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Internet Job Search, Employment, and Wage Growth

Evidence from the Arab Republic of Egypt

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Abstract

This paper assesses the impact of Internet job search on employment in the Arab Republic of Egypt, the most populous country in the Middle East and North Africa region. Using panel data from the 2012 and 2018 rounds of the Egypt Labor Market Panel Survey, the paper examines the impact of Internet job search by the unemployed on their employment prospects. It also examines the impact of Internet job search by employed job seekers on their wage growth, as well as the impact of digitalization at the workplace on earnings. Accounting for individual and geographical unobserved heterogeneity using panel data, the results suggest that Internet job search is an effective job search method, as it increases the probability that the unemployed—and in particular unemployed men—will find employment. Auxiliary placebo regressions confirm that preexisting trends in labor market outcomes are not driving the results. However, Internet job search by employed job seekers does not appear to have an impact on their wage growth, nor does digitalization at the workplace affect the wage growth of employed individuals.

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Internet Job Search, Employment, and Wage Growth: Evidence from the Arab Republic of Egypt

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1. Introduction

Following the 2011 Arab Spring uprisings, several countries in the Middle East and North Africa (MENA), including the Arab Republic of Egypt, underwent economic transitions, with the objective of boosting growth, providing employment opportunities for the youth, stimulating investment, and fostering economic development.

Youth unemployment is one of the main economic challenges facing the MENA region. Indeed, poor labor market prospects for educated youth were one of the main drivers of the 2011 uprising (Campante and Chor, 2012). This paper focuses on Egypt, the most populous country in the MENA region, with a population approaching 100 million inhabitants. Egypt's large population is also very young—individuals aged 24 or younger are set to comprise 51% of the population in 2020 (UN World Development Prospects, 2019). As in much of the developing world, Internet use in Egypt has increased exponentially in recent years. According to the ITU World Telecommunication/ICT Indicators database (2019), the percentage of Internet users in Egypt increased from less than 1 percent in 2000 to reach approximately 47 percent in 2018 (Figure 1).

The growth and diffusion of the Internet constitutes a major shock to information flows, as it facilitates the transfer of vast amounts of information at low-cost. By reducing the cost of information flows, Internet adoption therefore affects local labor markets. For instance, the Internet made it possible to access a large amount of information on available jobs, vacancies, as well as company and career information, all at a low cost. These changes likely altered job search behavior by leading to a shift in job search methods, away from traditional methods towards increased use of Internet related search methods. These changes affect job search intensity, as well as the probability of success of the job-hunting process. Thanks to the Internet, job searchers can have access to a larger pool of available jobs and can therefore apply for more jobs at a faster rate. But does Internet job search actually make job seekers more likely to find a job and in the case of employed job seekers does it result in wage growth? Finally, does digitalization at the workplace affect the wage growth of employed individuals?

This paper assesses the impact of Internet job search on employment and wage growth focusing on Egypt for at least three reasons. Firstly, Internet adoption in Egypt has increased tremendously in recent years. Secondly, unemployment in Egypt is rife among the youth, so in light of the well-known fact that it is precisely the younger cohorts that use the Internet the most, it is especially important to investigate whether Internet use could increase the employment prospects of unemployed Egyptians or lead to wage growth among those who are already employed. Finally, Egypt's very large and fast growing population makes its labor market key for both regional development efforts and overall regional stability.

There is a growing body of academic literature on the impact of Internet job search on unemployment in the United States. The seminal work of Kuhn and Skuterud (2004) examined the impact of Internet job search on the employment prospects of the unemployed in the United States

in the late 1990s, finding that Internet job search is ineffective in reducing unemployment duration. Using comparable data from a decade later, Kuhn and Mansour (2014) replicated this study and found that Internet job search significantly reduced unemployment durations.[2] Kroft and Pope (2014), meanwhile, exploited the geographic and temporal variation in the expansion of the classifieds advertisement website Craigslist in the United States and found no effect on the unemployment rate. Atasoy (2013), on the other hand, examined the effects of the expansion of broadband Internet access in the United States from 1999 to 2007 on labor market outcomes and found that gaining access to broadband services in a county is associated with an increase in employment rates.

Another strand of the literature examines the effect of Internet use on wage growth. It includes the work of DiMaggio and Bonikowski (2008), who found a positive association between Internet use and earnings growth at the end of the "Internet Boom" in the United States. While focusing on the dimension of "intermediaries" in the online hiring process, Stanton and Thomas (2015) found that workers affiliated with outsourcing agencies had substantially higher probabilities of finding a job and higher wages, relatively to those without an agency affiliation.[3] Offering evidence from 12 African countries, Hjort and Poulsen (2019) more recently exploited the gradual arrival of submarine Internet cables from Europe to African coastal cities and found that Internet penetration had large positive effects on employment in Africa and that the impact on job creation was also associated with an increase in average wages.

Offering evidence from Egypt, this paper builds on the aforementioned literature on the impact of Internet job search by the unemployed on their employment prospects. Even though the cited literature spans several studies related to these questions, these studies focused for the most part on the United States. In the context of the MENA region, where digitalization and Internet use among the youth have spread rapidly in recent years, no studies have examined these questions. This paper therefore investigates these questions in the context of Egypt, using representative panel data on the Egyptian labor market, more specifically the two most recent survey rounds of the Egypt Labor Market Panel Survey (ELMPS), conducted in the years 2012 and 2018.

Using data from these two survey rounds and tracking individuals' job trajectories, I first examine the impact of Internet job search in 2012 by the unemployed on their employment prospects within 5 years following their unemployment spell, conditioning on individual characteristics in the pre-period. I also examine the impact of Internet job search on wage growth for employed job seekers. Taking advantage of the panel dimension of the data, I also rely on a first difference model to examine the impact of the change in Internet job search on the change in the probability of labor force participation and employment for working age individuals between 2012 and 2018. Moreover, I estimate a fixed-effects model to examine the impact of Internet job search on the

[2] See Kuhn (2003) for general representation of Internet job search and Internet recruiting and the possible effects on the labor markets and policy implications.

[3] Also see Faberman and Kudlyak (2016) for a review of the studies on the labor market and online job search and Autor (2001) on a discussion of the various mechanisms through which Internet affects worker-firm communications.

individuals' labor force participation and employment probability, while controlling for time-varying individual characteristics. This allows accounting for unobserved time-invariant heterogeneity at the individual level through fixed effects estimation. Additionally, it accounts for geographical heterogeneity and for aggregate factors that likely affect the labor market and employment by controlling for region and year fixed effects.

The results of this paper suggest that Internet job search is associated with an increase in the probability of employment for unemployed men. Indeed, controlling for home Internet access, I find that unemployed men who reported that job search is one of the purposes of Internet use are significantly more likely to find a job following an unemployment spell, relatively to unemployed men who do not use the Internet or those who use the Internet but not for job search. As for women, Internet job search is found to be associated with an increase in their labor force participation but not in employment. As for employed job seekers—be they men or women—Internet job search does not have an impact on wage growth. To make sure confounding factors related to both Internet adoption and local labor market outcomes do not drive these results, I rely on two sets of placebo regressions.

Firstly, I rely on the 2006 round of the ELMPS and follow the same individuals interviewed in 2012 and 2018 in the 2006 round. This allows me to examine the impact of future use of Internet job search on past labor market outcomes. I examine the effect of the change in Internet job search between 2018 and 2012 on changes in labor force participation and employment between 2012 and 2006. Indeed, I do not find any effect of the future use of Internet for job search on past employment, which suggests that pre-existing trends in labor market outcomes do not drive my results.

Secondly, I examine the impact of the percentage of Internet job searchers at the sub-district level in 2018 on labor force participation, employment, and unemployment, by gender, in the years 1988, 1998, 2006, and 2012, controlling for districts' demographics, as well as governorate fixed effects. These placebo regressions also show no significant effect of Internet use in 2018 on past sub-district level labor force participation, employment and unemployment rates. The first test invalidates the assumption that that pre-existing differences in labor market outcomes between individuals who rely on the Internet for job search and those who do not are driving the results, while the second test bolsters confidence that sub-districts with high versus low levels of Internet adoption are not following different pre-trends in terms of labor force participation, unemployment, and employment rates.

The remainder of this paper is organized as follows: Section 2 describes the data and presents recent unemployment trends in Egypt. Section 3 describes the empirical strategy. Section 4 presents the results, as well as robustness checks. Section 5 draws some conclusions.

2. Data and descriptive statistics

2.1 Unemployment in Egypt

The analysis relies on data from the Egypt Labor Market Panel Survey (ELMPS). The Egypt Labor Market Panel Survey is a nationally representative survey conducted in Egypt since 1998 by the Economic Research Forum (ERF), in cooperation with Egypt's statistical agency, the Central Agency for Public Mobilization and Statistics (CAPMAS). The ELMPS has been administered to nationally representative samples in 1988, 1998, 2006, 2012, and 2018, and is a wide-ranging panel survey that covers topics such as employment, unemployment, job dynamics and earnings, as in a typical labor force survey, but also provides very rich information on education, residential mobility, migration, and socio-economic characteristics.[4]

This section sheds light on recent unemployment trends in Egypt between 2012 and 2018, after the Arab Spring uprisings. It highlights in particular important gender differences in unemployment in Egypt, helping to explain the differential results obtained for men and women. Moreover, the analysis shows important disparities between urban and rural areas, highly educated and less educated individuals, as well as between younger and older age cohorts.

Following the 2011 uprisings, male unemployment rates increased in Egypt (Figure 2). It should be noted that unemployment rates vary depending on the definition used. The market definition of unemployment, for instance, counts subsistence workers as unemployed individuals, while the extended definition of unemployment counts them as employed. The broad definition of unemployment does not require active job search, whereas the standard definition does. Depending on which definition is used, male unemployment rates in Egypt vary between 4.7 and 5.8 percent in 2018. The different definitions and the results they produce are informative, as they capture distinct dynamics regarding active versus passive job search and engagement in subsistence activities, which are particularly relevant for women in Egypt. Female unemployment rates have actually fallen between 2012 and 2018, as opposed to those of men. Striking differences, however, emerge when examining female unemployment rates in Egypt relying on these various definitions (Figure 3). When relying on the market definition of employment, female unemployment rates are higher, as a large proportion of Egyptian women engage in subsistence work. While female unemployment rates seem overall to have fallen between 2012 and 2018, women's unemployment rates according to the broad unemployment (market definition) have increased. The latter suggests that the share of female discouraged workers, who are not actively searching for employment, actually increased. This pattern is consistent with the overall fall in female unemployment rates between 2012 and 2018.

Examining differences in unemployment rates between urban and rural areas by gender, Figure 4 and Figure 5 show that male unemployment rates are much higher in urban compared to rural areas, consistently across the two survey rounds. These figures and the following ones rely on the

[4] See Open Access Micro Data Initiative, OAMDI (2016) for the data source and Assaad and Krafft (2013) for more information on the data and the sampling.

standard unemployment (search required), market definition for comparability across the various survey rounds. As for women, the unemployment rate in urban areas is found to be higher than the unemployment rate in rural areas in 2018, while the opposite was true in 2012. The higher female unemployment rate in rural areas compared to urban areas in 2012 is in line with the findings of El-Mallakh, Maurel, and Speciale (2018), who examined the impact of the 2011 revolution on intra-household differences in labor market outcomes between 2006 and 2012, and found that the gender gap in labor force participation decreased in the aftermath of the uprisings, as women started to actively search for employment, in particular women belonging to the poorest households.

The highly educated in Egypt are those with the highest risk of unemployment (Figure 6 and Figure 7). As shown in these figures, male and female unemployment rates are strikingly higher among highly educated individuals (those with secondary education and above). [5] Moreover, unemployment is also higher among the youth. Examining unemployment rates by age cohorts, Figure 8 and Figure 9 show that unemployment is highest among younger age groups and in particular among those aged between 15 and 24. These patterns are true for both men and women and suggest that unemployment in Egypt is especially pronounced at first entry in the labor market.

2.2 Descriptive statistics on unemployed individuals

In this section, I present descriptive statistics on the sample of unemployed individuals. As presented in the introduction, the empirical analysis relies on panel data from the 2012 and 2018 rounds of the ELMPS. In 2018, the ELMPS tracks households and individuals that were previously interviewed in 2012, of which some were also interviewed in 1998 and 2006, while others belong to a new sample of individuals added in 2012. The total sample size in the panel is 13,763 households and 38,759 individuals.

The ELMPS has the advantage of providing rich information on Internet use. Individuals are asked whether they have home Internet access, if they use a computer in their job-hunting, if the computer is connected to the Internet, as well as information on Internet use at their workplace. Additionally, the ELMPS asks individuals if they use the Internet, where they use it (at home, at work, etc.), as well as the purpose of using it, which may include work, education or finding a job, among other purposes.

Table 1 presents the fraction of individuals with home Internet access, the fraction of individuals using the Internet to find a job, and the fraction of individuals using the Internet to find a job conditional on home Internet access, by labor market status and by year. The labor market status of individuals is defined according to the market definition of labor force participation (search

[5] The less educated individuals are those without any educational degree (either illiterate or literate, without any diploma) or those with primary or preparatory education. The high educated individuals are those with either secondary education and above secondary education (either post-secondary institute or university and above).

required). As shown in Table 1, the fraction of individuals with home Internet access and the share of individuals who report using the Internet to find a job are consistently higher in 2018 compared to the year 2012 across the various labor market statuses. The share of individuals with home Internet access is almost identical for individuals who are employed or for individuals who are out of the labor force in the years 2012 and 2018. However, the share of individuals with home Internet access is highest among the unemployed, 17% in 2012 and 33% in 2018. The increase in home Internet access is also highest among the unemployed, as the share of unemployed individuals with home Internet access almost doubled between 2012 and 2018. As for the share of individuals who report using the Internet to find a job, unsurprisingly, I find that unemployed individuals are those who use the Internet the most to find a job. In 2012, 38% of unemployed individuals used the Internet to search for a job, while in 2018 63% did. The share of unemployed individuals using the Internet for job search therefore increased by 66% between 2012 and 2018. Interestingly, I also find that employed individuals use the Internet to find a job. In 2018, the share of employed individuals using the Internet to find a job tripled compared to 2012, increasing from 3% in 2012 to 10% in 2018. I refer to these individuals as employed job seekers throughout this paper. Similarly, individuals who are out of the labor force also report using the Internet for job search but to a lesser extent. In 2012, only 1% of individuals out of the labor force used the Internet to find a job, versus 4% in 2018. Finally, in the last two columns in Table 1, I present the share of individuals using the Internet for job search conditional on home Internet access. Consistent with the previous evidence, Internet use in 2018 is higher than in 2012, across the various labor market statuses. Conditional on home Internet access, the share of individuals using the Internet for job search is lower compared to the statistics reported without conditioning on home Internet access. These findings therefore suggest that Internet use for job search is not particularly dependent on having Internet access at home and actually indicate that individuals engaging in Internet job search do not necessarily use the Internet at home. The sole exception is that the share of unemployed individuals using the Internet for job search conditional on home Internet access is slightly higher in 2018, relatively to the share of individuals using the Internet for job search unconditional on having home Internet access.

In Table 2, I present descriptive statistics on the unemployed individuals in 2012 (who were also interviewed in the year 2018), by gender. The descriptive statistics in Table 1 refer to the year 2012. For unemployed men and women, the average age is approximately 28 years old in 2012. Among unemployed males, 25% were married in 2012, compared to 76% of unemployed women. As presented in Section 2.1, the educational profile of unemployed individuals in Egypt tends to be high. For instance, for men, the incidence of secondary education is 43% and the incidence of above secondary education is 37%. Thus, the least educated category (those with no educational degree or those with primary or preparatory education) among the unemployed males is approximately 20%. As for women, only 4% of unemployed women belong to the least educated category. While the majority of unemployed men lived in urban areas in 2012 (59%), the majority of unemployed women lived in rural areas in 2012 (56%). Interestingly, I find that the majority of unemployed individuals, whether males or females, never worked before, as 54% of the

unemployed men never worked before, versus 84% of the unemployed women. In line with the descriptive findings presented in Section 2.1, these findings show that unemployment mostly affects individuals at first entry in the labor market. Table 2 also shows that the highest share of unemployed men and women lived in Rural Lower Egypt in 2012. While unemployed individuals in 2012 disproportionately belong to the highly educated category, in terms of parental education, they are found to have less educated parents: 93% of unemployed men have a relatively less educated mother (with no educational degree, intermediate education or less), versus 97% for unemployed women. Similarly, 86% of unemployed males have a relatively less educated father, versus 89% for unemployed women.

Before examining the effect of Internet job search on employment prospects, in Table 3, I present additional descriptive statistics on the various search methods that the individuals employed to find a job. For men, the most important job search method was asking friends or relatives for help in finding a job: 60% of surveyed individuals reported using this method. The second most popular search method used by unemployed men was filling a job application or sending a resume to an employer (41%), followed by entering government job assignment competition (37%) and registering in a government employment office (36%). Interestingly, for women, the two most popular job search methods are to enter a government job assignment competition (42%) and registering in a government employment office (38%). This is in line with a large body of evidence on Egypt highlighting the dependence of women on public sector employment (see for instance, Assaad and Krafft (2015) and Hendy (2015)), as it offers flexible working hours and allows them to combine work and family life. Other relevant search methods for women include asking friends and relatives for help in finding a job (35%) and filling out a job application or sending a resume to an employer (28%).

For both unemployed men and women, Table 3 also shows that a large fraction of unemployed individuals relied on Internet related job search methods, including looking at job advertisements in a newspaper or online, applying for a job advertised in newspapers or online or registering on an employment website.[6] As shown in Table 3, 32% of unemployed men versus 14% of unemployed women looked at job advertisements in a newspaper or online, while 25% of unemployed men and 11% of unemployed women applied to a job advertised in newspapers or online. Finally, 17% of unemployed men and 12% of unemployed women registered at an employment website. These figures show the importance of Internet related job search methods particularly among unemployed men who rely on these search methods more than women.

3. Empirical strategy

[6] Looking at or applying for jobs posted in newspapers or online are search methods that are grouped together in the survey questionnaire.

3.1 Impact of Internet job search on employment

Relying on panel data from the 2012 and 2018 survey rounds of the ELMPS, I examine the effect of Internet job search on employment and estimate various regression specifications. First, I estimate equation (1) where I examine the impact of Internet job search by the unemployed in 2012 on the probability of finding a job within a 5 year timeframe following their unemployment spell.

$$P(Employed_{i,2013-2017} \mid Unemployed_{i,2012}) = \beta_1 Internet\ job\ search_{i,2012} + B_2 X_{i,2012} + \varepsilon_i \quad (1)$$

I estimate the impact of Internet job search in 2012 on the probability of finding a job in the 5 years timeframe conditional on being unemployed in 2012 (relying on the market definition of labor force participation). The regression controls for home Internet access in 2012 in addition to the vector $X_{i,2012}$, which is a vector of individual characteristics in 2012. The control variables include: individual's age, a dummy variable for being male, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education, either general or vocational, and above secondary education, either post-secondary institute or university and above, and the reference category is no educational degree, either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas, as well as dummies for the various geographical regions (Greater Cairo, Alexandria and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt).

I also employ a first difference specification in equation (2) relying on the panel dimension of the data. The dependent variable is a first-difference in dummy variable indicators for being employed between 2018 and 2012, while the independent variable of interest thus becomes the first-difference in dummy variable indicators for using the Internet for job search between the years 2018 and 2012 controlling for the change in home Internet access. The regression also includes the same set of pre-determined controls in equation (1), first differenced between 2018 and 2012. Relying on this first-difference specification is equivalent to the inclusion of individual fixed effects, thus differences out all time-invariant unobservable characteristics. The main estimated coefficient of interest α_1 captures the effect of the change in the use of Internet for job search on the change in the probability of being employed between the two years. A positive coefficient would therefore mean that an increase in Internet job search is associated with an increase in the probability of employment.

$$\Delta Employed_i = \alpha_1 \Delta Internet\ job\ search_i + \alpha_2 \Delta X_i + \nu_i \quad (2)$$

Finally, I estimate a fixed effects model relying on equation (3). The dependent variable in equation (3) is a dummy variable indicator equal to one if the individual is employed in the corresponding year relying on the market definition of labor force participation. The main independent variable of interest is a dummy variable indicator equal to one if the individual reports using the Internet for job search in the corresponding year. The regressions also include X_{it}, which is a vector of time-varying control variables and it includes age, a dummy variable for being

married, educational dummies, a dummy variable for living in rural areas, as well as geographical regions dummies.

$$Employed_{it} = \gamma_1 Internet\ job\ search_{it} + \gamma_2 X_{it} + \gamma_i + \gamma_t + \epsilon_{it} \quad (3)$$

3.2 Impact of Internet job search and digitalization on wage growth

Apart from examining the effect of Internet job search on employment, I also examine the impact of Internet job search among employed job seekers on their wage growth, as well as the impact of using a computer connected to the Internet at work on earnings growth. First, I estimate equation (4), in which I examine the impact of using Internet job search on the logarithm of the difference in inflation adjusted hourly wage between the years 2018 and 2012, conditional on being employed in 2012. The vector of control variables $X_{i,2012}$ is equivalent to the vector of control variables described in equation (1). I also estimate the same model examining the impact of using a computer connected to the Internet at the workplace on earnings growth controlling for the general use of computers at the workplace and for the same set of covariates included in the regressions.

$$Log\ (w_{i,2018} - w_{i,2012}) |\ employed_{i,2012} = \delta_1 Internet\ job\ search_{i,2012} + \delta_2 X_{i,2012} + \omega_i \quad (4)$$

I also employ a fixed effects model to estimate the effect of using a computer at the workplace and of using a computer connected to the Internet at work on hourly wages, conditional on being employed. I estimate equation (5), in which the dependent variable is the inflation adjusted hourly wage and the main independent variable of interest is a dummy variable indicator for using a computer that is connected to the Internet, while controlling for the general use of computer at the workplace. The vector X_{it} includes the same set of time-varying control variables as those reported in equation (3). The regressions also include individual and time fixed effects. Individual fixed effects capture all time-invariant unobservable characteristics, while the time fixed effects capture all aggregate factors that likely affect digitalization and labor market outcomes.

$$Hourly\ wage_{it} = \theta_1 Computer\ at\ work_{it} + \theta_2 X_{it} + \theta_i + \theta_t + \epsilon_{it} \quad (5)$$

4. Results and robustness checks

4.1 Impact of Internet job search on employment and heterogenous effects

First, I examine the impact of Internet job search on the probability of employment within 5 years following an unemployment spell in 2012. In the ELMPS 2012, individuals were asked about the purposes of their Internet use, which included searching for a job. Internet job search is therefore

defined as a dummy variable indicator equal to one if the individual reported in 2012 that job search was a purpose of Internet use. Relying on the 2018 data, I track individuals who were interviewed in 2012 and identify whether they found a job following their unemployment spell in 2012. The ELMPS 2018 provides retrospective information on employment status and job mobility, which allows identifying if any individual changed his employment status/job and the year of new status or new job. This makes it possible to determine whether the unemployed individuals in 2012 found a job, and if so also the year in which they started the new job. In Table 4, I examine the impact of Internet job search in 2012 on the probability of being employed within a 5 years timeframe, conditional on being unemployed in 2012. Unemployed individuals are defined according to the labor market definition of labor force participation, so individuals who engage in subsistence economic activities are considered as unemployed according to this definition. Table 4 therefore reports results estimating equation (1). I include the control variables gradually to check the sensitivity of the results with respect to the covariates included in the regression specification. For instance, in column (1), I control for home Internet access, gender, and marital status. In column (2), I additionally control for age and educational attainment dummies, while in column (3) I also control for living in rural versus urban areas. Finally, column (4) includes the full set of control variables in addition to controlling for geographical regions' dummies. Controlling for Internet access at home, I find that unemployed individuals in 2012 who use the Internet for job search are significantly and consistently more likely to find a job within 5 years. Using the Internet for job search increased the likelihood that a previously unemployed found a job by 10 percentage points—a particularly large increase, given that the mean of the dependent variable is 0.038.

The results presented in Table 4 may be concealing heterogenous effects. In Table 5, I therefore investigate heterogeneous effects by gender, area of residence, age, and education. I estimate separate regressions for men and women in columns (1) and (2), respectively. Indeed, the results in Table 5 suggest that Internet job search is effective only for the subsample of unemployed men, as I do not find any significant effect for the subsample of unemployed women in 2012. It is worth mentioning that the magnitude of the estimated coefficient for men is much larger, as I find that using the Internet for job search is associated with a 15 percentage points increase in the probability of employment within 5 years among unemployed men in 2012. The differential impact of Internet job search by gender might be due to several potential reasons. There are structural differences between men's and women's unemployment and employment in Egypt and these differences viewed together help rationalize the differential results obtained by gender. First, marriage is concieved to be one of the main barriers to women's employment in Egypt, as women find it difficult to find jobs that help them combine work and family life. As shown, in the descriptive statistics, the incidence of marriage among unemployed women is found to be higher than among unemployed men. This reasoning brings in the second argument linked to the importance of public sector employment for women. Egyptian women have a strong preference for the public sector, which offers flexible working hours and allows them to more easily balance work and family. This is reflected in the descriptive statistics on the search methods employed by women, which show

that the two most popular search methods for women are entering a government job assignment competition or registering in a government employment office. Finally, women are also found to rely less on Internet related search methods relatively to men, which might be due to the fact that the returns to Internet job search are not the same for men and women. Given that there is substantial variation in the sectors of employment and types of jobs adversited on the Internet, these differences might be due to the fact that fewer public sector jobs are advertised online and that fewer jobs advertised online are socially suitable for women.

Apart from gender differences, I also investigate the heterogenous effects of Internet job search on employment between urban/rural areas in columns (3) and (4). These results show in fact that Internet job search is associated with higher employment only in urban areas. This is possibly due to higher Internet adoption in urban areas but also to the higher returns to Internet job search in urbans areas related to the greater concentration and proximity of employers using the Internet to search for prospective employees. When investigating the heterogeneous effect of age in columns (5) and (6), the results in Table 5 suggest that Internet job search is effective only for young unemployed individuals between the ages of 15 and 35. However, for older unemployed individuals aged between 36 and 64, Internet job search does not appear to have any effect on employment prospects. Younger cohorts, who use the Internet more intensively than older cohorts, are therefore more likely to reap the benefits of Internet use. Finally, I disentagle the heterogeneous effects of education. In column (7), the analysis is restricted to highly educated individuals (those with secondary education and university and above), while the results could not be estimated for individuals who are less educated (primary or preparatory education) as there is no sample variability in Internet job search (all the less educated individuals do not rely on the Internet for job hunting). Internet job search seems to be an effective search method for highly educated individuals, as it increases their probability of finding a job within 5 years following unemployment by 11 percentage points.

As presented in Section 3, I rely on a first-difference model to estimate the effect of the change in Internet job search on the change in labor market outcomes between 2012 and 2018. I estimate equation (2) that captures all individual time-invariant characteristics, while controlling for a vector of individual characteristics in first-difference. Since the results in Table 5 point out that Internet job search does not have any significant impact on women's employment, in Table 6 I further investigate the effect of Internet job search on labor force participation. In Panel A, I examine the effect of the change in Internet job search on changes in labor force participation (Panel A) and in Panel B I examine its effect on changes in employment, relying on both the market and extended definitions of labor force participation. Focusing on all working age individuals, the results are reported for the full sample in columns (1) and (2), for men in columns (3) and (4), and for women in columns (5) and (6). The first differenced variables take the value -1 if the individual relied on Internet job search in 2012 but not in 2018, 0 if the individual relied on Internet job search in 2012 and 2018 or if the individual did not use Internet for job search in the two years, and 1 if the individual used Internet job search in 2018 but not in 2012. Likewise, for the change in the

probability of labor force participation, the dependent variable takes the value -1 if the individual was participating in the labor market in 2012 but not in 2018, takes the value 0 if the individual was not participating in the labor market in 2012 and in 2018 or if the individual was participating in the labor market in the two years, and takes the value 1 if the individual was participating in both years. Therefore, a positive coefficient means that an increase in Internet use for job search between the two years is associated with an increase in labor force participation. The results in Panel A actually show that an increase in Internet job search leads to an increase in labor force participation for both men and women. I therefore investigate in Panel B whether the increase in labor force participation translates into an increase in employment. Consistently with the results in Table 5, I find that Internet job search is associated with an increase in the probability of employment for men by approximately 7 percentage points, while it does not have any significant effect on female employment. These results therefore suggest that Internet job search increases female labor force participation as they start to actively search for employment but does not translate into an increase in employment.

Finally, I also estimated a fixed-effects model that accounts for individual level time-invariant characteristics, as well as aggregate factors that affect the labor market and Internet use through fixed effects. I estimate the effect of Internet job search on labor force participation in Table 7 and on employment in Table 8, relying on the standard defintion of labor force participation. Consistent with the first-difference model, Internet job search is associated with an increase in the probability of labor force participation for both men and women and the magnitude of the estimated coefficients is very similar. The results in Table 8 suggest that an increase in Internet job search is associated with greater employment probability for men, while it does not have any significant effect for women's employment. The estimates in column (4), which includes the full set of control variables, suggest that using the Internet for job search increases men's probability of employment by 7 percentage points.

If use of the Internet facilitates job search and leads to an increase in male employment, then the question is what type of jobs do these Internet job searchers get? In Table 9, I report some descriptive statistics on the new job obtained after an unemployment spell. The vast majority of the new jobs are wage-work (90%). The new jobs were disproportionately in the private sector (87%) and similarly distributed between small-sized enterprises with less than 10 employees (52%) and large enterprises with 10 employees or more (48%). Interestingly, the new jobs were highly ranked on the occupational ladder, as 77% of the individuals engaged in white collar occupations. The new jobs also spanned various economic activities, with education being the first (26%), followed by agriculture, forestry and fishing (22%), and wholesale and retail trade (15%). In terms of job stability, the new jobs seem to be predominantely temporary (45%). However, 34% of individuals also obtained a permanent job. Consistent with this precariousness, 64% of the individuals had no contract and only 10% had social security.

4.2 Impact of Internet job search and digitalization on wage growth

The evidence presented in Section 4.1 suggests that Internet job search is an effective search method for unemployed men in Egypt, as it increases their likelihood of finding a job following an unemployment spell. As shown in Table 1, Internet job search is also popular among employed individuals, which I call employed job seekers. In this section, I ask whether Internet job search is associated with wage growth for employed job seekers. I also examine whether digitalization in the workplace, including for instance the use of computers and the Internet at work, has an impact on wage growth.

First, I estimate equation (4) on the impact of Internet job search on wage growth conditional on being employed in 2012, according to the market definition of labor force participation. Wage growth is defined as the logarithm of the change in inflation adjusted hourly wages between 2018 and 2012. The results are reported in Table 10 and show that there is no effect of Internet job search on wage growth for employed job seekers, be it for men or women. In Table 11, I further corroborate these results by asking whether digitalization at the workplace is associated with greater wage gains. My main independent variables of interest are the use of a computer at work and the use of a computer connected to the Internet at work. The results show that the use of a computer at the workplace or the use of a computer connected to the Internet does not have any effect on earnings growth for employed individuals. Relying on a fixed effects model in Table 12 also confirms these findings.

4.3 Robustness checks and placebo regressions

I checked the robustness of the findings presented in Section 4.2 with respect to the definition of unemployment. In Table 4 and Table 5, unemployed individuals are defined according to the market definition of labor force participation. In Table 13, I rely on the extended definition of labor force participation. In this case, subsistence workers are considered as employed individuals, instead of being considered as unemployed. The results reported in Table 13 are robust to this alternative definition and consistently show that Internet job search is associated with an increase in employment for men and that the results are mostly driven by younger cohorts, individuals who reside in urban areas and highly educated individuals. In Table 14, I also replicate the fixed effects model using the extended definition of labor force participation. Consistently with the results reported in Table 8, Table 14 shows that Internet job search is associated with an increase in men's employment while it does not seem to affect women's employment.

Relying on panel data allows controlling for unobserved heterogeneity through fixed effects estimation. Therefore, estimates are purged out of all time-invariant unobservables at the individual level and at the regional level. Moreover, the regressions also capture aggregate factors that could simultaneously affect Internet use and labor market outcomes through year fixed effects. In this section, I additionally present placebo regressions that address concerns about confounding factors that could be driving my results. I present two different tests that tackle these issues. First,

in Table 15, I rely on a first-difference model in which I examine the effect of the future use of Internet job search on past labor market outcomes. To do so, I additionally rely on the 2006 ELMPS survey round and follow the same individuals included in my estimation sample (the 2012 and 2018 panel) that were also surveyed in 2006. Focusing on working aged individuals, I examine the effect of the change in Internet job search between 2018 and 2012 on changes in labor force participation and employment between 2012 and 2006. The results reported in Table 15 show that the change in Internet job search between 2018 and 2012 is actually associated with lower labor force participation in the pre-period between 2012 and 2006, while my results in Table 6 actually show a positive association. This suggests that individuals who are using the Internet for job search do not initially have better labor market outcomes compared to individuals who are not—if anything, they seem to have lower labor force participation rates in the pre-period. Analyzing the impact on employment in Panel B actually shows no effect of the future use of Internet job search on past changes in employment, suggesting that the results are not driven by pre-existing trends in employment between individuals who rely on Internet job search and those who do not.

The second test consists in utilizing all the available ELMPS survey rounds conducted in Egypt since 1988 (1988, 1998, 2006, 2012 and 2018). Since attrition is problematic and it is impossible to follow individuals who remain in the working age category over such a long period of time, I rely on sub-district (*shyakha*) level regressions.[7] In these regressions, I use the percent of male/female Internet job searchers at the sub-district level in 2018 and examine the effect of the latter on men and women labor force participation rates, unemployment, and employment at the sub-district level. The analysis is conducted separately for each survey round and by gender. Regressions are restricted to men/women of working age in each survey round (15 to 64 years old) and include a vector of control variables at the sub-district level: the percent of men/women with home Internet access, the percent of men/women who are married, the average age of men/women, the percent of men/women with primary or preparatory education, the percent of men/women with secondary education, and the percent of men/women with above secondary education (the reference category is the percent of men/women with no educational degree), the percent of men/women living in rural areas, as well as governorate fixed effects. The results are reported in Figure 2 (for men) and Figure 3 (for women). For both men and women, I actually do not find any significant effect between the 2018 percent of Internet users on past labor market outcomes (labor force participation, employment, and unemployment rates) at the sub-district level. This additional test therefore invalidates assertions that neighborhoods with higher versus lower Internet adoption rates are initially following different economic trends and that these different economic trends are affecting both labor market outcomes and Internet use. Overall, these two sets of placebo regressions therefore confirm that the results are not driven by pre-existing trends in labor market outcomes.

[7] The *shyakha* is the smallest administrative division in Egypt. Egypt is divided into 27 governorates that are further divided into *qism* (the second administrative division) and *shyakha* (the third administrative division). The number of sub-districts (*shyakha*) is 1,101.

5. Concluding remarks

This paper investigates the impact of Internet job search on employment in Egypt, a country with a large population, high unemployment rates, and fast-growing Internet adoption rates. Given that in Egypt and more generally in the MENA region poor labor market prospects for the youth have contributed to large-scale protest movements and in some cases political instability, it is especially important to understand whether Internet job search could help reduce unemployment rates. The question is all the more relevant given that unemployment is particularly pronounced among the youth and that the younger cohorts are also the most likely to use the Internet.

Relying on panel data from the 2012 and 2018 rounds of the ELMPS, this paper thus examined the impact of Internet job search on the employment prospects of unemployed indivduals. Focusing on unemployed individuals in 2012, the results suggest that men who used the Internet for job search had a higher likelihood of finding a job within a five year timeframe compared to those who did not use the Internet or to those who used the Internet for purposes other than job search. While Internet job search seems to be an effective search method for men, as it increases men's employment, we find that Internet job search is associated with an increase in women's labor force participation but does not have an effect on women's employment. Accounting for unobserved heterogeneity through first-difference and fixed effects models yields consistent results. Meanwhile, placebo regressions confirm that the results are not driven by pre-existing trends in labor market outcomes between individuals who use the Internet for job search and those who do not or between neighborhoods with high versus low Internet adoption rates.

Finally, this paper also investigates whether Internet job search among employed job seekers is associated with wage growth and tackles the question of digitalization at the workplace and its effect on earnings growth. The findings of this paper suggest that Internet job search does not have any significant effect on wage growth for employed job seekers. Even though digitalization and Internet penetration have been associated in other contexts with job creation, productivity gains, and wage growth, in the case of Egypt I do not find any effect on wage growth, or at least not in the short term.

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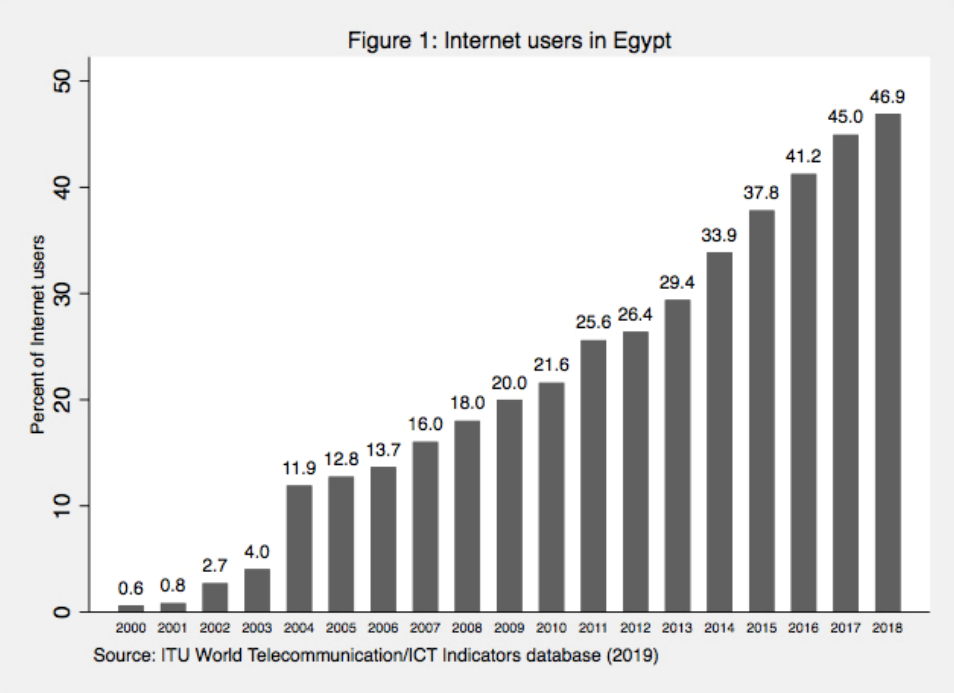
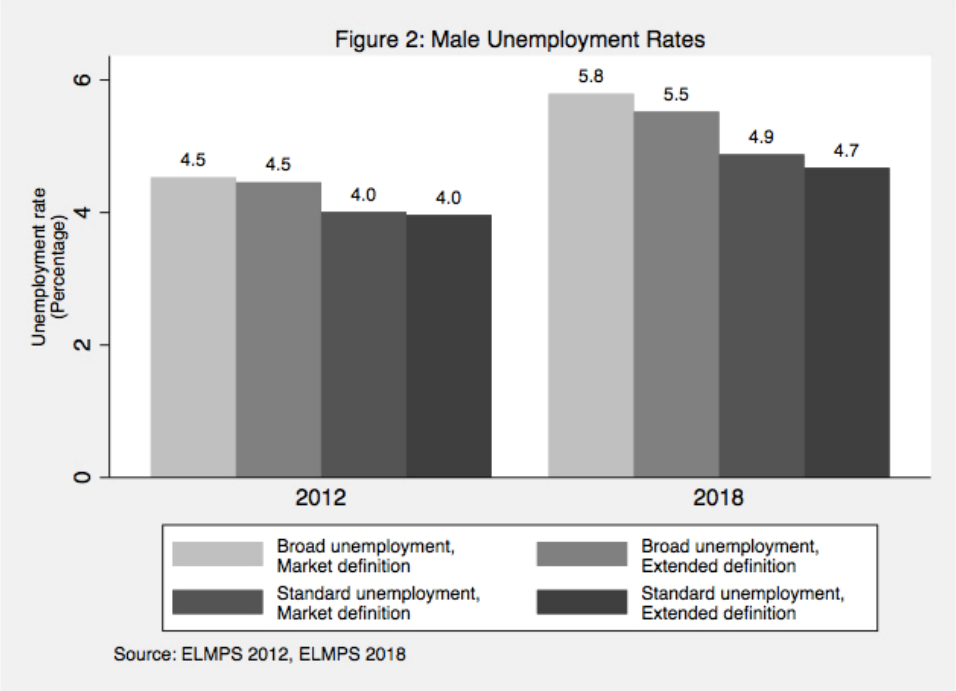
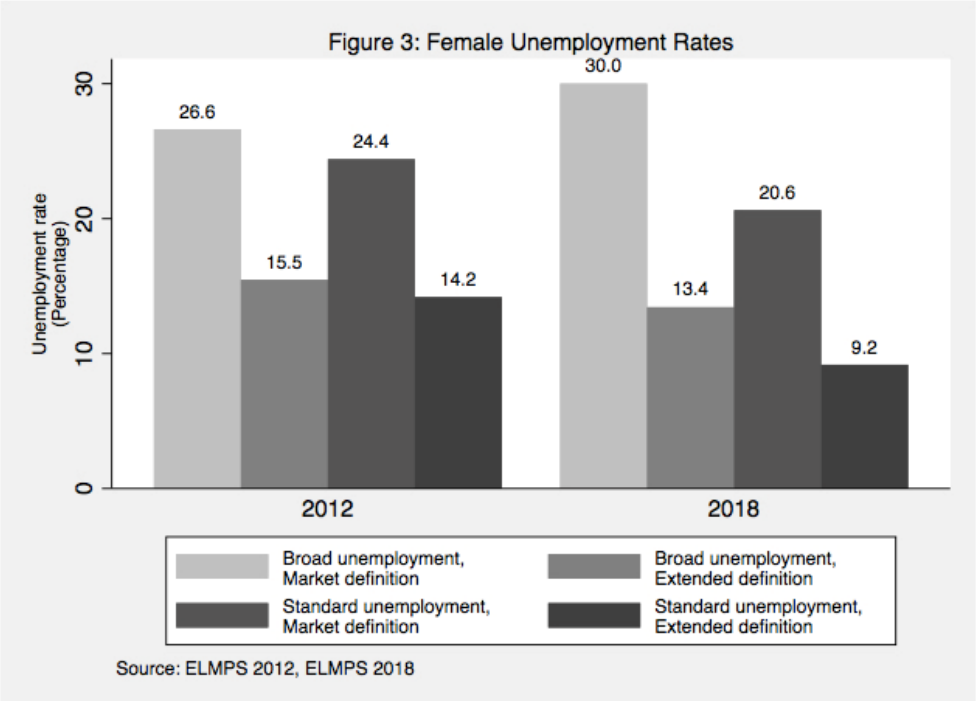


Notes. This graph features individuals using the Internet in Egypt as a percent of the population. Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV, etc.



Notes. The broad unemployment definition does not require active search, while the standard unemployment definition requires active search. According to the market definition of unemployment, subsistence workers are considered as unemployed individuals, whereas according to the extended definition of unemployment they are considered employed.



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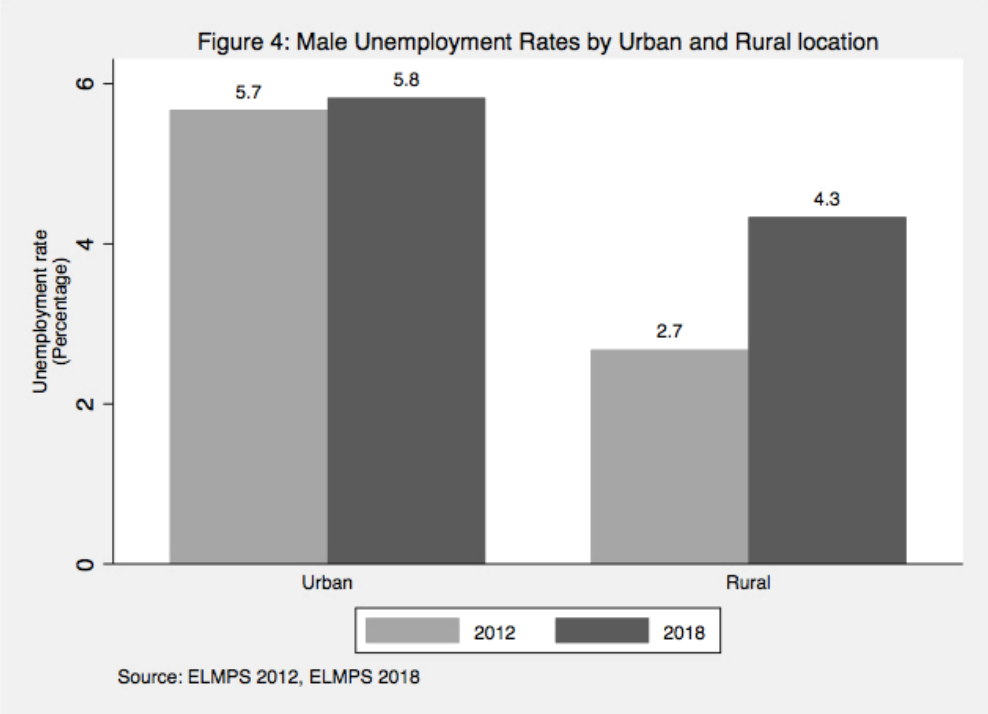
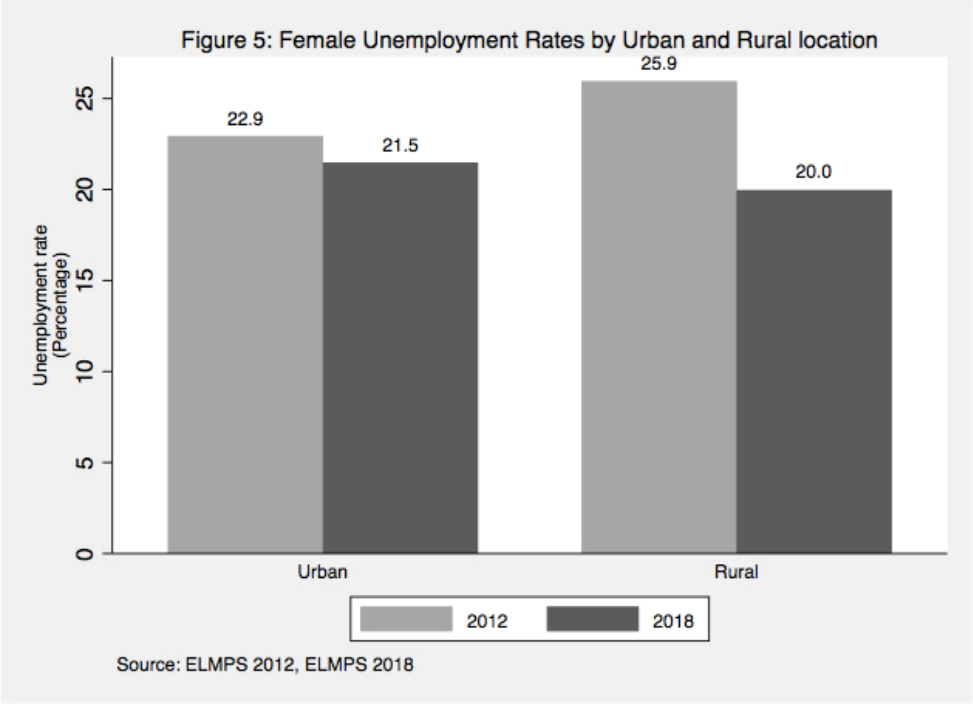


Notes. Unemployment is defined according to the market definition, standard unemployment (search required).



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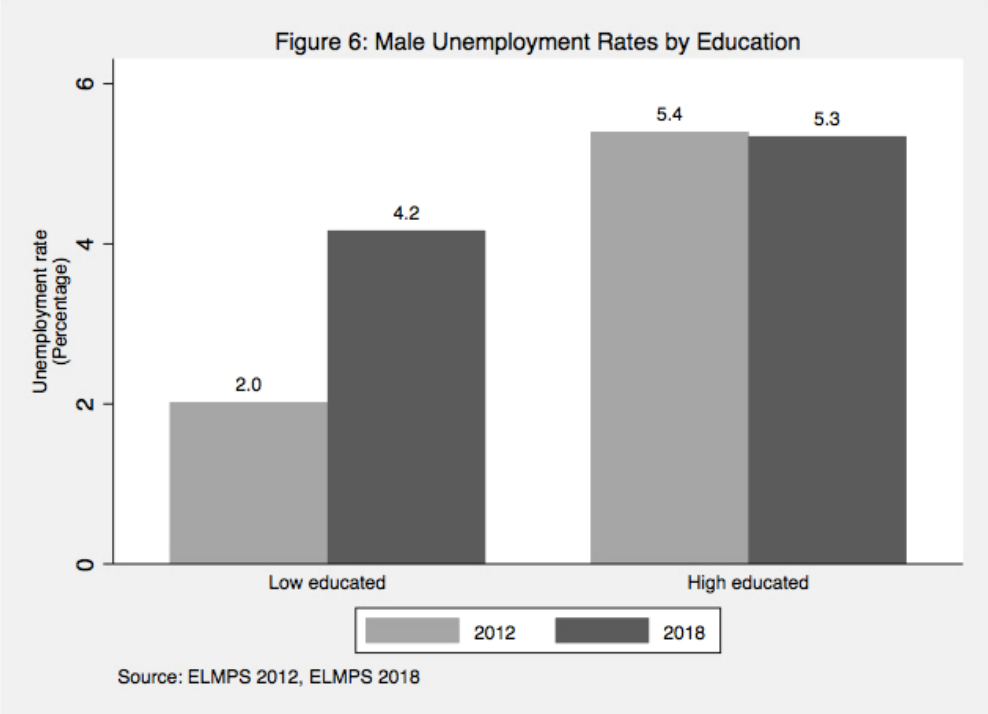
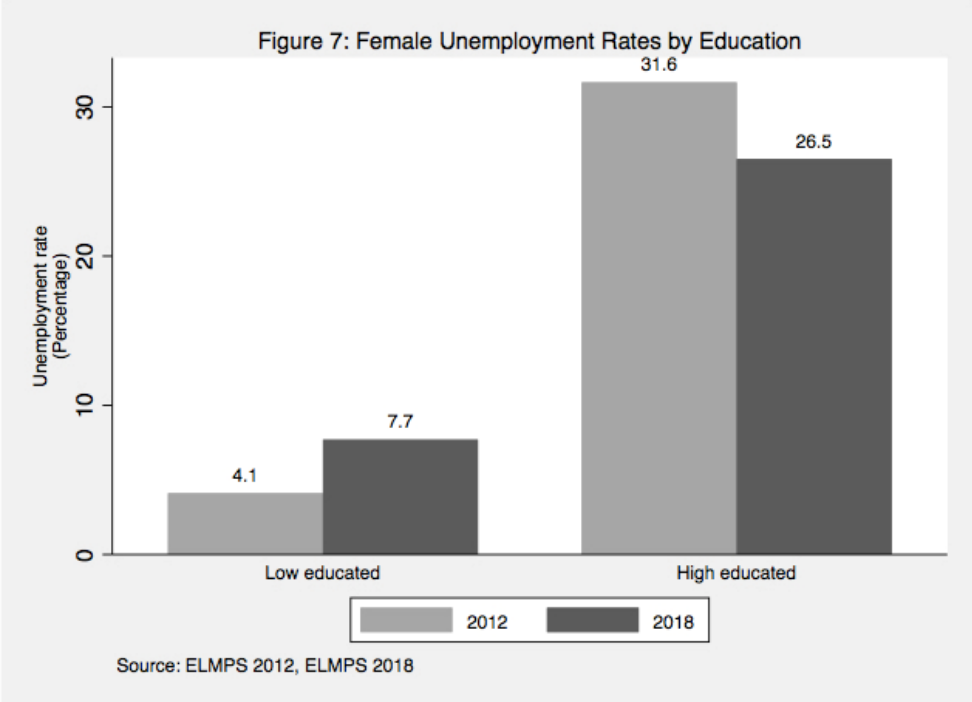


Notes. Unemployment is defined according to the market definition, standard unemployment (search required). Low educated individuals are those with less than secondary education. High educated individuals are those with secondary education and above.



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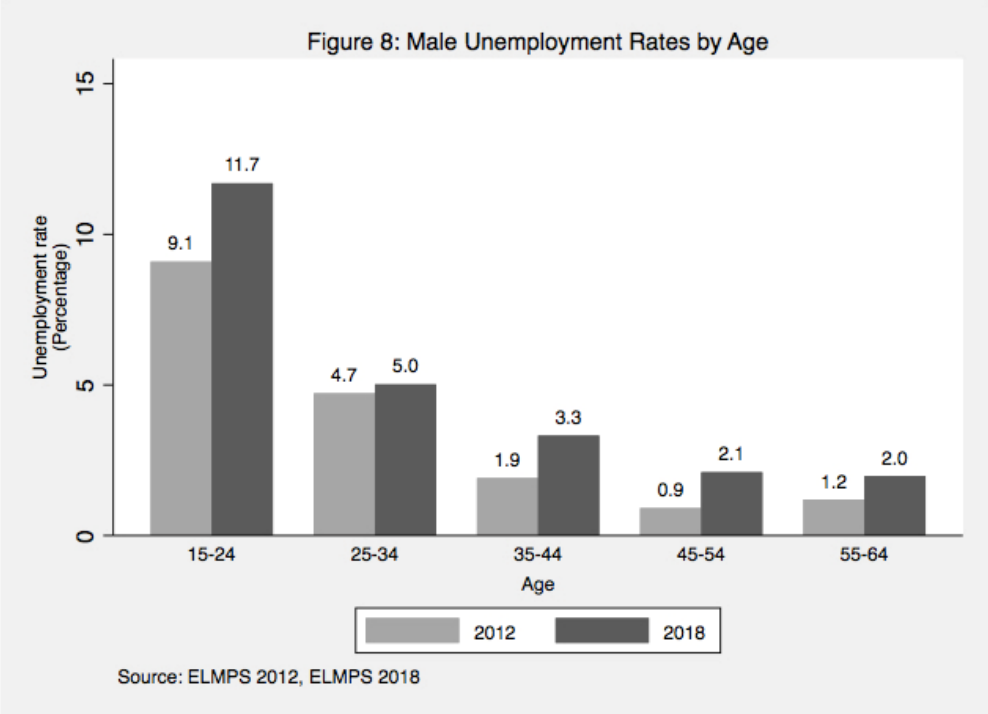

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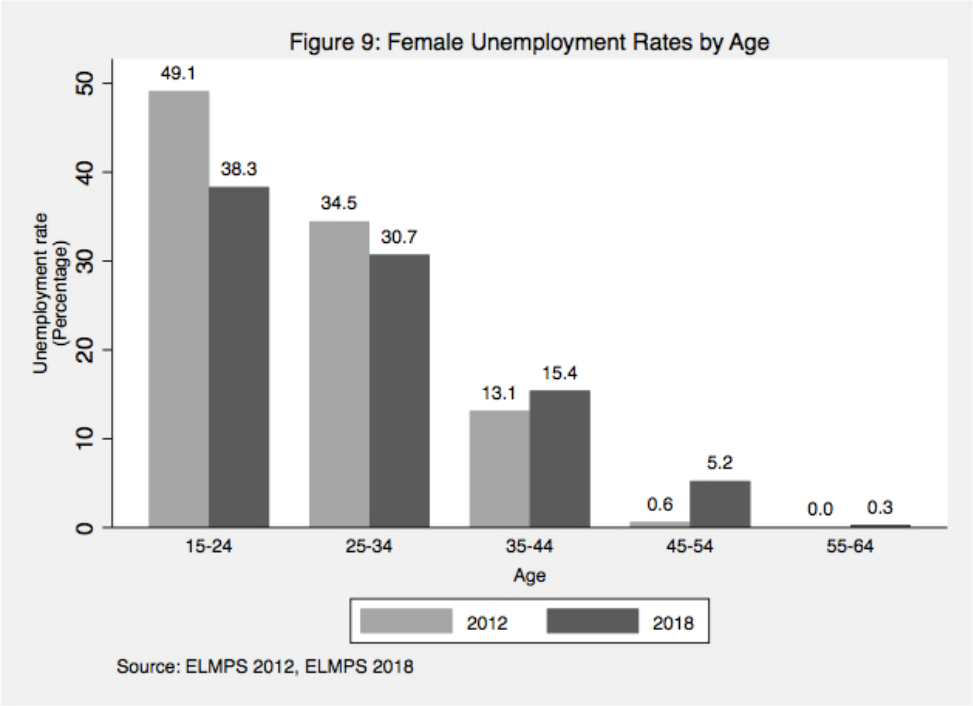

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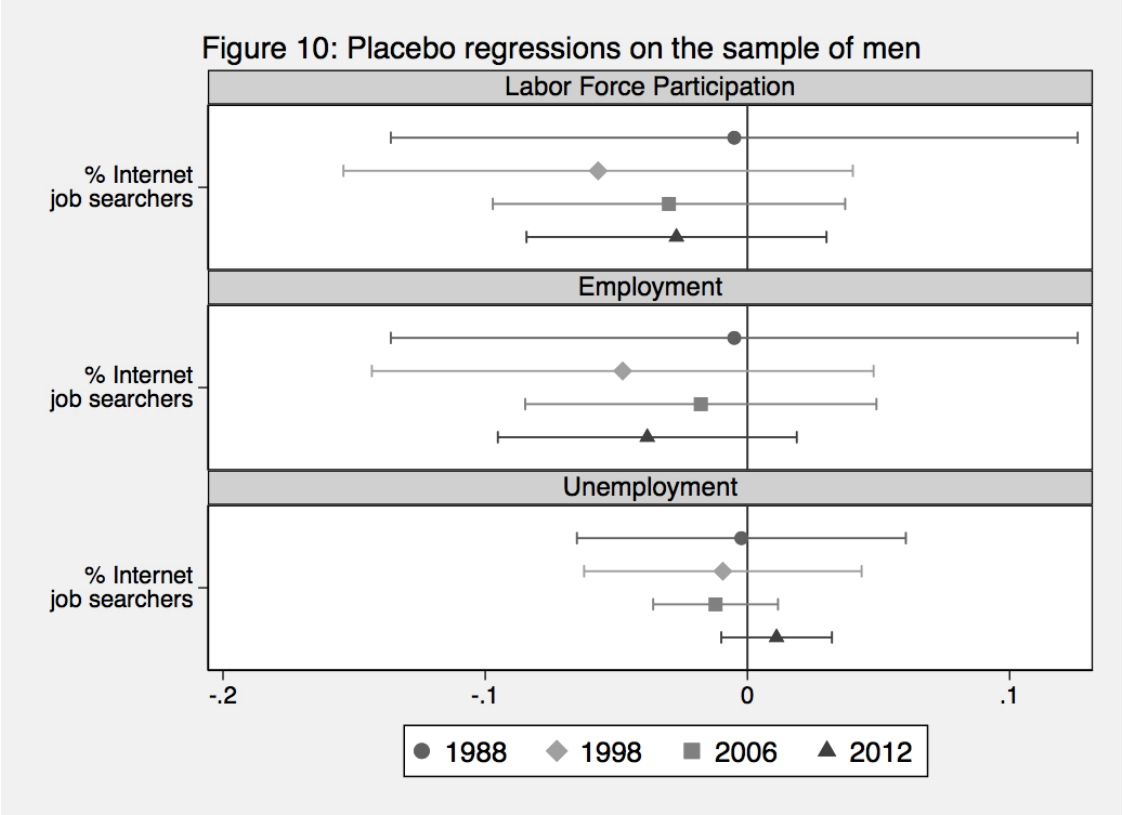

Notes. This figure represents coefficient plots on the impact of Internet use on male labor force participation, employment, and unemployment rates at the sub-district (*shyakha*) level in Egypt. The sub-district level regressions are conducted using various survey rounds of the ELMPS (1988, 1998, 2006 and 2012). The variable % of Internet job searchers corresponds to the percent of males who report using the Internet for job search at the sub-district level. Regressions are restricted to men of working age in each survey round (15 to 64 years old) and include a vector of control variables at the sub-district level: the percent of men with home Internet access, the percent of men who are married, the average men's age, the percent of men with primary or preparatory education, the percent of men with secondary education and the percent of men with above secondary education (the reference category is the percent of men with no educational degree), the percent of men living in rural areas as well as governorate fixed effects.

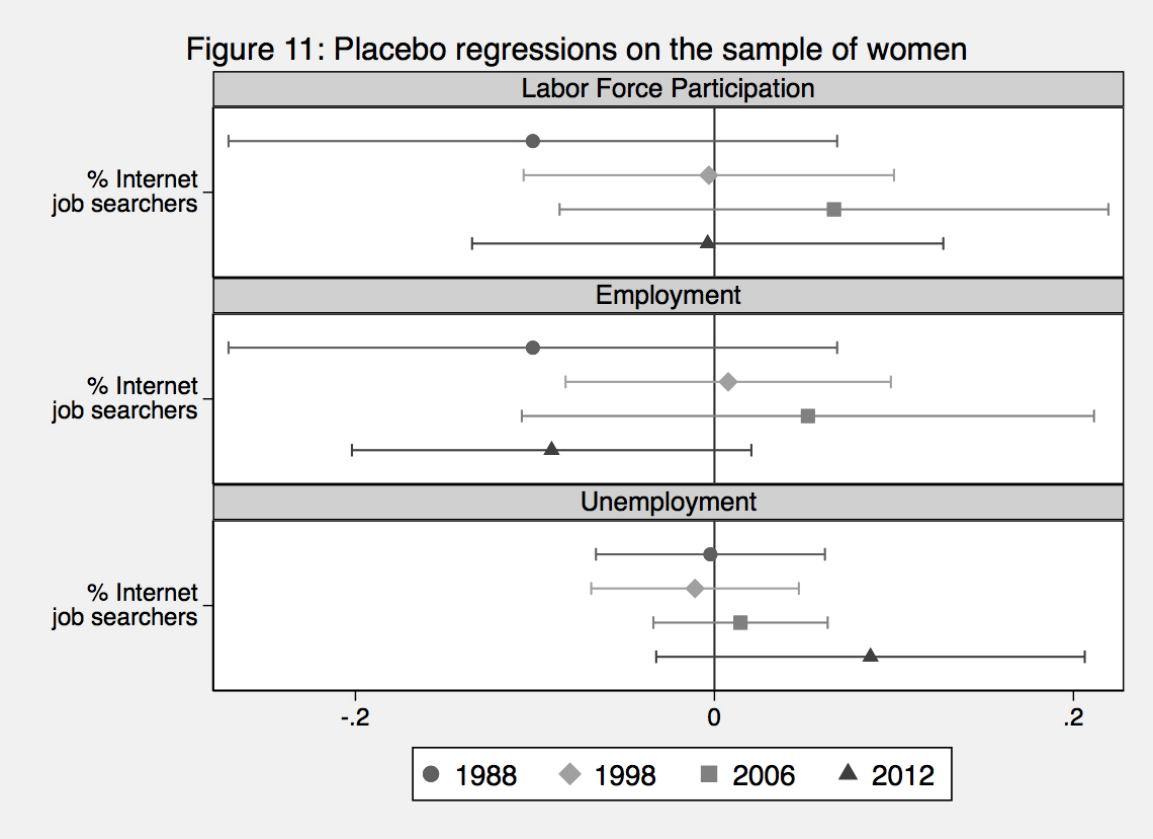

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Table 1: Fraction of individuals with home Internet access and using the Internet to find a job, by labor market status

	Fraction with home Internet access		*Fraction using the Internet to find a job*		*Fraction using the Internet to find a job, given home Internet access*	
	2012	2018	2012	2018	2012	2018
Employed	0.133	0.238	0.034	0.102	0.031	0.074
Unemployed	0.174	0.325	0.380	0.632	0.367	0.644
Out of Labor Force	0.125	0.235	0.011	0.036	0.008	0.027
Total	0.129	0.238	0.048	0.097	0.045	0.078

Notes. This table reports the fraction of individuals with home Internet access, the fraction of individuals who report that they use the Internet to find a job and the fraction of individuals who report using the Internet to find a job given home Internet access by labor market status. The populations of employed individuals, unemployed individuals, and individuals out of the labor force are defined according to the market definition of the labor force (search required).

Table 2: Descriptive statistics on the unemployed population in 2012, by gender

	Male Sample		Female Sample	
	(1)	(2)	(3)	(4)
VARIABLES	Mean	St. Dev.	Mean	St. Dev.
Individual characteristics				
Age	27.830	8.511	27.880	5.807
Married	0.247	0.432	0.758	0.429
No education	0.069	0.255	0.017	0.130
Primary or preparatory education	0.128	0.335	0.022	0.146
Secondary education	0.431	0.496	0.589	0.492
Above secondary education	0.372	0.484	0.372	0.484
Rural	0.410	0.493	0.555	0.497
Worked before	0.458	0.499	0.159	0.365
Geographical regions				
Greater Cairo	0.132	0.339	0.048	0.213
Alexandria and Suez Cities	0.135	0.343	0.061	0.239
Urban Lower Egypt	0.142	0.350	0.184	0.388
Urban Upper Egypt	0.181	0.385	0.153	0.360
Rural Lower Egypt	0.243	0.430	0.445	0.497
Rural Upper Egypt	0.167	0.373	0.110	0.313
Mother's education				
No education	0.625	0.485	0.765	0.424
Intermediate education or less	0.299	0.458	0.196	0.397
Higher than intermediate	0.021	0.143	0.016	0.125
University and above	0.056	0.229	0.023	0.150
Father's education				
No education	0.431	0.496	0.584	0.493
Intermediate education or less	0.427	0.496	0.310	0.463
Higher than intermediate	0.021	0.143	0.019	0.136
University and above	0.122	0.327	0.088	0.283
Number of observations	288		694	

Notes. This table reports descriptive statistics on the estimation sample of unemployed individuals in 2012 by gender (those that were also interviewed in the 2018 survey round). All the reported statistics refer to the year 2012. No education refers to individuals who are illiterate or literate without any diploma. Secondary education refers to individuals with general or vocational high school. Above secondary education refers to individuals with post-secondary institute or university and above. Worked before is a dummy variable indicator equal to one for unemployed individuals who worked before.

Table 3: Search methods of unemployed individuals in 2012, by gender

	Male Sample		Female Sample	
	(1)	(2)	(3)	(4)
VARIABLES	Mean	St. Dev.	Mean	St. Dev.
Register in a government employment office	0.354	0.479	0.382	0.486
Register in a private employment office	0.295	0.457	0.112	0.316
Enter government job assignment competition	0.368	0.483	0.419	0.494
Fill a job application or send resume to employer	0.406	0.492	0.282	0.451
Inquire at work location or contact an employer	0.347	0.477	0.107	0.309
Advertise in a newspaper	0.048	0.215	0.035	0.183
Look at job advertisement in a newspaper or online	0.319	0.467	0.137	0.344
Applied to a job advertised in newspapers or online	0.247	0.432	0.105	0.307
Register at an employment website	0.167	0.373	0.118	0.323
Ask friends or relatives for help to find a job	0.601	0.491	0.352	0.478
Contacted contractor	0.149	0.357	0.027	0.163
Waited at gathering locations for daily workers	0.090	0.287	0.012	0.107
Sought to start own project (by searching land, equipment)	0.056	0.229	0.049	0.216
Arranged to get finance for a private project	0.042	0.200	0.026	0.159
Number of observations	288		694	

Notes. This table reports descriptive statistics on the various search methods of unemployed individuals, by gender. I consider unemployed individuals in 2012 that were also interviewed in the 2018 survey round. All the reported statistics refer to the year 2012.

Table 4: Impact of Internet job search among the unemployed on employability within 5 years

VARIABLES	(1) Employed	(2) Employed	(3) Employed	(4) Employed
Internet job search	0.109**	0.103*	0.103*	0.103*
	[0.054]	[0.055]	[0.055]	[0.053]
Internet access at home	0.008	0.007	0.007	0.000
	[0.028]	[0.028]	[0.029]	[0.029]
Male	0.033*	0.041**	0.041**	0.038*
	[0.020]	[0.021]	[0.021]	[0.021]
Married	-0.008	-0.000	-0.001	0.006
	[0.016]	[0.015]	[0.015]	[0.016]
Age		-0.002**	-0.002**	-0.002**
		[0.001]	[0.001]	[0.001]
Primary or preparatory education		-0.076*	-0.076*	-0.083*
		[0.045]	[0.044]	[0.044]
Secondary education		-0.028	-0.028	-0.025
		[0.045]	[0.044]	[0.043]
Above secondary education		-0.025	-0.025	-0.022
		[0.045]	[0.045]	[0.044]
Rural			0.002	-0.035
			[0.013]	[0.039]
Observations	928	928	928	928
R-squared	0.034	0.041	0.041	0.052
Region dummies	NO	NO	NO	YES
Dependent variable mean	0.038	0.038	0.038	0.038

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression. The analysis is restricted to unemployed individuals in 2012 that were also interviewed in 2018, aged 15 to 64 years old in 2012. Unemployed individuals are defined according to the market definition of labor force participation. The dependent variable is a dummy variable indicator equal to one if the individual is employed within 5 years after this unemployment spell in 2012 (between the years 2013 and 2017, included). The control variables refer to the year 2012 and they include: a dummy variable equal one for individuals who report that finding a job is one of the purposes of Internet use, a dummy variable for having Internet access at home, age, a dummy variable for being male, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The dependent variable mean is reported in the last row.

Table 5: Impact of Internet job search among the unemployed on employability within 5 years, heterogeneous effects

Dependent variable: Employed	By gender		By residence area		By age		By education
	Men	Women	Urban	Rural	15-35	36-64	Secondary or above
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Internet job search	0.146*	0.075	0.118**	0.072	0.103*	-0.011	0.105*
	[0.086]	[0.068]	[0.060]	[0.108]	[0.056]	[0.018]	[0.055]
Internet access at home	-0.014	0.006	-0.016	0.035	0.000	0.007	0.000
	[0.058]	[0.034]	[0.033]	[0.056]	[0.032]	[0.013]	[0.030]
Male			0.023	0.060*	0.040*	0.036	0.035
			[0.028]	[0.031]	[0.024]	[0.033]	[0.021]
Married	0.054	-0.007	0.01	0.008	0.005	0.021	0.008
	[0.045]	[0.016]	[0.021]	[0.025]	[0.018]	[0.023]	[0.017]
Age	-0.003	-0.001*	-0.003***	-0.001	-0.002	-0.003	-0.002**
	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.003]	[0.001]
Primary or preparatory education	-0.133*	-0.000	-0.021	-0.118	-0.061	-0.048	-0.090*
	[0.074]	[0.015]	[0.019]	[0.071]	[0.048]	[0.049]	[0.049]
Secondary education	-0.048	0.021	0.045*	-0.067	0.004	-0.041	-0.027
	[0.076]	[0.013]	[0.025]	[0.068]	[0.048]	[0.048]	[0.048]
Above secondary education	-0.07	0.031**	0.031	-0.048	0.009	-0.054	-0.026
	[0.078]	[0.013]	[0.026]	[0.069]	[0.049]	[0.056]	[0.049]
Rural	-0.013	-0.051			-0.06	-0.006	-0.05
	[0.054]	[0.047]			[0.042]	[0.008]	[0.038]
Observations	269	659	455	473	826	102	811
R-squared	0.061	0.048	0.074	0.045	0.052	0.203	0.050
Region dummies	YES	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.071	0.024	0.042	0.034	0.041	0.010	0.043

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression. The analysis is restricted to unemployed individuals in 2012 that were also interviewed in 2018, aged 15 to 64 years old in 2012. Unemployed individuals are defined according to the market definition of labor force participation. The dependent variable is a dummy variable indicator equal to one if the individual is employed within 5 years after this unemployment spell in 2012 (between the years 2013 and 2017, included). The control variables refer to the year 2012 and they include: a dummy variable equal one for individuals who report that finding a job is one of the purposes of Internet use, a dummy variable for having Internet access at home, age, a dummy variable for being male, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions (Greater Cairo, Alexandria and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt and Rural Upper Egypt). The dependent variable mean is reported in the last row.

Table 6: First difference model, Impact of Internet job search on the probability of labor force participation and employment

	Full sample		Male Sample		Female Sample	
Panel A: Change in labor force participation						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	LFP (Market def.)	LFP (Extended def.)	LFP (Market def.)	LFP (Extended def.)	LFP (Market def.)	LFP (Extended def.)
Δ Internet job search	0.309***	0.281***	0.244***	0.247***	0.407***	0.360***
	[0.019]	[0.019]	[0.021]	[0.021]	[0.036]	[0.036]
Observations	17,348	17,348	8,540	8,540	8,808	8,808
R-squared	0.098	0.071	0.168	0.156	0.068	0.055
Δ Individual controls	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.051	0.051	0.090	0.090	0.014	0.014
Panel B: Change in employment						
VARIABLES	Employed (Market def.)	Employed (Extended def.)	Employed (Market def.)	Employed (Extended def.)	Employed (Market def.)	Employed (Extended def.)
Δ Internet job search	0.044**	0.030	0.071***	0.074***	-0.032	-0.038
	[0.020]	[0.021]	[0.027]	[0.027]	[0.022]	[0.029]
Observations	17348	17348	8540	8540	8808	8808
R-squared	0.043	0.03	0.104	0.095	0.018	0.023
Δ Individual controls	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.057	0.057	0.087	0.087	0.028	0.028

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression using a first difference model. The analysis is restricted to working age individuals in the years 2012 and 2018. Columns (1) and (2) report results on the full sample. Columns (3) and (4) report results on the sample of men. Columns (5) and (6) report results on the sample of women. In Panel A, the dependent variables in columns (1), (3) and (5) are the first difference in dummy variable indicators for participating in the labor force in the years 2018 and 2012, according to the market definition. The dependent variables in columns (2), (4) and (6) are the first difference in dummy variable indicators for participating in the labor force in the years 2018 and 2012, according to the extended definition. In Panel B, the dependent variables in columns (1), (3) and (5) are the first difference in dummy variable indicators for being employed in the years 2018 and 2012, according to the market definition of labor force participation. The dependent variables in columns (2), (4) and (6) are the first difference in dummy variable indicators for being employed in the years 2018 and 2012, according to the extended definition of labor force participation. The independent variable of interest Internet job search is the first difference in dummy variable indicators for Internet use for job search between the years 2018 and 2012. Regressions also include a vector of individual control variables first differenced between the years 2018 and 2012. The controls in first difference are the following: the change in Internet access at home, the change in dummy variables for being married, the change in three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), the change in dummy variable for rural areas as well as the change in dummies for the various geographical regions (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The dependent variable mean is reported in the last row.

Table 7: Fixed effects model, Impact of Internet job search on labor force participation by gender

	Male sample				Female sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP
Internet job search	0.338***	0.240***	0.244***	0.245***	0.519***	0.403***	0.402***	0.402***
	[0.025]	[0.024]	[0.024]	[0.024]	[0.040]	[0.041]	[0.041]	[0.041]
Internet access at home	0.008	-0.010	-0.010	-0.011	0.013	-0.015	-0.017	-0.017
	[0.013]	[0.012]	[0.012]	[0.012]	[0.016]	[0.016]	[0.016]	[0.016]
Age		0.001	-0.001	-0.001		-0.003	-0.003	-0.003
		[0.005]	[0.004]	[0.004]		[0.004]	[0.004]	[0.004]
Primary or preparatory education		-0.070***	-0.069***	-0.070***		0.036	0.028	0.029
		[0.021]	[0.020]	[0.020]		[0.023]	[0.023]	[0.023]
Secondary education		0.174***	0.177***	0.178***		0.130***	0.135***	0.137***
		[0.024]	[0.024]	[0.024]		[0.026]	[0.026]	[0.026]
Above secondary education		0.494***	0.491***	0.491***		0.394***	0.408***	0.410***
		[0.031]	[0.031]	[0.031]		[0.032]	[0.032]	[0.032]
Married			0.154***	0.155***			-0.047***	-0.048***
			[0.013]	[0.013]			[0.015]	[0.015]
Rural				0.189				0.224
				[0.222]				[0.196]
Observations	23,107	21,900	21,886	21,886	23,383	22,526	22,514	22,514
R-squared	0.787	0.823	0.828	0.828	0.720	0.742	0.743	0.743
Individual fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region dummies	NO	NO	NO	YES	NO	NO	NO	YES
Dependent variable mean	0.799	0.797	0.797	0.797	0.223	0.225	0.224	0.224

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression relying on panel data estimation. The analysis is restricted to working age individuals in the years 2012 and 2018. In columns (1) to (4), the analysis is restricted to the sample of males. In columns (5) to (8), the analysis is restricted to the sample of females. The dependent variable is a dummy variable indicator equal to one if the individual is employed in the corresponding year 2012 and 2018 (according to the market definition of labor force participation). The main independent variable of interest is a dummy variable indicator equals to one if the individual reports that finding a job is one of the purposes of Internet use in the corresponding year 2012 and 2018. The regressions also include time-varying controls: age, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The regressions also include individual and year fixed effects. The dependent variable mean is reported in the last row.

Table 8: Fixed effects model, Impact of Internet job search on employment probability by gender

	Male Sample				Female Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Employed	Employed	Employed	Employed	Employed	Employed	Employed	Employed
Internet job search	0.152***	0.064**	0.070**	0.070**	0.031	-0.034	-0.034	-0.034
	[0.029]	[0.031]	[0.030]	[0.030]	[0.023]	[0.025]	[0.025]	[0.025]
Internet access at home	0.017	0.000	0.000	0.000	0.025**	0.009	0.008	0.008
	[0.014]	[0.014]	[0.013]	[0.013]	[0.012]	[0.012]	[0.012]	[0.012]
Age		0.000	-0.002	-0.003		-0.004	-0.004	-0.004
		[0.005]	[0.005]	[0.005]		[0.004]	[0.004]	[0.004]
Primary or preparatory education		-0.066***	-0.065***	-0.065***		0.041*	0.037*	0.037*
		[0.021]	[0.021]	[0.021]		[0.021]	[0.022]	[0.022]
Secondary education		0.134***	0.139***	0.139***		0.064***	0.066***	0.067***
		[0.025]	[0.025]	[0.025]		[0.023]	[0.023]	[0.022]
Above secondary education		0.406***	0.402***	0.403***		0.220***	0.227***	0.227***
		[0.032]	[0.032]	[0.032]		[0.028]	[0.028]	[0.028]
Married			0.194***	0.194***			-0.023*	-0.024*
			[0.015]	[0.015]			[0.013]	[0.013]
Rural				0.087				-0.224
				[0.103]				[0.170]
Observations	23,107	21,900	21,886	21,886	23,383	22,526	22,514	22,514
R-squared	0.776	0.804	0.810	0.810	0.756	0.773	0.774	0.774
Individual fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region dummies	NO	NO	NO	YES	NO	NO	NO	YES
Dependent variable mean	0.772	0.770	0.770	0.770	0.171	0.172	0.172	0.172

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression relying on panel data estimation. The analysis is restricted to working age individuals in the years 2012 and 2018. In columns (1) to (4), the analysis is restricted to the sample of males. In columns (5) to (8), the analysis is restricted to the sample of females. The dependent variable is a dummy variable indicator equal to one if the individual is employed in the corresponding year 2012 and 2018 (according to the market definition of labor force participation). The main independent variable of interest is a dummy variable indicator equals to one if the individual reports that finding a job is one of the purposes of Internet use in the corresponding year 2012 and 2018. The regressions also include time-varying controls: age, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The regressions also include individual and year fixed effects. The dependent variable mean is reported in the last row.

Table 9: Descriptive statistics on the new job after an unemployment spell

VARIABLES	(1) Mean	(2) St. Dev.
Employment status		
Wage work	0.900	0.304
Self-employed	0.100	0.304
Sector of employment		
Public	0.135	0.347
Private	0.865	0.347
Size of establishment		
≤ 9 employees	0.514	0.507
≥10 and ≤49 employees	0.216	0.417
≥50 employees	0.270	0.450
Occupation		
Agriculture	0.065	0.25
Blue collar	0.161	0.374
White collar	0.774	0.425
Economic activity		
Agriculture, forestry and fishing	0.222	0.424
Wholesale and retail trade	0.148	0.362
Education	0.259	0.447
Human health and social work	0.111	0.320
Professional, scientific, technical, administration and support service activities	0.111	0.320
Other activities	0.148	0.362
Job stability		
Permanent	0.342	0.481
Temporary	0.447	0.504
Seasonal or casual	0.211	0.413
Work contract		
Yes, indefinite duration	0.077	0.270
Yes, definite duration	0.282	0.456
No contract	0.641	0.486
Social security		
Incidence of social security	0.103	0.307

Notes. This table features descriptive statistics on the new job found following an unemployment spell, including employment status, sector of employment, size of establishment, occupation, economic activities, job stability, and the incidence of work contract and social security.

Table 10: Impact of Internet job search on wage growth for employed job seekers

	Male sample				Female sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth
Internet job search	-0.197	-0.263	-0.260	-0.301	0.020	0.131	0.151	0.118
	[0.282]	[0.281]	[0.283]	[0.286]	[0.779]	[0.774]	[0.813]	[0.819]
Internet access at home	0.290***	0.157*	0.171*	0.184**	0.080	-0.030	0.009	0.021
	[0.086]	[0.093]	[0.093]	[0.092]	[0.140]	[0.143]	[0.141]	[0.140]
Married	0.020	0.010	0.008	0.014	0.024	-0.035	-0.065	-0.064
	[0.057]	[0.057]	[0.057]	[0.058]	[0.119]	[0.115]	[0.117]	[0.120]
Age		-0.000**	-0.000*	-0.000***		0.020***	0.022***	0.022***
		[0.000]	[0.000]	[0.000]		[0.006]	[0.006]	[0.006]
Primary or preparatory education		-0.000	0.003	0.001		0.152	0.134	0.140
		[0.084]	[0.084]	[0.084]		[0.495]	[0.492]	[0.492]
Secondary education		0.011	0.015	0.025		0.320*	0.318*	0.335*
		[0.071]	[0.071]	[0.071]		[0.178]	[0.181]	[0.183]
Above secondary education		0.265***	0.272***	0.276***		0.603***	0.626***	0.633***
		[0.083]	[0.084]	[0.085]		[0.186]	[0.189]	[0.190]
Rural			0.047	-0.077			0.217**	0.148
			[0.051]	[0.377]			[0.100]	[0.171]
Observations	2,494	2,493	2,493	2,493	529	527	527	527
R-squared	0.004	0.012	0.013	0.021	0.001	0.039	0.048	0.053
Region dummies	NO	NO	NO	YES	NO	NO	NO	YES
Dependent variable mean	0.865	0.865	0.865	0.865	0.933	0.932	0.932	0.932

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression. The analysis is restricted to employed individuals in 2012 that were also interviewed in 2018, aged 15 to 64 years old in 2012. Employed individuals are defined according to the market definition of labor force participation. The dependent variable is the logarithm of the difference in inflation adjusted hourly wages between the years 2018 and 2012. The main independent variable of interest is a dummy variable indicator equals to one if the individual reports that finding a job is one of the purposes of Internet use. The control variables refer to the year 2012 and they include: a dummy variable for having Internet access at home, age, a dummy variable for being male, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The dependent variable mean is reported in the last row.

Table 11: Impact of using a computer at work on wage growth, conditional on being employed

	Male sample				Female sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth	Wage growth
Use computer at work	0.145**	0.064	0.067	0.059	0.118	0.065	0.059	0.058
	[0.066]	[0.069]	[0.069]	[0.069]	[0.102]	[0.102]	[0.103]	[0.104]
Use computer with Internet at work	0.173	0.094	0.098	0.077	-0.021	-0.012	0.005	0.004
	[0.131]	[0.131]	[0.131]	[0.130]	[0.139]	[0.137]	[0.137]	[0.138]
Married	0.028	-0.057	-0.064	-0.060	0.060	-0.016	-0.048	-0.042
	[0.056]	[0.066]	[0.067]	[0.067]	[0.107]	[0.105]	[0.108]	[0.110]
Age		0.006**	0.007**	0.007**		0.019***	0.021***	0.021***
		[0.003]	[0.003]	[0.003]		[0.005]	[0.005]	[0.005]
Primary or preparatory education		-0.008	-0.003	-0.005		0.131	0.116	0.121
		[0.084]	[0.084]	[0.085]		[0.466]	[0.463]	[0.461]
Secondary education		0.009	0.015	0.030		0.261	0.262	0.296*
		[0.071]	[0.072]	[0.072]		[0.171]	[0.174]	[0.175]
Above secondary education		0.244***	0.254***	0.267***		0.539***	0.567***	0.585***
		[0.082]	[0.084]	[0.084]		[0.176]	[0.179]	[0.180]
Rural			0.050	-0.138			0.196**	0.400*
			[0.050]	[0.326]			[0.091]	[0.224]
Observations	2,609	2,608	2,608	2,608	626	624	624	624
R-squared	0.005	0.014	0.014	0.022	0.003	0.039	0.047	0.053
Region dummies	NO	NO	NO	YES	NO	NO	NO	YES
Dependent variable mean	0.869	0.870	0.870	0.870	0.941	0.940	0.940	0.940

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression. The analysis is restricted to employed individuals in 2012 that were also interviewed in 2018, aged 15 to 64 years old in 2012. Employed individuals are defined according to the market definition of labor force participation. The dependent variable is the logarithm of the difference in inflation adjusted hourly wages between the years 2018 and 2012. The main independent variables of interest are a dummy variable indicator equals to one if the individual reports using computer at work and a dummy variable indicator equals to one if the individual reports using a computer connected to the Internet at work. The control variables refer to the year 2012 and they include: a dummy variable for having Internet access at home, age, a dummy variable for being male, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The dependent variable mean is reported in the last row.

Table 12: Fixed effects model, Impact of using a computer at work on hourly wage by gender, conditional on being employed

	Male Sample				Female Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
Use computer at work	0.747	0.867	0.851	0.842	-1.954	-1.892	-1.872	-1.926
	[0.691]	[0.740]	[0.748]	[0.751]	[2.374]	[2.385]	[2.392]	[2.424]
Use computer with Internet at work	-2.723	-2.952	-2.988	-2.981	2.005	1.987	1.969	2.070
	[2.817]	[2.943]	[2.956]	[2.959]	[1.855]	[1.860]	[1.865]	[1.888]
Age		0.660*	0.669*	0.672*		-1.918	-1.919	-1.927
		[0.375]	[0.375]	[0.377]		[1.424]	[1.427]	[1.432]
Primary or preparatory education		0.004	0.000	0.004		0.169	0.152	0.151
		[0.512]	[0.512]	[0.513]		[1.828]	[1.896]	[1.908]
Secondary education		1.536*	1.543*	1.538*		1.909	2.100	2.116
		[0.890]	[0.889]	[0.891]		[2.253]	[2.326]	[2.340]
Above secondary education		0.120	0.138	0.125		2.132	2.348	2.349
		[2.310]	[2.347]	[2.349]		[2.290]	[2.370]	[2.383]
Married			-0.244	-0.250			0.664	0.716
			[1.227]	[1.231]			[0.894]	[0.915]
Rural				-2.571				-0.505
				[3.088]				[2.705]
Observations	13,444	12,759	12,753	12,753	2,714	2,672	2,671	2,671
R-squared	0.570	0.577	0.577	0.577	0.661	0.663	0.663	0.663
Individual fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region dummies	NO	NO	NO	YES	NO	NO	NO	YES
Dependent variable mean	5.877	5.958	5.959	5.959	6.504	6.553	6.553	6.553

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression, relying on panel data estimation. The analysis is restricted to working age individuals, conditional on being employed. Employed individuals are defined according to the market definition of labor force participation. In columns (1) to (4), the analysis is restricted to the sample of males. In columns (5) to (8), the analysis is restricted to the sample of females. The dependent variable is the inflation adjusted hourly wage. The main independent variables of interest are a dummy variable indicator equals to one if the individual reports using computer at work and a dummy variable indicator equals to one if the individual reports using a computer connected to the Internet at work. The regressions also include time-varying controls: age, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The regressions also include individual and year fixed effects. The dependent variable mean is reported in the last row.

Table 13: Impact of Internet job search among the unemployed on employability within 5 years, using the extended definition of labor force participation

Dependent variable: Employed	By gender		By residence area		By age		By education
	Men	Women	Urban	Rural	15-35	36-64	Secondary or above
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Internet job search	0.145*	0.078	0.121**	0.067	0.105*	-0.005	0.103*
	[0.086]	[0.071]	[0.061]	[0.110]	[0.057]	[0.019]	[0.054]
Internet access at home	-0.015	0.006	-0.015	0.039	0.000	0.009	-0.003
	[0.058]	[0.036]	[0.033]	[0.063]	[0.034]	[0.014]	[0.030]
Male			0.021	0.058*	0.038	0.030	0.033
			[0.029]	[0.033]	[0.025]	[0.028]	[0.024]
Married	0.054	-0.006	0.011	0.011	0.007	0.025	0.006
	[0.045]	[0.018]	[0.021]	[0.028]	[0.020]	[0.027]	[0.019]
Age	-0.003	-0.002*	-0.003***	-0.001	-0.002	-0.004	-0.003**
	[0.002]	[0.001]	[0.001]	[0.002]	[0.002]	[0.003]	[0.001]
Primary or preparatory education	-0.132*	0.002	-0.021	-0.138	-0.066	-0.071	
	[0.074]	[0.018]	[0.020]	[0.085]	[0.051]	[0.069]	
Secondary education	-0.047	0.028*	0.045*	-0.080	0.006	-0.070	-0.001
	[0.075]	[0.016]	[0.025]	[0.081]	[0.050]	[0.073]	[0.016]
Above secondary education	-0.069	0.036**	0.029	-0.058	0.009	-0.083	
	[0.077]	[0.015]	[0.027]	[0.082]	[0.052]	[0.081]	
Rural	0.021	-0.059			-0.046	0.159	-0.061
	[0.061]	[0.057]			[0.046]	[0.154]	[0.044]
Observations	266	545	439	372	724	87	736
R-squared	0.061	0.048	0.075	0.042	0.050	0.250	0.049
Region dummies	YES	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.071	0.029	0.043	0.043	0.047	0.012	0.045

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression. The analysis is restricted to unemployed individuals in 2012 that were also interviewed in 2018, aged 15 to 64 years old in 2012. Unemployed individuals are defined according to the market definition of labor force participation. The dependent variable is a dummy variable indicator equal to one if the individual is employed within 5 years after this unemployment spell in 2012 (between the years 2013 and 2017, included). The control variables refer to the year 2012 and they include: a dummy variable equal one for individuals who report that finding a job is one of the purposes of Internet use, a dummy variable for having Internet access at home, age, a dummy variable for being male, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The dependent variable mean is reported in the last row.

Table 14: Robustness checks using the extended definition of labor force participation, Fixed effects model, Impact of Internet job search on employment probability by gender

	Male Sample				Female Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Employed	Employed	Employed	Employed	Employed	Employed	Employed	Employed
Internet job search	0.150***	0.067**	0.072**	0.073**	0.015	-0.045	-0.047	-0.047
	[0.029]	[0.031]	[0.030]	[0.030]	[0.030]	[0.032]	[0.032]	[0.032]
Internet access at home	0.017	0.002	0.002	0.002	0.030**	0.017	0.017	0.017
	[0.014]	[0.014]	[0.013]	[0.013]	[0.015]	[0.016]	[0.016]	[0.016]
Age		0.000	-0.002	-0.003		-0.004	-0.004	-0.004
		[0.005]	[0.005]	[0.005]		[0.006]	[0.005]	[0.005]
Primary or preparatory education		-0.052**	-0.051**	-0.051**		0.063**	0.055*	0.055*
		[0.021]	[0.021]	[0.021]		[0.030]	[0.030]	[0.030]
Secondary education		0.124***	0.129***	0.130***		0.078**	0.083***	0.084***
		[0.025]	[0.025]	[0.025]		[0.032]	[0.032]	[0.032]
Above secondary education		0.390***	0.388***	0.388***		0.224***	0.237***	0.237***
		[0.032]	[0.031]	[0.031]		[0.037]	[0.037]	[0.037]
Married			0.190***	0.191***			-0.046***	-0.046***
			[0.015]	[0.015]			[0.017]	[0.017]
Rural				0.199				-0.035
				[0.217]				[0.193]
Observations	23,107	21,900	21,886	21,886	23,383	22,526	22,514	22,514
R-squared	0.774	0.801	0.807	0.807	0.696	0.713	0.713	0.713
Individual fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Region dummies	NO	NO	NO	YES	NO	NO	NO	YES
Dependent variable mean	0.777	0.775	0.775	0.775	0.327	0.325	0.325	0.325

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression relying on panel data estimation. The analysis is restricted to working age individuals in the years 2012 and 2018. In columns (1) to (4), the analysis is restricted to the sample of males. In columns (5) to (8), the analysis is restricted to the sample of females. The dependent variable is a dummy variable indicator equal to one if the individual is employed in the corresponding year 2012 and 2018 (according to the extended definition of labor force participation). The main independent variable of interest is a dummy variable indicator equals to one if the individual reports that finding a job is one of the purposes of Internet use in the corresponding year 2012 and 2018. The regressions also include time-varying controls: age, a dummy variable for being married, three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), a dummy variable for rural areas as well as dummies for the various geographical regions included in the last column (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The regressions also include individual and year fixed effects. The dependent variable mean is reported in the last row.

Table 15: Placebo regressions using first difference model, Impact of future Internet use on past labor market outcomes

	Full sample		Male Sample		Female Sample	
Panel A: Change in labor force participation between 2012 and 2006						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	LFP (Market def.)	LFP (Extended def.)	LFP (Market def.)	LFP (Extended def.)	LFP (Market def.)	LFP (Extended def.)
Δ Internet job search (2018-2012)	-0.124*** [0.032]	-0.122*** [0.032]	-0.070* [0.036]	-0.080** [0.035]	-0.217*** [0.058]	-0.188*** [0.059]
Observations	1,135	1,135	714	714	421	421
R-squared	0.332	0.310	0.372	0.361	0.311	0.283
Δ Individual controls	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.187	0.187	0.211	0.211	0.145	0.145
Panel B: Change in employment between 2012 and 2006						
VARIABLES	Employed (Market def.)	Employed (Extended def.)	Employed (Market def.)	Employed (Extended def.)	Employed (Market def.)	Employed (Extended def.)
Δ Internet job search (2018-2012)	-0.001 [0.035]	0.001 [0.036]	0.064 [0.044]	0.053 [0.044]	-0.103** [0.049]	-0.074 [0.055]
Observations	1,135	1,135	714	714	421	421
R-squared	0.175	0.159	0.216	0.208	0.181	0.153
Δ Individual controls	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.158	0.158	0.185	0.185	0.112	0.112

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. Each cell represents a coefficient estimate using OLS regression using a first difference model. The analysis is restricted to working age individuals in the survey years. Columns (1) and (2) report results on the full sample. Columns (3) and (4) report results on the sample of men. Columns (5) and (6) report results on the sample of women. In Panel A, the dependent variables in columns (1), (3) and (5) are the first difference in dummy variable indicators for participating in the labor force in the years 2012 and 2006, according to the market definition. The dependent variables in columns (2), (4) and (6) are the first difference in dummy variable indicators for participating in the labor force in the years 2012 and 2006, according to the extended definition. In Panel B, the dependent variables in columns (1), (3) and (5) are the first difference in dummy variable indicators for being employed in the years 2012 and 2006, according to the market definition of labor force participation. The dependent variables in columns (2), (4) and (6) are the first difference in dummy variable indicators for being employed in the years 2012 and 2006, according to the extended definition of labor force participation. The independent variable of interest Internet job search is the first difference in dummy variable indicators for Internet use for job search between the years 2018 and 2012. The regressions also control for the change in Internet access at home between 2018 and 2012. Regressions also include a vector of individual control variables first differenced between the years 2012 and 2006. The controls in first difference are the following: the change in dummy variables for being married, the change in three dummies for the individual's educational attainment (primary or preparatory education, secondary education either general or vocational and above secondary education either post-secondary institute or university and above, and the reference category is no educational degree either illiterate individuals or literate individuals without any diploma), the change in dummy variable for rural areas as well as the change in dummies for the various geographical regions (Greater Cairo, Alexandria, and Suez cities, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt). The dependent variable mean is reported in the last row.