Impact of Education Policy on Youth Unemployment in Egypt

By

ISMAIL, Pensee Badr

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Committee in charge:

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Abstract

Youth unemployment is a new challenge faced by a lot of countries with Egypt being no exception. This problem is more amplified in Egypt specifically due to the "youth bulge" that the labor market fails usually to absorb along with a steady rise in the number of informal jobs. The rising of this problem owes to the failure of the educational system in place whose aim is to acquire students with the needed skills necessary for a smooth transition to the labor market. The vocational education in Egypt was regarded for years as being unable to offer the above mentioned skills.

In order to investigate the validity of this argument, the paper aims to look into the relationship between education and unemployment. In other words, the paper tries testing the validity of the Human capital theory in the Egyptian case. More precisely, it will provide empirical evidence on how seeking different education tracks, affects one's likelihood to be unemployed in Egypt with a special focus on youth. Also the paper will try to investigate the outcome of the 1998-2006 university entrance limitation policy on unemployment incidence.

In contrast to what was argued, seeking vocational track seems to help reducing unemployment especially for young men who took the decision to seek vocational education between 2006 and 2012. It also makes individuals less prone to unemployment compared to university graduates which is totally in contrast with the Human Capital theory.

Keywords: vocational education, youth unemployment, empirical model, education policy

초록

청년 실업은 많은 국가들이 직면한 새로운 도전이다. 이집트도 마찬가지다. 이집트는 비공식 작업이 증가하면서 노동 시장이 청년의 팽창을 흡수하지 못하기 때문에 이 문제를 더욱 심각하게 만들었다. 이 문제가 왜 계속 심해지냐 하면 지금 실시하는 교육제는, 특히 직업 교육, 학교에서 노동 시장으로 원활하게 이행 위해 필요한 기술을 학생들에게 습득하기 실패했기 때문이라고 생각한다.

따라서 이 논문은 이 주장의 타당성을 조사하기 위해 교육과 실업의 관계를 조사하려고 한다. 다시 말해서, 이 논문은 이집트의 경우에 인간 자본 이론의 타당성을 시험하려고 한다. 좀 더 정확히 말하자면 이집트에서 일반 교육아니 직업 교육 그 둘 중에 하나 선택하면 본인의 실업률에 어떻게 영향을 미치는지에 대한 경험적인 증거를 제공한다. 또한 1998-2006 년 대학 입학 제한 정책은실업률에 어떤 영향을 미치는지 조사하도록 한다.

논의된 것에 반해서 직업 교육을 얻는 것은 특히 2006 년에서 2012 년 사이에 직업 교육을 받았던 젊은이들의 실업을 줄이는 데에 도움이 되는 것으로 보인다.

또한 인적 자본 이론에 반해서 대학 졸업생들에 비해 직업 교육을 얻었던 분들의 실업률을 낮춘 것으로 나타났다.

주요어: 직업 교육, 청년 실업, 경험적 모델, 교육 정책.

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I would like to express my first and foremost humble and profound gratitude to my advisors Professor Ju Ho LEE and Professor Sung Joon PAIK who provided me invaluable supervision and guidance to successfully complete this thesis paper.

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I would like as well to express gratitude to KDI School of Public Policy and Management for the wonderful opportunity given to me to attend my study in such a constructive and international oriented learning environment. My thanks also goes to all the great Professors from whom I gained a substantial knowledge as well to all the staffs at KDI School for their kind assistance during my two-year stay.

Also I'm deeply thankful to NIIED for giving me this precious opportunity to seek my post-graduate studies in Korea.

Last but not least, my deepest and heartfelt gratitude goes to my parents, my lovely sister Perihane, all my uncles and aunts as well my grandparents for their warm love and mental support and endless encouragement that gave me the strength to keep going and make my dream finally come true.

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Introduction

Youth unemployment is a quite recent phenomenon faced not only by developing countries but also by the developed ones. This also applies on the MENA region where Egypt takes part. According to Biavaschi C., et al (2012), MENA region suffers from a skill mismatch along with an increase in the number of informal jobs. And what makes dealing with this problem more difficult is the demographic "youth bulge" that characterize this region, since the labor market usually fails to absorb it. The rising of such a phenomenon might be explained by a skill mismatch between what the education systems, whether general or vocational, offers and what is really needed to be facilitate the access to the labor market (Biavaschi C., et al., 2012).

Of course, Youth unemployment can be a result of so many other economic or social factors but this paper will mainly focus on the education factor since we believe it plays a significant role in the Egyptian labor market.

In 2016, the total unemployment rate was around 12.5% which is not considered really high, unlike the case of youth unemployment: Young women (aging from 15-29) unemployment rate accounted for 36.6% while that of young men reached 21% in the same year. Women still remain more prone to be unemployed and this gap doesn't seem to shrink as it will be shown later in details.

During the period from 1982 till 1998, the Egyptian Government adopted a new policy in order to limit the entry to the general education path. As a result, students not able to access general education were only left to seek either the technical or the vocational path, leading hence to the enrollment of around 2 million students in both technical and vocational schools which attained at that time around double of those attending schools offering general education. In addition, the technical and

vocational schools graduates had a very high rate of unemployment back then since it was believed that these schools don't really offer the skills needed to access the labor market and only a minority (top 5%) can seek post-secondary education (Abrahart,2013).

Observing this high youth unemployment rate is a key factor to posing the question of how education might help to reduce unemployment. More specifically how seeking different education tracks might possibly affect one's probability to be unemployed especially when it comes to seeking vocational track.

To the best of our knowledge, no previous research papers where conducted to investigate the effect of vocational education on unemployment outcome in the Egyptian context, hence the proposed research aims to investigate this relationship between education and unemployment. In other words, the paper tries testing the validity of the Human capital theory in the Egyptian case. More precisely, it will provide empirical evidence on how seeking different education tracks, affects one's likelihood to be unemployed in Egypt with a special focus on youth. Also the paper will try to investigate the outcome of the before-mentioned education policy on unemployment incidence.

Assuming that vocational education has a negative impact on unemployment incidence, this paper will mainly try to find out:

- How does the decision of seeking whether general or vocational education paths affect unemployment in Egypt? Is the magnitude of this effect even larger for youth?
- Did the before-mentioned Government's policy lead to an increase in unemployment rate, especially for youth?

Three different waves of the Egyptian Labor market survey data will be used to predict the impact of seeking different education tracks on unemployment incidence, as mentioned before, using a Pooled OLS regression model as well to find out how the education policy.

The paper will be organized as follows; the first chapter will mainly offer a brief summary of the existing literature review and it will be followed by an explanation of the nature of the Egyptian education system with a special focus on the vocational education, which will be discussed in the second chapter. In the third chapter, some descriptive statistics will be used to explain the labor market situation in Egypt followed by the forth chapter which will be totally dedicated to the empirical model. And the last chapter will include some discussions and some policy recommendations based on the results we got from the empirical analysis.

Chapter I: Literature review

The Human capital theory founded by Becker (1964 and 1975) suggests that education increases one's productivity and hence lowers the expected costs related to trainings offered by firm since it's easier to train a person with high education level than that with a basic level of education. This theory proves that a positive correlation between education and employability since through general education individuals can acquire some of the needed basic skills such as the cognitive skills and hence it increases one's productivity. According to Becker (1964 and 1975), this human capital is referred to as the "general human capital". While vocational education offers some skills related to a narrow range of jobs and so it's called "specific human capital" (Becker G.S., 1964 and 1975). In other words, having a low level of education might increase one's likelihood of being unemployed. And according to Snieska et al. (2015), this effect is estimated to be around 5 times lower the unemployment incidence for those with university degree or higher, compared to high school graduates (Snieska et al., 2015).

Furthermore, the economic theory highlights the fact that youth employment may be relatively unstable due the availability of entry jobs which is strictly related to the need of trained labor (Magnussen O., 1979). The economic theory also predicts that women are more likely to be unemployed compared to their male counterparts. This phenomenon is explained partially by the fact that women tend to engage in unskilled work since they are expected to work for shorter periods unlike men. For this specific reason, employees are hence less encouraged to invest in any kind of on-the-job training for women employees (Magnussen O., 1979)

However, and unlike what the theory suggests, education doesn't necessarily reduce unemployment incidence in a lot of countries, raising consequently a lot of debates on this issue. It's also worth noting that there is still no accord yet in the literature on the effect of vocational education versus the general education on one's employability due to the lack of sufficient take on the issue.

Caroline Hall (2016) studied the effect of a reform aiming to prolong the vocational education in upper secondary schools while providing them with more general content in Sweden. Using an IV regression model, the author concluded that having access to more general education doesn't reduce the likelihood of being unemployed unless students with a poor performance from compulsory school attend a pilot program. She also found out that this effect is more relevant among male students and can be mainly justified by the high dropout rate resulting from changing programs (Hall C., 2016).

In a previous paper conducted in 2012, Hall also found out that enrolling in longer more general vocational programs helped increasing the number of upper secondary graduates, while it failed to encourage students to seek further education beyond this level. The author also found that enrolling in such programs has almost no impact one wages (Hall C., 2016).

Malamud and Pop-Eleches (2010) investigated the potential benefits of general versus vocational education through the study of an educational Romanian reform that took place in 1973. It aimed mainly to shift a big share of students from vocational to general track. By using a regression discontinuity design, the authors found out that this reform had no noteworthy impact on unemployment or wages

between the pre-reform cohort and the other cohort who were shifted to general schools as a part of that policy (Malamud, O., & Pop-Eleches, C., 2010).

Using UK data, Nickell (1979) analyzed the relationship between education and the incidence and duration of unemployment. He concluded that up to twelve years of schooling, every year is able to decrease one's projected unemployment duration by over 4% (Nickell S., 1979).

Mincer (1991) similarly demonstrates shorter duration of unemployment for better educated workers. By using a binominal logit model, the author also found out that seeking vocational education as well training (in trade schools and colleges) increases the unemployment incidence for men compared to attending a normal secondary school. While attending vocational schools for women helped them obtain some economic benefits through reducing their likelihood to be unemployed (Mincer J., 1991).

Mincer (1991) also highlighted the importance of obtaining a certificate and how it's as crucial as the attendance of such schools, especially for male students. For men who didn't have a certificate from such trade schools or colleges, the likelihood of being unemployed is as high as 14% compared to those who graduated high schools while not having a certificate or a diploma. The obtaining of a certificate was found to be insignificant in the case of women (Mincer J., 1991).

Oosterbeek and Webbink (2007) investigated the effect of a reform that took place in Netherlands in 1975. The aim of this reform was to add an additional year to the existing three years vocational track, which will dedicated to offer students more general education. In order to investigate the impact of such reform, the authors used a difference-in-differences approach where students who didn't take part of this four

years system were considered as the study's control group. They found out that adding one additional year of general schooling to the existing vocational track didn't increase the students' long term earnings (Oosterbeek H., Webbink D., 2007).

W. Craig Riddell and Xueda Song (2011) found out that education helps the re-employment process of the unemployed. The also concluded that seeking a post-secondary education will reduce the unemployment incidence while seeking further secondary education doesn't necessarily reduce the likelihood of being unemployed. Using a regression model, the authors found out that holding a high school certificate increases one's likelihood of re-employment by 11.7 % for those who were already unemployed for one year, while seeking an additional year of further schooling can only increase it by 2% (W. Craig R., Xueda S., 2011).

Tatiana Blinova, Svetlana Bylina and Victor Rusanovskiy (2015) conducted an empirical study in order to investigate the different factors that might affect the youth unemployment reduction while assessing the education system in different Russian regions. They concluded that there are 4 main factors causing the interregional differences as follows: the economic development of the region, the demographic structure of the population and specifically the share of young people within it, the structure of jobs as well as the availability of vocational education for young people. By running a regression dependence model between youth unemployment and the previously mentioned factors, the authors found that a positive relationship exists between youth unemployment and the demographic structure of the population while a negative relationship exists between the rate of youth unemployment and the number of persons with secondary vocational education.

The results also showed a negative correlation between the rate of youth unemployment and the number of secondary vocational education graduates, in addition to a positive relationship between the rate of youth unemployment and the number of secondary general education graduates. This correlation is justified by the huge number of fresh high school graduates who entered the labor market. Those students were lacking work experience which made them less employable (Tatiana B., Svetlana B., Victor R., 2015).

In order to investigate whether such results can be obtained as well in Egypt, we should briefly understand how the education system in Egypt works along with the situation in the Egyptian labor market. We will aim to discuss this in the following two chapters.

Chapter II: Education system in Egypt

The education system in Egypt can be divided into three main stages: primary, middle and high schools, where basic technical, vocational education and training (TVET) is provided through secondary technical, commercial schools as well trough post-secondary training institutions. In addition to that, dual system trainings and apprenticeships, in-service trainings, and re-trainings of people already in the labor force (for both the employed and unemployed) also exist. So, this type of education is delivered through either formal or informal channels which can in return be either private or public (Amer M., 2007).

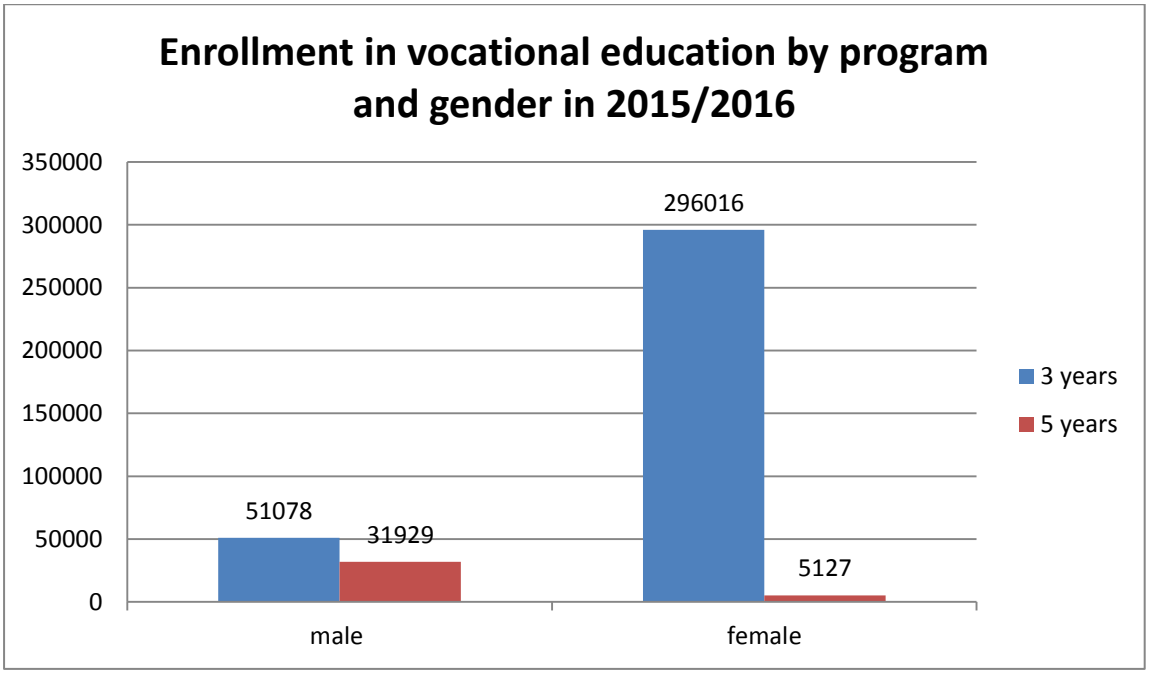
The public channel consists of different government agencies who work independently under the Supreme Council on Human Resource Development (SCHRD), a tripartite body managed by the Ministry of Manpower and Emigration (Amer M., 2007).

Basic TVET is provided through the Ministry of Education and the Ministry of Higher Education. The Ministry of Education manages around 2,150 technical and vocational schools with a total of 1,710,686 students in the academic year 2015/2016 according to CAPMAS. Out of these 2,150 schools, 1090 schools offer industrial vocation education to around 843,800 students while the remaining 1060 schools offer commercial and agricultural vocational education to 866,887 students during the same year. Alternatively, the Ministry of Higher Education manages 47 Middle Technical Institutes; offering two possible kinds of diplomas: a three-year technical diploma and a five-year technical diploma (Amer M., 2007).

As demonstrated in the graph below, in the academic year 2015/2016, a total of 51,048 male students were enrolled in the 3 years course while 296,016 female

students were enrolled in the same course. We observe that the 3 years course seems more appealing to both gender, more so for the female students who tend to enroll in the shorter program rather than the 5 years course.

Graph 1: Enrollment in vocational education by program and gender in 2015/2016



Source: CAPMAS, Below university education annual report for the academic year 2015/ 2016.

As for the post-secondary education, the Technical Institutes offer three different levels of qualification:

- A High Technical Diploma through two-year course in industrial and commercial fields.
- A Bachelor degree of Technology through four-year course which mainly aims to train technical teachers who are expected to teach in technical schools.
- A High Technical Diploma through two to five-years course that requires students with the needed skills for employment in specific industrial sectors (Amer M., 2007).

In addition, vocational training is also provided through 232 training centers also known as vocational training centers (VTCs) which are working under six ministries namely the Ministries of Industry and Technological Development, Housing, Manpower and Emigration, Agriculture, Health, and Culture (Amer M., 2007).

The ministries of Manpower and Emigration, Agriculture, Health, Culture offer some short courses for semi-skilled occupations that usually last from a few weeks to a few months. Once the trainee finishes the course, he obtains a certificate issued by the relevant ministry (Amer M., 2007).

By comparison with those four before-mentioned ministries, the Ministry of Housing and the Ministry of Industry and Technological Development offer long term courses for the skilled workers. The Ministry of Housing certifies its own courses while the 3-year training course based on apprenticeship offered by the Ministry of Industry and Technological Development is accredited by the Ministry of Education and is considered equivalent to the diplomas issued by vocational high schools (Amer M., 2007).

In fact, the vocational education was accused for years for being unable of offering the skills needed in the labor market (Amer M., 2007). It's also worth noting that the students who couldn't get sufficient scores to allow them enrollment in general high schools are the main population of vocational schools, associating the latter hence with a bad reputation over the years. Moreover, according to Amer, 2015), only about 50% of the annual intake can successfully complete their courses and among which around as much as 60% are unemployed after graduation (Amer M., 2007).

This phenomenon manifesting since long started to worsen even more during the last decade of the 20th century, when the government started to adopt a new policy aiming to restrict the entry to the general track while simultaneously improving the chances of general schools graduates proceeding to university by increasing the budget for universities 7 folds in the period between 1982 and 1998 while the share dedicated to MTIs merely doubled according to Amer (2007). By doing so, a lot of students were left with no other option but to seek more education in the discredited vocational track (Amer M., 2007).

By the end of the 20th century, technical and vocational schools had about double the number of students in general education, which accounted for around 2 million students (Amer M., 2007). A majority of this student body was faced with an extortionate unemployment rate regardless of whether they were successfully able to finish the courses or not. Consequently, they have a very low chance to seek higher level of education in universities. According to Amer (2007), only 5% of universities entrants came with a vocational education background which makes the two tracks to be almost independent from each other.

Later, the Government decided to gradually abolish this policy due to the poor outcome attributed to technical and vocational schools graduates. First the Ministry of Education started to downsize the vocational track though converting around 200 commercial schools into general high schools between the year 2002 and 2003. Also the remaining vocational schools started to focus less on vocational subjects in favor of the general subjects (Amer M., 2007).

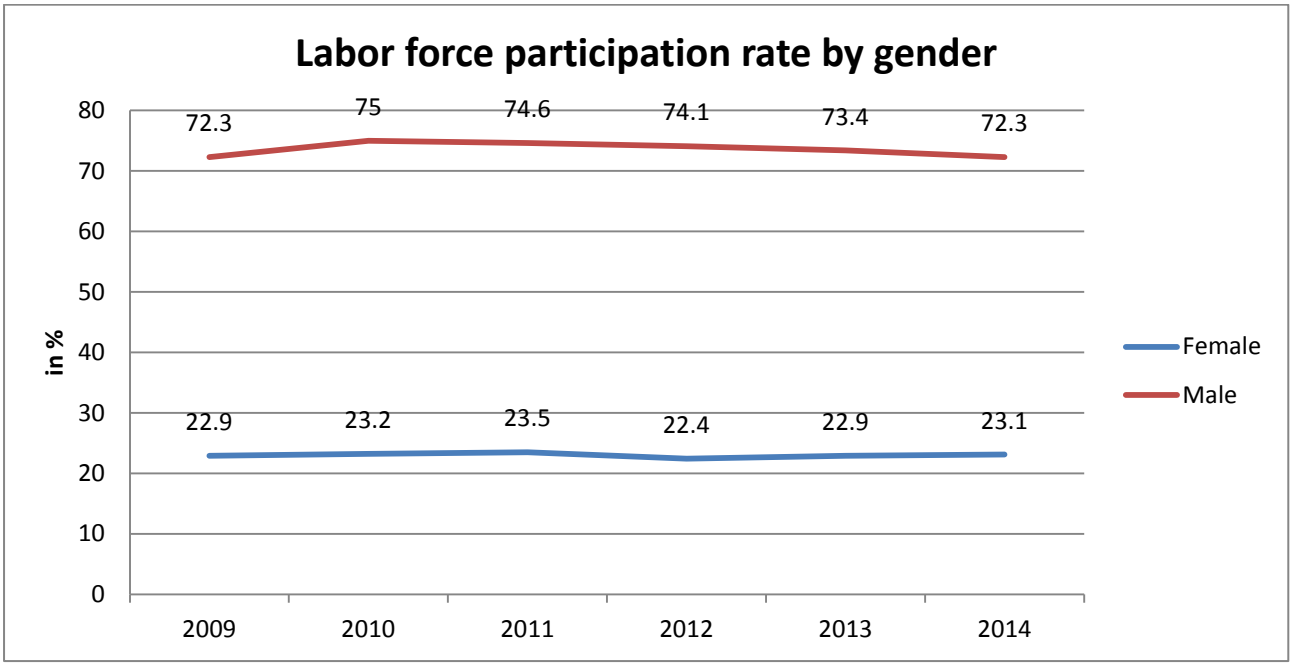
In order to have an even better understanding of the context in which the outcome of vocational education manifests itself, as well as the possible relationship

between said education and unemployment, we further elaborate in the upcoming section on the situation of the Egyptian labor market.

Chapter III: The labor market in Egypt

As graph 2 illustrates, the labor force participation rate for both females and males didn't change much over the years since 2009 till 2014. Men participation rate on average ranges from 72 to 75% while women participation rate is remains around 23 to 23.5% over the same period. We also notice that the gap between men and women is still substantial, making women less represented in the Egyptian labor market.

Graph 2: Labor force participation rate by gender between 2009 & 2014

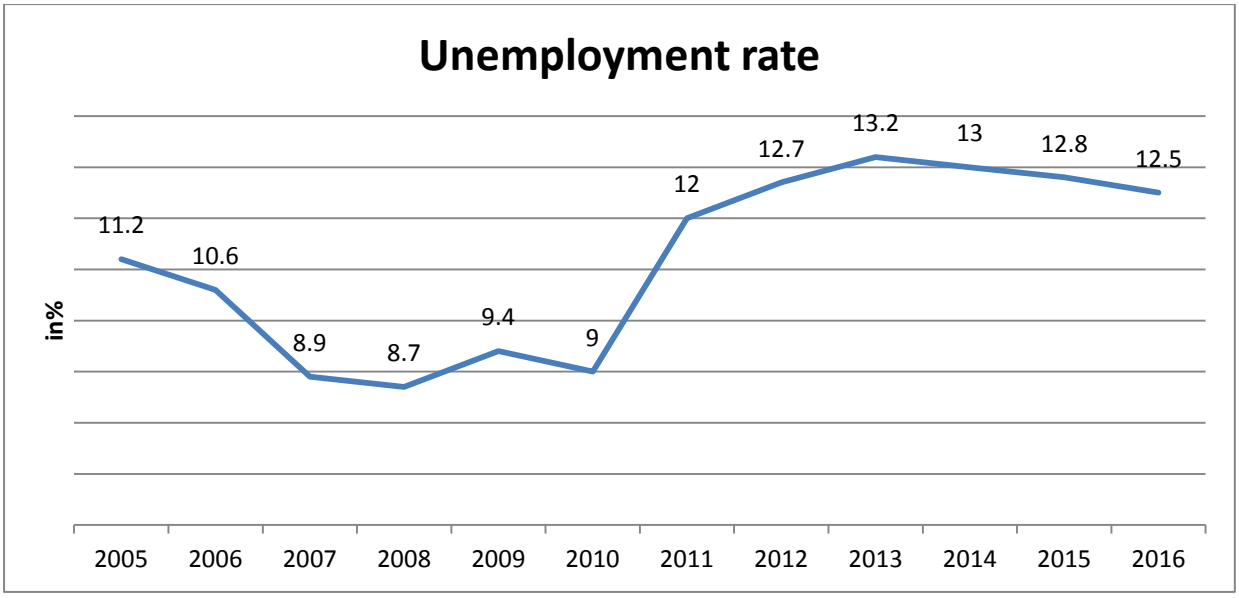


Source: CAPMAS, Labor force survey reports 2014 and 2016.

In regards to unemployment, and by observing graph 3, we can note that since 2005, the unemployment rate decreased steadily till 2010 by around 20% and then jumped back dramatically starting in 2011 to reach its highest peak within the last decade in 2013 at a staggering percentage of 13.2%. This sudden increase of around 33% in the unemployment rate between 2010 and 2011 was however perceived as a

natural consequence of the political and economic instability that followed the outbreak of the 2011 Revolution (El Khouli M., 2015).

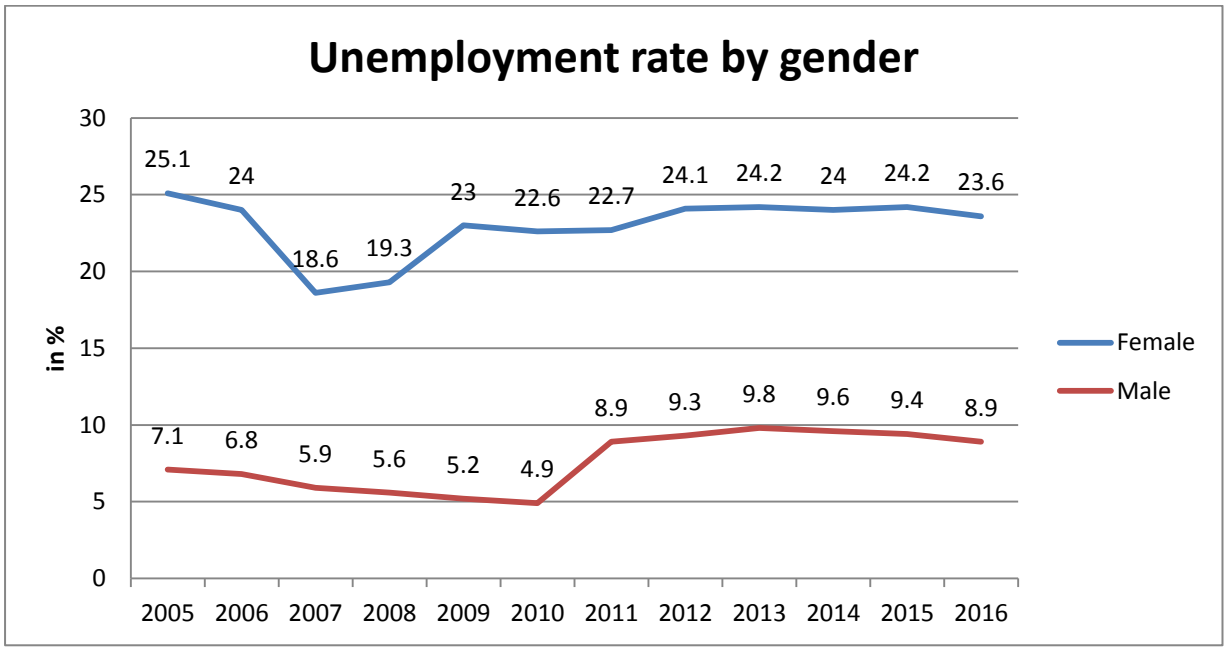
Graph 3: Unemployment rate evolution between 2005 & 2016



Source: Source: CAPMAS, Labor force survey reports 2014 and 2016.

If we take a closer look on unemployment while putting into consideration the gender aspect, we can also notice that, as expected, women are more prone to be unemployed than men. Women unemployment rate decreased by around 26% between 2005 and 2007 and it increased slightly till it almost stabilized since 2012 till 2016. While men unemployment rate witnessed a relatively stronger decrease between 2005 and 2010 by around 31% before it starts to increase again because of the revolution outbreak to reach its peak in 2013. We can also conclude from graph 4 that the 2011 revolution had a very negative impact on men unemployment unlike the women case. Between 2010 and 2011, women unemployment rate almost didn't change while it increased by around 82% for men.

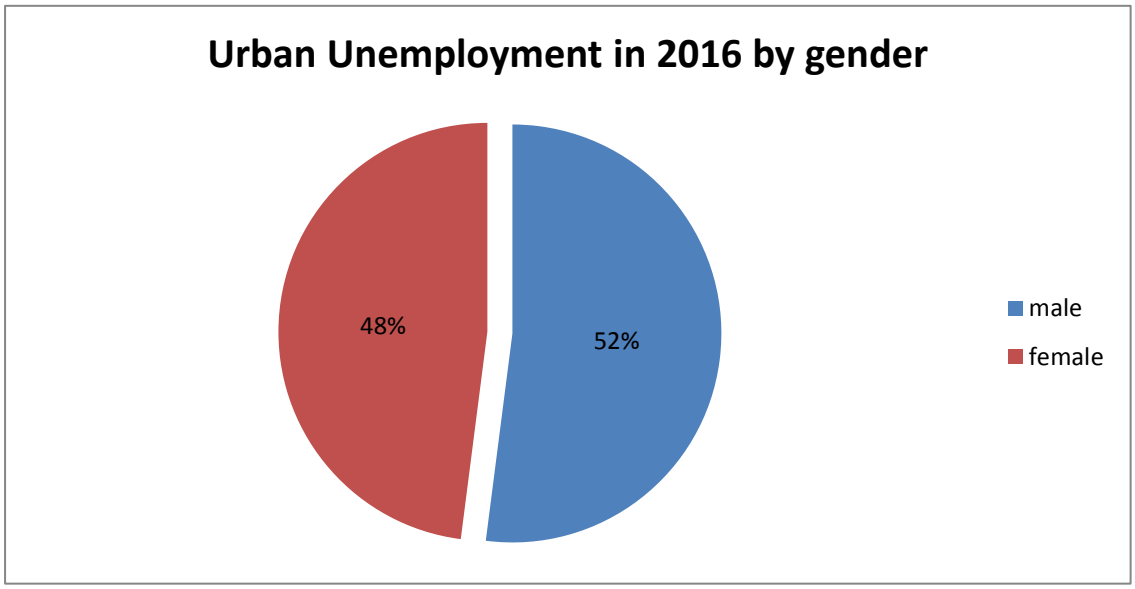
Graph 4: Unemployment rate evolution between 2005 & 2016 by gender



Source: Source: CAPMAS, Labor force survey reports 2014 and 2016.

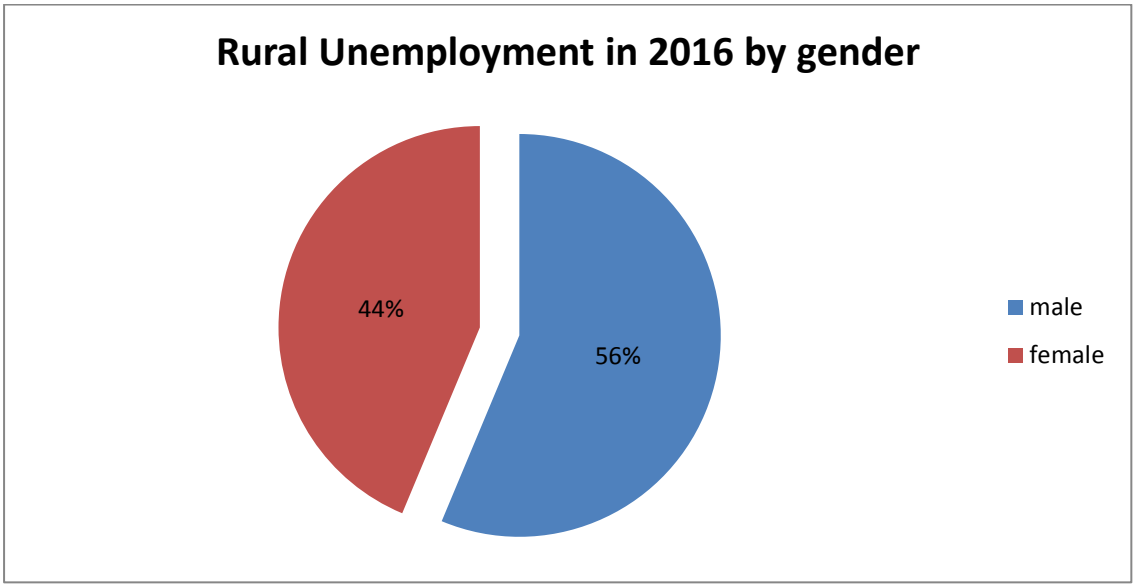
In 2016, unemployment share of urban areas consisted about 61.2% of the total unemployment while rural unemployment was only 32.3%. This can be explained by the nature of those rural areas which depends heavily on agriculture which offers more stable jobs unlike the industrial sector (El Khouli M., 2015). In both urban and rural areas men tend to be slightly more likely to be unemployed in 2016 as graph 5 and 6 show. Also this phenomenon is more visible in the rural areas.

Graph 5: Urban Unemployment in 2016 by gender



Source: Source: CAPMAS, Labor force survey reports 2016.

Graph 6: Rural Unemployment in 2016 by gender

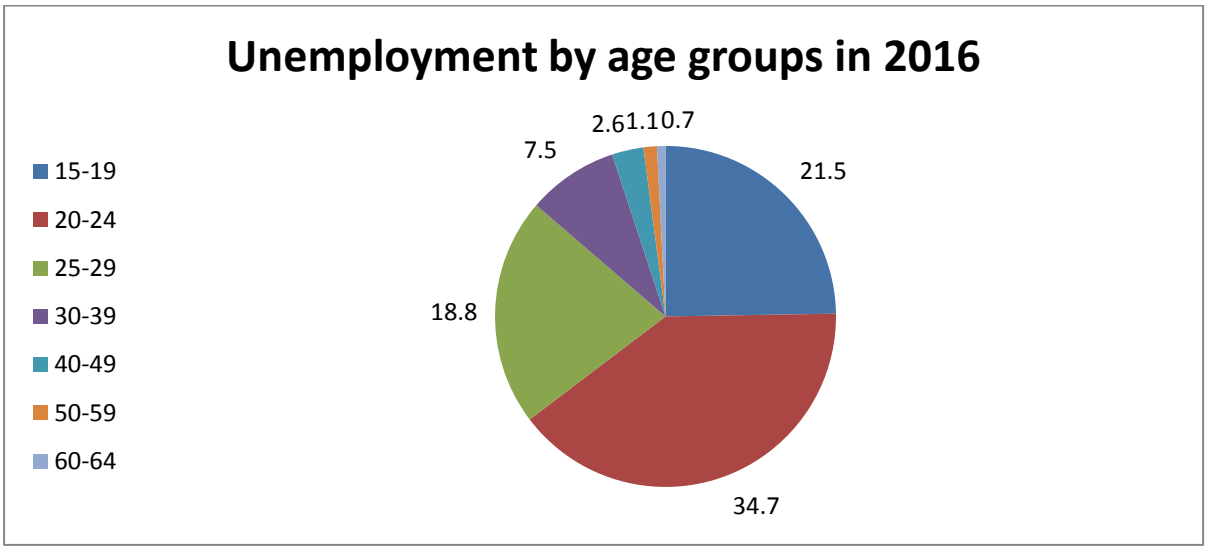


Source: CAPMAS, Labor force survey reports 2016.

As graph 7 shows, individuals whose age falls between 20 and 24 years old form the most likely group to be unemployed followed by those aging from 15 to 19

years old. These two categories represent more than 50% of the unemployed population. Confirming what was mentioned in the literature, younglings and fresh graduates tend to be the most vulnerable to unemployment since they lack work experience and sometimes might also lack the needed skills, essential for them in order to infiltrate the labor market more easily.

Graph 7: Unemployment by age groups in 2016

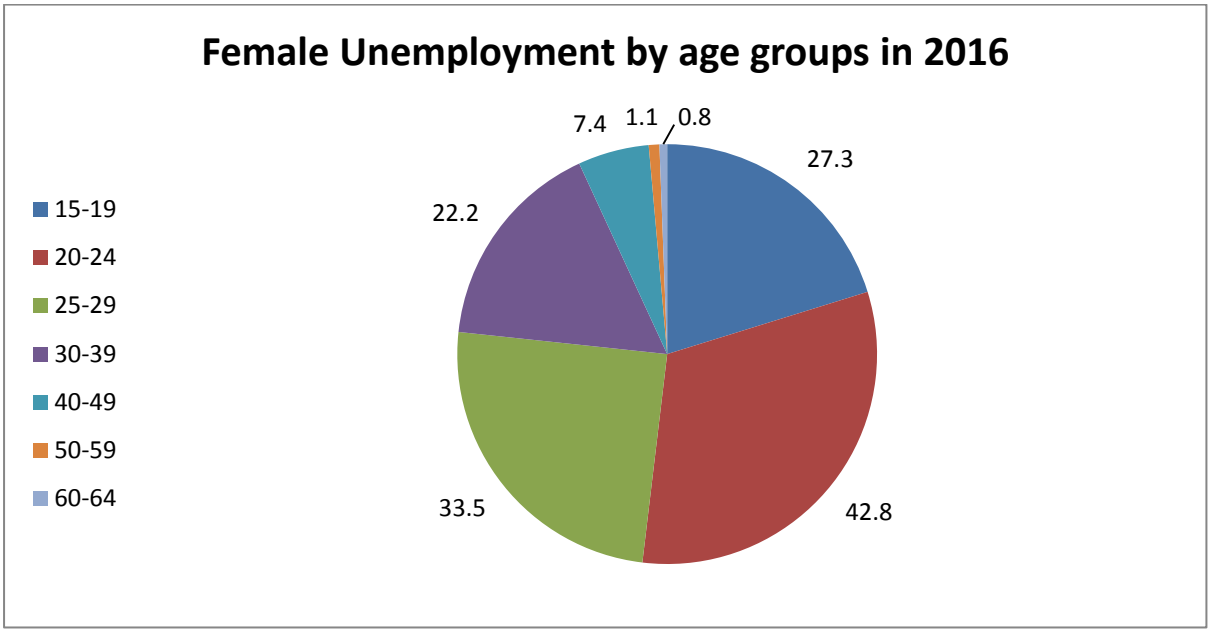


Source: CAPMAS, Labor force survey reports 2016.

Taking again into consideration the gender aspect, we find out that women aging between 20 and 24 are the most likely group to be unemployed (42.8%) followed by those aging between 25 and 29 years who account for around 33.5% of the total women unemployment. This might be explained by the fact that women's marriage tends to take place in this specific age range, rendering them less susceptible to follow through with their careers, especially in case of pregnancy or child care and lack of alternative care solutions; all in all decreasing their work engagement and increasing their unpaid care work within the household. These two groups in their totality account for more than 75% of the total women unemployment. While for men, as shown in graph 9, those aging between 20 and 24 years are the most likely to be

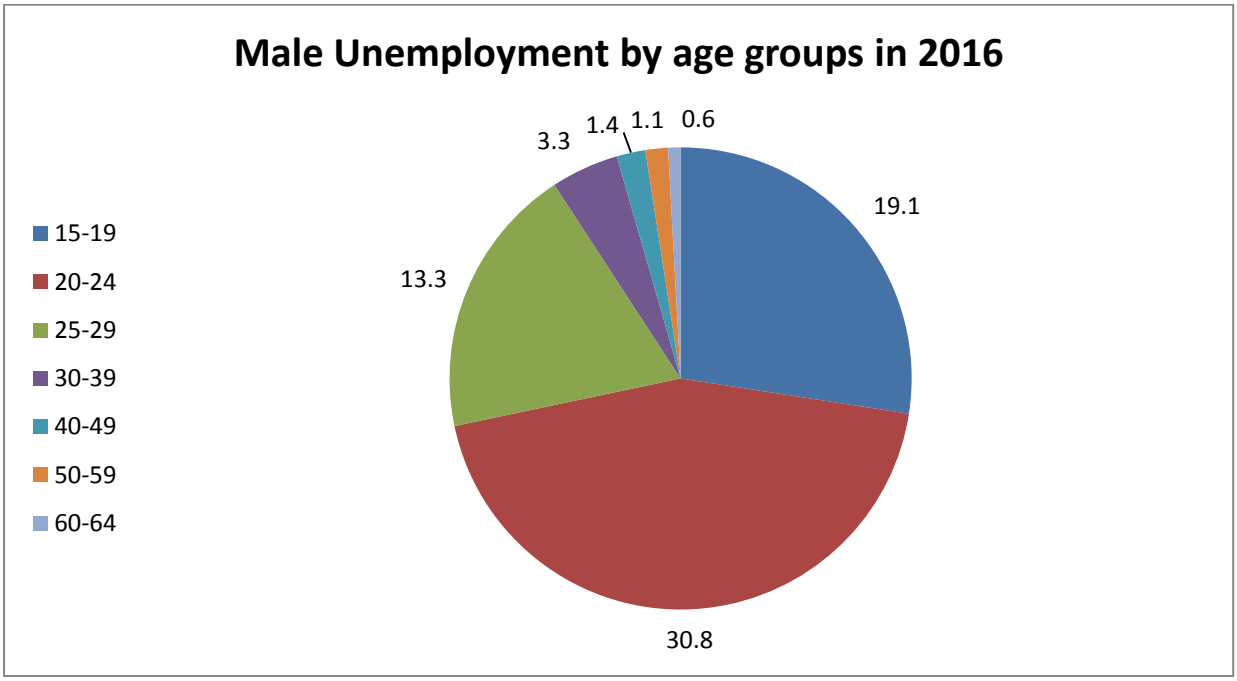
unemployed followed by the age group 15- 19 years, conforming to the previous findings in graph 7.

Graph 8: Female Unemployment by age groups in 2016



Source: CAPMAS, Labor force survey reports 2016.

Graph 9: Male Unemployment by age groups in 2016

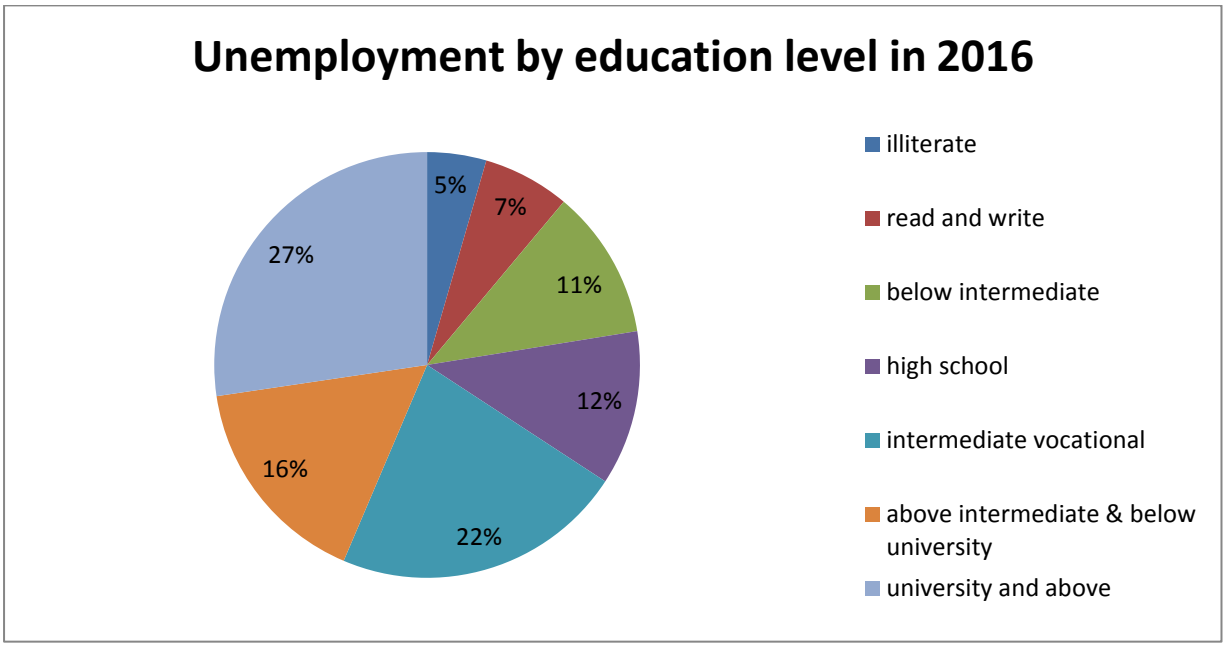


Source: CAPMAS, Labor force survey reports 2016.

From graph 10 concerning the educational level, we further notice that university graduates are the most likely group to be unemployed, accounting for around 27% of those who were unemployed in 2016 followed by middle vocational schools graduates (22%). These astonishing outcomes ignite a serious and valid questioning of the quality of the Egyptian education system and its ability to offer the needed skills that facilitates the transition from education to labor market.

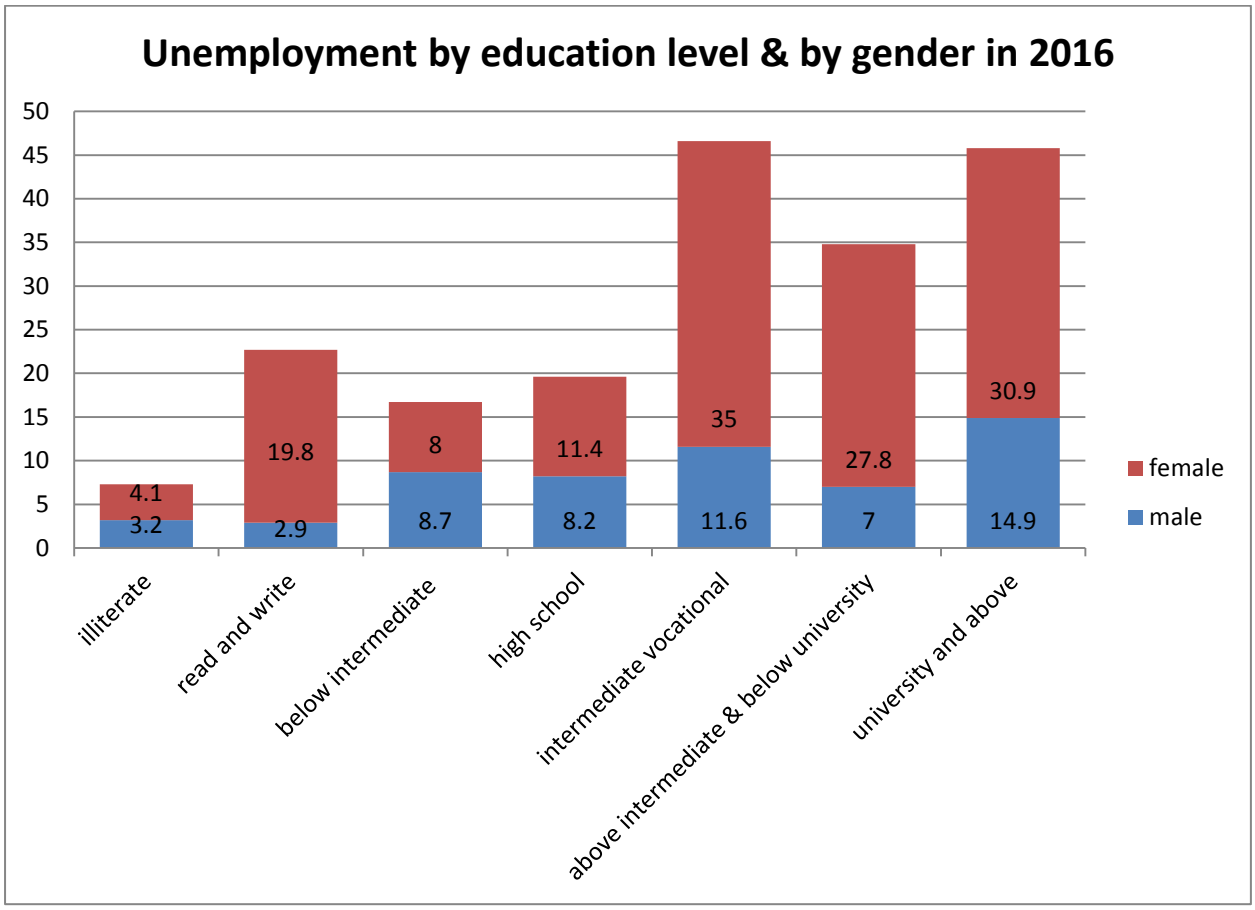
If we also take into account the gender aspect, we can conclude that women who graduated from vocational schools are more prone to be unemployed; which accounts for 35% of unemployed women in 2016 followed by university graduates (30.9%). While for men, it's contrariwise. Male university graduates are the most likely to be unemployed accounting for 14.9% of the total male unemployment followed by vocational graduates at 11.6%.

Graph 10: Unemployment by education level in 2016



Source: CAPMAS, Labor force survey report 2016.

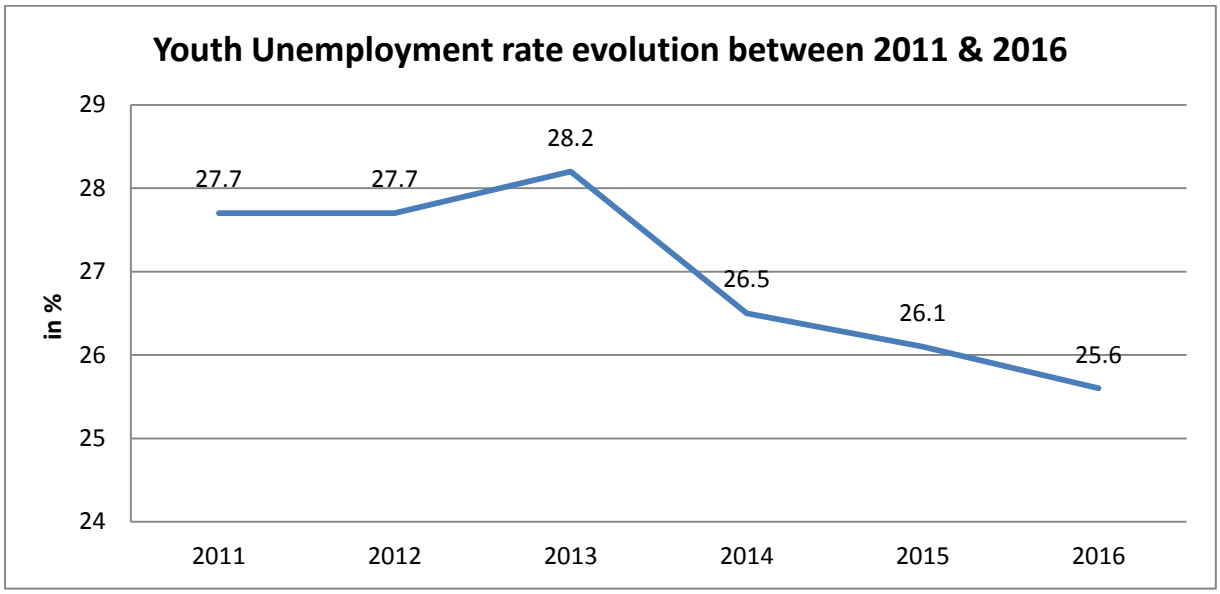
Graph 11: Unemployment by education level & by gender in 2016



Source: CAPMAS, Labor force survey report 2016.

Taking a closer look at the youth unemployment for those aging between 15 and 29 years old, we notice that youth unemployment rate was not affected much by the revolution outbreak in 2011 but however reached its peak in 2013 rising up to 28.2%. And despite the fact that this rate started to decline after 2013, it still remains relatively high, displaying the severity of the youth unemployment issue compared to the unemployment generally in Egypt. For instance, in 2016, unemployment rate was around 12.5% while for youth it reached around a quarter of the young working population at 25.6%.

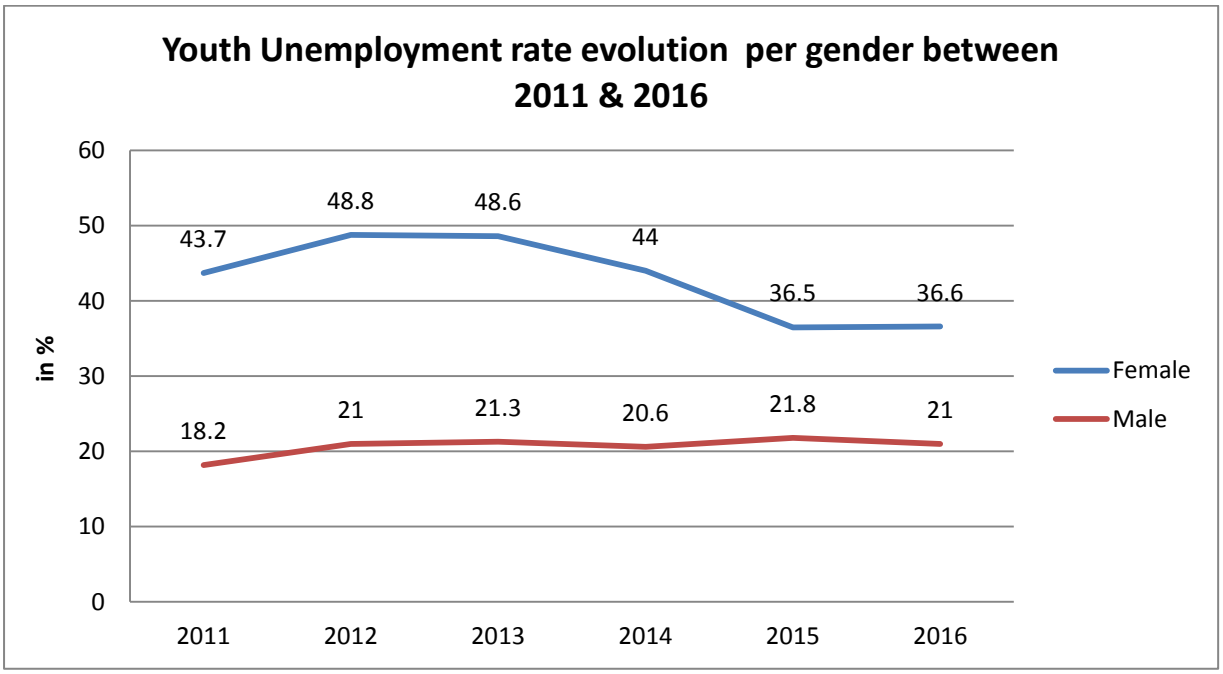
Graph 12: Youth Unemployment rate evolution between 2011 & 2016



Source: CAPMAS, Labor force survey report 2016.

Similarly to the unemployment rate, young women tend to be more likely unemployed compared to young men as shown in graph 12. Young female were as well less affected by the revolution outbreak in 2011. Young female's unemployment rate increased by 11.7% between 2011 and 2012, reaching a peak of 48.8%. While for young men, the increase over the same period was slightly higher, of around 15.4%. For both gender, the unemployment rate overall declined afterwards to almost starting to stabilize after 2013.

Graph 13: Youth Unemployment rate evolution by gender between 2011 & 2016



Source: CAPMAS, Labor force survey report 2016.

After we showcased both the education system as well the labor market in Egypt, we would like to see whether the same trends concerning vocational education as well higher education affects in general the unemployment output and specifically youth unemployment. Aiming to do so, we will use an empirical modeling in the next chapter.

Chapter IV: Empirical Model

In order to address the research questions, we will run a Pooled OLS regression using the Egyptian Labor market survey data set carried out by the Economic research forum (ERF) in cooperation with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) (Assaad and Krafft, 2013). Three waves of this survey (1998, 2006 and 2012) will be used in our analysis.

This repeated cross sectional data set consists of a sample survey data focusing on both households and individuals as unit of analysis.

The first wave of survey, the Egypt Labor Market Survey of 1998 (ELMS 1998) was carried out on a nationally representative sample of 4,816 households containing 23,997 individuals. The ELMPS 2006 followed the initial ELMS 1998 sample, locating 3,685 households from the original ELMS 1998 survey and adding 2,168 new households that emerged from these households as a result of splits, as well as a refresher sample of 2,498 households, all totaling 8,351 households containing 37,140 individuals (Assaad R., 2009).

The ELMPS 2012 covered 12,060 households, consisting of 6,752 households from the 2006 sample, 3,308 new households that emerged from these households as a result of splits, and a refresher sample of 2,000 households. Out of the 37,140 individuals interviewed in the 2006 survey, 28,770 persons were successfully re-interviewed in 2012. These individuals, 13,218 of whom were also tracked in 1998, form a panel that can be used for longitudinal analysis. The 2012 sample also includes 20,416 new individuals (Assaad and Krafft, 2013).

Due to the fact that these three rounds didn't track the same persons over the three years of the survey, we will treat the data as a repeated cross-sectional data set and hence pooled OLS will be conducted using 110,323 observations in total.

In order to first examine how seeking vocational education can affect one's probability to become unemployed, we defined our main model as follows:

$$Unemployment_{it} = \beta_0 + \beta_1 Voc_i + \beta_2 Univ_i + \beta_3 Yedu_{it} + \beta_4 age_{it} + \beta_5 agesq_{it} + \beta_6 Urban_{it} + \beta_8 Fatherempstatus_{it} + \beta_9 Motherempstatus_{it} + \varepsilon_{it}$$

Where,

$Unemployment_{it}$: is the dependent variable taking the value of 1 if the person is unemployed, 0 otherwise. Since the dependent variable is a binary variable, we will be dealing with a linear probability model through which we can estimate the probability of the unemployment incidence.

Voc_i: Is a dummy variable that takes the value of 1 if the person had vocational education, 0 otherwise.

$Univ_i$: Is a dummy variable that takes the value of 1 if the person had higher education, 0 otherwise.

$Yedu_{it}$: It measures the years of education, ranging from 0 to 23 with a mean around 7 years of schooling as it's shown below in table 1.

age_{it} : It measures one's age, ranging from 0 to 106 with a mean of around 26.5 years.

$agesq_{it}$: It measures the age squared in order to allow a non-linear function with the dependent variable.

$Urban_i$: A dummy variable that takes the value of 1 if the person lives in urban areas.

$Fatherempstatus_{it}$: A dummy variable that takes the value of 1 if the person's father is employed.

$Motherempstatus_{it}$: A dummy variable that takes the value of 1 if the person's mother is employed.

Table 1: Summary Statistics

	Count	Mean	SD	Min	Max
Voc	110323	.1633929	.3697255	0	1
Univ	110323	.0804728	.272025	0	1
yrschl	93010	7.193829	5.326102	0	23
age	110323	26.47936	19.64185	0	106
Agesq	110323	1086.955	1380.364	0	11236
Ftempstatus	110323	.708728	.4543506	0	1
MTempstatus	110323	.0736927	.2612713	0	1
N	110323				

In order to account for the gender difference, we ran the regression model twice once for females and once for males. Also since we are dealing with a linear probability model, we should be concerned about heterosckedasticity. That's why the heteroskedastic robust standard errors are reported between brackets.

In fact our analysis has some limitations due to our concern about a possible endogeneity between the vocational and university variables since education decisions is highly dependent on one's inner ability as well as his intelligence level.

We found out that on average, women who are either illiterate or didn't seek further education beyond middle school and also living in rural areas are 38.5% likely to be unemployed while their male counterparts are only 33.1% likely to be unemployed. If women decide to seek vocational education on average they are 13.3% more likely to be unemployed while if they decide to seek further education and enroll in universities, they are relatively less likely to be unemployed (10.6%). These results are similar to what Bertoni and Ricchituti found. Women in general are more vulnerable to be unemployed especially for the highly educated cohorts compared to men (Bertoni E., Ricchituti G., 2014).

As for men, seeking vocational education makes them 2.4% more likely to be unemployed while entering universities makes them relatively more likely to be unemployed (4.36%). We can notice the huge gap between men and women in terms of unemployment incidence which might be a consequence of job segregation or a possible bias in favor of men in the labor market. Also we notice that seeking higher education for women increases their employability relatively while it's not the case for men. Years of schooling seems to have a very trivial positive significant effect on unemployment for women, which also proves that regardless of how many years of education a woman seeks, she will always be prone to be unemployed.

Women are 5.53% more likely to be unemployed if they live in urban areas while men are only 2.71% likely to be unemployed. One's probability of being unemployed is also related to the parents employment status, as it's shown in the table below, both women and men are less likely to be unemployed if their father is employed. If the mother is working, men tend to be more prone to be unemployed while it has no significant effect on women's probability to be unemployed.

Table 2: Pooled OLS of Unemployment over Vocational education

VARIABLES	(1) Female	(2) Male
Voc	0.133***	0.0240***
	(0.00953)	(0.00384)
Univ	0.106***	0.0436***
	(0.0126)	(0.00581)
yrschl	0.00237***	0.000466
	(0.000655)	(0.000335)
Age	-0.0146***	-0.0150***
	(0.00114)	(0.000753)
agesq	0.000118***	0.000158***
	(0.0000137)	(0.00000898)
Urban	0.0553***	0.0271***
	(0.00617)	(0.00271)
Ftempstatus	-0.0223***	-0.00890**
	(0.00746)	(0.00375)
MTempstatus	-0.00641	0.0488***
	(0.0132)	(0.00879)
Constant	0.385***	0.331***
	(0.0230)	(0.0150)
Observations	13,512	26,361
R-squared	0.140	0.055

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

After examining the general impact of seeking vocational education on unemployment incidence, we would like to see this effect on young men and women. We included only those who are between 22 and 30 years old who are mainly fresh graduates who are probably still searching for jobs and we get the following results.

Youth are relatively more susceptible to be unemployed if they are less educated. On average, young women who are either illiterate or didn't seek further education beyond middle school and living in rural areas are 42% more likely to be

unemployed while their male counterparts are only 37.3%. If women decide to seek vocational education on average they are 4.21% more likely to be unemployed while if they decide to seek further education and enroll in universities, they are more likely to be unemployed (7.25%).

As for men, seeking vocational education makes them 7.36% more likely to be unemployed while entering universities makes them relatively more likely to be unemployed (9.53%). We can notice that seeking higher education for both young men and women increases their probability to be unemployed which makes us wonder about the quality of universities' curriculum. Years of schooling seems to have a very trivial positive significant effect on unemployment for both young men and women unlike the case in the first model where it only affected women unemployment incidence.

Women are 3.55% more likely to be unemployed if they live in urban areas while men are even more prone to be unemployed (4.44%). Talking a look at the parents employment status, we found out that both young women and men are less likely to be unemployed if their father is employed. Unlike the case in the first model, even if the mother is working, young men and women tend to be more prone to be unemployed.

Table 3: Pooled OLS of Unemployment over Vocational education for Youth

VARIABLES	(1) Young Female	(2) Young Male
Voc	0.0421*** (0.00433)	0.0736*** (0.00648)
Univ	0.0725*** (0.00645)	0.0953*** (0.00945)
Yrschl	0.00172*** (0.000368)	0.00328*** (0.000518)
Age	-0.0192*** (0.000773)	-0.0169*** (0.00108)
Agesq	0.000197*** (0.00000929)	0.000170*** (0.0000131)
Urban	0.0355*** (0.00306)	0.0444*** (0.00445)
Ftempstatus	-0.0110*** (0.00414)	-0.0192*** (0.00576)
MTempstatus	0.0371*** (0.00841)	0.0186* (0.00971)
Constant	0.418*** (0.0151)	0.373*** (0.0206)
Observations	30,485	21,740
R-squared	0.076	0.085

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In order to predict the possible effect of the university entry policy, we will run another regression model which is defined as follows:

$$Unemployment_{it} = \delta_0 + \delta_1 Y06 + \delta_2 Y12 + \delta_3\, Voc_i * Coh1_i + \delta_4\, Univ_i * Coh1_i + \delta_5\, Voc_i * Coh2_i + \delta_6\, Univ_i * Coh2_i + \alpha\, ControlVariables + \boldsymbol{\mu_{it}}$$

Where,

$Y06$: Is a dummy variable that controls the time effect that takes the value of 1 if the survey round is 2006.

$Y12$: Is a dummy variable that controls the time effect that takes the value of 1 if the survey round is 2012.

$Voc_i * Coh1_i$: Is an interaction term between the vocational dummy variable and cohort 1. We defined cohort 1 as follows, we tried to target those who had to take the decision to seek general or vocational education under the policy. As for the 1998 survey data set, only people aged from 14 to 18 years old were included. In other words, individuals who are about to enter high schools or universities were included. As for the 2006 data set using the same logic above, we included those who were likely to take that decision between 1998 and 2006 and hence individuals aging from 22 to 28 years old were included in this cohort.

$Univ_i * Coh1_i$: Is an interaction term between the university dummy and cohort 1.

$Voc_i * Coh2_i$: Is an interaction term between the vocational dummy variable and cohort 2. We defined cohort 2 as follows, we tried to target those who had to take the decision to seek general or vocational education after the abolishment of the policy. As for the 2006 survey data set, only people aged from 14 to 18 years old were included. In other words, individuals who are about to enter high schools or universities were included. As for the 2012 data set using the same logic above, we included those who were likely to take that decision between 2006 and 2012 and hence individuals aging from 22 to 28 years old were included in this cohort.

$Univ_i * Coh2_i$: Is an interaction term between the university dummy and cohort 2.

$ControlVariables$: This includes the whole set of control variables used in the previous model.

Our analysis will be based mainly on comparing the different output we get from the two different cohorts we are dealing with. As for females, there is slightly small decrease of around 6.5% in terms of unemployment incidence caused by enrolling in vocational education after the policy was abolished. While for seeking higher education, it increased the employability of women (the unemployment probability decreased by around 20.5%). The same trend is also observed for young women.

As for the policy impact on men, after the policy abolishment a huge decrease in unemployment incidence of around 78% was noticed for men who had the decision to seek vocational education. A similar trend was also noticed for those who decided to seek higher education after the policy abolishment; the unemployment probability decreased by around 48%. When we take a look on how the policy affected young male, we can also find that seeking vocational education actually helps reducing their unemployment incidence especially for the second cohort.

We'd like to highlight the importance of the unemployment spell rather than its incidence itself. If one's unemployment spell is quite long, the likelihood to leave unemployment decreases a lot. That's why we would like to conduct a further research paper focusing on projecting the unemployment spell caused by seeking vocational or general track. Also we would like to find out a good IV estimator in order to get rid of the possible endogeneity of the dummy variables Voc and Univ.

Table 4: Assessment of the policy impact on Unemployment incidence

VARIABLES	(1) Female	(2) Male
Voc	0.107***	0.0236***
	(0.0103)	(0.00411)
Univ	0.0280**	0.0133**
	(0.0128)	(0.00543)
yrschl	0.00310***	0.000815**
	(0.000651)	(0.000332)
age	-0.0113***	-0.0134***
	(0.00113)	(0.000770)
agesq	0.0000858***	0.000143***
	(0.0000135)	(0.0000091)
Urban	0.0617***	0.0226***
	(0.00621)	(0.00276)
Ftempstatus	-0.0214***	-0.00775**
	(0.00738)	(0.00373)
MTempstatus	-0.0298**	0.0413***
	(0.0133)	(0.00867)
Y06	-0.0215***	-0.0357***
	(0.00608)	(0.00402)
Y12	0.0198***	-0.0335***
	(0.00671)	(0.00381)
VocCoh1	0.0771***	0.0319***
	(0.0214)	(0.0105)
UnivCoh1	0.224***	0.170***
	(0.0285)	(0.0203)
VocCoh2	0.0721***	-0.00697
	(0.0211)	(0.00793)
UnivCoh2	0.178***	0.0882***
	(0.0236)	(0.0159)
Constant	0.309***	0.321***
	(0.0236)	(0.0162)
Observations	13,512	26,361
R-squared	0.159	0.069

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Assessment of the policy impact on Youth Unemployment incidence

VARIABLES	(1) Young Female	(2) Young Male
Voc	0.0290*** (0.00459)	0.0919*** (0.00798)
Univ	0.0136** (0.00614)	0.0384*** (0.0102)
yrschl	0.00240*** (0.000365)	0.00343*** (0.000522)
age	-0.0155*** (0.000785)	-0.0158*** (0.00109)
agesq	0.000161*** (9.34e-06)	0.000160*** (1.32e-05)
Urban	0.0319*** (0.00309)	0.0433*** (0.00450)
Ftempstatus	-0.00932** (0.00411)	-0.0184*** (0.00576)
MTempstatus	0.0218*** (0.00838)	0.00958 (0.00969)
Y06	-0.0444*** (0.00408)	-0.0288*** (0.00525)
Y12	-0.0343*** (0.00398)	-0.00978* (0.00548)
VocCoh1	0.0610*** (0.0103)	-0.0188 (0.0115)
UnivCoh1	0.200*** (0.0169)	0.158*** (0.0180)
VocCoh2	0.0294*** (0.00884)	-0.0494*** (0.0106)
UnivCoh2	0.148*** (0.0141)	0.0992*** (0.0153)
Constant	0.365*** (0.0162)	0.364*** (0.0217)

Observations	30,485	21,740
R-squared	0.095	0.095

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Chapter V: Discussion and Policy recommendations

We can conclude that university graduate males have higher unemployment likelihood which is different from what the Human capital theory suggests, while women who seek vocational tracks are more prone to be unemployed. Also women in general are more vulnerable to unemployment regardless of which track they decide to seek compared to their male counterparts, which is conforming with what the literature review suggests. Unlike what the descriptive analysis has shown, women living in urban areas suffer more from unemployment in general while young men living in urban regions are more prone to be unemployed than young women. We also can conclude that young men who chose the vocational track are more prone to be unemployed that young women who seek the same track.

Based on the results we got from the empirical model, we noticed that the bad reputation that vocational education gained over the years seems to not hold truth anymore, on the contrary it helps increase one's employability especially for young men. For this special reason, we would like to suggest that the government should invest more in vocational education, since for the most part, we are witnessing contemporarily the occurrence of the fourth industrial revolution, which is particularly characterized by a massive increased volume of available data, automation and a wide use of artificial intelligence as well as robots. Thanks to this revolution, it is envisioned that economies will shift from a mass production model to a customized production of high value-added products with almost no barriers to start one's own business, but there is always a concern about its possible negative effect on the non-skill labor market.

Also given the fact that the service sector absorbs a large share of the total

employment in Egypt (around 48% in 2014 according to CAPMAS) where most of youth tend to start their career since they lack work experience, a real education paradigm shift should be implemented. These jobs (such as transactional jobs, assembly-line work, sales and technicians) represent around 49% of the available jobs in the Egyptian labor market and they are highly vulnerable to automation in the near future. This risk is even greater for young women who mainly work in sales as well in office and administrative jobs (World Economic Forum, 2017).

Aiming to compete in this age and time, the vocational education should be reformed as follows: First, the contents taught in vocational schools should be updated in a way that reflects the continuous change in the labor market. To make this reform feasible, the Government should offer targeted trainings for teachers on regular basis through which they can acquire the needed knowledge in the concerned field, rendering it possible for them to effectively deliver forth this knowledge to the students. By doing so, teachers will be lifelong learners and will be more able to adapt to changes in the market. Also one very important aspect is to offer students simulation of real life problems that might face them during their career and they should be asked to solve it in the most efficient and creative way. This will tackle the lack of on-hands experience for fresh graduates that Egypt is suffering from.

Also digital literacy is a must in the fourth industrial revolution era. Computer coding courses are recently offered in many schools and universities in Egypt but we believe that the content taught should be more extensive and more courses should be offered. And in order to make sure that not only students but every citizen can get an adequate knowledge in that field, some courses related to digital literacy as well computer coding should be available through MOOCs system.

This MOOCs system should also be enforced gradually in all schools and universities and for all courses and we strongly believe it will help to reduce the gap between the urban and rural areas, also giving housewives the chance to develop their skills while being at home. This system won't only benefit students by giving them a customized learning experience but teachers as well since teachers will have to spend less time on preparing for each class which, allowing them the time to focus further on how to offer possible on-hands experience to their students . This could be further beneficial for the teachers themselves, by allowing them time to develop their own skills through accessing some courses using the same system, achieving by doing so a lasting " *lifelong learning*" for both groups.

And despite the importance of Digital literacy, it's crucial to accompany it with the required analytical skills in order to make a maximum use of the rich data sets available, in shaping new policies. Innovation is also a high-priority; it seems that in the future, benchmarking other countries successful cases and merely imitating them won't be enough to survive. Each country should have a comparative advantage that makes it stand out in the international market. And since the technological advance is expected to happen in a very rapid pace, which in consequence might lead to a high rate of jobs turnover, individuals should be able to adapt to new environments and should be flexible enough to respond to changes in the labor market.

Individuals should also be curious and ambitious to seek more education across their whole life span. As we mentioned earlier since the likelihood of job change is so high, being flexible and ambitious to develop one's skills and abilities will help a lot to reduce the incidence of unemployment in the future especially for youth. These skills discussed so far are known as "*the enterprise skills*" and since they can be applied in all industries it would be so efficient to invest in fostering them.

Aside from those soft skills, technical skills which are specific to each field will be no doubt needed. Fostering STEM skills should go side by side with enterprise skills since there will be a need for experts who are able to mix the digital and analytical skills they have with their deep knowledge in such fields such as digital-mechanical engineers and business operations data analysts (World Economic Forum, 2017).

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