Economic Research-Ekonomska Istraživanja

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rero20

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To cite this article: Chi-Wei Su, Ke Dai, Sana Ullah & Zubaria Andlib (2022) COVID-19 pandemic and unemployment dynamics in European economies, Economic Research-Ekonomska Istraživanja, 35:1, 1752-1764, DOI: 10.1080/1331677X.2021.1912627

To link to this article: https://doi.org/10.1080/1331677X.2021.1912627

Published online: 12 May 2021.

ECONOMIC RESEARCH-EKONOMSKA ISTRAŽIVANJA
2022, VOL. 35, NO. 1, 1752–1764
https://doi.org/10.1080/1331677X.2021.1912627

COVID-19 pandemic and unemployment dynamics in European economies

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ABSTRACT

This study goal to scrutinize the influences of the COVID-19 pandemic on unemployment in five selected European economies. To this end, the study uses a Fourier causality test for the period of December-2019 to December-2020. In Z-test results, Germany, Spain, and the UK have a significant positive change in unemployment due to COVID-19. The finding shows that COVID-19 cases cause unemployment for Germany, Italy, and the UK. Moreover, in terms of deaths, COVID-19 also causes unemployment in Italy and UK. Overall, the study's outcomes highlight that the pandemic increases the unemployment rate robustly in the mostly European economies. That is one of the rare negative effects of the virus on the European labor market. Novel COVID-19 findings provide a reliable guide to the future policy implication for the labor market. An active labor market policy will be needed to be in front of the world urgently.

ARTICLE HISTORY
Received 18 January 2021
Accepted 30 March 2021

KEYWORDS
COVID-19; European economies; labor market; unemployment rate

JEL CODES
J6; J11; E24

1. Introduction

In the last decade, marvelous progress has been made in epidemiology; still, different infectious diseases represent significant challenges to modern societies (Jordà et al., 2020). Empirical evidence relates pandemics with loss of human lives, sufferings, and serious economic challenges and implications for developing and the developed world (McKibbin & Fernando, 2020; Umar et al., 2020). The recent pandemic COVID-19 originated in December 2019 from Hubei province, Wuhan city in China, has now spread throughout the world. Currently, the top three epicenters of the pandemic are the Americas, Europe, and Southeast Asia[1]. Surprisingly the cases from the developed countries of the world, which were previously considered resilient and had strong healthcare systems, have proved to be more vulnerable to the recent pandemic and its associated economic effects. Therefore, COVID-19 has become a grave concern for the world population and economies. The adverse impacts of pandemics, epidemics,

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economic crisis, a natural disaster on different macroeconomic variables is not a new phenomenon, and numerous literature supports it, for example, Fasanya et al. (2020); McKibbin and Fernando (2020); and Shaikh (2020).

On the economic front, the epidemics' impacts go beyond morbidity and mortality, and it could be seen as far-reaching to the world economies. Evidence proves that the pandemic's effect has transmitted to different pervasive sectors such as travel, tourism, supply chains, stock market instability, and oil price fluctuations (Fairlie, 2020). For instance, currently, the world is experiencing a major disruption in imports and exports patterns due to this outbreak. Similarly, due to travel-related restrictions, economies worldwide have seen a further decrease in economic activities (Ji & Chu, 2020; Vanov, 2020). The overall panic among consumers and firms has distorted the established consumption patterns and created market anomalies (Baker et al., 2020). The COVID-19 has also posed an unprecedented challenge to the European economies as the spread of the virus is picked up speed and causing damage in almost every sector of these economies (Demertzis et al., 2020). According to the International Monetary Fund (IMF) outlook for October 2020, in response to the recent economic turmoil of the outbreak, the world economy is projected to contract by 4.4% in 2020, and it is even predicted to be much worse than the financial crisis 2008-09. Simultaneously, the same report projected an 8.1 percent downturn in GDP growth rate, a 0.5 percent inflation rate, and an 8 percent unemployment rate for modern Europe in 2020. Additionally, the same report also projected these figures for 2021. According to this report, these projections are 5.2 percent for GDP growth, 1 percent for inflation, and 8.5 for unemployment in 2021 for modern Europe.

COVID-19 is an example of a public health crisis in our times; it has affected almost every sector of the economy, locally and globally. Due to the decrease in demand for industrial inputs and energy sources, the markets have experienced constant volatility in oil prices to further exuberate countries' economic performance (Zhang et al., 2020). Furthermore, due to lockdown and business closure, the firms are hampered to pay their employees, causing a further increase in poverty estimates in different countries (Kartseva and Kuznetsova, 2020). The stock markets are also down worldwide. On the positive side, economic recovery and stability in the economies are projected in 2021 (Baker et al., 2020). The global financial markets have experienced major disruption due to the on-going changes in the economies' different sectors. Generally, the episode of volatility and uncertainty of the pandemic is widespread globally, and the effect is not exceptional only to the European economies. Almost all the European economies are suffering from the consequences of these disruptions, and therefore these economies are experiencing higher unemployment rates.

According to the ILO monitor (2021), the COVID-19 has impacted the world of work badly regarding reduced working hours and employment losses. Even these figures are higher than those which were observed during the 2009 financial crisis. The same ILO document indicates that almost 9 percent of global working hours were lost in the last year, which is alternately equivalent to 255 million full-time jobs. The pandemic's worst outcome is the massive loss in global labor income, which is approximately equal to 4.4 percent of the global gross domestic product. Women and young (15 to 24 years old) workers are more affected by this pandemic as compared

to their male counterparts. The youth unemployment rate has increased to 8.7 percent compared to the adult unemployment rate i.e, 3.7 percent. The ILO (and) (2020, ILO, 2021) also predicted the K shape recovery in the labor market that some hard-hit sectors will be left behind in recovery compared to others. Therefore we expect to see an increase in poverty and inequality as the aftermath of this pandemic.

Currently, the European economies are facing two challenges, the spread of the outbreak and its impacts on different macroeconomic variables, such as employment and/or unemployment. It is projected by different think thanks that economic instability caused by the current pandemic could bring a long-term economic downturn in the European economies. In line with this, Wren-Lewis (2020) explained that COVID-19 hurts economic growth and labor supply, inflation, and production costs. Blundell et al. (2020) used the UK's LSE-CEP survey and revealed that self-employed workers are the most affected ones during this pandemic. According to the same study, the vast majority of the self-employed workers reported that they work fewer hours than the pre-pandemic times. This further upsurges their vulnerabilities towards the pandemic. Boneva et al. (2020) also explained the same situation for three economies, i.e., UK, US, and Germany. According to their empirical findings, most self-employed workers suffer from the long spell of unemployment during the recent pandemic. The young group of workers and those who are having only college degrees are more likely to suffer from job losses. In a similar context, Leka (2020) explored the impact of COVID-19 on the Albanian economy and concluded that this pandemic impacted almost every sector of the economy specifically. It has badly affected the growth rate of GDP, unemployment, inflation and interest rates, and the tourism sector. Fernandes (2020) assessed the impacts of COVID-19 on 30 economies of the world. The empirical findings reveal that service economies are at more risk and have to see a long unemployment spell. Besides, tourism and trade sectors are badly affected in economies during the crisis, and also many workers lost their jobs in these sectors. Rodríguez-Caballero and Vera-Valdés (2020) explored the long-term and persistent impacts of the recent pandemic on economic growth and unemployment and concluded that these effects are comparatively more persistent in terms of unemployment in the UK economy.

Similarly, Farayibi and Asongu (2020) explored the impact of COVID-19 on key macroeconomic variables in Nigeria. The study concluded that COVID-19 has a negative impact on GDP, exchange rate, employment, and inflation. Similarly, Binder (2020) view that people expect longer spells of unemployment during the different phases of the current pandemic in the USA. Besides these studies, the researcher observed the employment and unemployment trends in developed countries are almost similar. The employment trends in the European countries are almost similar as observed in the USA. In a similar context for the USA economy, Coibion et al. (2020) revealed that most of the workers suffering from job losses are no longer looking for work. Thus it brings further increase in the overall unemployment rate. For the UK economy, Costa Dias et al. (2020) explained that most UK firms are not posting new vacancies. The study also elaborated that in this scenario worst sufferers are those who are working in low-skilled occupations. Even though a high skilled job market is also contracted due to a massive outbreak in the UK. Campello et al.

(2020) also view in the USA that higher-skill jobs have seen a sharp decline compared to low-skilled jobs. In complement to the present situation, we have seen in the previous literature that negative shocks mostly adversely affect employment levels in different economies. On the same lines, Boeri and Jimeno (2016) also assessed the impact of economic recession on unemployment for European countries. According to their empirical findings, countries with higher wage flexibility have seen low unemployment rates, and on the other hand, countries with higher employment flexibility registered a higher unemployment rate. In a similar context, Guichard and Rusticelli (2010) explored the impact of the financial crisis on selected OECD countries and concluded that the financial crisis economies have seen an increase in structural unemployment. In an interesting study, Choudhry et al. (2010) captured the post-financial crisis scenario concerning its impact on youth employment. The study found that young workers have to suffer a lot after the financial crisis and have to stay unemployed for longer spells than their older counterparts in the labor market.

This study attempts to quantify the impact of COVID-19 on unemployment in the selected European economies such as France, Germany, Italy, Spain, and the UK. These selected economies are among the top ten most affected countries in the world[2]. Therefore, the objective is to assist the policymakers in taming the pandemic's response in the selected European economies where a pandemic has already played havoc. We are specifically focusing on the European economies for various reasons; 1) these are the worlds' most influential economies; therefore, it is an important source of transferring the spillover effects to the other economies worldwide. 2) These economies are currently passing through two serious shocks, a pandemic spread and the downturn in macroeconomic variables, most importantly the unemployment rate. 3) Most of the European economies are under severe lockdown even though the European policy practitioners have much more information to cope with the consequences of the outbreak than the other countries. However, unfortunately, these economies are registering the largest number of confirmed cases and deaths than any other country in the world. Therefore, by exploring the impact of the on-going pandemic on unemployment in these economies, we can provide policy insights for the rest of the developed and developing countries.

In the existing literature, we have found many studies on the impact of the COVID-19 on oil prices (Narayan, 2020) and stock market volatility (Baker et al., 2020). The study is unique because it will explore the impact of the COVID-19 pandemic on labor markets of developed economies. The study will contribute to the existing literature on the economic impacts of the pandemic in various ways. It is taking into account the case of the most influential and developed economies of the world. It has also shed light on an important policy debate that is how COVID-19 impacts the labor markets, particularly in these economies and generally all over the world. The proper functioning of labor markets has become part and parcel of the recent era's economic growth process. The growth process is halted without the proper functioning of the labor markets in developed and developing countries.

Furthermore, the recent pandemic has severely affected the labor markets and increased the unemployment rates drastically. The study will also provide policy insight for the selected European economies, which could be equally generalized for the other developed countries in the region. Also, the study's findings are used to draw inferences for capturing the impacts of future pandemics on labor markets functioning in developed economies.

2. Theoretical framework and methodology

2.1. Theoretical framework

Human history has seen some of the worst epidemics and pandemics in the last decade, it includes the Swine flu, SARS, Ebola, MERS, and worst among all is the recent one, the COVID-19 (Kaur et al., 2020). The COVID-19 has affected almost every sector of the economy and disrupted everyday life. The low-income and developing countries and the developed countries are some of the worst sufferers out of this pandemic. Due to lockdown, the economies have seen significant disruptions in the employment rates. The theoretical underpinning between pandemics and unemployment is relatively straightforward. We can relate the same with the recent outbreak. Whenever there is a massive outbreak in human history than to overcome this pandemic's effects, precautionary measures have been adopted (Kelly, 2020). For example, in the recent pandemic, the lockdown measure is used throughout the world (Habicht et al., 2020). The massive lockdown measures have become one of the major causes of slowing down economic activity, as the production units have closed down. Therefore we have observed the massive number of unemployment rates throughout history (ILO-stats). The increase in the unemployment rate has some alarming consequences, such as an increase in poverty and inequality and increased crime rates (Voßemer et al., 2018). Therefore the present study attempts to assess the impact of COVID-19 on unemployment rates in the selected European countries.

2.2. Method and data

The COVID-19 pandemic is a new research agenda to describe how the COVID-19 pandemic worsens the labor market. The COVID-19 is also one of the economic crises with enormous unemployment increases in the world (ILO, 2020). Currently, the literature suggests that the dynamics of the COVID-19 recession may play out quite differently on the labor market as well economy (Gallant et al. 2020). Therefore, COVID-19 is one of the most unusual recessions in the world in the modern era. In empirical research, most researchers began to examine causal relations between macroeconomic variables by employing the Granger (1969) causality test. We use a causality testing approach to examine the empirical analysis. In literature, Granger causality tests revealed that Toda and Yamamoto (1995) neglect the structural breaks that may occur in the series such as ours in COVID-19. Alternative best is to resolve the issues; Nazlioglu et al. (2016) and Enders and Jones (2016) proposed the Fourier Granger causality tests for a short sample. The model employed the Fourier causality test is described in equation (1) as:

Table 1. Descriptive statistics.

		Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
France	Unemployment	8.077	9.400	6.900	0.785	0.157	1.772	0.870	0.647
	COVID-19cases	6.247	10.07	0.000	3.572	−0.906	2.346	2.008	0.366
	COVID-19deaths	3.172	6.837	0.000	2.290	−0.034	1.992	0.553	0.758
Germany	Unemployment	4.123	4.600	3.300	0.457	−0.696	1.987	1.605	0.448
	COVID-19cases	5.764	10.02	0.000	3.534	−0.789	2.292	1.622	0.444
	COVID-19deaths	2.439	5.236	0.000	2.122	0.123	1.488	1.272	0.530
Italy	Unemployment	9.131	9.800	7.400	0.666	−1.392	4.409	5.275*	0.072
	COVID-19cases	5.869	10.61	0.000	3.668	−0.695	2.201	1.392	0.499
	COVID-19deaths	3.385	6.335	0.000	2.482	−0.191	1.545	1.226	0.542
Spain	Unemployment	15.43	16.90	13.50	1.205	−0.625	1.946	1.448	0.485
	COVID-19cases	6.029	9.857	0.000	3.767	−0.753	2.072	1.696	0.428
	COVID-19deaths	3.175	6.405	0.000	2.322	−0.170	1.633	1.075	0.584
UK	Unemployment	4.162	4.900	3.700	0.369	0.640	2.300	1.154	0.562
	COVID-19cases	6.317	10.04	0.000	3.470	−0.868	2.459	1.790	0.409
	COVID-19deaths	3.182	6.737	0.000	2.478	0.055	1.580	1.099	0.577

Note: ***, **, and * denotes significance level at 1%, 5%, and 10%, respectively.
Source: Author's calculations.

$$\Delta y_t = \gamma + \delta_1 \cdot \mathrm{Sin}\left(\frac{2\Pi kt}{T}\right) + \delta_2 \cdot \mathrm{Cos}\left(\frac{2\Pi kt}{T}\right) + \pi_1 y_{t-1} + \ldots + \pi_{p+dmax} y_{t-(p+dmax)} + \mu_t$$

In the equation, yt signifies the vector containing the variables of unemployment and COVID-19 cases and deaths, π is the coefficients matrix, t is the time trend, T denotes the number of sample observations, δ_1 and δ_2 The maximum order of integration determines the coefficients of the estimations that captured the structural shifts and dmax. In the study, the null hypothesis of no causality is tested as H_0: $\pi_1 = \ldots \pi_p = 0$. This testing procedure provides better outcomes in policy implications.

We find the causality between COVID-19 and unemployment. We addressed this research issue for the European economies, namely, France, Germany, Italy, Spain, and the UK, for the period of Dec-2019 to Dec-2020. These economies are selected for analysis because five economies are severely affected by the COVID-19 in Europe. Data has been extracted from the OECD database and the European Center for Disease Prevention and Control (ECDPC) database. We used the monthly dataset from the OECD (2021) to represent the unemployment rate, while data relating to COVID-19 confirmed cases and deaths are attained from the ECDPC (2021). Our data is based monthly from Dec-2019 to Dec-2020 to scrutinize the changes in the unemployment rate due to the COVID-19 pandemic. Finally, we also used monthly data of COVID-19 from Dec-2019-Dec-2020 of the five economies. For a causality analysis of COVID-19 data, we use the COVID-19 confirmed cases and deaths while data measured in numbers. To obtain a more robust result, we converted the data into a natural logarithm except for the unemployment rate.

The detailed descriptive statistics of the five economies are also given in Table 1. In Table 1, Spain's unemployment has the highest mean 15.43, and followed Italy, France, UK, and Germany. On the contrary, Italy has the highest deaths 3.385, and followed UK, France, Spain, and Germany. Figure 1 also presents a comparative analysis of the unemployment situation in these economies. We have observed that Spain is showing the worst scenario among all economies. However, Germany and UK are

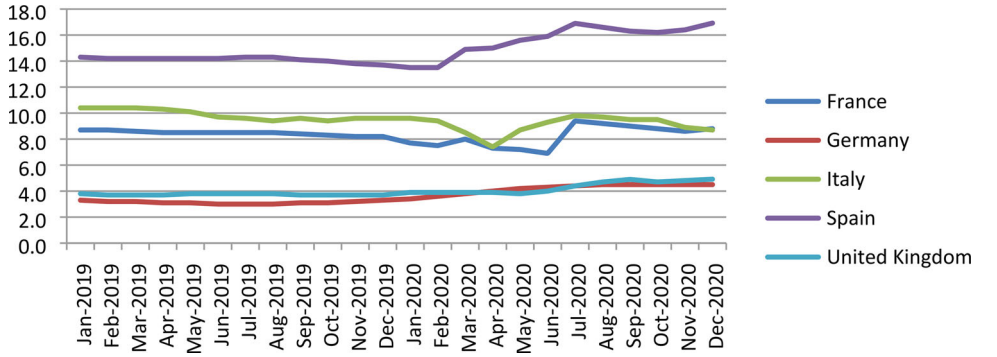

Figure 1. COVID-19 and unemployment in Europe.
Source: Author's calculations.

performing better in comparative terms. Also, in the last two quarters of the year 2020, France and Italy have experienced more disruption in their unemployment rates than other regional economies. The Jarque-Bera statistics show that the unemployment rate is normally distributed in Italy while other economies are not following the normally distributed pattern due to COVID-19. Therefore, both COVID-19 variables, the number of the confirmed cases, and deaths do not follow the normal distribution in France, Germany, Italy, Spain, and the UK. After exploring the descriptive characteristics, we applied unit root and Fourier causality tests in the next segment.

3. Result and discussions

Table 2 compares the features of unemployment with and without the COVID pandemic by using the Z-test. The result shows that Germany (1.090%), Spain (1.400%), and UK (0.493%) have a positive and significant change in unemployment due to COVID-19. These outcomes also show that France and Italy are also a better employment situation in the COVID-19 pandemic. That implies that the labor market badly influences Germany, Spain, and UK economies in the spread of pandemics compared to France and Italy. A similar results outcome has been revealed in a correlation matrix. Table 3 displays the Pearson correlation coefficient results and shows a strong positive significant correlation between COVID-19cases and unemployment in France, Germany, Spain, and the UK over the pandemic period. However, the correlation between COVID-19deaths and unemployment is also strong in Germany and Spain for the pandemic period. While the correlation between COVID-19cases, COVID-19deaths, and unemployment is also negative in Itlay, it implies that Covid-19 has produced more online job opportunities in the economy and decreased unemployment. In short, these finding also infers that the impact of COVID-19 cases is stronger than the number of deaths.

The present study aims to assess the impact of COVID-19 on unemployment in the selected European economies. Table 4 presents the unit-roots estimates for the selected variables, the total number of confirmed COVID-19 cases, COVID-19 deaths, and the unemployment rate as the Fourier LM unit root tests estimate elaborate that all variables are non-stationary at the level. However, they have become stationary at first difference. Therefore we can find a causality association between the selected variables.

Table 2. Unemployment without and with COVID pandemic in Europe.

	Without COVID pandemic in 2019	With the COVID pandemic in 2020	Z-test	Change
France	8.466	8.002	−0.464*	Negative
Germany	3.133	4.223	1.090**	Positive
Italy	9.875	9.003	−0.872*	Negative
Spain	14.12	15.52	1.400***	Positive
UK	3.741	4.234	0.493*	Positive

Source: Author's calculations.

Table 3. Correlation Matrix.

		Unemployment	COVID-19cases	COVID-19deaths
France	Unemployment	1		
	COVID-19cases	0.401**	1	
	COVID-19deaths	0.176	0.829***	1
Germany	Unemployment	1		
	COVID-19cases	0.880***	1	
	COVID-19deaths	0.567**	0.812***	1
Italy	Unemployment	1		
	COVID-19cases	−0.464*	1	
	COVID-19deaths	−0.738**	0.876***	1
Spain	Unemployment	1		
	COVID-19cases	0.816***	1	
	COVID-19deaths	0.621**	0.836***	1
UK	Unemployment	1		
	COVID-19cases	0.535**	1	
	COVID-19deaths	0.146	0.846***	1

Note. ***, **, and * denotes significance level at 1%, 5%, and 10%, respectively.
Source: Author's calculations.

Table 4. Unit root results.

	COVID-19 cases		COVID-19 deaths		Unemployment	
	I(0)	I(1)	I(0)	I(1)	(0)	(1)
France	−1.695	−2.786*	−1.774	−2.629*	−1.775	−3.989**
Germany	−1.447	−3.029**	−1.675	−3.256**	−3.139	
Italy	−1.558	−3.108**	−1.573	−2.635*	−1.771	−2.653*
Spain	−1.619	−3.062*	−1.517	−2.680*	−1.402	3.173*
UK	−1.712	−2.785*	−1.568	−3.077*	−1.448	2.668*

Note: ***, **, and * denote significance level at 1%, 5%, and 10%, respectively.
Source: Author's calculations.

COVID-19 has impacted almost every sector of the economy, and the labor market is not an exception in this regard. These five selected European economies have to deal with the problem of a large number of unemployed populations. These economies face two problems at the same time. Due to the lockdown and closure of many industries, most of the employed population has become unemployed, and also, those who are employed are working fewer hours (Takagi et al., 2021). In both cases, unemployment is connected with lower purchasing power and an increase in poverty. This situation is even becoming worse for most of the population as it is essential to spare money for health-related expenditures during the pandemic (Bauer & Weber, 2020). Therefore, low-skilled workers and those already at the poverty threshold have to suffer the most from this situation. Our results are consistent with the recent literature such as Huang et al. (2020); Bianchi et al. (2021). A similar situation can be observed in Table 5.

Table 5. COVID-19 causing unemployment rate in Europe.

	(COVID-19cases → Unemployment)			(COVID-19deaths → Unemployment)		
	F-Statistic	Prob.	Adj-R2	F-Statistic	Prob.	Adj-R2
France	0.617	0.571	0.03	0.007	0.993	0.05
Germany	4.053*	0.071	0.06	1.079	0.398	0.07
Italy	7.189**	0.026	0.07	10.52**	0.011	0.06
Spain	0.261	0.778	0.04	0.499	0.630	0.06
UK	2.858*	0.086	0.08	3.352*	0.072	0.05

Note: ***, **, and * denotes significance level at 1%, 5%, and 10%, respectively.
Source: Author's calculations.

Table 5 presents the empirical estimates of the Fourier causality test. We have a few interesting policy insights from Table 5. First, we have checked the causality between the total number of COVID-19 cases and unemployment. We have accepted the null hypothesis that the total number of COVID-19 cases in France and Spain does not cause an increase in unemployment. However, in Germany, Italy, and the UK, the estimated results reveal that the total number of COVID-19 cases is one of the major determinants of an increase in the unemployment rate (Takagi et al., 2021; Bauer & Weber,2020).

Similarly, we can see the causality between COVID-19 deaths and unemployment for the five selected European economies. We observe from Table 5 that COVID-19 deaths are causing unemployment in Italy and the UK. Our empirical results are in line with previous literature (Ancillo et al., 2020; Parvathamma, 2020; Couch et al., 2020; Fernández-Villaverde & Jones, 2020; Blundell et al., 2020; Boneva et al., 2020; Fernandes, 2020). Our results show that COVID-19 cases are more cause of unemployment compared to COVID-19 deaths.

These three economies are included in the top ten epicenters i.e., the UK is at the 5^{th} position, Italy is at the 7^{th} position, and Germany occupies the 9^{th} position (WHO 2021). The previous literature also observed that an increase in the total number of COVID-19 cases is causing panic in the economy and responds to the higher number of reported cases, and adversely affects the labor market. Due to these lockdowns, the situation further exacerbates as these lockdowns bring a slowdown in both the demand and supply sides of labor (Bianchi et al., 2021). Due to the closure of firms and supply chain disruptions, the demand for labor also goes down, and therefore unemployment goes up in these economies (ILO-OECD, 2020). At the same time, we found from the existing literature on the labor market impacts of COVID-19 that most low-skilled workers and self-employed workers are the worst sufferers out of this pandemic. Our results are in line with the previous labor market studies for example, Boneva et al. (2020) has revealed that COVID-19 badly impacted the labor markets of the UK and Germany. According to their empirical findings, low-skilled workers and self-employed have to suffer from longer unemployment spells. In another study of the UK economy, Blundell et al. (2020) revealed that self-employed workers have to lose their jobs more frequently during the current pandemic. As we have discussed previously, self-employed and low-skilled workers are hardly hit workers out of this pandemic (ILO, 2021). In current, at this point, if these workers have to stay out of the job market for a longer period, then consequently, they have to rely on their savings. These savings will not be channelized for

investment purpose in these economies; therefore, it further slows down the economy (ILO-OECD, 2020). According to the IMF outlook for October, the modern European economies will get back the growth momentum in 2021, but still, the outlook is not much promising concerning employment numbers.

4. Conclusion and implications

The nature of the COVID-19 is associated with the labor market is rare. The European economies faced new difficult tasks. One of them is unemployment. Since 2020, unemployment in Europe rose dramatically. Therefore, this study examines the impact of COVID-19 cases and deaths on unemployment in the European economies. The descriptive findings show that the share of COVID-19 cases and deaths in Italy and the UK are higher in the European regions. France's labor market is affected by the pandemic in the very early period in Europe, while later ones, Italy was badly influenced. In Z-test results, Germany, Spain, and the UK have a significant positive change in unemployment due to COVID-19. The Fourier causality test results establish that COVID-19 causes unemployment in three out of five European economies. An important result of the analysis is that COVID-19 cases cause unemployment in Germany, Italy, and the UK, while COVID-19 deaths cause unemployment in Italy and UK. An upsurge in the number of cases of COVID-19 in Europe robustly harmful effects on the labor market more than an upsurge in the number of deaths by shrinking the employment rate. The COVID-19 has also slowed the economic activities by reducing the jobs in the market, and industrial and services sectors also sharply shrunk in Europe in pandemic situations. That caused the industry and service sectors to essentially ceasing their production activities. Indeed, in a pandemic, we also find more increase in the unemployment rate after COVID-19 cases rather than deaths.

Moreover, the effects of COVID-19 lockdown on employment will generate a significant opportunity to evaluate and emerge future labor market policies. One of the important policies, European governments, can improve the labor market by promoting substitution of man-power with reboots in pandemic and by implementing awareness-raising programs on e-business and expand remote working opportunities. With the rapid spread of the virus in the second-wave, Europe should be introduced the novel and advanced policy of labor wage rates. If COVID-19 is severe and prolonged, e-commerce must prioritize the economy, and government intervention is likely to be necessary for advancement. Also, hiring subsidies, wage subsidies, and job search assistance for the unemployed can also help the reorganization of labor families. Following the COVID-19 pandemic, governments and policymakers in Europe take the necessary steps to be reduced unemployment, and the labor market can be improved by increasing the job vacancies. Governments also revise the job reallocation policies during the COVID-19 recession. The authorities should also stimulus an "unemployment insurance program" that could lead to a sharp fall in labor demand.

The study will prove to be a stepping stone in the recent literature on the impact of COVID-19 on labor markets. It will set the direction for future studies in various ways. Depending upon the data availability, future studies can analyze the recent

pandemic's impact on male and female unemployment rates. Another important area of discussion could be the impact of COVID-19 on different age groups and employment statuses, as younger and informal sector workers are the worst sufferers in this pandemic. The same analysis can be done for the other European economies.

Notes

1. https://covid19.who.int/?gclid=Cj0KCQiA0fr_BRDaARIsAABw4EuIvby9S5JsgDUTKSn1-ip0bHFDoO0hgazUs-P4vx6kn4Jq-Fysv60aAs7wEALw_wcB
2. https://covid19.who.int/table

Disclosure statement

No potential conflict of interest was provided by the author(s).

Funding

This research is partly supported by the National Social Science Fund of China (20BJY021).

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