

# The Impact of Job loss on Mental Health During the Covid-19 Crisis: Evidence from Tunisia

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## Abstract:

This paper investigates the impact of job loss on the mental health of individuals in Tunisia during the Covid-19 crisis using the counterfactual decomposition technique and the potential outcome approach. In the first part, we will calculate mental health indicators for all individuals included in the sample based on the WHO-5 items. Then, the individuals will be grouped into two sub-populations. The first group includes those who have lost their jobs and the second group will include individuals whose status in the labor market remains unchanged. In the second part, we will use the Blinder and Oaxaca decomposition to explain the mean difference in the mental health scores between the two groups and determining the factors contributing to that difference. Our empirical results show that the symptoms of depressed mood, decreased energy and loss of interest have been identified in several persons. From these three symptoms, we were able to classify individuals into three types of depression namely, mild, moderate and severe. In addition, there is clear evidence that the job loss has significantly contributed to the worsening of the mental health of individuals. Our findings suggest that psychological interventions for the treatment of depression and for supporting vulnerable groups seem urgent during crisis periods. The establishment of an insurance system for employees who have lost their jobs or made redundant for economic or technical reasons is highly important.

**Keywords:** Counterfactual decomposition; Job loss; Mental health and Covid-19.

**JEL Classification:** C43, I12, J64.

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## **1- Introduction**

After being detected in the city of Wuhan, China's Hubei Province, COVID-19 spread rapidly around the world, resulting in global human tragedy and enormous economic damage (Baldwin and Weder di Mauro, 2020; Elgin et al., 2020; Bel et al., 2020). Following the World Health Organization (WHO) recommendations and in order to slow down a rapid spread across and within countries, many governments have responded with strict measures, including lockdown with border closures, restrictions of travel, self-isolation, social distancing and school and work-place closures (Schomaker et al. 2021; Talbot, 2020; Nasri et al; 2021).

These measures have resulted in large increases in unemployment in many countries (Blustein et al., 2020). In this regard, the international labor organization (ILO) estimated that the working-hour losses in 2020 were approximately four times greater than during the global financial crisis of 2009 (ILO, 2021). This decline in working hours translated into both job loss and a reduction in working hours for those who remained employed. In total, there were unprecedented global employment losses in 2020 of 114 million jobs compared to 2019, with significant variations across regions; sex and age. Globally, job losses have been highest in the Americas, for women and for young workers (ILO, 2021). Furthermore, the job loss means not only the loss of income and financial benefits for many people, but also the loss of their identities. Hence, this can also be a major reason why depressive symptoms may be reported more in them relative to those remaining in the same status in the labor market (Griffiths et al, 2021; Posel et al., 2021).

Currently, it is increasingly being recognized that other than the economic costs, the health costs of COVID-19 are not limited to physical health but include the effects of the pandemic on the individual's mental or psychological well-being, especially in due to Covid-19 / coronavirus or related restrictions (Knolle et al.,2021; Petersen et al.; 2021).

Tunisia, like most countries in the world, has employed various measures to prevent the entry of the virus into their country. Once the virus circulates in a country, authorities are forced to adjust their strategy to reduce the burden on the health system.

On March 22, 2020, total population containment was imposed on Tunisia for two weeks, and it was extended twice (Nasri et al., 2021). In Tunisia, the lockdown has made job-search more difficult or impossible in certain cases and a proportion of workers was lost their jobs (Krafft, Assaad and Marouani, 2021). Being worried about the indefinite duration of the disease was associated with severe symptoms of depression and anxiety. Indeed, fear, worry and stress are normal responses to perceived or real threats, and sometimes when we are faced with uncertainty or the unknown. It is therefore normal and understandable that people experience

fear and depression in the context of the COVID-19 pandemic. In this research, we aim to investigate the impact of job loss on the mental health of individuals in Tunisia during the Covid-19 crisis.

Although the psychological impact of the pandemic COVID-19 outbreak among healthcare professionals has been the subject of other studies in health literature on Tunisia (see, Fekih-Romdhane et al., 2020 and Hammami et al., 2021), to the best of our knowledge, no research has addressed the impact of job loss on mental health for Tunisian workers. Thus, this paper contains research to fill this gap. Based on the WHO-5 items which tap into the subjective well-being of the respondents, we calculated seven mental health indicators for all individuals included in the sample. Our empirical results show that the symptoms of depressed mood, decreased energy and loss of interest have been identified in several persons. From these three symptoms, we were able to classify individuals into three types of depression namely, mild, moderate and severe. By applying the counterfactual decomposition technique, our results show that the job loss has significantly contributed to the worsening of the mental health of individuals.

This paper is structured as follows: Section 2 presents a literature review to give a perspective on the impact of Covid-19 crisis and the job loss on mental health of individuals; Section 3 presents our data and descriptive statistics; Section 4 provides a detailed description of our empirical strategy; Section 5 discusses the main results, and Section 6 concludes the paper.

## **2. Literature review**

The impact of the covid-19 crisis on the mental health of individuals has been the subject of several studies and academic work. The review of the existing literature on covid-19 and mental health that was undertaken by Rajkumar (2020) found that symptoms of anxiety and depression and self-reported stress were common psychological reactions to the pandemic and were frequently associated with disturbed sleep quality (Xiao et al., 2020). Studies within the review noted also that individuals' characteristics and their behaviors as well as other structural variables (e.g., support services) may mediate and moderate risk.

In a global study of risk and resilience factors linked to the impact of Covid-19 on mental health, Płomecka et al. (2020) built several linear and logistic regression models to examine psychological symptoms related to the Covid-19 pandemic in 12 countries and five WHO regions. This study showed that female gender, pre-existing psychiatric condition and previous trauma exposure were identified as notable risk factors, while optimism, the ability to share

concerns with family and friends as usual, the positive prediction on COVID-19 and daily exercise predicted fewer psychological symptoms.

Using an online survey, Wang et al (2020) estimated the frequency of individual mental health symptoms in the Chinese population. Based on Depression, Anxiety and stress scale (DASS-21) and Impact of Event Scale-Revised (IES-R), the authors showed that moderate and severe symptoms of depression are present in 16.5% of the population and that 8.1% suffer from moderate and severe stress. Wang et al (2020) also pointed out that the availability of accurate information and the use of specific preventive measures, such as hand washing, appeared to mitigate these effects. In a study based on the general population in Denmark, Petersen et al (2021) suggested that the first wave of the Covid-19 pandemic had only a minor impact on the mental and physical health of the general population compared to before the pandemic. With ordinal regression analyzes, the authors concluded that gender, age, education, and physical illnesses were not associated with worry about illness, emotional distress, or burden of physical symptoms. Moreover, Das et al. (2021) using an online cross-sectional survey of 672 Bangladeshis aged 15-65 across the country, estimated that a large portion of respondents reported mental health problems during the COVID-19 pandemic. This paper also points out that in Bangladesh, the key factors associated with poor mental health during COVID-19 were female gender, unemployment, being a student, obesity and life without a family.

Other studies have examined the likely impact of the covid-19 pandemic in some countries. For example, Zandifar and Badrfam (2020) highlighted the role of unpredictability, uncertainty, misinformation, and social isolation in contributing to stress in Iran. Another study from Japan highlighted the economic impact of COVID-19 and its effects on well-being, as well as the likely high levels of fear and panic behavior, such as hoarding and storing resources, in the general population (Shigemura et al., 2020). This paper also identified populations at higher risk of adverse mental health outcomes, including patients with COVID-19 and their families, individuals with existing physical or psychiatric morbidity, and healthcare workers.

On the other hand, several papers have addressed the impact of COVID-19 on the mental health of health workers. For example, Lai et al., (2020) conducted a survey of health care workers in Wuhan and other regions in China and found that participants reported experiencing psychological burden, especially nurses, women, those in Wuhan, and frontline health care workers directly engaged in the diagnosis, treatment, and care for patients with COVID-19. Fekih-Romdhane et al. (2020) have shown that 30.5%, 24.3% and 18.6% of the health care workers, participants in a cross-sectional survey conducted using online questionnaires from April 20th to April 30th, 2020 and from all over Tunisia, reported severe or extremely severe

levels of depression, anxiety and stress, respectively. Moreover, Multivariable logistic regression analysis showed that, after controlling for confounders, women developed more depression symptoms than men. Being worried about the indefinite duration of the disease was associated with severe symptoms of depression and anxiety.

There is also a large literature which investigates how the loss of employment during the covid-19 crisis affects depression or anxiety, where studies compare the mental health of employed and unemployed. For example, Mojtahedi et al. (2021) studied the relationship between mental toughness, job loss, and mental health issues during the COVID-19 pandemic. They found that job / business loss was a significant predictor of anxiety, depression and stress and that these findings align with previous research that had identified a link between job loss and depressive symptoms (Burgard, Brand and House 2007). Such a result has also been shown by Mimoun, Ben Ari and Margalit (2020) highlighting that there is a relationship between temporary job loss and stress during the COVID-19 pandemic. Mimoun, Ben Ari and Margalit (2020) explained that jobs give people a sense of confidence, self-worth and control and that cutting one's job is likely to reduce one's sense of worth and purpose, consequently.

### **3. Data and Descriptive Statistics**

In this research, we aim to explore how job loss affects workers mental health using micro-data collected after the introduction of the COVID-19 lockdown in Tunisia. We will use Tunisian data taken from the ERF COVID-19 MENA Monitor Household Survey (OAMDI,2021) fielded primarily in November 2020. The sample universe for the household survey was mobile phone users aged 18-64. Random digit dialing (RDD), within the range of valid numbers, was used. Samples were stratified by country-specific market shares of mobile operators. The sample is designed to cover at least 2000 unique households and individuals. Essentially, inverse probability weighting was used to reduce bias within a number of observable dimensions. Weights were created on three levels: Individual, household, and household member. The survey covers the demographic and household characteristics, education and children, labor market status<sup>4</sup>, food security, income, social safety net, employment and unemployment detection, attitudes towards risks, mental health, social distancing. Additionally, it includes a worker module on occupation, job formality, impact of COVID-19 on employment, work from home. A farmer module on crops, inputs, harvest, prices, markets ...etc. A household

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<sup>4</sup> The survey asked for the labor market status in October and collected retrospective data on labor market status in February of 2020.

enterprise module on industry, employment, sales/revenue, impact of COVID-19 on business, policy response, plans for future...etc. A women module on care giving time for children and housework, and activities that she spent time doing for her household.

As shown in Figure 1, the first wave of the COVID-19 pandemic in Tunisia lasted for almost three and a half months. It started after the discovery of the first case on March 02, 2020, and it extended until June 13, 2020, the date of total control of the health situation, where zero new confirmed cases were recorded during several successive days. On March 22, a national lockdown was imposed on the whole country for two weeks, which was extended twice before the return to the targeted lockdown and a total deconfinement on June 07, 2020. To manage this first wave, several measures have been taken, such as cancellation of public events, restrictions on international travel, closure of public transport, stay-at-home obligations, restriction of internal movement, as well as the shutdown of schools and workplaces. All these measures have impacted activities and lifestyle of Tunisian in general and they have changed the labor market outcomes for some categories of the population. They made job-search more difficult or impossible in certain cases. In this regard, Krafft, Assaad and Marouani (2021) estimated that 82 percent of the unemployed in February 2020 remained unemployed in November 2021 and 16 percent of salaried workers in the private sector became unemployed while the public sector remained more protected.

As shown in Table 1, 85.23% of individuals working, in February 2020, in the public and private sectors, as Farmers, business owner or self-employed, kept the same status in October 2020. Individuals who have lost their job represent 11.65% while those who have switched to another status represent 3.11%.

Individuals working as farmers in February 2020 represent 3.75% of the sample, among them 88% remained farmers in October 2020 and 6.67% changed their jobs while 5.33% fell into unemployment. 84.48% of business owners or self-employed included in the sample kept the same status in October 2020 and 5.87% switched to another status. In addition, 9.65% of this category became unemployed in October 2020.

On the other hand, we estimated 94.42% of public sector employees remained in the same status, this proportion is estimated at 81.98% for private sector employees. Workers who changed their status in October 2020 represent 1.23% and 2.13% for the public and private sectors respectively. However, our results show that 4.30% of public workers and 15.89% of private sector employees lost their jobs in October 2020. Also, 22.22% of individuals who were unemployed and 4.67% of those who were out of the workforce in February 2020 found a job in October 2020.

Currently, it is increasingly being recognized that the health costs of COVID-19 are not limited to physical health but include the effects of the pandemic on the individual's mental or psychological well-being, especially for those who have lost their jobs. The job loss means not only the loss of income and benefits, but also the loss of their identities.

In this research, the mental health of individuals is measured from the WHO-5 items-questionnaire presented in Table 2 and which was introduced in the survey questionnaire under the "Mental Health" module (OAMDI,2021).

The WHO-5 is a short questionnaire consisting of 5 simple items, which tap into the subjective well-being of the respondents. The WHO-5 was derived from the WHO-10, which in turn was derived from a 28-item rating scale used in a WHO multicenter study in 8 different European countries. The 10 items making up the WHO-10 were selected from among these 28 items on the basis of a non-parametric item response theory analysis, which identified the 10 most valid items from the original 28-item scale. The items for the 28-item scale were selected from the Zung scales for depression, distress and anxiety as well as from the General Health Questionnaire and the Psychological General Well-Being Scale. The WHO-5 items (Table 2) are: (1) 'I have felt cheerful and in good spirits', (2) 'I have felt calm and relaxed', (3) 'I have felt active and vigorous', (4) 'I woke up feeling fresh and rested' and (5) 'My daily life has been filled with things that interest me'. The respondent is asked to rate how well each of the 5 statements applies to him or her when considering the last 14 days. Each of the 5 items is scored from 5 (all of the time) to 0 (none of the time). The raw score ranges from 0 to 25, 0 representing worst possible and 25 representing best possible mental health. From these total scores, we will identify the following three syndromes: Depressed mood (B1), reduced energy (B2), and loss of interest (B3). These three syndromes will allow us to classify individuals in three depression types (mild, moderate and severe).

### **3. Methodology**

To examine the impact of job loss during the covid-19 period on the mental health of Tunisian workers, we use a methodology based on the counterfactual decomposition technique popularized by Blinder (1973) and Oaxaca (1973) and the potential outcome approach.

In the first step, we will calculate a mental health score  $S_i$  for all individuals. If the individual has scored 0 to 2 on item 1, he is considered in a depressed mood (B1), the individual is in decreased energy (B2) if he has scored 0 to 2 on either item 3 or 4 and he is in Loss of interest (B3) if he has scored 0 to 2 on item 5. On the other hand, we assume that individuals suffer from mild depression if they have syndrome B1 or Syndromes (B2 and B3). We consider those

having the syndromes (B1 and B2) or (B1 and B3) as individuals with moderate depression. The depression is severe if individuals have all three syndromes (B1, B2 and B3).

Then, we will identify the individuals who lost their jobs following the social distancing measures applied to Tunisians during the period of the first wave. We will follow the same identification strategy used in Krafft, Assaad and Marouani (2021). Workers who lost their jobs are those who were working in the private sector, in the public sector or as self-employed in February 2020, and who became unemployed (self-reported, using a broad definition of unemployment that does not require search) by October 2020. Workers who have switched positions or activity sector are excluded.

Then, the individuals will be grouped into two sub-populations: the first one, denoted "L", will include those who have lost their jobs. The second group will be denoted "NL" and includes individuals whose status in the labor market remains unchanged.

The objective of this paper is to identify and quantify the effect of job loss on the mental health of the first group "L". For this purpose, we will use the Blinder and Oaxaca decomposition to explain the mean difference in  $S_i$  (outcome variable) between the two groups (Group\_1 "L" and Group\_2 "NL") and determining the factors contributing to that difference. We model separately, in the group "L" and the group "NL", a linear relation between the variable of interest  $S_i$  and its determinants as:

$$S_i = \beta_{L0} + \sum_{i=1}^k X_{ik}\beta_{Lk} + \varepsilon_{iL} \quad \forall i \in L$$

$$S_i = \beta_{NL0} + \sum_{i=1}^k X_{ik}\beta_{NLk} + \varepsilon_{iNL} \quad \forall i \in NL$$

where  $X_{ik}$  is a set of predictors,  $\beta_{g0}$  the constants,  $\beta_{gk}$  the parameters to be estimated, and  $\varepsilon_{gL}$  is the terms error,  $g: \{L, NL\}$ . We note  $\bar{S}_L$  and  $\bar{S}_{NL}$  the means of the explained variable in the two groups (L and NL). That is:

$$\bar{S}_L = \hat{\beta}_{L0} + \sum_{i=1}^k \bar{X}_{Lk}\hat{\beta}_{Lk}$$

$$\bar{S}_{NL} = \hat{\beta}_{NL0} + \sum_{i=1}^k \bar{X}_{NLk}\hat{\beta}_{NLk}$$

The mean outcome difference can be expressed as the difference in the linear prediction at the group-specific means of the regressors. That is,

$$\begin{aligned} \bar{S}_{NL} - \bar{S}_L &= \hat{\beta}_{NL0} + \sum_{i=1}^k \bar{X}_{NLk}\hat{\beta}_{NLk} - \hat{\beta}_{L0} - \sum_{i=1}^k \bar{X}_{Lk}\hat{\beta}_{Lk} \\ &= \hat{\beta}_{NL0} + \sum_{i=1}^k \bar{X}_{NLk}\hat{\beta}_{NLk} - \sum_{i=1}^k \bar{X}_{Lk}\hat{\beta}_{Lk} + \sum_{i=1}^k \bar{X}_{Lk}\hat{\beta}_{Lk} - \hat{\beta}_{L0} - \sum_{i=1}^k \bar{X}_{Lk}\hat{\beta}_{Lk} \end{aligned}$$



$$= \underbrace{\sum_{i=1}^k (\bar{X}_{NLk} - \bar{X}_{Lk}) \hat{\beta}_{NLk}}_{\hat{\delta}_x \text{ (explained component)}} + \underbrace{(\hat{\beta}_{NLO} - \hat{\beta}_{LO}) + \sum_{i=1}^k \bar{X}_{Lk} (\hat{\beta}_{NLk} - \hat{\beta}_{Lk})}_{\hat{\delta}_s \text{ (unexplained component)}}$$

According to this decomposition, the mean differences in the mental health scores may differ from one group to another for two reasons: First, because the characteristics are not the same in the group "L" and in the group "NL" (differences in the predictors). This explained part of the deviation is denoted by  $\hat{\delta}_x$  and is known as "the endowments effect" (Ben Jann; 2008). The second part noted as  $\hat{\delta}_s$  measures the contribution of differences in the coefficients (including differences in the intercept) and designates the unexplained difference since the differences in observable characteristics do not allow us to account for it.

In several studies, this unexplained part measures the discrimination between two groups (Ref), that is to say a difference in treatment which is only due to the fact of belonging to one group rather than the other. In other words, this difference can be assimilated to a causal effect under the hypothesis of conditional independence within the framework of the potential outcome approach (Rubin,1974). Explicitly, the treatment variable corresponds to the membership variable to the group "L", which is a dummy variable  $T$ :  $T_i = 0$ , if the individual  $i \in NL$  and  $T_i = 1$  if the individual  $i \in L$ .

Given  $S_i$  the outcome variable, then  $S_i(0)$  if  $T_i = 0$  and  $S_i(1)$  if  $T_i = 1$ . At any given point in time, for a given individual, we do not observe the two potential mental health scores at the same time, but only the effective realization of the outcome variable depending on whether the individual belongs to the "L" group or to the "NL" group:  $S_i = (1 - T_i)S_i(0) + T_iS_i(1)$ . Based on the Stable Unit treatment value assumption (STUVA), Rubin defines the treatment effect (the impact of job loss) as the quantity  $S_i(1) - S_i(0)$  and the Average Treatment effect on the Treated (ATT) as:

$$ATT = E [S_i(1) - S_i(0)|T_i = 1] = E [S_i(1)|T_i = 1] - E [S_i(0)|T_i = 1]$$

the Average Treatment effect on the Treated can be estimated empirically by the component unexplained resulted from the decomposition of Blinder-Oaxaca, given the average characteristics in the "L" group valued as that of the individuals of the "NL" group (noted as,  $\sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{NLk}$ ) is a consistent estimator of  $E [S_i(0)|T_i = 1]$ .

## 4. Results and Discussion

### 4.1 General Assessment of Mental Health Indicators

In Table 3, we calculated seven mental health indicators for all individuals included in the sample. As mentioned above, the raw total scores are derived from the WHO-5items-questionnaire and range from 0 to 25, 0 representing worst possible and 25 representing best

possible mental health. These scores are generally compared with the mean score of the population. Our results show that 37.75% of individuals have overall mental health scores lower than the mean population score (estimated at 16,921). This rate varies according to the socio-demographic characteristics of individuals. 41.7% of individuals living in rural areas have scores lower than the average score of the total population, while this rate is estimated at 36.06% for people living in urban areas. A slight difference is observed between the estimated rate for men (38.52%) and that estimated for women (36.65%). However, this rate varies considerably depending on the age group. 31.65% of individuals between 18 and 29 years old have scores lower than the mean score of the population, while this rate exceeds 44% for people between 50 and 64 years old. Similarly, we have estimated the highest rates among individuals living in large families, it is around 40%. This rate drops to 36.64 for individuals living in households made up of 3 to 4 people and to 33.33% for households made up of one or two individuals. Conversely, this rate decreases each time the level of education becomes higher. It is estimated to be over 40% for individuals with basic and less than basic levels and it is estimated at 27.7% for individuals with higher education level. This rate is equal to 39.15% for married individuals against 32.85% for not married individuals (Never married, divorced or widowed). Those living with children under age six at Home have the highest rates (39.18%).

On the other hand, the third column of Table 3 presents the proportions of people suffering from depressed mood, Decreased energy and loss of interest. Our results show that 29.2% of individuals have a depressed mood after the first wave of covid-19 in Tunisia. The highest rates are estimated among individuals aged over 50 (34.9%); individuals with a less than basic educational level (37.5%), individuals living in families made up of at least 5 people (32.05%), married people (30.89%) and among women (29.5%). the second symptom is Decreased energy. The highest rates are estimated for men (34.86%) and it is present in people aged 40 and over (37%).

Furthermore, 41.66% of individuals with less than basic educational level suffers from this second symptom. For individuals living with children under age six, this rate is estimated at 38.5%. As for the third symptom, our estimates show that only 10.5% of individuals feel loss of interest. Unlike the other two symptoms, loss of interest is present more in individuals aged between 30 and 39 years, individuals living in households made up of one or two people and not married persons with rates estimated respectively at 11.28%, 11.25% and 13.6%.

From these three symptoms, we were able to classify individuals into three types of depression namely, mild, moderate and severe. 31.6% of the individuals included in the sample suffer from mild depression. the highest rates are estimated among men (32.14%), individuals aged between

50 and 64 years (37.92%), married people (33.09%) and those who have not completed the basic educational level (40.83%). This Mild depression includes individuals who have either the depressed mood symptom or both symptoms at the same time (Decreased energy and loss of interest).

Moderate depression is identified in individuals with two symptoms at the same time, either depressed mood and Decreased energy or Depressed mood and loss of interest. We estimated 20.2% of people with moderate depression whose women are the most affected (20.87%) compared with men (19.72%) and individuals over 50 years with an estimated percentage of 24.90%. On the other hand, this rate of young people aged between 18 and 29 years is estimated at 14.78% and it is estimated at 12.74% for individuals who have completed a higher educational level. The lowest rates are estimated for unmarried individuals (16.75%) and for those living in a family of no more than two people (15.83%).

Individual is considered to be in severe depression, if he is in depressed mood, decreased energy and loss of interest at the same time. our estimates show that 4.1% of people have severe depression. Similar to the other two types of depression, the highest rates are estimated among individuals aged between 50 and 64 years (5.47%), among those living in large families (4.6%) and individuals with an educational level less than basic (6.04%). This rate decreases when the educational level becomes higher.

on the other hand, no difference was observed between married and unmarried individuals and between individuals living with children under age six or not. However, a clear difference can be observed between individuals who lost their jobs (hereafter, "group\_1») and those who remained in the same status in the labor market during the covid-19 crisis (hereafter, "group\_2").

#### **4.2. Job loss and Mental Health indicators**

As illustrated in figure 2, all the mental health indicators of individuals keeping their employment status, are significantly better than those estimated for individuals losing their job. The percentage of individuals with mental health scores lower than the mean score of the total population is estimated at 37.83 in the second group, while this rate reaches 43.83% in the first group.

In addition, the three symptoms of depression are more present in the individuals of the first group. Our results show that 34.93% of group\_1 have a depressed mood, while it is estimated at 29.4% for the second group. Also, 47.26% of individuals in the first group felt a Decreased energy, while this rate is estimated at 32.95% in the second group. Regarding the loss of interest,

we estimated that this symptom was present in 14.39% of the first group and did not exceed 10% in the group\_2.

On the other hand, more than 40% of the individuals who lost their jobs were in mild depression, however this rate is estimated at 31.36% of the individuals included in the second group. We estimated that more than a quarter of the first group was in moderate depression and about 5.5% in severe depression. However, these two types of depression (moderate and severe) present 19.85% and 3% of individuals in the second group, respectively.

To understand this difference, we present in the following an in-depth analysis. We attempt to explain the difference in mental health scores between individuals who remain in the same labor market status and those who have lost their jobs. To do this, we used the Blinder-Oaxaca decomposition which allowed us to estimate two components (explained and unexplained).

In Table 4, we present the three regressions used to estimate the two components. The difference between the mean scores of two groups is regressed on a set of explanatory variables included in a pooled combined as recommended by Jann (2008). These variables are the age, sex and marital status of the individual; educational level; respect for social discrimination; household income stability; the size of the household, the presence of children aged under six at home and the level of fear of individuals concerning the economic situation of the country. Most variables are significant at 5% with the exception of education level which is significant at 10% and age at 15%. however, we found that the two variables (Gender and marital status) are not relevant in the pooled model.

In Table 5, the decomposition output reports the mean predictions by groups and their difference in the first panel. In our sample, the mean of mental health scores is 17.03 for individuals in the second group (unaltered status) and 15.15 for the first group (Job loss), yielding a scores gap of 1.88.

In the second panel of the decomposition output, the scores gap is divided into two parts.

The first part reflects the mean improvement in the scores of the individuals of the first group if they had the same characteristics as the individuals of the second group. Differences observed in the stability of household income account for about 80% the explained part of outcome differential, whereas the other variables do not seem to matter much.

The second part quantifies the change in the scores of individuals who lost their jobs when applying the coefficients estimated from the pooled model to the first group characteristics. This part unexplained by the differences in the characteristics of two groups, can due to the fact of belonging to one group rather than the other. In other words, it is the average effect of job loss on the mental health of individuals in the first group.

## **6. Conclusion and Policy Recommendations**

In this paper, we investigated the impact of job loss on the mental health of individuals in Tunisia during the covid-19 crisis using several mental health indicators and on the basis of the counterfactual decomposition technique. The data used in this work are derived from the ERF COVID-19 MENA Monitor Household Survey fielded primarily in November 2020. This survey covered, among others, demographic and household characteristics, education and children, labor market situation, employment and detection of unemployment, attitudes towards risks and mental health.

The mental health module is based on the WHO-5 items which tap into the subjective well-being of the respondents. From this module, we calculated seven mental health indicators for all individuals included in the sample. These indicators are the proportion of people with a gross total score lower than the average population score, three depression symptoms (depressed mood; Decreased energy and Loss of interest) and three types of depression (mild, moderate and severe). The results obtained show that three out of ten people were in depressed mood between October and November 2020. The decreased energy symptom has been present in four out of 10 people, particularly in individuals aged between 50 and 64 years and those with less than basic education regardless of their ages. Compared to the other symptoms, the loss of interest symptom was not dominant during the covid-19 crisis. In addition, almost one third of the individuals included in the sample were mildly depressed and fifth of them suffered from moderate depression, and almost 41 in a thousand individuals experienced severe depression.

On the other hand, our findings have shown that the age of individuals and the size of the household are two factors that can influence the mental health of individuals. Also, having a higher level of education can strengthen individuals' resilience against mental effects during the covid-19 crisis. However, we have not been able to observe that the mental health indicators constantly differ according to the sex or the marital status of the individuals. These last two variables also did not contribute to the explanation of differences in mean scores calculated for individuals who lost their jobs and those who remained in the same status in the labor market before the covid-19 crisis.

By applying the counterfactual decomposition technique, our results show that mental health is significantly better in the second group compared to that in the first group. There is clear evidence that the instability of household income, caused by job loss, has significantly contributed to the worsening of the mental health of individuals.

By decomposing the difference in mean scores of two groups, no evidence shows that age, household size, fear of the country's economic situation can explain the difference observed between the scores of individuals who lost their jobs and those of second group remaining in the same status. This difference is mainly due to the household income stability variable which in turn is strongly linked to the protection of employment status in the labor market. These results call into question the effectiveness of social measures and the decisions taken during this period of crisis, in particular the aid granted to companies to encourage them to grade their workers.

From this research, several policy and suggestions can be recommended. Other than the financial aid to encourage firms keeping their workers, it should have put in place psychological support policies intended for vulnerable groups such as the elderly individuals and those with a low level of education. These can strength the capacity to resist against health shocks such as the crisis caused by covid-19. There is an urgent need to set up a job loss insurance system managed by an independent fund bringing together employees made redundant for economic or technical reasons, as well as another group of graduates who have completed their higher education and have been unemployed for some time by supporting and accompanying them in the implementation of projects. These unemployment benefits even though they may seem costly for the time being, their positive effects on social and economic conditions in the long run are highly important. They keep the unemployed linked to the labor market, avoiding in this way more costly economic, social and mental health consequences in the future. In addition, encouraging informal workers to participate in the social security system in order to receive benefits in the event of job loss or at the old age.

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## Figures

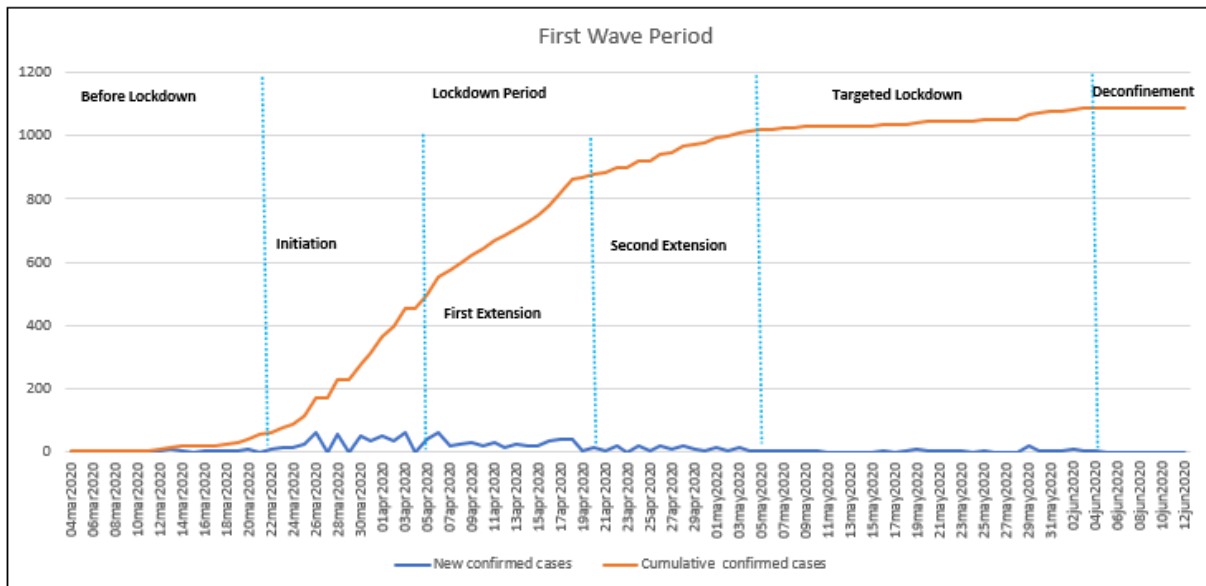


Figure 1: Evolution of Cumulative Confirmed COVID-19 Cases and Daily New Confirmed Cases During the First Wave in Tunisia

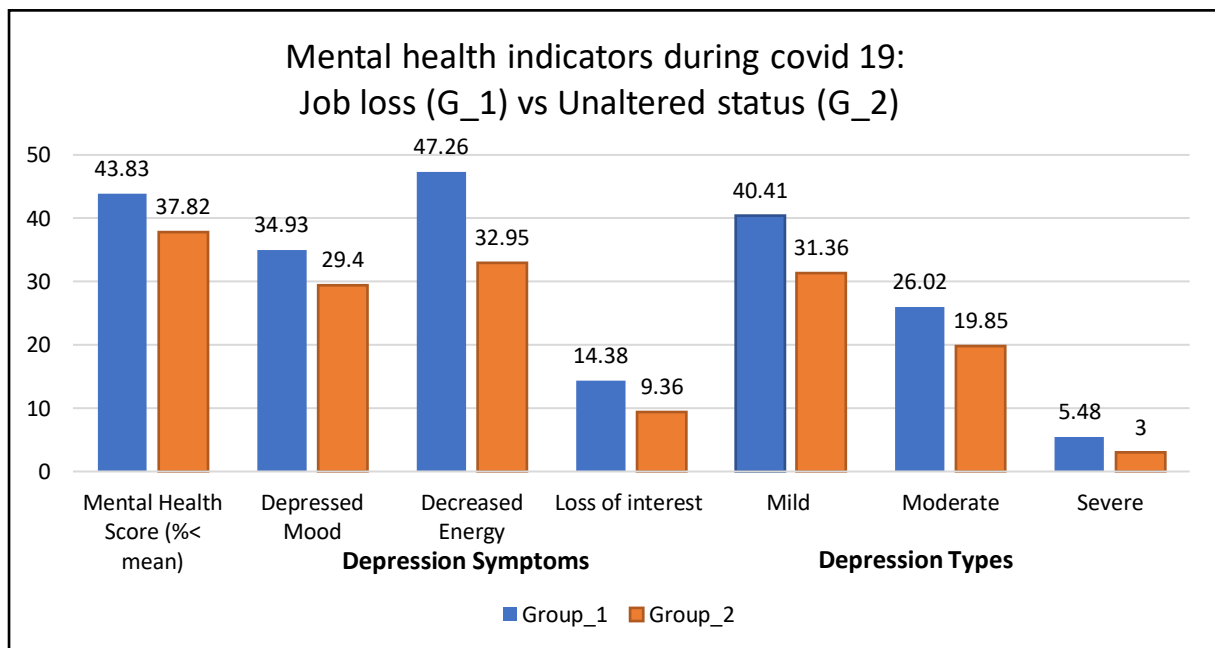


Figure 2: Comparison of Mental Health indicators between G\_1 and G\_2

## Tables

Table 1: Labor Market Outcomes transition between February and October 2020

Labor market status in February 2020	Labor market Status in October 2020				
	Sample Size	Sample share (%)	keeping the same status	Transition to Unemployment Job loss	Switched to another status
Farmer	75	3.75	88	5.33	6.67
Business owner/self employed	290	14.50	84.48	9.65	5.87
Public wage	233	11.65	94.42	4.30	1.28
Private wage	655	32.75	81.98	15.89	2.13
Total	1253	62.65	85.23	11.66	3.11
Unemployed	126	6.30	77.78	0	22.22
Out of Labor force	621	31.05	93.08	2.25	4.67
Total	2000	100			

Table 2: The WHO-5 Well-Being Scale. Instructions and scoring principle.

The WHO-5- questionnaire						
Over the past 2 weeks...	All of the time	Most of the time	More than half the time	Less than half the time	Some of the time	At no time
1- I have felt cheerful and in good spirits	5	4	3	2	1	0
2- I have felt calm and relaxed	5	4	3	2	1	0
3- I have felt active and vigorous	5	4	3	2	1	0
4- I woke up feeling fresh and rested	5	4	3	2	1	0
5- My daily life filled with things that interest me	5	4	3	2	1	0

Table 3: Mental Health: Score, Symptoms and Depression Types

	Mental Health score (% <mean)	Symptoms			Depression Types			
		B1	B2	B3	Mild	Moderate	Severe	
Overall	37.75	29.2	34.4	10.5	31.6	20.2	4.1	
Location	Rural %	41.7	31.15	39.86	13.4	34.33	22.11	6.36
	Urban %	36.06	28.36	32.07	9.26	30.43	19.38	3.13
Gender	Female%	36.65	29.5	33.73	6.91	30.82	20.87	2.8
	Male %	38.52	29	34.86	13.01	32.14	19.72	5.01
Age	18-29	31.56	24.27	29.19	10.95	26.09	14.78	2.55
	30-39	36	25.38	33.40	11.28	28.41	17.35	4.12
	40-49	39.47	32.32	37.1	9.32	34.05	24.07	4.33
	50-64	44.15	34.9	38.3	10.37	37.92	24.90	5.47
HH size	1-2	33.33	25	31.25	11.25	28.75	15.83	3.75
	3-4	36.64	27.3	33.57	10.04	29.66	18.91	3.66

	≥ 5	39.93	32.05	36	10.72	34.13	22.53	4.6
Marital status	married%	39.15	30.89	35.77	8.72	33.09	22.16	4.08
	not married %	32.86	26.23	32	13.6	29	16.75	4.12
Education levels	Less than basic%	45.83	37.5	41.66	13.54	40.83	25.41	6.04
	Basic %	42.33	30.33	42	15.33	35.33	23.66	5
	Secondary%	36.87	29.15	32.54	9.54	30.71	20	4.05
	Higher education%	27.7	19.78	24.83	5.71	20.87	12.74	1.53
Children under six at Home	Yes %	39.18	27.6	38.5	9.88	30.32	19.93	4.25
	No %	37.15	29.86	32.7	10.75	32.13	20.31	4.03

B1: Depressed Mood; B2: Decreased Energy and B3: Loss of interest

Table4: Covariates and Regression results

Covariates	Sample Label	Model 1	Model 2	Pooled Model	
		coefficients	coefficients	coefficients	Sig <sup>a</sup>
Age	COR5	-.0367043 (0.02) <sup>b</sup>	.0024046 (0.05)	-0.0307464	*
Education level	COR14	.2808552 (0.18)	.7900822 (0.54)	0.3266413	**
Respect of Social Distance	COR41	-2.149504 (0.59)	-4.354863 (1.92)	-2.365476	***
Marital Status	COR7	.4238517 (0.45)	.1614637 (1.30)	0.3738509	
Household's income Stability	COR23	.9258828 (0.17)	.9668539 (0.55)	0.9380525	***
Gender	COR6	-.6071867 (0.44)	1.797182 (1.27)	-0.2722172	
HH size	COR9	-.2341163 (0.09)	.0961547 (0.28)	-0.2081632	***
Worry about Economic Situation	COR35	-.3739039 (0.18)	-.8723501 (0.54)	-0.4268047	***
Constant	--	20.37894 (1.59)	15.94243 (4.63)	19.95548	***

(a)\* significant at 15%, \*\* significant at 10%, \*\*\* significant at 5%. (b) Standard deviation

Table 5: Blinder-Oaxaca Decomposition Outcomes

Blinder-Oaxaca decomposition		Number of obs = 1,214				
1: T = 0						
2: T = 1						
Scores	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
<b>Differential</b>						
Prediction_1	17.0309	.1914163	88.97	0.000	16.65573	17.40607
Prediction_2	15.15068	.5760496	26.30	0.000	14.02165	16.27972
Difference	1.880214	.6070201	3.10	0.002	.6904765	3.069951
<b>Decomposition</b>						
Explained	0.6219107	.178526	3.48	0.000	.2720061	.9718152
COR5	-0.0705					
COR14	0.0853*					
COR23	0.4930***					
COR9	0.0825*					
COR35	-0.0381					
Unexplained	1.258303	.5901864	2.13	0.033	.1015592	2.415047

\* Significant at 15%, \*\*\* significant at 5%.