad hoc value (generally, one standard deviation) are classified as over-educated [6]. Based on the observed distribution of education for a given occupation, the statistics approch of over-education is sensitive to cohort effects and to the level of aggregation necessary to obtain a reliable distribution of education. It also assumes that all jobs with the same title have identical skill requirements.

In this paper we introduce the measurment of overeducation from the wages point of view.

According to the human capital theory, a graduate is considered as overeducated when he/she does not make profitable the additional investment in formation compared to less graduate young people. This measurement is also based on the fact that the wages reflect the

hierarchical position of employees in the company. The main advantage presented by this measurement is the fact of avoiding the hierarchical problem of the SPC. Indeed, initial training constitutes the principal component of the human capital. As such the preparation of a diploma is interpreted as an investment in capital and the level of wages represents the "return on investment". Over-education related to wages lies within the Thurrow's theory job competition: the individual wages are not the fruit of an adjustment on the labour market but the reflection of the hierarchy sitation in the company fixed beforehand. The adjustments being done on the level of employment, it is legitimate to use the wages to measure the rank of the employee in relation to the employment that he/she occupies.

Over-education related to wages presents several advantages. Since occupied jobs are ranked according to their productivity and not according to the CSP, the measurement of over-education related to wages is not affected by biaised technological progress. In addition, wages are not appreciated in the absolute but relatively to those of less graduated employees. In this case, the measurement of the over-education related to wages is less biaised by the diplomas inflation mechanism. It remains affected by the supposed rise of the heterogeneity of the potential aptitudes within the diplomas which become more abundant.

Finally, over-education related to wages is based on criteria independent of time; thus it is more robust in the analysis of its evolution.

We propose to identify and compare the effects of different determinants on each kind of measurment of overeducation. We consider among the determinants the demographic ones and those relating to the job characteristics. We focus also on the training characteristics, specially, the various kinds of diplomas and fields of study. We can then highlight mass higher education effects on the over-education risk through the abundance of higher education diplomas such as the bachelor's degree and the technical bachelor's degree.

Data and Methodology

In this paper we propose, with a probit model, to identify the determinants of each kind of overeducation measurment for the graduates' cohort 2004 obtaining a job 18 months after leaving higher education (2005). For this purpose we used the data survey of the study "Employment dynamics among university graduates" carried out by the Tunisian ministry of Vocational Training and Employment and the World Bank.

This empirical study presents three over-education measurments. The first is a job-analysis over-education. It is measured in a normative way by applying professional correspondence diploma-group relationship established by the Tunisian Ministry of Vocational Training and Employment following the example of correspondence suggested by Affichard (1981)(Table 1).

Table 1: Diploma-socio-professional category correspondence

	Legislators and senior officials Scientific and intellectual profession Professionals	Technicians and associate professionals	Clerks	Service workers and shop and market sales workers	Skilled agricultural and fishery workers	Craft and related trade workers	Plant and machine operators and assemblers	Elementary occupations
Bachelor of technology			overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated
Bachelor's Degree		overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated
Engineer		overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated
Architect		overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated
Doctor		overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated
Primary education teacher		overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated	overeduc ated

Source : « Employment dynamics among university graduates »P93 Ministry of Vocational Training and Employment and World Bank (2009)

The second over-education measurment is subjective or self-assessment - obtained through a graduate's personnel evaluation of the situation. The last measurment is related to the wages received by graduates according to each type of certification. With the "over-eduation ralated to wages", we can study the nature of the correspondance between wages and diploma.

To obtain the "over-education related to wages" we must, first, classify the graduates according to their wages and compare each type of diplomas relatively to the median. According to the obtained hierarchy, a graduate is considered as overeducated at the wage point of view if more than X% of individuals, with immediately a lower diploma, gain better than him/her. Usually we choose the median as X% to get an over-education at the first order. With these three measurments we obtain the endogenous variable which is a binary variable taking value 1 if the individual is Over-educated and 0 if not.

We use a sample of 1630 graduates and three types of characteristics:

demographical data, employment characteristics and tertiary training characteristics (Table 2)

Table 2: Mean and standard deviation of selected variables

Over-education	Normativ		Self assessment		Related to wages	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Demographical data						
Man	0,4179	0,4936	0,4941	0,5004	0,3665	0,4822
Single	0,9482	0,2218	0,9425	0,2330	0,9368	0,2435
Father working as legislators or senior officials	0,2071	0,4056	0,2352	0,4245	0,2038	0,4031
Studying State Financial Support	0,7804	0,4144	0,7530	0,4317	0,8057	0,3960
In-company training	0,6696	0,4708	0,6988	0,4592	0,6635	0,4729
Employment characteristics						
Public sector	0,2446	0,4303	0,3909	0,4884	0,3112	0,4634
Contract of adaptation and professional insertion (SIVP1)	0,2804	0,4496	0,2572	0,4375	0,2891	0,4537
Contract of a undetermined time (CDI)	0,1018	0,3026	0,2132	0,4099	0,0806	0,2724
Contract of a predetermined time (CDD)	0,2821	0,4504	0,2809	0,4498	0,2891	0,4537
Less than 10 employees	0,3750	0,4846	0,2555	0,4365	0,4281	0,4952
10-49 employees	0,2179	0,4132	0,3029	0,4599	0,2670	0,4427
50_199 employees	0,1696	0,3757	0,1980	0,3988	0,1406	0,3479
200-499 employees	0,0929	0,2905	0,1117	0,3152	0,0695	0,2545
500 employees and more	0,1446	0,3521	0,1320	0,3388	0,0948	0,2932
Educational characteristics						
Bachelor's Degree (Baccalauréat+4)	0,5946	0,4914	0,4721	0,4996	0,5087	0,5003
Doctor	0,0000	0,0000	0,0135	0,1157	0,0142	0,1185
Primary education teacher	0,0000	0,0000	0,0085	0,0917	0,0000	0,0000
Bachelor of technology (Baccalauréat + 3)	0,3554	0,4790	0,3807	0,4860	0,4234	0,4945
Engineer	0,0357	0,1857	0,1117	0,3152	0,0348	0,1833

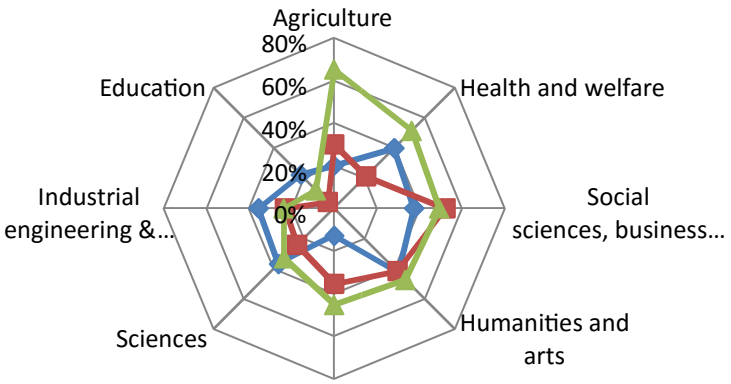
Bachelor of arts	0,0143	0,1188	0,0135	0,1157	0,0126	0,1118
Social sciences, business and law	0,4875	0,5003	0,3316	0,4712	0,4076	0,4918
Education	0,0071	0,0843	0,0372	0,1895	0,0190	0,1365
Humanities and arts	0,1643	0,3709	0,1591	0,3660	0,1643	0,3708
Sciences	0,1161	0,3206	0,1658	0,3722	0,1390	0,3462
Industrial engineering & Construction	0,1482	0,3556	0,2166	0,4123	0,1343	0,3412
Agriculture	0,0107	0,1030	0,0068	0,0821	0,0205	0,1419
Health and welfare	0,0393	0,1944	0,0694	0,2543	0,0837	0,2772
Services	0,0196	0,1389	0,0068	0,0821	0,0221	0,1472
Observations		560		591		633

Source: author's calculation

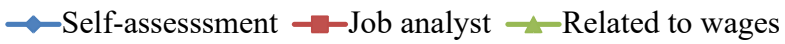
The most abundant school titles are strongly touched by the three types of over-education (Figure 1) which is the case of the Bachelor's degree and bachelor of technology. The title of engineer presents a strong employability and is appreciated with its right value on the labour market. But engineers' personal appreciation presents a strong over-education feeling.

The distribution of the graduates by type of over-education and fields of studies (Figure 2) confirms the relation between school titles abundance and overeducation situation. We note that fileds of study with strong employability present weak proportion of normative and over-education related to wages and a strong overeducation feeling. These fields are industrial engineering and construction, sciences and education. Concerning the discipline education, it should be noted that its graduates are mainly recruited in the sector of public education whose access is by the success in a national competition which guarantees the adequacy between skills and job required qualifications.

Figure 2: Fields of studies and over-education



Services



Source : Author's calculations

The second sample of discipline presents a strong adequacy between school titles and SPC and at the same time, strongly correlated to the related to wages overeducation. Indeed the graduates in agriculture and services are strongly appreciated on the labour market but at the same time underpaid. It is also the case of the graduates in Health and welfare but with a strong subjective over-education.

The last category of discipline presents a strong inadequacy between diplomas and SPC, and a weak subjective over-education case of the graduates of social sciences, business and law and humanties and Article.

So can we admit that the over-education in Tunisia emphasizes the problem of the quality of higher education training, or ther is just a desequilibrium of higher education garduates labour market?

Job stability represents one of the principal determinants of over-education. It is clear that only jobs with an undtermined time present a small proportion of normative and over-education related to wages and a little strong feeling of overeducation (Figure 3).

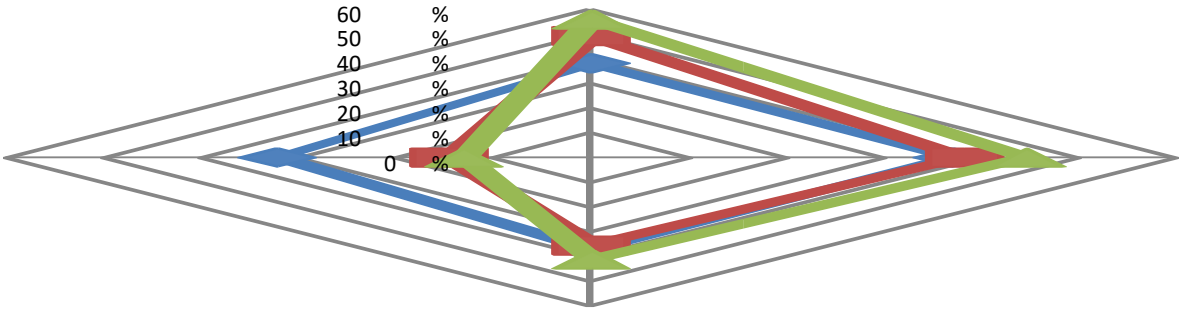


Figure 3: Job stability and over-education

Source : Author's calculations

We present two models. The first considers only the demographic and employment characteristics. In the second model we introduce the educational chatracteristics.

Results and Interpretation

To measure the qualitative correlation observed in a population we use the Cramer's V. This statistics is derived from the Khi2 statistics and defined as:

$$= \sqrt{\frac{x^2}{x^2 max}} = \sqrt{\frac{x^2}{n \quad l \ c}} \qquad \times [\min(\ , \qquad) - 1]$$

The more the obtained V is close to zero, the more there is independence between the two studied variables.

We calculate the Cramer's V to study the correlation between diplomas, socioprofessionel category (SPC) and wages (Table 3).

Table 3: Cramer's V value

	Diplomas	SPC	Wages
Diplomas	--	0.2529	0.5788
SPC	0.2529	--	0.4239
Wages	0.5788	0.4239	--

Source: author's calculations

A Cramer's V of 0.2529 reflects, for the studied sample, a weak correlation between the diploma and its occupational category relatively to the job exerted by the higher education graduates. We can so conclude that there is a mismatching between the labor market needs and the higher education supply of qualifications. Correlations between diplomas and wages are stronger than diplomas-SPC with a Cramer's V of 0.5788. Indeed, in spite of the situation of mismatching, higher education graduates are remunerated according to their productivity. Nevertheless, the correlation between the wages and the socio-professional category is less intense with the satitistic of correlation of 0.4239.

Can we say that Tunisian higher education garduates are not appreciated with their right values, given the situation of mismatching although they are remunerated according to their productivity? The results of the probit model can partially give an answer to this question.

We have also to study the correlation of each type of over-education with the key variables describing the tertiary training or the SPC (Table4).

Table 4: Over-education, Diploma and SPC correlation with Cramer's V

	Over-education		
	Normative	**Self-assessment**	**Related to wages**
Normative	1	-0.001	0.3486
Self-assessment	-0.001	1	0.051
Related to wages	0.3486	0.051	1
Diplomas	0.2802	0.1332	0.2723
SPC	0.8053	0.0627	0.3562

Source: author's calculations

According to Cramer's V results, there is a positive and significant correlation relationship between normative and over-education related to wages measurements. Self-assessment over-education is statistically independent from the other overeducation measurements.

School titles present a stronger positive correlation with normative and over-education related to wages than with self-assessment. SPC is much more positively correlated with normative over-education than with related to wages ones and is independent from the self-assessment over-education.

Over-education is more frequent among the more abundant graduates in the labor market which are the Bachelor's degree and the bachelor technology degree (Table 5).

Tableau 5: Over-education among Bachelor's degree and bachelor Technology

	Job analyst	Self assessment	Related to wages	Observations
Bachelor's degree	43.36%	36.84%	42.5%	760
Bachelor Technology	34.36%	39.47%	47.01%	570

Source: author's calculations

The results of the estimated Probit model (exclusively presented as marginal effects (dY/dX) (Table 6)) are over all satisfactory. Nevertheless, we must note that the integration of the diploma effect in the second model reduces our sample to 1607 graduates. Indeed, we could not consider the architects, the doctors and primary education teachers because they are statistically non significant.

Table 6: Probit model results

		Model 1			Model2	
Over-education	Normative	Self assessmenn	Related to wages	Normative	Self assessment	Related to wages
Observations		1630		1607	1630	1630
log likelihood	-853.161	-1050.257	-819.134	-773.696	-1037.550	-789.027
Pseudo R^2	0.1919	0.0167	0.2445	0.2619	0.0286	0.2722
Wald Chi2	262.42	31.27	374.18	357.31	55.54	399.24
Prob	0.0000	0.6021	0.0000	0.0000	0.1349	0.0000
Correctly classified(lstat)	71.60%	63.56%	75.52%	76.79%	63.80%	75.83%
Roc curve	0.7716	0.6013	0.8155	0.8231	0.6288	0.8344
Sensitivity	44.64%	5.41%	61.61%	61.79%	11.34%	63.35%

Specificity	85.70%	96.63%	84.58%	84.81%	93.65%	93.75%
Man	-13.70%#	0.627%	-16.87%#	-9.96%#	2.44%	-13.63%#
	(0.000)	(0.819)	(0.000)	(0.001)	(0.395)	(0.000)
Married	-8.80%##	1.66%	-1.24%	-5.46%	2.24%	1.52%
	(0.080)	(0.776)	(0.835)	(0.339)	(0.708)	(0.806)
Father working as legislators or senior officials	-3.97%	2.38%	-3.31%	-6.33% ##	1.71%	-4.25%
	(0.203)	(0.459)	(0.337)	(0.046)	(0.599)	(0.205)
Working mother	- 4.23%	-1.54%	-2.93%	-2.16%	-1.13%	-1.91%
	(0.378)	(0.746)	(0.572)	(0.68)	(0.817)	(0.714)
Studying State Financial Support	2.98%	-2.05%	7.94%##	3.22%	-2.01%	8.31%##
	(0.341)	(0.526)	(0.016)	(0.328)	(0.538)	(0.012)
Regional unemployment rate	0.50%	0.43%	1.05%#	1.84%	0.51%	1.07%#
	(0.220)	(0.234)	(0.009)	(0.119)	(0.167)	(0.008)
Public sector	-1.01%	4.20%	0.98%	0.64%	4.61%	0.71%
	(0.811)	(0.321)	(0.834)	(0.119)	(0.284)	(0.008)
In-company training	-16.56%#	-0.76%	-11.15%#	-9.32%	-0.10%	-7.33%###
	(0.000)	(0.795)	(0.001)	(0.364)	(0.975)	(0.055)
Job stability, Reference: Contract of a predetermined time (CDD)						
Contract of adaptation and professional insertion (SIVP1)	-7.06%##	0.11%	0.61%	-21.56%##	1.04%	1.79%
	(0.042)	(0.976)	(0.877)	(0.049)	(0.784)	(0.657)

Contract of a undetermined time (CDI)	-14,39% #	-5.69%	-27.16%#	-35.18%#	-2.65%	-24.18%#
	(0.000)	(0.152)	(0.000)	(0.006)	(0.515)	(0.000)
Other types	5.78%	0.44%	6.16%	17.16%	1.02%	6.85%###
	(0.131)	(0.907)	(0.136)	(0.118)	(0?790)	(0.100)
	Company size, reference: 10-49 employees					
Less than 10 employees	10.14%#	-3.54%	16.52%#	32.91%#	-3.55%	16.71%#
	(0.008)	(0.326)	(0.000)	(0.003)	(0.332)	(0.000)
50_199 employees	-1.13%	-4.94%	-6.18%	-2.59%	-6.68%###	-6.75%#
	(0.779)	(0.176)	(0.118)	(0.512)	(0.069)	(0.086)
200-499 employees	-0.97%	0.84%	-6.15%	-0.21%	-1.11%	-5.431%
	(0.853)	(0.869)	(0.217)	(0.970)	(0.825)	(0.281)
500 employees and more	8.90% ###	-5.45% -	7.79%###	10.01%##	-6.21%	-7.20%
	(0.051)	(0.189)	(0.072)	(0.038)	(0.133)	(0.104)
Sectors of activities, reference: public education						
Non declared	12.15%	13.06%	41.76%#	20.32%	12.88%	43.07%#
	(0.493)	(0.483)	(0.010)	(0.324)	(0.420)	(0.005)
Mining and quarrying	30.28%	13.59%	-0.027%	28.59%	9.35%	-3.24%
	(0.139)	(0.409)	(0.999)	(0.191)	(0.576)	(0.844)
Construction materials industries	36.15%# #	5.77%	-13.04%	34.12%# # #	-9.13%	-18.97%
	(0.047)	(0.463)	(0.466)	(0.079)	(0.591)	(0.197)
Chemical industries	23.36%# # #	-1.68%	16.36%	36.13%# #	-4.82%	19.43%

	(0.086)	(0.884)	(0.273)	(0.025)	(0.670)	(0.207)
Electricity production, Gas and Water	10.35%	0.22%	-7.35%	13.18%	- 4.40%	-10.33%
	(0.658)	(0.990)	(0.66)	(0.564)	(0.870)	(0.518)
Public administration	28.68%###	-10.46%	8.30%	25.79%###	-13.21%	2.04%
	(0.012)	(0.27)	(0.463)	(0.054)	(0.139)	(0.848)
Health and Social work	23.28%###	2.47%	36.43%###	34.14%###	- 0.67%	41.91%###
	(0.000)	(0.646)	(0.000)	(0.000)	(0.907)	(0.000)
Private education	- 1.59%	12.30%	63.75%	-6.60%	8.36%	62.60%###
	(0.861)	(0.155)	(0.000)	(0.431)	(0.339)	(0.000)
Electricity and mechanical industries	31.26%###	5.77%	17.69%###	35.16%###	2.60%	14.93%
	(0.000)	(0.463)	(0.054)	(0.000)	(0.743)	(0.113)
Financial activities	24.78%###	2.26%	17.35%##	9.27%	-1.66%	7.14%
	(0.005)	(0.768)	(0.046)	(0.323)	(0.830)	(0.418)
Building	48.31%###	6.68%	41.55%###	49.34%###	2.95%	37.01%###
	(0.000)	(0.422)	(0.000)	(0.000)	(0.725)	(0.000)
Agriculture	44.30%###	7.28%	48.51%###	50.21%###	4.63%	43.12%###
	(0.000)	(0.439)	(0.000)	(0.000)	(0.645)	(0.000)
Transport and Communication	45.26%###	-0.78%	28.73%###	47.04%###	-5.34%	25.05%###
	(0.000)	(0.910)	(0.000)	(0.000)	(0.438)	(0.002)
Another Manufacturing industries	50.02%###	0.13%	21.26%###	51.20%###	-3.64%	15.08%###
	(0.000)	(0.985)	(0.000)	(0.000)	(0.619)	(0.095)

textile clothing and leather	54.91%#	16.64%###	20.17%##	55.80%#	14.15%	12.97%
	(0.000)	(0.068)	(0.042)	(0.000)	(0.130)	(0.201)
Real estate activities	43.71%#	-8.09%	25.10%#	43.99%#	12.41%##	18.60%##
	(0.000)	(0.214)	(0.002)	(0.000)	(0.045)	(0.029)
Social and private collective services	55.80%#	12.37%###	34.14%#	56.01%#	8.32%	28.61%#
	(0.000)	(0.096)	(0.000)	(0.000)	(0.280)	(0.000)
Commerce	53.80%#	9.06%	26.74%#	50.03%#	4.40%	18.78%##
	(0.000)	0.175	(0.000)	(0.000)	(0.807)	(0.012)
Hotels and Restoration	56.65%#	19.44%###	27.31%#	56.12%#	16.53%	19.91%###
(0.000)		(0.058)	(0.010)	(0.000)	(0.122)	(0.077)
Kinds of graduates, reference: Bachelor's Degree (Baccalauréat+4)						
Primary education teacher				NA	NA	NA
				NA	NA	NA
Doctor				NA	1.16%	-3.80%
				NA	(0.927)	-0,767
Bachelor of technology (Baccalauréat + 3)				-15.83%#	6.55%###	4.17%
				(0.000)	(0.075)	(O.280)
Engineer				-27.60%#	4.48%	-2.12%#
				(0.000)	(0.393)	(0.000)

Bachelor of arts	-18.15%#	3.11%	4.30%
	(0.010)	(0.818)	(0.782)
Fields of study, reference: Social sciences, business and law			
Education	-29.42%#	-17.54%#	-23.05%#
	(0.000)	(0.001)	(0.000)
Humanities and arts	0.43%	3.73%	-0.73%
	(0.926)	(0.426)	(0.879)
Sciences	-11.92%#	-3.73%	-9.25%##
	(0.001)	(0.376)	(0.024)
Industrial engineering & Construction	-12.44%#	-5.30%	-10.27%##
	(0.001)	(0.213)	(0.016)
Agriculture	-6.20%	-18.18%##	25.04%
	(0.618)	(0.066)	(0.123)
Health and welfare	-19.64%#	-3.33%	-21.97%#
	(0.000)	(0.641)	(0.000)
Services	- 7.89%	-26.47%#	-8.11%
(0.362)		(0.000)	(0.380)

: significant at 1% level, ## : significant at 5% level, ###: significant at 10% level

Source: author's calculations

We note that only models estimating the probabilities of the normative and over-education related to wages present a strong explanatory capacity with respective Pseudo R^2 of Mac Fadden of 19.19% and 24.45% (Modele1).

This explanatory capacity respectively improves if we consider training characteristics (Model 2) with respective Pseudo R^2 of Mac Fadden of 26.19% and 27.22%.

The logarithm of probability presents the same evolution affirming the improvement of the explanatory capacity. According to Wald test results, we can reject the hypothesis that the effects of diploma and fields of study are simultaneously zero.

In addition, the logistic models are characterized by the analysis of the discriminatory capacity. The power of the model's to discriminate between positive and negative cases is quantified by the sensitivity, specificity and the area under the ROC curve. The compromise between specificity and sensitivity is reached only with models of normative and over-education related to wages (Sensitivity=44%, specificity=83% for the job analysts over-education and Sensitivity=61.61%, specificity=84.58% for the over-education related to wages (model 1)). Discriminatory capacity is improved with the addition of the training caracteristics (sensitivity= 61.79%, specificity=84.81% for the job analysts over-education and Sensitivity=63.35%, specificity=93.573% for the over-education related to wages (model 2)). This improvement is confirmed with the area under the ROC curve witch pass from 0.771 (model 1) to 0.8231 (model 2) for the job analysts over-education and from f 0.8155 (model 1) to 0.844 (model 2) for the over-education related to wages reflecting an excellent discriminatory capacity.

Model 1 correctly predicts 71.60% of normative over-education cases and 75.52% of related to wages over-education. With adding training characteristics (Model 2), these values grow up respectively to 76.79% and 75.83%.

Concerning demographic variables, we can say that men are more protected than women from the over-education risk considering the job-analysis and overeducation related to wages with respective probabilities of -13.70 % and -16.87%. Moreover a married person presents 8.80% of chance in less to be over-educated at the job analyst's point of view. We integrate the social capital by considering the SPC of the father. Have a father working as legislators or senior officials represent a protection of only a job analyst's over-education with a probability of -6.33%.

Among the demographic variables, we introduce studing state financial support to represent the financial situation of the graduates' family. Receiving this public aid means that graduate can't wait to get a job in adequacy with its higher education. It is obliged to accept any job

at the end to provide for the needs of its family. This probability is of 7.94% in the case of normative over-education.

Realising an in-company training protects more from the normative overeducation (-16.56%) than from the over-education related to wages (-11.15%). Unfortunately we can't define the effects of regional unemployment rate and the public sector on the probability of over-education because of their non significant results.

Job characteristics are represented through three variables: job stability; represented by the type of contracts, Company size and sector of activities.

Job stability represents also a protection from the over-education risk comparatively to the type of contract of reference (Contract of a predetermined time (CDD)). Getting a job with a Contract of an undetermined time (CDI) represents 14,39% of chance in less to be normatively over-educated relatively to the CDD, and 27.16% of chance in less in the case of the related to wages over-education. A contract of adaptation and professional insertion is one of the main active labour market policy in Tunisia specially created for higher education graduates. A job with a contract of adaptation and professional insertion represents, relatively to a CDD, is a protection from only the job-analysts over-education (-7.06%). We explain this probability by an adequacy between skill and the required qualification by the job. The probability of -21.56% obtained with the second model confirm this assumption. This adequacy is guaranteed by the fact that the employer is not obliged to pay wages proportionally to the productivity. We note also that, in general, the SIVP is concluded by a layoff. The size of the recruiting institution shows that working in an establishment with less than 10 employees represents 10.14% of chance to be overeducated with the normative measurement and 16.52% with the over-education related to wages relatively to a CDD. These probabilities are reinforced with model 2, where the probability of the normative over-education increasing from 10.14% to 32.91% relatively to a CDD. The probabilities of the over-education related to wages remains relatively constant.

According to the economic theory, large companies present a better defined qualification structure leading to weaker risk of over-education. This is confirmed only with the over-education related to wages (Model1).

Relatively to the sector of reference i.e public education, sectors of activity such as commerce, textile, clothing and leather, Social and private collective services and hotels and restoration present more than 50% of chance to be over-educated at the normative point of view. From the related to wages point of view, these same sectors presents the weaker probability relatively to the reference. With the insertion of training characteristics, these probabilities increase for the normative overeducation but decrease for the related to wages over-education. We can so conclude that this kind of mismatching is reinforced if we consider

only the diplomas- SPC and, vice versa, if we consider the distribution of wages among different kinds of certification. Can we say that wages reflect the real productivity of a higher education graduates and but not of diploma?

To answer this question it is necessary to compare the diploma and fields of studies effects on the probabilities of each over-education type.

Unfortunately, we can't consider all the type of school titles offered by the Tunisian higher education system. Titles as Primary education teachers and architects are statistically non-significant. Concerning the other diplomas, we can deduce that, relatively to the Bachelor degree, all the school titles present a protection from the normative over-education. Being a Bachelor technology is 15.83% of chance in less to be normatively over-educated. For the Bachelor of Arts and Engineers these probabilities are respectively of -18.15% and 27.60%. Diplomas effects on overeducation related to wages are not important. Only the title of engineer affect negatively and significantly the probability of the related to wages over-educated (-2.12%).

Among the fields of studies, and compared to the discipline of reference social sciences business and law; education, sciences, industrial engineering and construction and health and welfare represent a protection from the risk of the normative overeducation with respective probabilities of -29.49%, -11.92%, -12.44% and -19.64%.

Over-education increases if we consider the related to wages overeducation except for the discipline Health and welfare whose risk drops to -22%. These results are mainly explained by the fact that more than a half of graduates from these fields have jobs in the public sector.

Conclusion

The Tunisian révolution was animated by a feeling of injustice largely widespread among the young people. Scarce are Tunisian young people who have not realized a higher education training while hoping to reach a better socioeconomic situation. Unfortunately, they found unemployment and a precarious situation. The problem extends difficulties of professional insertion, we observe today the development of the over-education phenomenon. This study highlights the determinants of this phenomenon. Econometric results conclude that there is a weak correlation between labour market needs and the competences obtained with the tertiary training. The correlation is stronger between diploma-wages or wages-SPC. In other words, the over-education situation accentuates the adequacy between the wages and diploma and inadequacy between diploma and SPC. Indeed, Cramer's V shows that the diploma is strongly correlated with normative over-education and wage but not with subjective over-education.

Unfortunately, the econometric results of the Probit models do not enable us to identify the principal determinants of subjective over-education. Results of the normative and related

over-education are strongly conclusive. It is clear that the stability of employment, the scarcity of the diploma on the labour market and the public sector represent a protection of the over-education risk as well as at the normative level and the related to wages over_education. The access to this type of advantage remains exclusive to an elite which holds a financial and social capital which explain the failure of the Tunisian higher education system in his role of social elevator.

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