The impact of education to the transition from unemployment to employment in Egypt

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Abstract

Purpose – This paper aims to identify the level of contribution of different levels of education to remaining in unemployment as well as the transition from unemployment to employment in Egypt.

Design/methodology/approach – In this paper, transition probabilities matrix differentiated by gender, age groups, educational levels, marital status and place of residence based on worker flows across employment, unemployment and out of labor force states during the period 2012–2018 using Egypt Labor Market Panel Survey of 2018. The results point to the highly static nature of the Egyptian labor market. Employment and the out of labor force states are the least mobile among labor market states. This is because employment state is very desirable and the out of labor force is the largest labor market states, especially for females. Also, this study examines the impact of different educational levels separately on remaining in unemployment and transition from unemployment to employment state using eight binary logistic regression models.

Findings – The main results of transitions from unemployment to employment are relatively large for males, elder-age, uneducated workers as well as workers who are not married and urban residents, and the results of the logistic regression models consistent with the transition probabilities matrix results, except for few cases. Based on the above findings, there is enough evidence to accept the null hypothesis that no education has a positive significant impact to transition unemployed individuals from unemployment to employment, while less than intermediate as well as higher education have a negative significant impact to transition unemployed individuals from unemployment to employment.

Originality/value – This paper proposes to address the problem of the unemployment among highly educated which is much higher compared with illiterates and try to understand the impact of different levels of education separately on the transition from unemployment to employment, to help the policymakers to eradicate the gap between education and the demand of the labor market in Egypt.

Keywords Education, Employment status, Transition probabilities matrix analysis, Binary logistic regression, Egypt

Paper type Research paper

1. Introduction

The problem of unemployment is a global problem that affects the world's economies, and sometimes it is called the body of the economy. In the early literature, the issue of the relation between unemployment and human capital, especially education, is studied in the static analysis, but recently by using the panel data, the dynamic analysis is available. Unemployment is a waste of society's human capital. Human capital played the main role in the unemployment duration and labor mobility. Unemployment is the most important challenge facing policymakers in the world, especially in developing countries. Unemployment duration is higher for people with higher educational levels, which shows

that less educated people have lower wages; a similar result was found for females and males. The previous results related to the study conducted by Canavire-Bacarreza and Soria (2007), using data from the household surveys in Argentina for the period 1998 to 2005. This study applied "stochastic dominance and econometric techniques" as well as "conditional multinomial probity techniques."

In Egypt, the unemployment rate has slightly decreased from 12.7% in 2012 (9.3% for males vs 24.1% for females) to about 11.8% in 2017 (8.2% for males vs 23.1% for females), the unemployment rate is high for females compared with males over 2012–2017, while it is slightly decreased from 24.1% to 23.1% during this period. The unemployment rate is high especially among the highly educated, about 33.2% in 2012 and about 34% in 2017, while it is very low among illiterates with about 3.2% in 2012 and 3% in 2018 (CAPMAS, 2019). It is clear that unemployment among highly educated is much higher compared with illiterates and it slightly increased during this period, while it is very low among illiterates and slightly decreased during the same period. Due to this issue, it is useful to address this problem and try to understand the impact of different levels of education separately on the transition from unemployment to employment, to help the policymakers to eradicate the gap between education and the demand of the labor market in Egypt.

This study proposes to address the problem of the unemployment among highly educated which is much higher compared with illiterates and try to understand the impact of different levels of education separately on remaining in unemployment and transition from unemployment to employment, to help the policymakers to eradicate the gap between education and the demand of the labor market in Egypt.

In this study, the transition probabilities matrix is differentiated by gender, age groups, educational levels, marital status and place of residence based on worker flows across employment, unemployment and out of labor force states during the period 2012–2018 using Egypt Labor Market Panel Survey of 2018. Also, this study examines the impact of different educational levels separately on remaining in unemployment and on the transition from unemployment to employment using binary logistic regression models.

To sum up, the main findings of transitions from unemployment to employment are relatively large for males, elder-age, uneducated workers as well as workers who are not married and urban residents, and the results of the logistic regression models consistent with the transition probabilities matrix results, except for few cases. Based on the above findings, there is enough evidence to accept the null hypothesis that no education has a positive significant impact to transition unemployed individuals from unemployment to employment, while less than intermediate as well as higher education have a negative significant impact to transition unemployed individuals from unemployment to employment.

The plan of the paper is organized as follows. The rest of this section contains the objectives and research hypothesis. Section 2 presents the literature review. Section 3 describes the data source. Section 4 describes the methodology. Section 5 discusses the results of our analysis, and Section 6 presents the conclusion and recommendations.

1.1 Objectives of the study
The objectives of this study are to

(1) Examine the relationship between education levels (primary education, secondary education, and higher education) and remaining in unemployment in Egypt.

(2) Examine the relationship between education levels (primary education, secondary education, and higher education) and transition from unemployment to employment in Egypt.

(3) Identify the level of contribution of different levels of education to remaining in unemployment in Egypt.

(4) Identify the level of contribution of different levels of education to transition from unemployment to employment in Egypt.

1.2 Research hypothesis
The null hypotheses based on these objectives are the following:

H0(1). No education has a significant impact on remaining in unemployment in Egypt.

H0(2). Less than intermediate education has a significant impact on remaining in unemployment in Egypt.

H0(3). Intermediate and above education has a significant impact on remaining in unemployment in Egypt.

H0(4). Higher education has a significant impact on remaining in unemployment in Egypt.

H0(5). No education has a significant impact on the transition from unemployment to employment in Egypt.

H0(6). Less than intermediate education has a significant impact on the transition from unemployment to employment in Egypt.

H0(7). Intermediate and above education has a significant impact on the transition from unemployment to employment in Egypt.

H0(8). Higher education has a significant impact on the transition from unemployment to employment in Egypt.

2. Literature review
Several studies examine the dynamic labor market using Markov transition process probabilities. The pioneering studies are conducted by Funkhouser (1997). Other studies of labor mobility include the study of Gong *et al.* (2004) that examine mobility patterns and their dynamics about individual characteristics in five cities in Mexico and the study of Tansel and Kan (2012) in Turkey.

A study conducted by Gong *et al.* (2004) explore the labor mobility in five urban cities of Mexico using two separate five-wave panels over the period 1992–1995. The aim is to determine the mobility patterns and their underlying dynamics associated with individual characteristics. This study finds the probability of transitions between not working and the informal sector to be higher than that between not working and the formal sector. Also, this study notes that probability of remaining in the formal sector is significantly higher than that in informal sector. Then, "a reduced form dynamic multinomial panel logit model with random effects is run to examine the influence of one's age, education, gender, ethnicity, region and previous labor market state." The results reveal a positive relationship between education level and the formal sector employment, a negative (positive) relationship between the income of other family members, and informal sector employment.

A study conducted by Bernabè and Stampini (2009) examines the relationship between unemployment and higher education using quarterly 1998–1999 panel data to examine mobility across six labor market statuses (inactivity, unemployment, formal wage employment, informal wage employment, self-employment and farming). The study

concluded that there is "largely a queuing device for individuals with higher education waiting for formal jobs. Some self-employment is subsistence activities and consistent with a segmented labor market, while other is high risk and potentially high return activities." Age, gender and education are significant determinants of labor mobility.

To examine and compare labor market dynamics in Argentina, Brazil and Mexico. Bosch and Maloney (2010) conducted a study using panel data from these three countries and Appling Markov transition processes. The main results indicate that there are broad commonalities among the three countries and more common patterns of worker mobility among sectors of inactivity and work.

Tansel and Ozdemir (2015) study the determinants of transitions across formal/informal sectors in Egypt; this study provides Markov transition process probabilities differentiated by gender-based on worker flows across different employment states using Egypt Labor Market Panel Survey of 2012. The main results of this study indicate that government employment and the out of labor force are the least mobile labor market states. Informal private wage work and unemployment are the most mobile labor market states. Also, this study uses the multinomial logit regression to discuss the determinants of outflows from the labor market states. Only a few of the explanatory variables except the high levels of education are found to have predictive power in explaining the transitions from unemployment, formal wage, informal wage and self-employment labor market states.

In a comparative study conducted by Assaad and Krafft (2016) to study "labor marker market dynamic and youth unemployment the middle east and north Africa: evidence from Egypt, Jordan and Tunisia" using data from Egypt, Jordan and Tunisia. "The three rounds of the Egypt Labor Market Panel Survey (ELMPS), fielded in 1998, 2006, and 2012, the Jordan Labor Market Panel Survey (JLMPS) of 2010, and the Tunisian Labor Market Panel Survey (TLMPS) of 2014. This study estimates a complementary log-log model with gamma frailty on annual data for the probability of ending an unemployment spell in each year. This model is also known as the Prentice-Gloeckler-Meyer model" (Meyer, 1990). The main results of this study are that the education of the unemployed in the three countries also very important contrasts. While 87% of the unemployed in Egypt in 2012 had secondary education or higher, that share falls to 54% in Jordan in 2010 and 44% in Tunisia in 2014. In Egypt, individuals with less than secondary education have no chance of obtaining formal jobs and therefore have little incentive to remain unemployed searching for such jobs. "In contrast an individual with a basic education in Jordan and Tunisia has nearly twice the probability of getting either a public sector job or a formal private sector job than a similar individual in Egypt, giving them more reasons to remain unemployed for some time while seeking these jobs." In all three countries, there is a large number of educated young women who want to make use of their educational experiences but lack the mobility to move to where the jobs are.

A study conducted by Assaad and Krafft (2017) investigates "how labor market insertion for Egyptian youth and how-to nature of youth transitions relate to gender and social class." The main result of this study is that youth today face a poorer chance of transitions into a good job than previous generations. Also, social class is the main pillar in determining the success of the transition from school to work in Egypt.

Assaad et al. (2018) examine female labor force participation over time for MENA countries – Algeria, Egypt, Jordan and Tunisia – control by marital status, educational attainment and place of residence (urban/rural) differences using multivariate logit models estimated on annual labor force survey data by country to simulate trends in female participation in different types of participation (public sector work, private wage work, private non-wage, unemployment and non-participation. The main results indicate that "the decline in the probability of public, sector employment for women with higher education is associated with either an increase in unemployment or a decline in participation."

This study proposes to fill the gap in the literature about the impact of different levels of education separately on remaining in unemployment and transition from unemployment to employment state using eight binary logistic regression models.

3. Data source

The data used in this paper come from the 2018 wave of the Egypt Labor Market Panel Survey (ELMPS 2018). "The ELMPS 2018 is the fourth wave of a longitudinal survey carried out by the Economic Research Forum (ERF) in cooperation with the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). The 2018 wave follows previous waves in 1998, 2006, and 2012. The panel design of the survey offers substantial advantages over pooled cross-sectional data by allowing for a more accurate assessment of change over time that controls for both observable and unobservable individual and household characteristics. It also allows for a unique perspective on life course transitions by allowing researchers to link life course outcomes like education, employment, marriage, etc." (Assaad *et al.*, 2019).

"The first round of the panel was the ELMS 1998. It included a nationally representative sample of 4,816 households with 23,997 individuals. The second round ELMPS 2006 located 3,685 households from the ELMS 1998 the first round. An additional 2,168 new households were resulting from splits and a refresher sample of 2,498 households to ensure the representativeness of the sample. These add up to 8,351 households with 37,140 individuals. The third round of ELMPS 2012 includes a total of 12,060 households and 49,186 individuals. The attrition from the 2006 sample to the 2012 sample was not random and due to several processes. 12,060 households included 6,752 households located from the 2006 sample, 3,308 new households resulting from splits from these households, and a refresher sample of 2000 households. 28,770 individuals from the 2006 sample were successfully in 2012 forming a 2-year panel. A total of 13,218 were also tracked in 1998 forming a panel covering three points in time" (Tansel and Ozdermir, 2015).

"The fourth round of ELMPS 2018 included 15,746 households and 61,231 individuals. Of these households, 13,793 households included members from 2012 (10,042 panel and 3,751 split households) and 1,953 were refresher households. Among individuals, 53,040 were in households that included at least one individual interviewed in 2012 (i.e. either panel or split households), while 8,191 were in refresher households. Of the 49,186 individuals included in the 2012 sample, 39,153 (79.6%) were successfully re-interviewed in 2018. Of the 37,140 individuals in the 2006 sample, 22,901 (61.7%) were successfully tracked over three waves. Finally, of the 23,997 individuals included in the 1998 wave, 10,145 (42.3%) were successfully tracked over four waves". For the specific aim of this paper, the panel sample extracted covers the labor force defined by those between the ages of 15–64 years who responded to employment status questions in both 2012 and 2018. That corresponds to 18,408 individuals (Assaad *et al.*, 2019).

4. Methodology

To achieve the objects of this study, two approaches are used: the transition probabilities matrix analysis and multivariate statistical analysis using binary logistic regression.

4.1 First approach: the transition probabilities matrix

To constriction the transition probabilities matrix, we need to calculate P_{ij}, where P_{ij} "is the probability of finding a worker in stat j at the end of the period given that he/she was at state i at the beginning of the period." For each cell of the transition probability matrix, the simple probability (the maximum likelihood estimator) is given by $P_{ij} = \frac{n_{ij}}{n_i}$, where $\boldsymbol{n_{ij}}$ is the number of workers who were in state i and move to state j between the period t and $t + 1$ (in this study between 2012 and 2018); and $\boldsymbol{n_i}$ is the number of workers who were in state i in period t. In this

study, we have three labor market states. They are as follows: employment state, unemployment state and OLF state. Employment state is including formal/informal private regular wage work, irregular wage work, government (includes government administration and public enterprises) and self-employed agriculture/non-agriculture. Unemployment is based on standard definition "including individuals who are not working but actively searching for a job." Out of Labor Force (OLF) "includes individuals who are not working but not searching for a job."

4.2 Second approach: the multivariate statistical analysis

To determine the impact of the main factors, especially education levels affecting remaining in the unemployment state or transition from unemployment state to employment state, two groups of binary logistic regression models are used. The first group contains four models related to remaining in the unemployment state and the second group contains also four models related to the transition from unemployment state to employment state. To estimate the impact of different education levels: no education, less than intermediate, intermediate and above and higher education on remaining in unemployment state (dependent variable: 1 if the worker remains in unemployment state (between 2012 and 2018) and 0 otherwise).

To estimate the impact of different education levels: no education, less than intermediate, intermediate and above and higher education on the transition from unemployment state to employment state (dependent variable: 1 if worker move from unemployment state to employment state (between 2012 and 2018) and 0 otherwise). This study fits eight regression models divided into two groups: (1) the models related to remaining in unemployment state (four models); (2) the models related to the transition from unemployment state to employment state (four models). The binary logistic regression model is adapted because of the dichotomous nature of the dependent variable.

In a general form, binary logistic regression models with a set of socioeconomic factors that affect remaining in unemployment state and transition from unemployment to employment state are taking the following forms (Chong *et al.*, 2008):

$$\text{Prob}(Y = 1 | X_{t-1}) = F(\beta X_{t-1})$$

where X's are the various characteristics of workers, that determine their probabilities of moving between the different employment states (unemployment and employment). These factors include gender (represented by male takes the value of 1 and zero otherwise), age (15–64) (represented by three categories: youth age group (15–24), middle-aged group (24–44) and elder-aged group (45–64)) (used the elder-aged group as a reference), education levels (represented by four categories: no education, less than intermediate, intermediate and above, and higher education) and it will introduce separately, marital status (takes the value of 1 if the worker is not married and zero otherwise) and place of residence (takes the value of 1 if the worker resided in an urban area and zero otherwise).

5. Statistical analysis

5.1 Descriptive statistics

Three different labor market states are identified. They are as follows: employment state, unemployment state and OLF state.

The share of each labor market state in the total labor force between 2012 and 2018 is shown in Figure 1. The proportions for the labor market status are quite similar in employment, unemployment, and the OLF state during 2006–2018. The trend of the labor force across labor market states is quite similar from 2006 to 2018. Figure 1 indicated that the share of employment state slightly increased from about 50% in 2006 to about 51% in 2018. The unemployment state remains stable around 5% (4.3% in 2006 vs 4.5% in 2018). Further, the decline in the OLF state is from about 47% in 2006 to about 44% in 2018.

Table 1 gives the shares of each labor market state in the male and female samples separately. In the male sample, it is substantial increases in the employment state from about 75% in 2006 to about 82% in 2018, while it is a substantial decrease in the OLF state from about 21% in 2006 to 13.5 in 2018. The unemployment state remains stable at around 4%. In the female sample. The share of employment is about 21–23% through the period between 2006 and 2018. The largest labor market state is the OLF state with about 71–74% share between 2006 and 2018. The unemployment state remains stable at around 5%.

5.2 Transition probabilities matrix analysis
In this section, we construct the transition probabilities matrix to identify the factors that may make more movements from unemployment to employment. These factors include gender, age, education level, marital status and place of residence respectively.

5.2.1 Transition probabilities matrix for the total sample. Table 2 shows the transition probabilities matrix for Egypt's labor market between 2012 and 2018. The matrices show the proportions of individuals who stayed in the same state (employment, unemployment and out of labor force) or move from one to others, across the six years, "the main diagonal shows the %ages of individuals who remained in a given state" between 2012 and 2018.

The results of Table 2 referents high levels of diagonal elements in the whole sample, employed individuals in 2012 remain in the same original state in 2018 with 83.5% and OLF state is the second less mobile state with 75% remaining in this state between 2012 and 2018. While unemployment state shows high mobility with only about 12% remaining in the state between 2012 and 2018.

Employed individuals are the least-mobile among all other labor market groups. The transition probability of flows from employment state to unemployment state is very
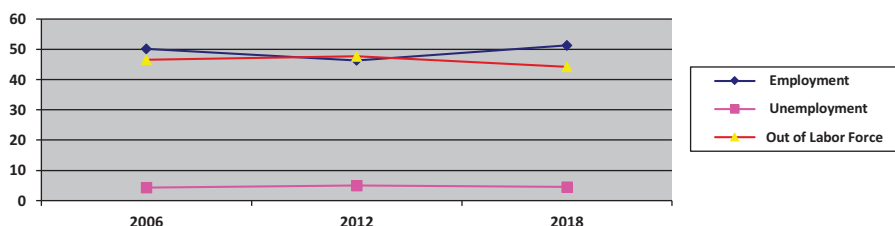
Source(s): ELMPS 2018

Figure 1.
Trends of labor market states in the total sample (%), 2006–2018, Egypt

	2006	2012	2018
Male			
Employment	74.75	86.55	82.3
Unemployment	3.84	3.57	4.2
OLF	21.41	9.88	13.5
Female			
Employment	23.71	22.08	21.2
Unemployment	4.93	6.45	4.8
OLF	71.36	71.47	74.0

Table 1.
Trends of labor market states in the male and female samples, 2006–2018, Egypt

Source(s): Computed by the research using ELMPS 2018

little with 3%. The probability of transition from the employment state to the OLF state is 13.7%.

The unemployed individuals display huge movement among all other labor market groups. The transition probability of flows from the unemployment state in 2012 to the employment state in 2018 is about 33%, while the transition probability of flows from the unemployment state in 2012 to the OLF state in 2018 is about 55%.

OLF state is the second low mobile after employment. The transition probability of flows from the OLF state in 2012 to the employment state in 2018 is about 19%. Only about 6% of OLF state in 2012 move into the unemployment state in 2018.

5.2.2 Transition probabilities matrix analysis for gender. Table 3 shows the transition probabilities matrix for gender between 2012 and 2018. The results of Table 3 indicate that the probability of remaining in employment state from 2012 to 2018 is somewhat similar in both the matrix of male and the total sample (88.9% vs 83.5%), while is much lower for female than the total sample (62.2% vs 83.5%). The proportion of workers who remain in the employment state from 2012 to 2018 is the highest probability in the male sample (88.9%), while in the female sample, the proportion of remaining in OLF state is the highest probability with 83.6%. It means that the OLF state is dominated by females. In the male sample, the probability of remaining in the unemployment state from 2012 to 2018 is much lower than in the total sample (about 9% vs about 12%), while in the female sample the probability is quite similar to the total sample (about 13% vs about 12%).

The transition probability of flows from employment state to unemployment state is very little in both the male and female samples with 3.1 and 1.1% respectively. In the male sample 8% of males employed in 2012 move to OLF state in 2018, while 36.7% in the female sample in 2012 move to OLF state in 2018. It means that women prefer to move to the OLF state.

2012	Employment	2018 Unemployment	OLF	Total
Employment	83.5	2.8	13.7	100
Unemployment	32.9	12.2	54.9	100
OLF	19.3	5.7	75.0	100
Total	51.3	4.5	44.2	
Source(s): Computed by the research using ELMPS 2018				

Table 2.
Transition probabilities matrix for the total sample, 2012–2018, Egypt

2012	Employment	2018 Unemployment	OLF	Total
Male				
Employment	88.9	3.1	8.0	100
Unemployment	79.1	9.4	11.5	100
OLF	54.5	8.5	37.0	100
Total	82.5	4.2	13.2	
Female				
Employment	62.2	1.1	36.7	100
Unemployment	14.2	13.3	72.5	100
OLF	11.4	5.0	83.6	100
Total	21.3	4.7	74.0	
Source(s): Computed by the research using ELMPS 2018				

Table 3.
Transition probabilities matrix for gender, 2012–2018, Egypt

In the male sample, unemployed individuals are highly movement among all other labor market groups with about 79%, while only about 14% in the female sample in 2012 move from unemployment state to employment state in 2018. In the male sample, the transition probability of flows from the unemployment state in 2012 to OLF state in 2018 is 11.5%, while in the female sample the transition probability of flows from unemployment in 2012 to OLF state in 2018 is 72.5%. These results are supported by the results of Tansel and Ozdemir (2015).

In the male sample, the transition probability of flows from OLF state in 2012 to employment in 2018 is much more than in the female sample (54.5% vs 11.4% (about 5 times)). The transition probability of flows from OLF state in 2012 to the unemployment state in 2018 is quite similar in the female sample with the total sample (5% vs 5.7%), while it is greater in the male sample than in the total sample (8.5% vs 5.7%).

5.2.3 Transition probabilities matrix analysis for age groups. Table 4 shows the transition matrices for labor force age categories: youth age group (15–24), middle-aged group (25–44) and elder-aged group (45–64) for the 2012–2018 flows. The results indicate that the transition probabilities of the middle-age group are somewhat similar to the transition probabilities for the total sample.

The results of Table 4 indicate that the probability of remaining in employment state from 2012 to 2018 is quite similar in both the matrix of the middle-aged group and the total sample (89.0% vs 83.5%), which is most immobile among the middle-aged group compared with other groups, while is much lower for both the youth group and the elder-aged group respectively than the total sample (79.6 and 73.2% vs 83.5%). The proportion of workers who remain in the employment state from 2012 to 2018 is the highest probability in the middle-aged group (89%), while in the elder-aged group, the proportion of remaining in OLF state is the highest probability with 87.5%. The probability of remaining in unemployment state from 2012 to 2018 is highest among the young age group (about 14% vs 11.4% for the middle-aged group, 5.2% for the elder-aged group, and about 12% for the total sample, while in the group of the middle-aged group the probability is quite similar with the total sample (about 11% vs about 12%).

2012	Employment	2018 Unemployment	OLF	Total
Age (15–24)				
Employment	79.6	5.6	14.8	100
Unemployment	33.3	14.3	52.4	100
OLF	29.2	9.0	61.8	100
Total	40.8	8.6	50.7	
Age (25–44)				
Employment	89.0	3.0	8.0	100
Unemployment	31.6	11.4	57.0	100
OLF	13.7	5.0	81.3	100
Total	57.7	4.2	38.1	
Age (45–64)				
Employment	73.2	0.9	25.9	100
Unemployment	63.2	5.2	31.6	100
OLF	12.2	0.3	87.5	100
Total	48.4	0.7	50.9	

Source(s): Computed by the research using ELMPS 2018

The transition probability of flows from employment state to unemployment state is very little in the elder-aged group, followed by the middle-aged group and youth age group with 0.9, 3, and 5.6% respectively. The transition probability of flows from employment state to OLF state is the highest in the elder-aged group among other groups with 25.9%, this result due to that some of the workers in this age group retire to reach the age of sixty, followed by the probability in the young age group and the middle-aged group with 14.8 and 8% respectively.

In the elder-aged group, unemployed individuals are highly movement to employment state among all other labor market groups with about 63%, while only about 33 and 32% in the youth age group and middle-aged group respectively in 2012 move from unemployment state to employment state in 2018. In the middle-aged group, the transition probability of flows from the unemployment state in 2012 to the OLF state in 2018 is the highest with 57%, followed by both the young age group and the elder-aged group with about 52 and 32% respectively.

In the young age group, the transition probability of flows from OLF state in 2012 to employment state in 2018 is much more compared with both the middle-aged group and the elder-aged group (about 29% vs about 14 and about 12% (more than 2 times)). The transition probability of flows from OLF state in 2012 to unemployment state in 2018 is quite similar in the middle-aged group with the total sample (5% vs 5.7%), While is greater in the youth age group than in the total sample (9% vs 5.7%) and is very little in the elder-aged group with only 0.3%.

5.2.4 Transition probabilities matrix analysis for education levels. Table 5 shows the transition matrices for education levels: no education, less than intermediate, intermediate, and above and higher education.

2012	Employment	2018 Unemployment	OLF	Total
No education				
Employment	76.7	2.4	20.9	100
Unemployment	64.1	5.1	30.8	100
OLF	14.7	1.1	84.2	100
Total	42.2	1.7	56.1	
Less than intermediate				
Employment	81.4	4.6	13.7	100
Unemployment	56.3	10.4	33.3	100
OLF	23.7	6.3	70.0	100
Total	45.9	5.8	48.3	
Intermediate and above				
Employment	86.7	2.7	10.6	100
Unemployment	27.3	10.4	62.3	100
OLF	20.8	8.6	70.6	100
Total	55.1	5.7	39.2	
Higher education				
Employment	87.6	1.7	10.7	100
Unemployment	34.6	17.8	47.6	100
OLF	18.1	12.0	69.9	100
Total	68.2	5.3	26.5	

Table 5.
Transition probabilities matrix for education levels, 2012–2018, Egypt

Source(s): Computed by the research using ELMPS 2018

The results of Table 5 indicate that the proportion of remaining in employment state from 2012 to 2018 is quite similar for individuals in each education categories (less than intermediate, intermediate and above, and higher education) and the total sample (81.4, 86.7, and 87.6% respectively vs 83.5%), except the individuals with no education the proportion is only 76.7%.

The proportion of workers who remain in employment state from 2012 to 2018 is the highest probability among the workers with high education (87.6%), as well as, the highest proportion of remaining in unemployment state is among the workers with high education (17.8%) and the least proportion of remaining in unemployment state among workers with no education (5%), while the proportion of workers who remain in OLF state is the highest among workers with no education by 84.2%.

The workers with high education are the least mobility from employment state to unemployed state with 1.7%, also to OLF state with 10.7% compared with the workers in other education categories, followed by workers with intermediate and above, less than intermediate and no education respectively. This result is supported by Bernabè and Stampini (2009).

Also, the results indicate that individuals with no education make the most transition from unemployment state to employment state, where about 64% of individuals with no education moved from unemployment state in 2012 to employment state in 2018- this transition is a highly important result-, followed by individuals with less than intermediate (56.3%), workers with higher education (34.6%) and individuals with intermediate and above (27.3%) respectively.

In the group of individuals with less the intermediate, the transition probability of flows from OLF state in 2012 to employment in 2018 is the highest compared with the other groups. About 24% of this group of individuals make the transition, followed by individuals with intermediate and above (20.8%), individuals with higher education (18.1%), and individuals with no education (14.7%) respectively.

5.2.5 Transition probabilities matrix analysis for marital status. Table 6 shows the transition probabilities matrix for marital status between 2012 and 2018. The single group includes workers who are never married as well as widowed and divorced. The results of Table 6 indicate that the probability of remaining in employment state from 2012 to 2018 is quite similar in the group of married workers and the total sample (84.7% vs 83.5%), while is lower for workers who are not married than the total sample (77.6% vs 83.5%). The proportion of workers who remain in employment state from 2012 to 2018 is the highest probability for the workers' married group (84.7%), while the proportion of remaining in

2012	Employment	2018 Unemployment	OLF	Total
Married				
Employment	84.7	2.1	13.2	100
Unemployment	24.3	10.7	65.0	100
OLF	12.4	3.6	84.0	100
Total	51.8	3.1	45.1	
Single				
Employment	77.6	6.2	16.2	100
Unemployment	55.4	16.0	28.6	100
OLF	34.6	9.9	55.5	100
Total	49.6	9.0	41.4	
Source(s): Computed by the research using ELMPS 2018				

Table 6.
Transition
probabilities matrix
for marital status,
2012–2018, Egypt

unemployment state is the highest probability with 16% for the single individuals' group which is higher than in the total sample (about 16% vs about 12%).

The workers who are married are the least mobility from employment state to unemployed state with 2.1%, also to OLF state with 13.2% compared with the workers who are not married with 6.4 and 16.2% respectively.

Also, the results indicate that individuals who are not married make a greater transition from unemployment state to employment state compare with the workers who are married (55.4% vs 24.3%).

Also, in the group of single individuals, the transition probability of flows from the OLF state in 2012 to the employment state in 2018 is the highest compared with the married individuals' group. About 35% of this group of individuals make the transition, while only about 12% in the group of married individuals.

5.2.6 Transition probabilities matrix analysis for place of residence. Table 7 shows the transition probabilities matrix for the place of residence between 2012 and 2018. The results of Table 7 indicate that the probability of remaining in the employment state from 2012 to 2018 is quite similar for workers who resided in urban or rural areas with 83.6% and 83.5% respectively, and the total sample with 83.5%. Also, the probability of remaining in the unemployment state from 2012 to 2018 is quite similar for workers who resided in urban or rural areas with 11.7 and 12.7% respectively, and the total sample with 12.2%.

Individuals residing in urban areas are more mobile from the unemployment state in 2012 to the employment state in 2018 than those residing in rural areas. About 39% of individuals residing in urban areas are move from unemployment state in 2012, while about 27% of those resident rural areas make a similar transition.

To conclude, using the transition probabilities matrices can help to link workers' movement between 2012 and 2018 and their characteristics to identify the factors that made more movements from unemployment to employment. Based on the previous results, transitions from unemployment to employment are relatively large for males, elder-age, uneducated workers as well as workers who are not married and urban residents. These results are supported by Assaad and Krafft (2017). To examine the impact of these factors (characteristics) especially education level on the transition from unemployment to employment, binary logistic regression models will be used in the next section.

5.3 The multivariate analysis
5.3.1 Remaining in unemployment. To estimate the impact of different education levels (no education, less than intermediate, intermediate and above, and higher education) on

2012	Employment	2018 Unemployment	OLF	Total
Urban				
Employment	83.6	2.7	13.7	100
Unemployment	39.3	11.7	49.0	100
OLF	18.3	6.9	74.8	100
Total	51.3	5.2	43.6	
Rural				
Employment	83.5	2.8	13.7	100
Unemployment	26.8	12.7	60.5	100
OLF	20.2	4.7	75.1	100
Total	51.3	4.0	44.7	

Table 7.
Transition probabilities matrix for place of residence, 2012–2018, Egypt

Source(s): Computed by the research using ELMPS 2018

remaining in unemployment (as mention before, "unemployment includes individuals who are not working but actively searching a job") between 2012 and 2018, this study estimates four binary logistic regression models.

Model (1) to Model (4) in Table 8 shows the impact of education levels on remaining in unemployment when education levels variables entered separately into the regression. The results from Table 8 revealed that all factors are significant in all models except the middle-aged group in model (2).

Results of Table 8 show that education variables seem to play an important role in remaining in unemployment, for models (1) and (2) unemployed individuals with no education and with less than intermediate are more likely to remain in unemployment compared to the others by about 1.35 and 2.73 times respectively, while for models (3) and (4) unemployed individuals with intermediate and above and with higher education are less likely to remain in unemployment compared to the others by about 19 and 74% respectively The results of models (1) to (4) in Table 8 indicates that unemployed men are significantly less likely to remain in unemployment compared to unemployed women by about 97–98%. Also, unemployed individuals ages 15–24 years (young age group) are significantly more likely to remain in unemployment compared to their elder-aged group (45–64) by about 5.7, 4, 5.2 and 5 times respectively as well as unemployed individuals ages 25–44 years (middle-aged group) are significantly more likely to remain in unemployment compared to their elder-aged group (45–64), except in model (2), by about 1.1–1.2 times. Besides, unemployed individuals who are not married are significantly more likely to remain unemployed compared to their married individuals by about 1.3–1.4 times. Unemployed individuals who reside in urban areas are significantly less likely to remain unemployed relative to those who reside in rural areas by

Independent variables	Model 1 β	Model 1 Exp. (β)	Model 2 β	Model 2 Exp. (β)	Model 3 β	Model 3 Exp. (β)	Model 4 β	Model 4 Exp. (β)
Constant	0.297***	1.346	0.458***	1.581	0.549***	1.731	0.569***	1.760
Gender								
Male	−3.750***	0.024	−3.980***	0.019	−3.779***	0.023	−3.866***	0.021
Age group								
(15–24)	1.734***	5.661	1.375***	3.956	1.643***	5.170	1.616***	5.032
(25–44)	0.184***	1.202	0.057	1.059	0.130***	1.139	0.207***	1.230
Education levels								
No education	0.301***	1.351						
Less than intermediate	–	–	1.003***	2.727	–	–	–	–
Intermediate and above	–	–	–	–	−0.211***	0.810	–	–
Higher education	–	–	–	–	–	–	−1.190***	0.275
Marital status								
Single	0.358***	1.430	0.273***	1.317	0.343***	1.409	0.363***	1.438
Place of residence								
Urban	−0.116**	0.891	−0.152***	0.859	−0.154***	0.857	−0.131***	0.877
Correct classification	81%		82%		81%		82%	

Source(s): Computed by the researcher using ELMPS 2018
**p-value < 0.05, ***p-value < 0.01

Table 8.
The logistic regression estimation results for remaining in unemployment, 2012–2018, Egypt

about 11–14%. Based on the above findings, there is enough evidence to accept the null hypothesis that different educational levels have significant impacts on remaining in unemployment.

5.3.2 Transitions from unemployment to employment. Table 9 shows the transition from unemployment to employment. The results indicated that education variables seem to play an important role in the transition from unemployment to employment, for model (5) unemployed individuals with no education are more likely to move from unemployment to employment compared to the others by about 25%, while for models (6) and (8) unemployed individuals with less than intermediate and with higher education are less likely to move from unemployment to employed compared to the others by about 14 and 20% respectively (intermediate and above is insignificant). The results of models (5) to (8) in Table 9, unemployed individuals ages 15–24 years (young age group) are significantly more likely to move from unemployment to employment compared to their elder-aged group (45–64) by about 3.4, 3.2, 3 and 3.1 times respectively as well as unemployed individuals ages 25–44 years (middle-aged group) are significantly more likely to move from unemployment to employment compared to their elder-aged group (45–64) by about 1.4–1.5 times. Besides, unemployed individuals who are not married are significantly more likely to move from unemployment to employment compared to their married individuals by about 3.2–3.3 times. These results are supported by Tansel and Ozdemir (2015). Unemployed individuals who reside in urban areas are significantly more likely to move from unemployment to employment relative to those who reside in rural areas by about 1.1–1.2 times. This result is supported by Bernabè and Stampini (2009), Canavire-Bacarreza and Soria (2007) and Assaad and Krafft (2017).

Independent variables	Model 5 β	Model 5 Exp. (β)	Model 6 β	Model 6 Exp. (β)	Model 7 β	Model 7 Exp. (β)	Model 8 β	Model 8 Exp. (β)
Constant	−3.219***	0.040	−3.055***	0.047	−3.077***	0.046	−3.049***	0.047
Gender								
Male	−0.019	0.981	−0.035	0.966	−0.048	0.954	−0.044	0.957
Age group								
(15–24)	1.233***	3.432	0.171***	3.226	1.116***	3.052	1.121***	3.068
(25–44)	0.436***	1.547	0.374***	1.453	0.356***	1.428	0.384***	1.468
Education levels								
No education	0.224***	1.251	–	–	–	–	–	–
Less than intermediate	–	–	−0.154***	0.857	–	–	–	–
Intermediate and above	–	–	–	–	0.063	1.066	–	–
Higher education	–	–	–	–	–	–	−0.221***	0.801
Marital status								
Single	1.167***	3.212	1.190***	3.286	1.177***	3.244	1.166***	3.210
Place of residence								
Urban	0.118**	1.126	0.052	1.054	0.074	1.076	0.213***	1.237
Correct classification	90%		89%		88%		89%	

Source(s): Computed by the researcher using ELMPS 2018. **p-value < 0.05, ***p-value < 0.01

Table 9.
The logistic regression estimation results for transition from unemployment to employment, 2012–2018, Egypt

As a whole, the results of the logistic regression models consistent with the transition probabilities matrix results, except for a few cases. Based on the above findings, there is enough evidence to accept the null hypothesis that no education has a positive significant impact to transition unemployed individuals from unemployment to employment, while less than intermediate as well as higher education have a negative significant impact to transition unemployed individuals from unemployment to employment.

6. Conclusion and recommendations

6.1 Conclusion

The problem of unemployment is a global problem that affects the world's economies and sometimes it is called the body of the economy. Unemployment is an important and pivotal problem, regardless of time, in the past, and also in the present. In Egypt, the unemployment rate has slightly decreased from 12.7% in 2012 (9.3% for males vs 24.1% for females) to about 11.8 in 2017 (8.2% for males vs 23.1% for females), the unemployment rate is high for females compared with males over 2012–2017, while it is slightly decreased from 24.1% to 23.1% during this period. The unemployment rate is high especially among the highly educated, about 33.2% in 2012 and about 34% in 2017, while it is very low among illiterates with about 3.2% in 2012 and 3% in 2018 (CAPMAS, 2019). It is clear that unemployment among highly educated is much higher compared with illiterates and it slightly increased during this period, while it is very low among illiterates and slightly decreased during the same period. Due to this issue, it is useful to address this problem and try to understand the impact of different levels of education separately on the transition from unemployment to employment, to help the policymakers to eradicate the gap between education and the demand of the labor market in Egypt.

In this study, the transition probabilities matrix is differentiated by gender, age groups, educational levels, marital status, and place of residence based on worker flows across employment, unemployment and out of labor force states during the period 2012–2018 using Egypt Labor Market Panel Survey of 2018. Also, this study examines the impact of different educational levels separately on remaining in unemployment and on the transition from unemployment to employment using eight binary logistic regression models.

In the whole sample, the results indicate that employed individuals are the least-mobile among all other labor market groups. Unemployed individuals display huge movement among all other labor market groups. The transition probability of flows from employment state to unemployment state is very little in both the male and female samples. In the male sample, unemployed individuals are highly movement among all other labor market groups with about 79%, while only about 14% in the female sample in 2012 move from unemployment state to employment state in 2018. The transition probability of flows from the employment state is very little in the elder-aged group, followed by the middle-aged group and youth age group. In the elder-aged group, unemployed workers are highly movement to employment state among all other labor market groups, followed by youth age group and middle-aged group respectively.

The workers with high education are the least mobility from employment state followed by workers with intermediate and above, less than intermediate, and no education respectively. Also, the results indicate that the workers with no education make the most transition from unemployment state to employment state-this transition is a highly important result-, followed by workers with less than intermediate, workers with higher education, and workers with intermediate and above respectively. The workers who are married are the least mobility from employment state compared with the workers who are mot married. Also, the results indicate that the workers who are not married make a greater transition from the unemployment state to the employment state compare with the workers who are married.

The probability of remaining in the employment state from 2012 to 2018 is quite similar for workers who resided in urban or rural areas. Workers residing in urban areas are more mobile from the unemployment state in 2012 to employed state in 2018 than those residing in rural areas. About 39% of workers residing in urban areas are move from unemployment state in 2012, while about 27% of those resident rural areas make a similar transition.

The study concluded that by using the transition probabilities matrices it can link workers' movement between 2012 and 2018 and their characteristics to identify the factors that made more movements from unemployment to employment that the main results of transitions from unemployment to employment are relatively large for males, elder-age, uneducated workers as well as workers who are not married and urban residents.

To estimate the impact of different education levels: no education, less than intermediate, intermediate and above, and higher education on the transition from unemployment state to employment state (dependent variable: 1 if worker move from unemployment state to employment state (between 2012 and 2018) and 0 otherwise). This study fits eight regression models divided into two groups: (1) the models related to remaining in unemployment state (four models); (2) the models related to the transition from unemployment state to employment state (four models). The binary logistic regression model is adapted because of the dichotomous nature of the dependent variable.

The main results of the binary logistic regression models indicated that education variables seem to play an important role in the transition from unemployment to employment, unemployed individuals with no education are more likely to move from unemployment to employment compared to the others, while unemployed individuals with less than intermediate and with higher education are less likely to move from unemployment to employed compared to the others (intermediate and above is insignificant). Also, the results show that unemployed individuals ages 15–24 years (young age group) are significantly more likely to move from unemployment to employment compared to their elder-aged group (45–64) as well as unemployed individuals ages 25–44 years (middle-aged group) are significantly more likely to move from unemployment to employment compared to their elder-aged group (45–64). Besides, unemployed individuals who are not married are significantly more likely to move from unemployment to employment compared to their married individuals. Unemployed individuals who reside in urban areas are significantly more likely to move from unemployment to employment relative to those who reside in rural areas.

As a whole, the results of the logistic regression models consistent with the transition probabilities matrix results, except for a few cases. Based on the above findings, there is enough evidence to accept the null hypothesis that no education has a positive significant impact to transition unemployed individuals from unemployment to employment, while less than intermediate as well as higher education have a negative significant impact to transition unemployed individuals from unemployment to employment.

6.2 Recommendations
Based on the main findings derived from this study about the impact of different education levels especially higher education and no education levels on the transition from unemployment to employment, the following are important recommendations may help the policymakers to eradicate the gap between education and the demand of the labor market in Egypt.

(1) Skill mismatching. The education system needs to start determining the skills that youth are needed to find rewarding work. Education institutions, especially higher education institutions should work to strengthen the personals skills of the graduates.

(2) Education and training program. The high prevalence of unemployment among educated, especially among university students. Higher education graduates' training strategy must be developed so that new graduates who are awaiting job appointments can have a working environment experience.

(3) Investment in and promote vocational training for the youth with intermediate and above or technical education.

(4) Education institutions need to develop and innovate their program curricula and inclusive teaching and learning materials to be able to meet global standards for monitoring the quality of the program to cope with the labor market.

(5) Encourage entrepreneurship among youth through facilitating financial support as providing loans with small interest (Barsoum *et al.*, 2014).

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