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Determinants of Graduate Unemployment in Tunisia

by

Hanène Ben Ouada Jamoussi^{*}, Maher Gassab^{**}

Abstract

According to the report of the Central Bank of Tunisia (2009), the unemployment rate had reached 13.3% in 2009. This rate had steadily increased from 12.5% in 2006. This is one of the major challenges of the Tunisian economy and many countries of the MENA region. Furthermore, with more than 500 000 job seekers, the unemployment rate in Tunisia remains one of the highest in the MENA region. A feature of unemployment in Tunisia is the unemployment of graduates. The unemployment rate for this category of young people has recently grown dramatically from 16.9% in 2006 to 21.9% in 2009. This rate is expected to rise in coming years despite all the arrangements made for young graduates to insert them into the labour market. To understand the determinants of this type of unemployment, the paper is based on the diagnosis of the situation through a synthesis of the key findings of surveys conducted in 2005 and 2007 on the promotion of graduates in 2004. This diagnosis was supported by an econometric model linking the unemployment indicator to the key indicators of qualification.

The massification of the higher education and the lack of creation of adequate jobs are the main causes of the exponential rise of the unemployment rate for graduates. This situation has forced many students to continue their studies, thus paradoxically minimizing their chances of being recruited because of their over qualification.

With the exception of a few specialties such as medicine, computing, telecommunications and architecture, where opportunities are available, especially abroad, other types of graduates meet more or less difficulty on the labour market. The solutions to overcome this crisis of unemployment are rather difficult, requiring enormous resources over several years. These solutions would affect several areas; such as the higher education, the vocational training, the investment and the regional integration.

1. Introduction

With over half a million unemployed in a population of 10.5 million strong young - the age group 15-29 years accounts for 29% of the total population - Tunisia is experiencing a serious unemployment problem. Almost one third of unemployed higher education qualifications and two thirds of the additional job demands emanate from this category of job seekers. Tunisia has experienced for some years a real blockage of social mobility, a sign of the failure of economic and social policy in recent years.

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This alarming situation has been reached despite the fact that Tunisia has given special and constant attention to the problem of unemployment since the early sixties.¹ During the last decade, fighting against unemployment and employment promoting, especially for young people, were among the major projects of the development policy of the Tunisian government, with emphasis on developing skills.

The economic literature, including human capital literature, since its first version with Schultz (1960) and Becker (1964) to the most recent developments, reinforces the idea that employment rates increase with the level of training. This is mainly due to the fact that more educated individuals who have invested more in human capital seek to enhance their investment.

According to Fraisse-D'Olimpio (2009), human capital determines various areas of daily life of individuals which indicates that this notion is now at the heart of public policies in developed countries and increasingly in developing countries. The public choice in particular are moving towards improving the education and training of populations throughout the life cycle but also the degree of social integration of societies, with emphasis on the role of qualifications in improving growth.

However, these assumptions known since the "Chicago school" literature and then with the followers of the theory of endogenous growth have been increasingly subject to criticism particularly in situations characterized by high rates of unemployment, youth issues and especially graduates.

Spence (1973), with signal theory, attempted to explain why people are studying. In fact, youth not attending school to earn skills but to acquire a degree diploma will serve as a signal to future employers. Moreover, according to the filter theory (Arrow 1973), individuals hired are those who exhibit characteristics with training costs the lowest, not the most productive. The Diploma also acts as the indicator of the ability to be formed. In a context of high unemployment, individuals located at the end of the queue then undergo a crowding (Guillon 2010).

Balsan (2000) points out that the human capital theory was developed in a period of full employment, where individuals make their choices without uncertainty about the possibility to hold employment after training. Today, in economies experiencing high rates of unemployment among graduates of higher education, the assumption of the absence of the influence of unemployment on the choice of investment in education is difficult to sustain.

The strategy requires investment in training, taking into account the risk of unemployment (Guillon 2010). Thus, as stated Giret (2000), investment in human capital depends not only on the expected wage, but also the risk of unemployment. The extension studies can then be explained by lower opportunity costs. In this sense, Kodde (1989) shows that the prospect of unemployment risk leads the individual to invest more in education, to improve employability, to reduce the risk of unemployment.

Lepage (1999) points out that the relationship between human capital and unemployment remains complex. On the one hand, the underemployment encourages the unemployed to invest more in human capital. On the other hand, rising unemployment destroyed part of human capital, following its degradation. Human capital may depreciate if the skills are not maintained in good condition through regular use. From this point of view, the long-term unemployment and youth unemployment can lead to deterioration of knowledge and skills (Fraisse-D'Olimpio 2009).

In Tunisia, despite efforts in skills development (training, retraining, comprehensive studies) graduate unemployment has reached very high rate (13.3% in 2009) and was the main demand at the root of social revolution of January 2011. It is therefore most important, nowadays, to revise the policy guidelines for investment in human capital in Tunisia, taking into account the problem of unemployment among graduates of higher education. This requires a preliminary investigation of this issue very closely, allowing, after a diagnosis of the situation, the identification of the

¹ Ben Sedrine (2009)

characteristics and determinants of this type of unemployment. This also allows the assessment of the impact of training and qualification on employment opportunities process. That is the purpose of our work.

Thus, Section 2 describes the evolution of unemployment since the 1960s to highlight the emerging problem of unemployment among graduates of higher education from the early 2000s. Section 3 focuses on two main determinants of graduate unemployment in Tunisia: i) the rapid increase in student numbers, and ii) the insufficient job creation by the national economy in order to better understand problems of graduate unemployment; Section 4 summarizes the main results of surveys conducted in 2005 and 2007 on graduates of 2004. This diagnosis is supported in Section 5 by an econometric model linking the unemployment indicator and key indicators of qualification. Finally, section 6 concludes.

2. The evolution of unemployment in Tunisia

As shown in Table 1, unemployment in Tunisia is a structural problem. Since the 1960s, it has never dropped below 12%, regardless of calculation methods used and criticisms that we can make on them.

Table 1: Evolution of unemployment rates between 1966 and 2009

Year	1966	1975	1984	1989	1994	1999	2000	2001	2002	2003	2004	2009
Male	15,3	13,4	13,7	13,9	15	15,6	15,5	14,9	14,5	13,8	12,9	
Female	13,4	10,6	11	20,9	17,2	16,3	16,1	15,3	16	15,8	16,7	
Total	15,2	12,9	13,1	15,3	15,6	15,8	15,6	15	14,9	14,3	13,9	13,3

Source: INS

It follows from the data above that the rate of female unemployment since the late 1980s exceeds the male one. Indeed, if the variation average rate of male labor force has been 2.3% per year between 1966 and 2007, it has been 6.4% for the female labor force. This reflects the growing entry of women in the labor market, even if the female labor force is now less than 30% of the total workforce.

In addition, it should be noted that there are regional disparities in unemployment. For example if the unemployment rate nationally is 14.1% in 2007, the South-West and North West have higher rates of unemployment (around 20%). They are followed by the Midwest and Southeast who have rates above the overall average. Regions least affected are located on the axis coast (North-East, Central and Eastern District of Tunis) as shown in Table 2.

Table 2: Unemployment rates by region 2007 (%)

Region	Unemployment rates
South West	20
North West	19,6
South East	17,6
Central West	14,3
Tunis District	13,9
Central East	11,7
North East	10,3
Tunisia	14,1

Source: INS (2008), from Boubakri (2010)

According to Boubakri (2010), more than half of the governorates have rates above the average. Some inland areas even have unemployment rates almost twice the national average:

- 24 to 26%: Tozeur, Jendouba and Siliana.

- 20 to 22.5%: Kasserine, Gabes, Gafsa
- 14 to 19%: Tataouine, Mahdia, Manouba, Le Kef, Ben Arous, Kebili Medenine.
- 4 governorates have very moderate rate (less than 10%): Zaghouan, Monastir, Nabeul and Sidi Bouzid.

By observing the data on the structure of unemployment by educational level, it is obvious that such a structure has changed dramatically over the past thirty years. Table 3 shows that unemployment among university graduates was virtually nonexistent in the mid-1970s and high school graduates level was quite low. The quest for diplomas was a way to avoid unemployment and this affected illiterate or primary level populations. The trend was reversed with the proportion of unemployed high school and higher education more than 60% of the population seeking employment. Nowadays, “social elevator” is actually “broken”, with almost one in three unemployed who graduated from higher education.

Table 3: Changes in the structure of unemployment by educational level (in %)

Year	1975	1984	1994	1999	2001	2002	2003	2005	2006	2007	2010
None	41,5	34,4	24,4	13,1	9,5	10	9,2	7,3	7	4,8	
Primary	47,8	45,7	47,8	48	45,2	43,8	43,3	41,4	39,5	35	
Secondary	10,5	19,2	26,2	34	38,2	37,7	37,4	37,7	36,3	40	
Higher	0,2	0,7	1,6	4,7	7,1	8,5	10,1	13,6	17,2	20,1	28
Total	100	100	100	100	100	100	100	100	100	100	100

Source : INS

It is obvious that the problem of unemployment among university graduates has been amplified over the last decade, as shown in Table 4. The structure of the additional demand has changed radically in few years (from 23.1% of global additional demand jobs in 2001 to 55.2% in 2007 and close to 60% now come from higher education).. Applications rose from 74,100 in 2001 to 91200 in 2006 and 87100 in 2007, 88300 in 2008 and 85000 in 2009 (BCT. 2009), that leads to a cumulative volume of 738,700 jobs in 9 years.

Table 4: Evolution of the structure of the additional demand of employment by education level (%)

Year	2001	2002	2003	2004	2005	2006	2007
Higher	23,1	32,6	43,1	51,5	54,1	47,3	55,2
Others	76,9	67,4	56,9	48,5	45,9	52,7	44,8
Total	100	100	100	100	100	100	100

Source: INS

It is obvious that one of the specificities of unemployment in Tunisia is the unemployment of university graduates. In effect, in spite of the efforts that were made to insert young graduates into the labor market, the unemployment rate for this category of young people is increasing dramatically in recent years (from 8.6% in 1999 to 16, 9% in 2006 to 21.9% in 2009). This rate is expected to grow for the coming years, especially with only 89.3% of the additional demand satisfied over the period.

3. The socioeconomic determinants of unemployment among university graduates

The socioeconomic determinants of unemployment among graduates of higher education are located at both the supply and demand in the labor market. From the supply side, we see a continued increase in the flow of graduates. From the demand side, we note an insufficient adapted job creation by different economic structures.

3.1. The massification of higher education

The dynamics of unemployment among graduates is partly explained by the arrival of new cohorts of graduates in the labor market. The workforce has changed from 13,000 students in 1975-1976 to 40,000 students in 1986-1987 to 137,000 in 1997-1998 to \$ 357,472 during 2009-2010. Student numbers have been multiplied by 27 between 1976 and 2010 with an average annual growth rate of 10.2%.

With regard to the cohorts of graduates, the average annual growth rate is 11.1% over the period 2001-2009, from 24,500 in 2001 to 59,300 in 2009. According to Ben Sedrine (2009), the mass flow direction of academic achievement of basic education to secondary school and then to higher education has produced the massification of this last cycle. This has been encouraged through free public education since the Tunisian independence (in 1956) and automatic access to the university for any bachelor. In the context of low growth in highly skilled employment, strong growth in the number of graduates is an issue of employability. This phenomenon could be further enhanced without the birth control policy implemented since the 1960s, generating population growth among the lowest in the MENA region (1.2% in 2007).

In addition, Ben Sedrine (2009) adds that this expansion can be explained by the slow implementation of the reform of vocational training. Indeed, the vocational training system, which targets the qualification of the workforce and middle management staff, has undergone, since the mid-ninety, a comprehensive reform to bring it into harmony with requirements of the new economic context of upgrading the economy, due to the introduction of a free trade zone with the European Union. This reform, based on flying training vocational qualifications needs of the economy and work and training with the company, began to produce positive effects on quality. Furthermore, the search for appropriate modalities of articulation between vocational and academic education, on a matching basis, as was predicted in the reforms of 1991 and 2002, has been slow to materialize because of the absence of a system of information and advice in schools which would have facilitated the voluntary guidance of young people to vocational tracks at the same time, the same way and under the same conditions as the school types.

3.2. Insufficient job creation

During the period (2001-2009), an average of 73,300 jobs had been created every year to reach a total of 659,700 jobs for the whole period. Therefore, only 89.3% of the additional demand over the period had been satisfied, so as to increase the overall unemployment rate.

However, t creations tend to better reflect the needs of jobseekers from secondary school than those in higher education. This reflects one of the fundamental weaknesses of the Tunisian labour market, namely a persistent mismatch, even increasing, between supply and demand on the labour market (Boubakri 2010). Indeed, over the period 2001-2007, created jobs for high school graduates cover 71.7% of the additional demand in this category. However, the creation of jobs for secondary graduates accounted for 112% of additional demand in this category. While over the same period, the additional demand for university graduates averaged 41% of global demands, jobs created on average accounted for 34.2%.

The Tunisian economy is facing a very specific problem; this economy does not create enough jobs, especially for university graduates. Faced with this inadequacy of the labour market for graduates in higher education, three solutions appear to reduce the evolution of the unemployment rate for this category of job seekers:

- Adjustment of the economy to supply of existing skills, often inadequate or overqualified.
- Reform of the University and proliferation of additional training to better meet the needs of the labor market.
- Migration of young graduates to Europe and North America in search of jobs suitable to their qualifications.

Certainly, during the last decade, there have been these three movements, without much success. The unemployment rate for graduates has continued its meteoric rise. During the period 1994-2004, two types of evolution were recorded (Boubakri 2010):

- Strengthening the dynamism of both service sector (including commerce, communication and transport) and building, construction and manufacturing industries. In terms of job creation, the service sector grew by 3.6% on average per year while construction and manufacturing industries have evolved more timid rates (2 to 2.2% per year).
- A lighter weight of other sectors such as agriculture, fisheries, mining and energy, where the creations of jobs actually fell between 1994 and 2004.

It is obvious that the economic policies already adopted have been insufficient to absorb the unemployed university graduates. These policies are mainly focused on attracting foreign direct investment often low value-added and thus requiring few skills. Accordingly, the program of upgrading and modernization of the industry at this level has not achieved the desired results.

Similarly, the continuation of the Bologna process in higher education since 2006 has not improved the situation. As a result, many students want to continue their studies either in Tunisia or abroad to escape unemployment, which can only aggravate the mismatch between supply and demand in the Tunisian labour market.

Reforms should involve the economic and the academia sphere. However, before any recommendation, each sphere must undergo a profound investigation. Thus, close monitoring of graduates in their search for work seems like a much-needed exercise that will identify further characteristics and determinants of graduate unemployment in Tunisia.

The National Observatory for Employment and Qualifications (ONEQ), organ of the Ministry of Employment, initiated such an investigation. The Centre conducted a survey of 2004 graduates. This study (ONEQ 2009) intervenes in effect in a particular context of the job market. Young graduates are relatively higher risk of unemployment, particularly long-term unemployment. This reflects increased staffing graduates, who outnumber the jobs generated by the economy for this category, and mismatches between the needs of the economy and the production skills of higher education institutions. These imbalances are reflected in the lengthening of waiting time before a first job and an increasingly delayed stabilization in employment. Imbalances that should be better analyzed with appropriate statistical surveys.

4. Lessons from the investigation of university graduate unemployment in 2005 and 2007

The Ministry of Employment, through ONEQ, conducted in 2005 and 2007 two surveys of graduates from higher education (cohort 2004) to follow their professional future. The survey covered a sample of 4763 graduates from a total of 39 052 graduates, according to the degree and specialty group study. A work to analyze the main results registered by graduates on unemployment at the time of investigation (about a year and a half and three and a half years after getting their degrees in 2004) was then conducted.

In this unique study in Tunisia, the analysis is focused on the unemployment rate calculated in accordance with international concepts, referring to the week preceding the survey day. This rate is the ratio between the number of graduates considered as unemployed during the reference period and the number of working graduates. They were considered as unemployed persons who have not worked during the week preceding the survey day, looking for a job, available and willing to work within two weeks from the date of investigation. Youth in integration training (SIVP), young people

in further training and youth in pursuit of higher education were not counted as unemployed. After a brief presentation of the results on unemployment for all graduates, this study presents a comparative analysis between the main types of degrees including: senior technician, master and engineer. Then, for each degree, a comparison was made between specialty groups studied.

The evolution of professional situations between the two surveys reveals a continuing high level of unemployment among young graduates, despite an improvement in employment status under employment and the balance between training and employment exercised. It also confirms strong observed mismatches in the first passage of certain education tracks compared to the requirements of the labor market. The study seeks to analyze in turn the types of career paths, the situation in employment and unemployment, and their respective determinants. Putting into perspective the results of two surveys, the goal is to understand the evolution of integration paths, to what extent the problems of integration have been diminishing over time and identify graduates who are still highly vulnerable to unemployment.

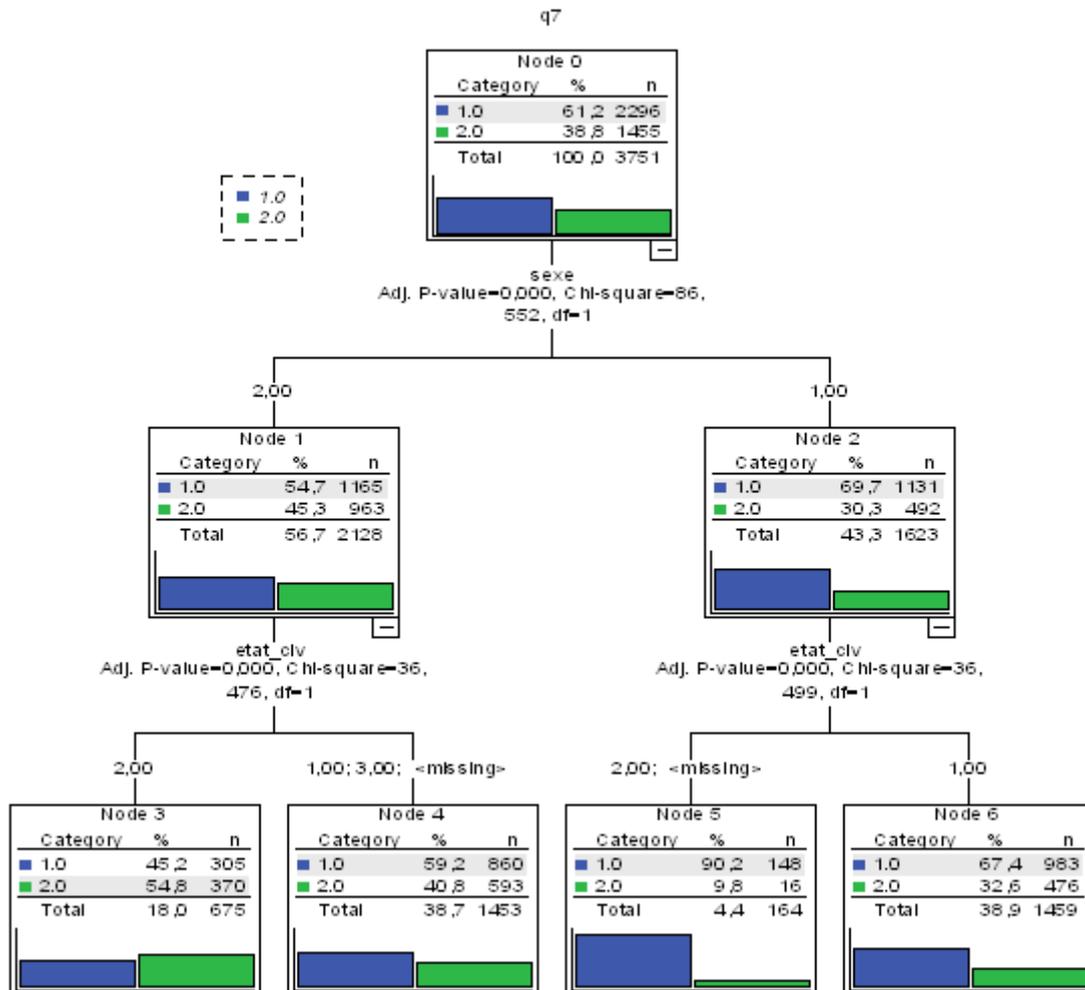
The position of the 2004 graduates on the labour market has improved significantly between 2005 and 2007. The overall employment rate, which includes wage employment, self employment and integration training (SIVP), increased from 43% in 2005 to 62% in 2007. More than half (51%) of graduates had an employment in the end of 2007 or 20 points higher, compared to the first poll in late 2005. This increase in employment took place mainly at the expense of inactivity, the proportion of which was divided by 2 and is 9% in late 2007. Unemployment, although declining by 7 percentage points, remains at a very high level in late 2007: it relates to 29% of young graduates about three and a half years after obtaining their diplomas. Note that this overall figure predominantly reflects the situation of masters graduates and technicians who together count for 90% of the graduates. The degree and specialty are key determinants of integration. Compared to the first survey, it was found that engineers continue to improve their already positive position on the job market with an average of 76% in paid employment or even above 90% in specialties, such as computer, telecommunications or electronics. Those in law and social sciences continue to be more often unemployed, 3 years after graduation.

In addition to graduation, gender remains a factor affecting the employability. A married man has 27% more chance of being integrated than a married woman. At the aggregate level, the share of employed youth increased remarkably during the first 3 years. She was only 33% in June 2005 and 47% after one year and has exceeded 55% in June 2007. The share of graduate unemployment decreased considerably over the months but remains above 30%, twice the national unemployment rate.

In this study, some trajectories appear:

- Stabilization in employment concerns only 30% of graduates, especially among engineers and doctors. It often occurs after a period of unemployment ranging from six months to one year;
- Persistent unemployment concerns 24% of graduates three years after graduation, against 39% after 18 months.
- The return to unemployment concerns 13% of graduates. It is characterized by recurrent episodes of unemployment interspersed with a period of employment or training in which these young people have probably failed to improve their employability.
- Continuing education after 2004 was adopted by 13% of graduates, without being able, for lack of information, to know if it was beneficial in terms of future access to employment.

Beyond these simple sorting analysis developed by the study, we conducted, considering the 2007 survey, bivariate analysis linking unemployment (q7 procedure 1) gender (1 for Male) and marital status (1 single, 2 married and 3 divorced) of the graduate. Using the method of tree-classification by the Chi2 test of independence, we establish the following summary scheme.



It appears from this analysis that the relationship between gender and unemployment is significant. Furthermore, the rate of unemployed women outnumbers the men rate. The relationship unemployment, gender and marital status is also significant. Married women are more unemployed than single or divorced. This is in contrast with the status of married men who are employed more than single men or married women. Thus, from the social perspective, discrimination in employment exists against women and singles. Note, however, that the work of married men could be encouraged simply by their age compared to young singles who usually have just finished their studies. The survey data do not, however, allow verifying this finding.

Apart from the characteristics used above (gender and marital status), we found useful to examine, through a logistic regression, the impact of overeducation on job opportunities. The latter is reflected among others by intensive study, training or retraining, as part of the government policy to fight against qualified unemployment. This question has remained unanswered in the study of ONEQ. The chosen method is essentially conditioned by the availability and nature of the survey data.

5- Econometric analysis

To follow the problematic of this communication we specify an econometric model that explains the probability of being in an unemployment situation by different determinants. Many characteristics are examined (unemployment situation, degree course...) about both persons

concerned by the survey and their family. In these determinants' choice we were constrained by the data availability.

We consider for the econometric investigation the database of the ONEQ. The survey, as seen before, concerns two cohorts of persons, graduated in 2004, and observed in 2005 and 2007. The first cohort contains 4763 and the second 3750 graduates which could constitute an interesting data base for quantitative studies, especially when we note that this survey is the almost unique credible one. Anyhow, the important number of missing values limits its empirical exploitation possibilities. Many variables were integrated in the first model. After iterations the significant ones were: Gender (Male, female), study specialty (cdns)), certification after formation cycle (q3) or retraining (q6), doctorate study (q5), matrimonial status (non married, married, divorced).

Results obtained by logistic regression estimation are resumed in the following table:

		Variables in the Equation					95,0% C.I. for EXP(B)		
		B	SE.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1	sexe	,538	,074	53,132	1	,000	1,712	1,482	1,978
	cdns	-,024	,004	31,186	1	,000	,977	,968	,985
	q6	,619	,135	20,937	1	,000	1,858	1,425	2,422
	q5	,195	,038	25,938	1	,000	1,216	1,128	1,310
	q3	,202	,051	15,825	1	,000	1,223	1,108	1,351
	q1	,031	,049	,414	1	,520	1,032	,938	1,135
	etat_civ	,342	,086	15,978	1	,000	1,408	1,191	1,666
	Constant	-2,392	,231	107,695	1	,000	,091		
Step 2	sexe	,539	,074	53,396	1	,000	1,714	1,483	1,981
	cdns	-,024	,004	30,861	1	,000	,977	,969	,985
	q6	,621	,135	21,037	1	,000	1,861	1,427	2,426
	q5	,202	,037	30,020	1	,000	1,224	1,138	1,315
	q3	,200	,051	15,644	1	,000	1,222	1,106	1,349
	etat_civ	,340	,086	15,759	1	,000	1,404	1,188	1,661
		Constant	-2,364	,226	109,053	1	,000	,094	

a. Variable(s) entered on step 1: sexe,cdns,q6,q5,q3,q1,etat_civ.

The model is validated on both global and individual valuation (given the econometric tests shown in annex).

Global valuation

The null hypothesis is not rejected in the Hosmer-Lemeshow test and rejected in the likelihood-ratio one. The model fits the data (with a negligible error risk).

Individual valuation

- The different explicative variables are significant (at 0% risk of error).
- The global classification rate is high enough (63.2%). This value is especially due to a good prediction of the employment probabilities (see annex for probabilities distributions).

Comments

- If we take into consideration that the codification of the variables "certification after formation cycle" (q3) or "reconversion" (q6) and "doctorate study" (q5) is ascending (1 for absence of training, etc...) we see that signs of the coefficients are not plausible.
- The unemployment probability increase with female gender, qualified women have (comparing to men) 1.7 more chances to be in unemployment situation (with a probability of 0.62%)².

² These probabilities p_i are deducted from the odds ratio values (OR) by : $p_i = \frac{OR_i}{1 + OR_i}$. See Hosmer D.W. and S. Lemeshow (1989) for more details.

- For graduated persons that have pursued a traineeship or training cycle (q3, q6), and those who have continued PhD studies to be more qualified, the chances to get employed decrease largely (unemployment probabilities are respectively about 55% for questions q3 and q5 and 65% for q6).
- Non married graduate persons are easily employed comparing with married and divorced ones (the logistic probability corresponding to the variable matrimonial statue is about 0.58).

6- Conclusion

This work has tried to show the existence of a mismatch between supply and demand in the Tunisian labour market, affecting particularly the graduates of higher education. It is a specificity of unemployment in the Tunisian economy over the past ten years. Social mobility is blocked, and assumptions of human capital theory are, in conditions of graduates' unemployment, undetermined. The massification of higher education and insufficient creation of adequate jobs are the main causes of the exponential rise in the unemployment rate of graduates. This situation has forced many students to further rise their studies, minimizing paradoxically their chances of being recruited, due to their over qualification.

With the exception of a few specialties such as medicine, computing, telecommunications and architecture, where opportunities are available especially abroad, other types of graduates meet more or less difficulties to find a job.

Since January 14 (date of the Tunisian revolution), the country live an unstable situation, a growth rate near zero and an unemployment one predicted to reach 17% at the end of 2011.

Government effort should be accentuated and targeted.

Solutions to overcome this crisis of unemployment are very difficult and require enormous resources over several years.

On the one hand, we must continue the LMD (Licence, Master Doctorate) reform, while revising some choices. The reform now requires additional financial and human resources that are missing from the University of Tunisia. Meanwhile, it is necessary to enhance the system of vocational training with additional resources. This would reduce the number of students and ensure better employability of youth.

On the other hand, the Tunisian economy has to create more skilled jobs, with more domestic and foreign investment with high added value, particularly in disadvantaged areas. This is conditioned by the consolidation of regional integration in the Maghreb and with Mediterranean countries.

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Annex

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	181,434	7	,000
	Block	181,434	7	,000
	Model	181,434	7	,000
Step 2	Step	-,412	1	,521
	Block	181,022	6	,000
	Model	181,022	6	,000

a. A negative Chi-squares value indicates that the Chi-squares value has decreased from the previous step.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	4765,857 ^a	,048	,065
2	4766,269 ^a	,048	,065

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than ,001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	27,984	8	,000
2	29,173	8	,000

Classification Table^a

Observed		Predicted			
		chom1		Percentage Correct	
		0	1		
Step 1	chom1	0	1996	237	89,4
		1	1119	336	23,1
Overall Percentage					63,2
Step 2	chom1	0	1997	236	89,4
		1	1121	334	23,0
Overall Percentage					63,2

a. The cut value is ,500