



## The Effects of the COVID-19 Pandemic on Iranian Female Unemployment in Relative to Male Unemployment

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### Abstract

COVID-19 emerged in late 2019 in Wuhan, China, and the new coronavirus quickly spread across the globe. The COVID-19 epidemic wreaked havoc on the economy and put people's lives and health at risk. The effect of COVID-19 on the labor market was characterized by a growing unemployment rate in many economies, which deteriorated the employment prospects of millions of people, especially women. This study aims to examine the impact of COVID-19 on female unemployment relative to male unemployment in the Iranian economy using the Vector Autoregressive (VAR) model. Although both male and female workers have been affected by the COVID-19 pandemic, our findings indicate that women have been more severely affected by COVID-19. In other words, women lost their jobs more quickly and for longer durations than men. Our findings show that because of the COVID-19 outbreak in Iran, female workers were more likely to be hurt and harmed than males. The impact of this shock on the labor market can be mitigated by policies such as banking system credits, unemployment insurance, tax exemptions for unemployed women, and the use of technology to promote remote working for female workers.

**Keywords:** COVID-19, Epidemic, Female Unemployment, Unemployment, VAR.

**JEL Classification:** C22, I15, J16, J65.

### 1. Introduction

COVID-19 has demonstrated itself to humans by daily victims and fatalities. Economic shocks have been reported in all nations as a result of the global incidence of COVID-19. Preventive measures, such as quarantine (lockdown), have been implemented to stop the spread of COVID-19. As a result of these policies, there was a significant impact on the economic performance of many

nations. Due to the negative effect of COVID-19 on production capabilities, the adverse effects of the virus on economic performance are readily apparent; the IMF<sup>1</sup> estimated that global economic growth in 2020 was around -3.2% lower than in 2019. Additionally, Iran's economic growth was estimated by the IMF to be -2.6% in 2020, a decline of more than 5% from pre-COVID-19 levels. By reducing overall economic demand, the recession caused by COVID-19 may be similar to the one caused by the 2003 SARS<sup>2</sup> pandemic.

One of COVID-19's most severe consequences was on the labor market. Employment has always been a critical dimension of human existence. When children grow up in a family, they acquire social skills and learn how to build a new life for themselves through their work and careers. Employment is a crucial component of life that is badly impacted by the COVID-19 epidemic. According to the ILO<sup>3</sup>, 5% of female and 3.9% of male workers have become unemployed as a result of the COVID-19 epidemic. Numerous men and women have experienced a temporary loss of employment and were jobless. According to the G20<sup>4</sup>, the average reduction in working hours during the COVID-19 crisis was six degrees greater than during the global financial crisis<sup>5</sup>.

Women were not protected from the effects of labor market instability during the COVID-19 outbreaks, resulting in catastrophic damage. Coach et al. (2022) demonstrated that women were more negatively affected by the COVID-19 outbreak than men, and it contributed to gender inequality in the labor market. In addition, according to the Department of National Statistics in Iran, female employment was affected by COVID-19 and increased during the first half of 2020. With substantial changes in Iran's social and cultural attitudes, work for women has been redefined as an economic demand. The Iranian female workers outnumber males in the service sector, which was the most susceptible economic sector during the COVID-19 epidemic.

Goldin, C. (2022) hypothesized that women were more concerned about the negative effects of COVID-19 on the labor market; hence, this study aims to address this hypothesis. It is critical to analyze women's unemployment rates

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<sup>1</sup>. International Monetary Fund

<sup>2</sup>. Severe acute respiratory syndrome (SARS), a viral disease that first identified in 2003 in China.

<sup>3</sup>. International Labor Organization

<sup>4</sup>. Group of 20

<sup>5</sup>. The global financial crisis was the worldwide economic crisis that occurred in 2007-2008.

during the COVID-19 epidemic since women's sensitivity to economic shocks was often greater. Women's unemployment, in particular, can have economic and social effects, most of which will be detrimental for many years. It is critical to comprehend the negative aspects of COVID-19, as they influenced economic policy.

## **2. Literature Review**

The emergence of the COVID-19 pandemic signaled the onset of uncertainty in all domains, including economics. One of these crucial fields was employment, which has different effects on men and women. Women have distinct experiences as a result of their various responsibilities. The objective of this section is to review past infectious diseases and their consequences on the economy, followed by a discussion of the status of women during the COVID-19 pandemic in terms of uncertainty. Furthermore, expressing concerns about instability in other fields, such as the price of oil and the dollar as a critical proxy of global economics, led to a more comprehensive explanation of the instability during the COVID-19 pandemic.

### **2.1 The Economic Impact of Infectious Diseases: Instability**

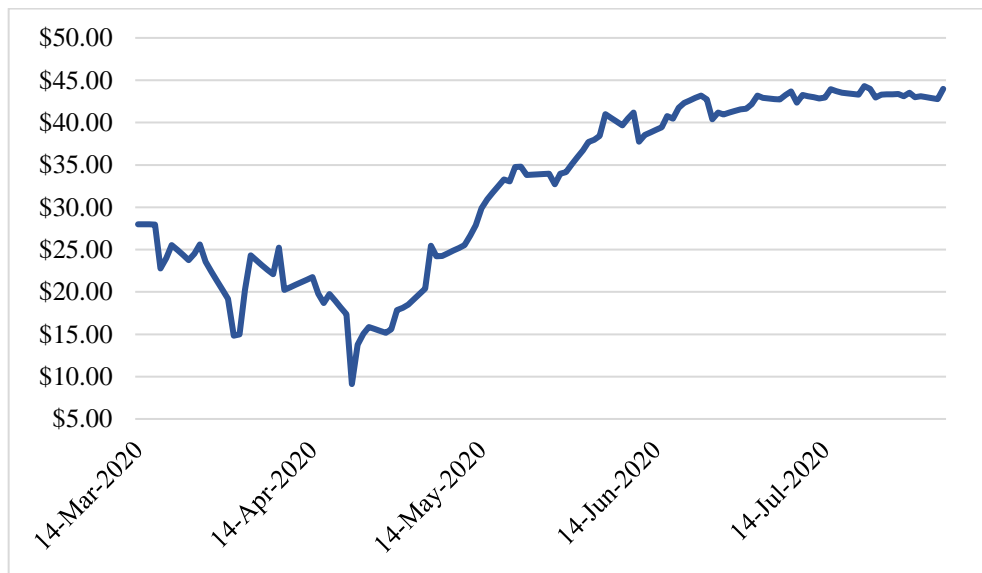
Kostova et al. (2020) examined the severity of the SARS pandemic. Their analysis revealed the loss of around 61,200 jobs in the American export sector. Ceylan and Ozkan (2020) found that SARS had a negligible effect on the per capita gross domestic product of various nations. Moreover, Tanaka (2022) noted that the fear of infectious diseases such as the COVID-19 pandemic has a negative influence on the economies in Asian nations that have experienced SARS previously. Finally, it is critical to address this issue; countries that have experienced SARS have increased their vulnerability to the COVID-19 pandemic.

Like earlier shocks, there was considerable uncertainty over the impact of COVID-19. Nevertheless, it was the same in more complicated circumstances. The International Monetary Fund has ranked COVID-19's shock as the worst of all shocks. Bianchi et al. (2021) identified the COVID-19 employment shock as being three times more harmful than previous market shocks. The COVID-19 experience has taught countries a great lesson. According to Ke and Hsiao (2022), China is affected by the COVID-19 epidemic. It witnessed a 37% reduction in total GDP and a 31% decrease in the service sector. Stiglitz (2021) emphasized the COVID-

19 importance of the shock in the past, and he believes that the contemporary world is erroneously thinking that the economy would quickly recover to pre-pandemic levels.

In 2020, the IEA<sup>1</sup> reported that countries had seen a 25% weekly decline in oil demand since April. The oil price can be viewed as an indication of COVID-19's impacts on the world economy and trade. For instance, in the early months of 2020, the price of Brent oil fell precipitously to one-third of its previous level (Figure 1).

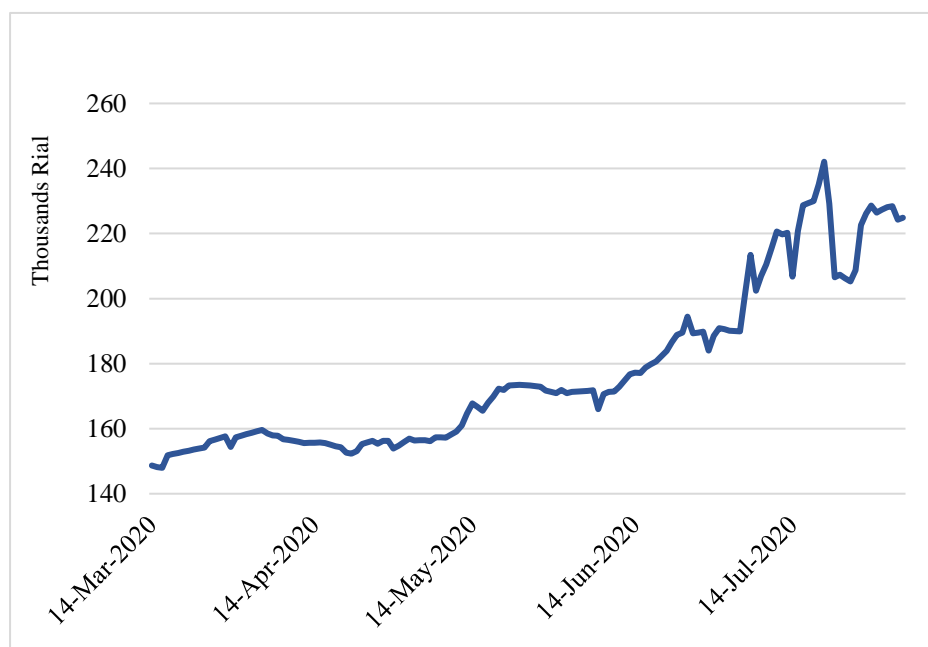
Another important aspect is the fluctuation of the exchange rate. Exchange rate fluctuations have had significant negative effects on the economies of countries. Iran's economy also experienced severe fluctuations in the exchange rate during this period (Figure 2), which had many negative effects on the production sector.



**Figure 1.** Daily Price of Brent Oil

Source: [www.investing.com](http://www.investing.com)

<sup>1</sup>. International Energy Agency



**Figure 2.** Daily Dollar Exchange Rate  
**Source:** Iran's national statistics department.

Furthermore, global trade was another sector that may have seen upheaval as a result of COVID-19. The WTO<sup>1</sup> reported that the trade volume of commodities had been significantly lower in 2020. The volume of global service exports decreased from 50 units in 2019 to 21.7 by the end of 2020. Iran's commerce, according to this group, was likewise at \$ 66 billion in 2019 but fell to \$ 54 billion in 2020.

## 2.2 Unemployment via the Eyes of the COVID-19

According to the International Labor Organization, an employed person is someone who is fifteen years of age or older and has worked for pay or profit for at least one hour per week. According to US statistics, men's unemployment jumped from 3.6 to 13.5% during the first six months of the COVID-19 pandemic. However, women's unemployment grew by 16.2% in April 2020, indicating that women faced a more significant burden from rising unemployment. According to Villarreal and Yu (2022), women have suffered more than other segments of society during COVID-19 prevalence. The COVID-19 pandemic's impacts on

<sup>1</sup>. World Trade Organization

women's employment were not country-specific but can be detected globally. Reichelt et al. (2021) obtained the following findings by examining women's unemployment statistics in Germany and Singapore during the COVID-19 pandemic:

1. During COVID-19, women worked from home at a rate of 5% higher than men;
2. Women worked 5% fewer hours per week.
3. Since January 2020, women have seen a 3% greater unemployment rate than men.

Lee et al. (2021) concluded that COVID-19's economic effects on women have been improving continuously. According to their research, some of the inequities created by the recession were imperceptible in the short run. However, their catastrophic losses were recouped over time.

In contrast to the 2008 financial crisis, researchers have demonstrated that the COVID-19 epidemic has severe effects on economic activity in the United States (Li, Z et al, 2022). Men's unemployment rate in the United States was higher than women's in 2007 when the global financial crisis began (Gezici and Ozay, 2020). Indeed, men were more employed in industries that were damaged by the 2007 recession. As another comparison between two recent global recessions, Shibata (2020) noted that one of the significant contrasts between the 2007 financial crisis and COVID-19 was the quick drop in women's employment in the COVID-19, where women have played a unique role in the service sector that has been harmed by the COVID-19.

The following are the critical components of COVID-19 that affected women's employment:

### **2.2.1 Child Care**

The upkeep of children was an issue that, as a result of school closures, has prompted mothers to leave their jobs to undertake this chore. At that point, family care tasks evolved unconsciously. The family institution, like unwritten rules, was also impacted by that new job. Augustine and Prickett (2022) projected that mothers increased their time spent caring for their children during the COVID-19 epidemic. 51% of this increase was related to their decreased labor force participation. Alon et al. (2020) calculated that before the COVID-19 pandemic, women were responsible for child care in families with both partners working full-time. Additionally, they have disclosed the hours that women spend on housework

as a result of the school's closure, which resulted in women losing jobs at a higher rate than men.

Russell and Sun (2020) have established a direct link between schools and children's education classes and the rising rate of mother unemployment in Europe. The findings of Dang and Nguyen (2021) concerned the work hour reduction; both men and women faced an increasing amount of time for household activities; however, the time increase for women during the COVID-19 quarantine was more substantial than for men.

### **2.2.2 Medical Care**

The other role that women were reimagining is that of health care providers. Azcona et al. (2020) with the Ebola<sup>1</sup> experience stated that when humans faced this type of disaster, women were put in charge of even the minute's essential health care. Other instances, such as the 1997 financial crisis, demonstrate the need for health care; for instance, women's participation in caregiving activities increased by 6.9% in 1997 in Indonesia. Landivar and de Wolf (2022) showed that in April 2020, the unemployment rate for mothers climbed by 15.7%, which was greater than the 9.6% increase experienced by fathers during the same month. In addition, because of the extra responsibilities brought on by the COVID-19 pandemic, mothers' work has been difficult to recover. According to Seck et al. (2021), women spent three times as much time on health care as men did before COVID-19. These responsibilities, however, have increased in importance during the COVID-19 pandemic.

### **2.2.3 The Status of Women in the Workplace**

In 2021, the United Nations stated that women's employment was at risk. Women were the first to be laid off in the event of a COVID-19 pandemic because of the delicate nature of the workplace, such as forced mitigation and inadequate adherence to labor standards. Desai et al. (2021) also researched the unemployment of men and women in Delhi, India; even though men and women experience similar unemployment rates, women were frequently excluded from the labor force.

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<sup>1</sup>. Ebola virus disease (EVD) was a severe illness that was first identified in 2014 in central Africa.

### **2.3 Iran's Job Market via the Eyes of COVID-19**

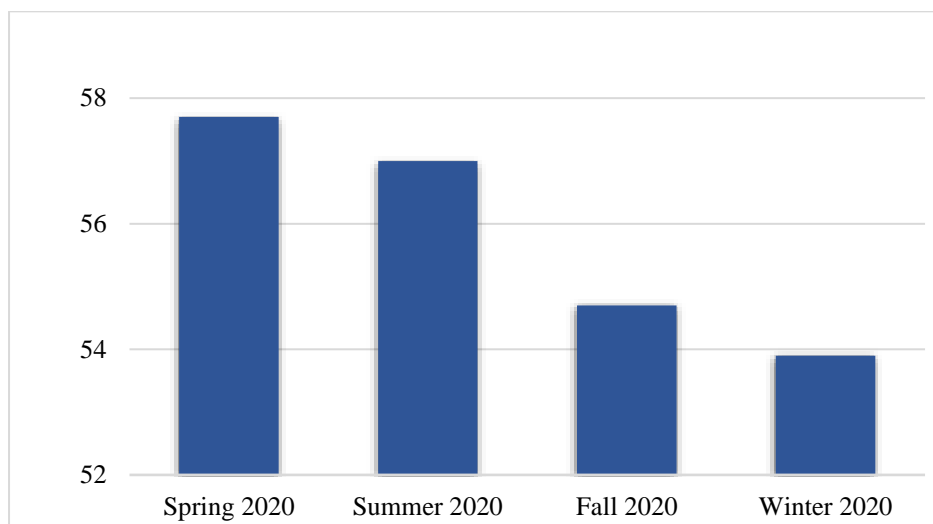
As with other countries, Iran has been affected by the COVID-19 pandemic. In April 2021, The International Monetary Fund estimated that Iran's employment rate was approximately 11.2%. Iran's labor force participation rate has also reduced by around 3% since 2020. Iran's official sources categorized the enterprises harmed by COVID-19 into three categories:

1. Jobs that have seen a significant reduction in demand due to the COVID-19 outbreak impacted family health care, such as travel agency services, hotel operations, and passenger transportation;
2. Certain jobs, including wholesale and retail, legal, and management consulting, were subject to quarantine restrictions due to quarantine rules;
3. The closures have affected careers in education, schools, universities, and sports groups.

The service sector was one of the sectors that had increased worldwide. Additionally, this sector contributed a sizable portion of GDP. In Iran, employed women have a unique role in the service sector. The main factor in growing women's employment in Iran over the last forty years has been their transition from agriculture to the service sector. Additionally, it clearly illustrated the decline in this part throughout the COVID-19 epidemic in Figure 3.

According to Taherpour et al. (2021), numerous workers have left the labor market due to their desperation to find work in the event of a COVID-19 pandemic. The "disappointed worker's situation" demonstrated a drop in the active workforce. This indicates that the unemployed population has ceased looking for work and has shifted their focus to housekeeping or being unemployed. Iran's national statistics department estimated that if 27.9% of the inactive population remained in the job market, the spring 2020 unemployment rate would reach 13.6%, coinciding with the COVID-19 pandemic.

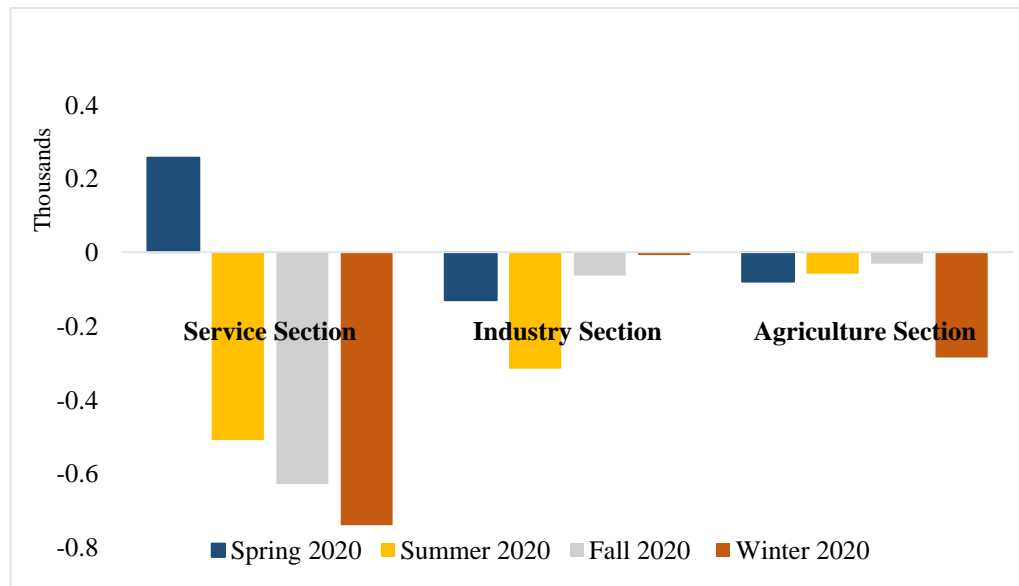




**Figure 3.** Employment of Iranian Women in the Service Sector in 2020

**Source:** Iran's national statistics department.

According to data from Iran's national statistics department, with a 49% decline in employment in the service sector over the summer of 2020, it was clear that the COVID-19 consequences on the Iranian economy have manifested. Furthermore, working hours were decreased by an average of one hour per week. According to Iran's national statistics department, the services sector's economic growth rate was -2% in 2020. This area may also be shocked, as the majority of jobs in the service sector were related to consumer and everyday demand, which was restricted under COVID-19. This harm is depicted in Figure 4.

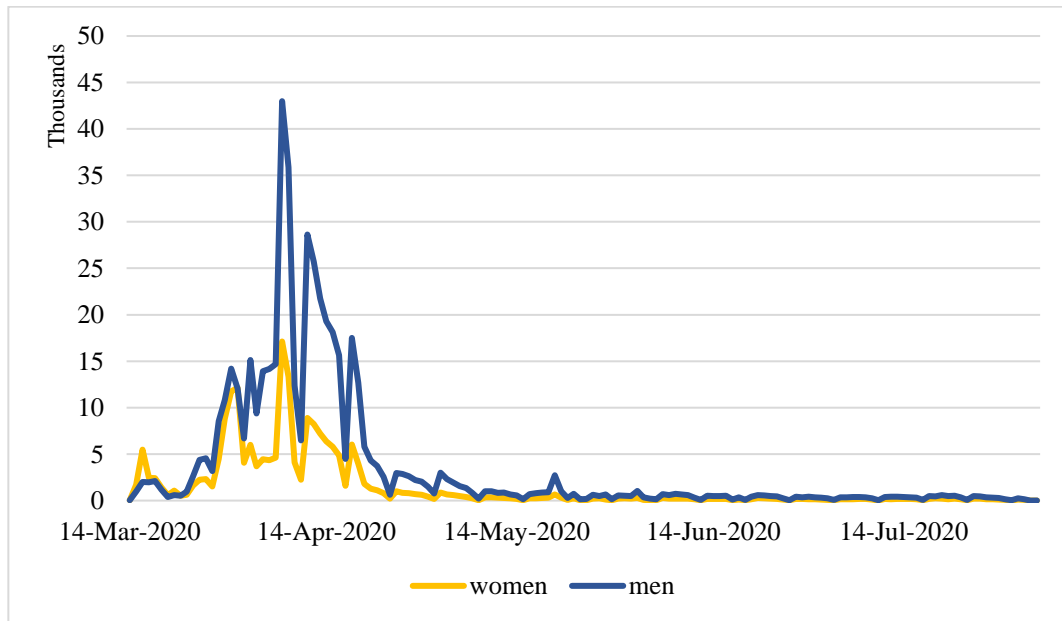


**Figure 4.** Depicts Iran's Employment Mix during the COVID-19 (Thousands Person)  
**Source:** Iran's national statistics department.

### 3. Methodology and Data

The unemployment insurance applicants represent the number of people who lost their jobs during the COVID-19 outbreak. The COVID-19 outbreak had a noticeable impact on the demand for unemployment insurance. Unemployment insurance applicants are divided into two groups based on gender;  $M_t$  for the unemployed men, and  $W_t$  for the unemployed women. As a result of the prevalence of COVID-19 in Iran, the Ministry of Cooperative Labor and Social Welfare established a system for unemployed individuals seeking unemployment insurance. The information used in this study comes from this data source. It should be noted that due to the unavailability of data for COVID-19 prevalence, this is the only data being relied upon. In other words, there were numbers of unemployed women and men, indicating that they were affected by the COVID-19 pandemic. At the time of the outbreak of COVID-19 in Iran, the total number of unemployment insurance claimants was 738,000 people. This variable can discriminate between males and females, allowing for comparisons and interpretations between the two groups. On the other side, 543,000 people were unemployed men, while the remaining 202,000 people were unemployed women. Even though males outnumber women in the labor force COVID-19 workforce, it

is crucial to determine which gender is more likely to be injured by COVID-19. The study’s purpose is to assess the impact of COVID-19 on Iran’s labor market, particularly on women’s unemployment.

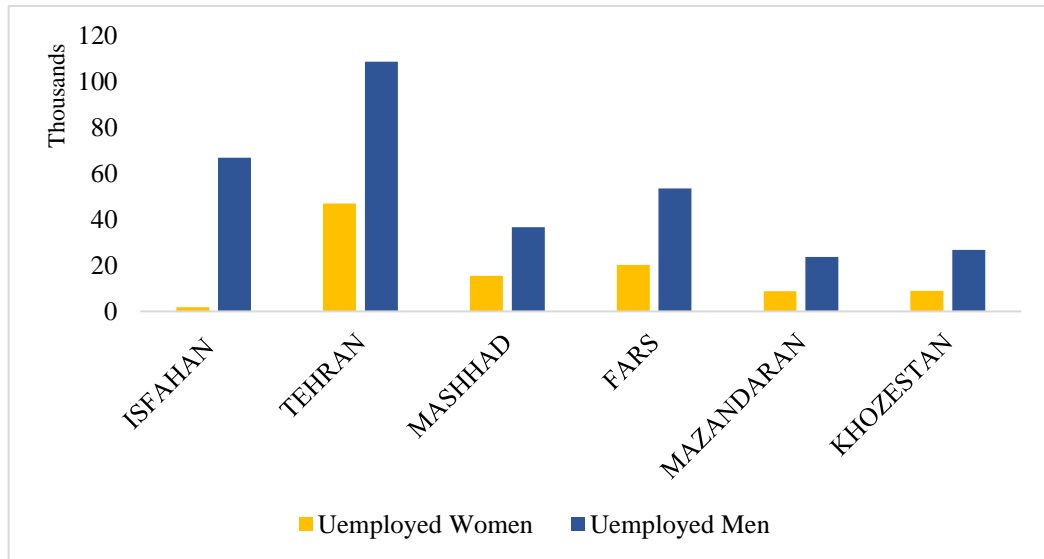


**Figure 5.** Daily Number of Unemployed Iranian Women and Men (Thousands Person)  
**Source:** Ministry of cooperative labor and social welfare.

According to Iran's national statistics department, in the spring of 2020, which corresponded with the COVID-19 pandemic, 62% of Iran’s employed population consisted of men, compared to 38% of women. In other words, the Iranian labor market was comprised of 19 million men and only 3 million women. This makes the employed females react quicker than the employed males. The rapid response of the women to the COVID-19 shock is depicted in Figure 5. In addition, current data can be used to explain male and female unemployment by separating Iran’s major industrial cities, as shown in Figure 6.

The next variable is the patients of COVID-19, which was identified every single day in Iran and increased dramatically during the initial months of the COVID-19 epidemic. The number of patients with COVID-19 indicated the severity of the disease in the population. This variable is displayed by  $dCOV_t$ . According to

Figure 5, the initial rise occurred in March 2020, followed by a fall and a subsequent increase.



**Figure 6.** Number of Unemployed in Iran's Key Industrial Cities (14 Mar - 04 Aug 2020) (Thousands Person)

**Source:** Ministry of cooperative labor and social welfare.



**Figure 7.** Daily Number of COVID-19 Patients in Iran (Person)

**Source:** Ministry of health, treatment, and medical education.

According to prior claims, one of the crucial variables in Iran’s economy is oil price, which had a significant impact. The oil market is completely connected to worldwide trade and demand. During this period, the oil variable impacted the Iranian economy through two channels. The first is the oil price, and the second is the oil price as an indicator of the world economy. In other words, falling oil prices led to a decline in Iran’s oil earnings and a worldwide economic downturn, both of which had negative effects on output and employment.  $dOIL_t$  demonstrates this variable. The prevalence of COVID-19 has limited international trade and Iranian foreign exchange earnings. The fall in foreign exchange revenues caused some modifications. In other words, Iran was required to import intermediate goods, capital goods, and raw materials. In this process, the rising exchange rate led to production constraints, and this issue had a direct impact on employment which is shown by  $dEX_t$ .

VAR models are commonly used to obtain information about data description, policy analysis, and forecasting. This study employed a vector autoregressive model to investigate the unemployed response to the COVID-19 epidemic. The following equations can be written based on the VAR model and defined variables.

$$\text{VAR}(i): M_t = \sum_{i=1}^{\infty} \phi_1 M_{t-i} + \sum_{i=1}^{\infty} \phi_2 dCOV_{t-i} + \sum_{i=1}^{\infty} \phi_3 dOIL_{t-i} + \sum_{i=1}^{\infty} \phi_4 dEX_{t-i} + u_t$$

$$\text{VAR}(i): W_t = \sum_{i=1}^{\infty} \phi_1 W_{t-i} + \sum_{i=1}^{\infty} \phi_2 dCOV_{t-i} + \sum_{i=1}^{\infty} \phi_3 dOIL_{t-i} + \sum_{i=1}^{\infty} \phi_4 dEX_{t-i} + u_t$$

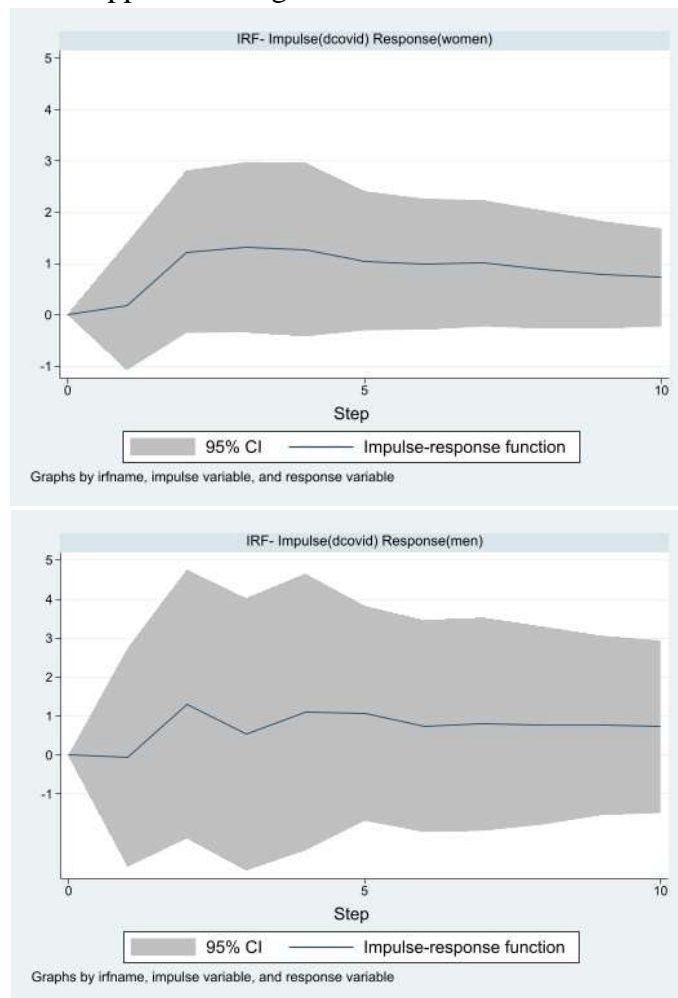
Moreover, these data were utilized to develop a time series model from February 2020 to August 2020. In this study, the variables must be stationary at level. Besides, another crucial aspect of this model is that variables do not fit into the categories of endogenous and exogenous. All variables are named as endogenous variables.

#### 4. Results

According to the assumptions of the VAR model, all variables must be  $I(0)$  stationary at the first step. Before reviewing the results, it is critical to review the stability and residual tests which are acceptable (Appendix 1). Also, it is crucial to indicate that VAR (1) is the most efficient lag in this study based on lag order criteria.

First, the study demonstrates that the employment status of both women and men in Iran responded to the COVID-19 outbreak with a rise in the unemployment rate. In the first period, the response of employment of both men and women to the

occurrence of COVID-19 is nearly equal, and both exhibit an increase in unemployment. Additionally, it can be inferred that during the second period, an alarming increase in the number of unemployed women occurred. Another noticeable fact is that the increasing unemployment rate for women has been consistent throughout time, whereas the reaction for male unemployment has been fluctuating. The variance decomposition results indicate that patients with COVID-19 define 5% of female unemployment throughout a ten-period, but COVID-19 patients correspond to less than 1% of unemployed men. The inequalities between men and women are apparent in Figure 8:



**Figure 8.** Impulse Response Function (COVID-19, Women- COVID-19, Men)

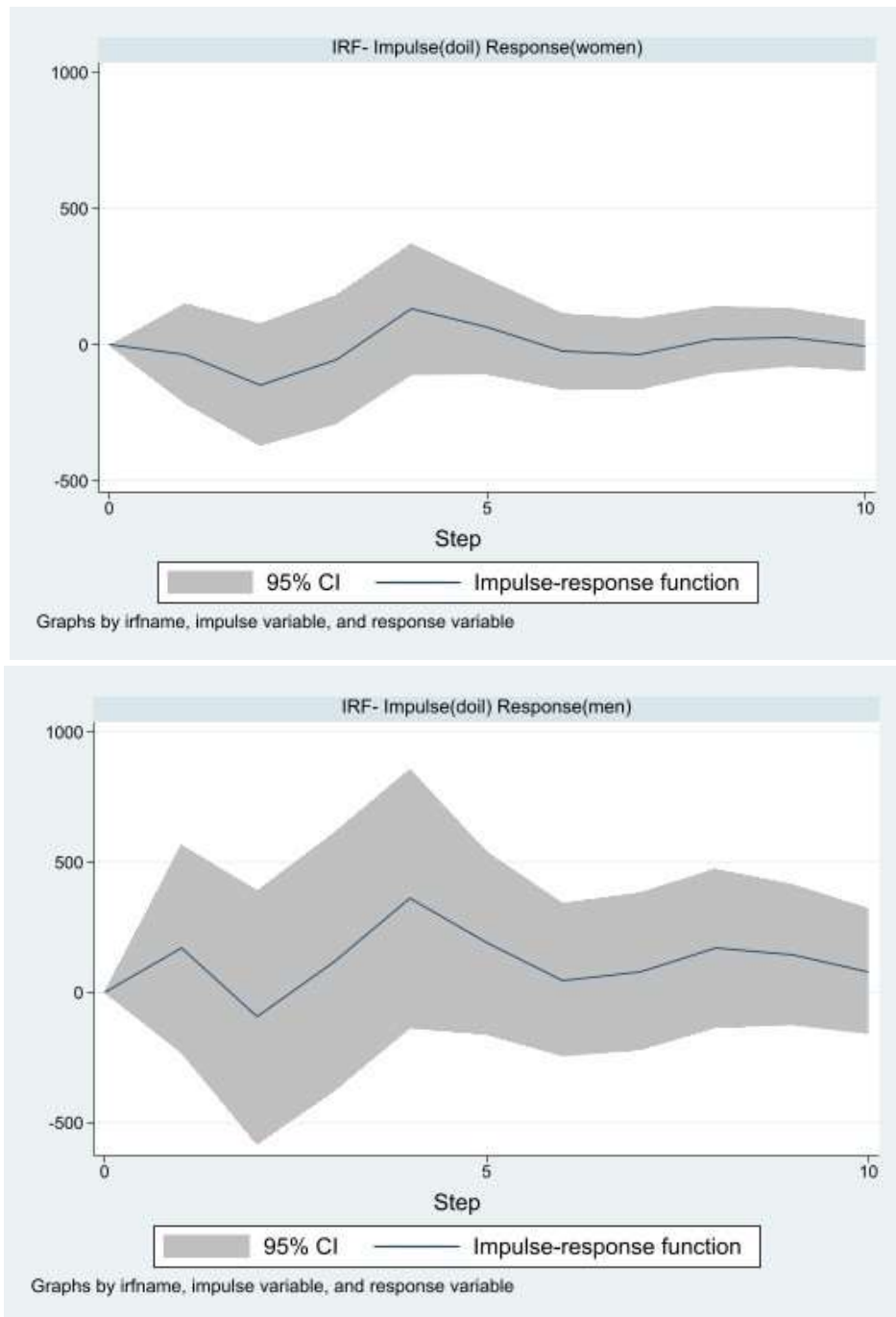
**Source:** Research finding (Stata).

COVID-19 increased women's unemployment relative to men over the same period. Several practical factors affected this reaction, including child care, fulfilling health requirements, and service sector damage caused by the COVID-19 epidemic. Russell and Sun (2020) drew a direct correlation between school closures and increased working mothers' unemployment. As stated previously, school closures added significant additional responsibilities to mothers, forcing them to quit their jobs. In contrast to the industrial and agricultural sectors, the service sector in Iran faced the most significant damage during COVID-19. COVID-19's nature, which necessitated distance and medical care, conflicted with the service sector's jobs. Women comprise a sizable portion of the workforce in this sector. As a result, it can be claimed that women reacted faster than men in these situations. In reality, the COVID-19 pandemic has had an impact on the labor market, with women seeing an increase in unemployment.

Another significant aspect is variance decomposition. In this test women and men are defined as a response, while COVID-19 is classified as an impulse variable. Based on Table 4 (Appendix 2) during the ten periods, the COVID-19 variation explains why 5% of women's unemployment fluctuates, whereas this explanation accounts for less than 1% of men's unemployment during the same period.

Another finding is that positive shocks in global oil prices resulted in a decline in the number of unemployed people. The oil price has been considered a proxy for the global economy, and a positive shock to oil prices is understood as higher demand for factors of production like oil, and hence the price of oil increases. As expected, the global economy had a spillover effect on the Iranian economy, leading to a decline in unemployment insurance applications.

With the decline in oil prices, which can be a proxy for a recession in the global economy, the number of unemployed individuals applying for unemployment insurance was growing. Changes in the price of Brent oil caused by the COVID-19 outbreak had a greater impact on male unemployment than female unemployment. In the first period, male unemployment responded to this variable. Despite this, unemployment of both men and women responded to it in subsequent periods. However, it was possible that this reaction can be inferred as a result of future declines in the price of Brent oil. In other words, the decline in oil prices increased female and male unemployment as time progressed.

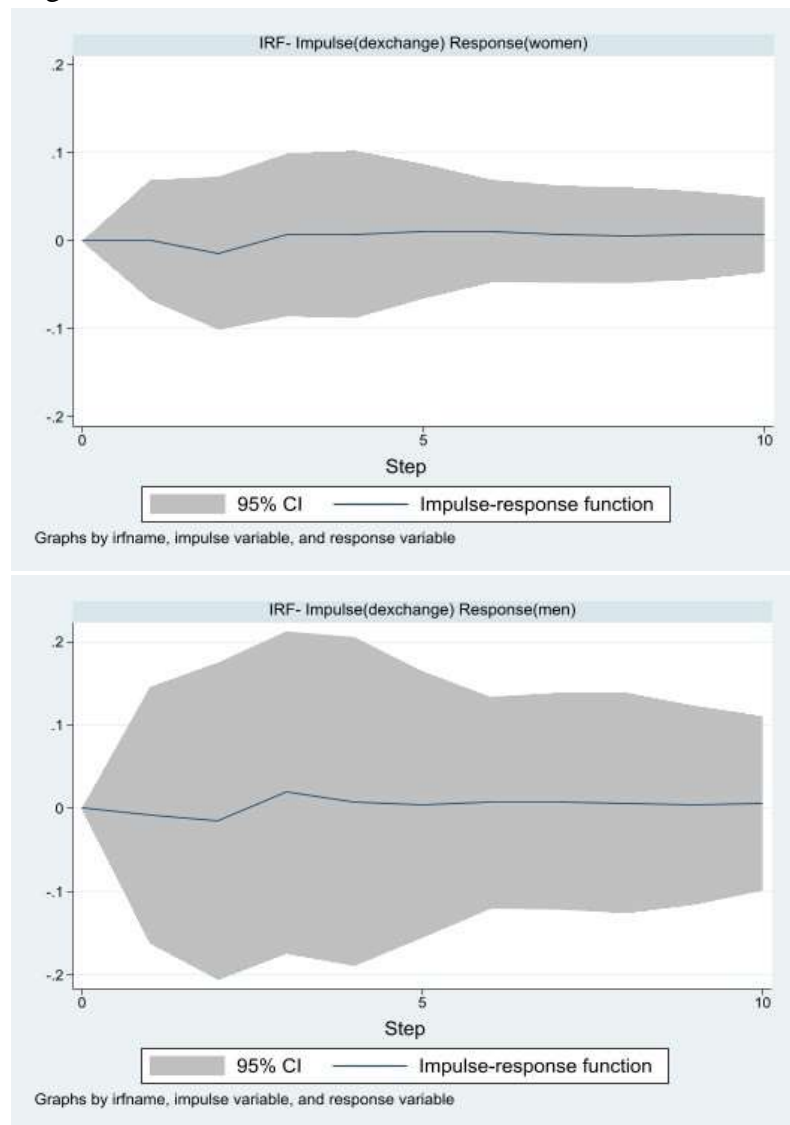


**Figure 9.** Impulse Response Function (Oil, Women-Oil, Men)

**Source:** Research finding (Stata).



Finally, the positive exchange rate shock reduced the number of people who registered for unemployment insurance. Iran’s economy was heavily reliant on imports of intermediate goods and raw materials. It was projected that an increase in the exchange rate would lead to a rise in unemployment. This expectation, however, was not met. The exchange rate had no significant effect on the labor market during the COVID-19 outbreak.



**Figure 10.** Impulse Response Function (Exchange, Women- Exchange, Men)

**Source:** Research finding (Stata).

Based on the findings of this section, the spread of COVID-19 caused substantial damage to the workforce, both in terms of the public health crisis and the disruption to economic activity and international economic relations. The quarantine policies were implemented to preserve the health of society, but they may have negative economic consequences.

## **5. Conclusion**

With the prevalence of the COVID-19 pandemic, all countries have been negatively affected. Many people lost their jobs, and the new rules to curb COVID-19 affect all aspects of their lives. Because of infectious diseases, many economic sectors faced uncertainty and instability, such as fluctuations in oil prices and the exchange rate. As a result, Iran's economy could have been affected by these two global economic variables.

This study began with the hypothesis that the COVID-19 pandemic influenced various parts of the economy, particularly the labor market, which experienced an increase in unemployment during the early months of the epidemic. In addition, several indicators of the COVID-19 outbreak were examined and it was established that the outbreak caused volatility in various areas of economic variables, including oil prices, international trade, and the labor market. In the same way that the COVID-19 outbreak had an impact on major global indicators, the Iranian economy was affected by COVID-19 and its consequences were observable in various economic sectors.

Following the outbreak of COVID-19, the Iranian economy experienced a disappointing worker situation, decreasing the labor force participation rate to 41%. In comparison to the same period last year, the rate decreased by 3.7% (approximately 2 million individuals). Also, compared to the previous season, there was a decline of 1.4% or around 760 thousand individuals.

Women in Iran and other countries such as Germany were not immune to the plethora of COVID-19 and were confronted with new and distinct problems compared to the pre-COVID-19 period. Caki (2022) noticed that during the COVID-19 pandemic, women lost their jobs and had significantly fewer possibilities than males to regain their previous jobs. Furthermore, black women are not an exception, and findings show that women in South Africa were affected more than men because the COVID-19 pandemic harmed a sector in which women were more participated than men.

According to Iran's national statistics department's reports, despite being a lower percentage of the active population, women played a significant role in the service sector of the Iranian economy, which was more severely affected by policies to curb COVID-19 harmful effects; consequently, a large number of working women had lost their jobs and faced unemployment. This variable was included in this study to represent female unemployment. In contrast to the agriculture and industry sectors, the service sector where women were more engaged, faced the greatest amount of harm from COVID-19. As a result, women were more negatively affected than men.

Furthermore, different aspects of unemployment were investigated in this study. The econometric method known as the vector autoregressive model (VAR) aided us in probing and comprehending this shock. In our model, male and female unemployment were estimated individually. As a result, it can be shown that female unemployment responded more rapidly than male unemployment to COVID-19's impact on the Iranian labor market. The definitive conclusion was that women were more prone to the COVID-19 epidemic than men and they experienced significantly more employment losses.

Additionally, one may assert that this vulnerability did not exist for a single initial period; rather, it existed for the subsequent periods included in the observed data. This result could be interpreted in various ways, including a decline in female employment in the service sector as a result of Iran's COVID-19 expansion or an increase in working mothers' health responsibilities, which affected their employment.

Next, in this paper, we can discuss assisting businesses to prevent unemployment. At the moment, businesses, particularly those in the service sector, are facing so many uncertainties that exacerbated the unemployment rate. In this regard, the government should provide financial aid by providing credit through the banking system, as well as tax exemptions and the payment of insurance premiums by itself. The government should make a special effort to support businesses, especially those in the services sector. In addition, it is crucial to give more attention to unemployed women, since they are more negatively affected by COVID-19 in the labor market. As a result, it is essential to enhance their working conditions. Additionally, the banking system can give loans with low interest rates and higher-than-normal re-payback periods to women who have lost their jobs due to the COVID-19 epidemic.

Due to the nature of the shocks, it is extremely difficult to monitor all aspects of them and respond to them in a short period. The prevalence of COVID-19, which has swept all over the world in a short period and has harmed all sectors of society, including women, necessitates a consideration of all economic factors. Technology can also assist in creating a post-COVID-19 world. One option is to promote remote work. People have this opportunity to work from home. It is worth noting, however, that reaching this aim is required to fulfill the required subset of all economic sectors, many women who have lost their employment at this time will be able to return to the labor force by meeting the necessary standards. Furthermore, remote work allows working mothers to be paid for other chores, including child care, which was one of the primary causes of women's unemployment during the COVID-19 epidemic.

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## Appendix 1

**Table A1.** Augmented Dickey-Fuller Unit Root Test

Name	Variable	ADF Statistics	Critical value (5%)	Order of Integration
Unemployed Men	M	-3.848	-2.887	I(0)
Unemployed Women	W	-4.13	-2.887	I(0)
COVID-19 Patients	dCOV	-12.997	-2.887	I(0)
Brent Oil	dOIL	-12.436	-2.887	I(0)
Exchange Rate	dEX	-10.837	-2.887	I(0)

**Source:** Research finding.



**Table A2.** Residual Test (Women-Men)

Lagrange- multiplier test	Chi2	df	Prop > chi2
Women	7.130	16	0.377
Men	13.204	16	0.657

**Source:** Research finding (Stata).

**Table A3.** Stability Condition (Women- Men)

Stability condition	Modulus
Women	0.911
Men	0.953

**Source:** Research finding.

## Appendix 2

**Table A4.** Variance Decomposition

Period	Women	Men
0	0	0
1	0	0
2	0.0002	$2.6e^{-6}$
3	0.0145	0.003
4	0.291	0.004
5	0.039	0.005
6	0.043	0.006
7	0.048	0.006
8	0.053	0.007
9	0.056	0.008
10	0.058	0.008

**Source:** Research finding (Stata).



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