DOI 10.15826/vestnik.2024.23.4.037 Original Paper

The Influence of Natural and Technological Disasters on Unemployment in Pakistan

Shah Mehmood Wagan ✉, ***Sidra Sidra***

Sichuan University,
Chengdu, China
✉ *shah.mehmood04@outlook.com*

Abstract. Natural and technological disasters have a significant impact on unemployment in Pakistan and are an important factor in economic instability. Pakistan's economy is now going through a critical phase of instability. The current government has to deal with a number of economic and social challenges, such the high unemployment rate. The study hypothesizes that the number of deaths and the number of people affected by disasters have a significant impact on the unemployment rate, and this impact has a lag. The study examines Pakistan's economic statistics, focusing on its instability over the past 30 years. It uses Stata software for regression equations to examine unemployment rate, inflation, price index changes, technological disaster deaths, and natural disaster impact. The study reveals that the number of deaths from natural and technological disasters has an important positive impact on unemployment rates, suggesting that economic repercussions of such disasters may emerge after initial response phases. The authors failed to examine the impact of recent events on the labor market due to inaccessible data, a gap that could have been significant. This study pioneers an investigation into the effect of the influence of natural and technological disasters on unemployment. It fills a gap in research of the impact of disasters on unemployment rates in disaster economics and labor economics and emphasizes the lag of disaster impacts. It provides a scientific basis for the government and relevant agencies in formulating post-disaster reconstruction and employment policies and recommends strengthening disaster prevention and infrastructure construction to reduce the long-term negative impact of disasters on the economy.

Key words: unemployment; natural disaster; technological disaster; inflation; labor force; Pakistan.

JEL J64, H56, Q54, O33, E31

1. Introduction

It is important for us to understand the impacts of technological and natural disasters in order to help mitigate their impact. By understanding that disasters in these forms influence unemployment, we can create better contingencies. In this paper, we look at the effects of military conflicts, technological and natural disasters on unemployment in Pakistan as well as policy recommendations for mitigating these negative effects. It is understandable that military conflicts and disasters could hinder progress toward full employment in a developing nation.

In this paper, we show that disasters both natural and technological actually have more of an impact on unemployment than many economic factors and even military conflicts. In order to analyse this relationship, we use a time series econometric model to examine how unemployment is influenced by disaster, whether it be natural or man-made.

Natural disasters, such as earthquakes and floods, tend to damage vast acres of

agricultural land and thus have long-lasting impacts on unemployment. These disasters account for rising unemployment within Pakistan more so than factors previously thought responsible. We believe that disasters could be one of the most prominent factors of unemployment in the Pakistani economy; one that could be addressed in order to help mitigate the impact. We believe that with proper pre-emptive planning it will be easier to stabilize the impact of such disasters.

Government preparation can help rehabilitate a country after disasters through a good support structure. However, there must be systems in place before such disaster occur both for business and agricultural production (a main source of employment in Pakistan) as well as social safeguards to help individuals and communities rebuild after said disasters.

It is understood that Pakistan has paid a high price in terms of the social and economic (human) capital with regard to the recent military conflict. Therefore, we account for its potential a destabilizing impact on unemployment. This destabilization adversely affects the economy directly and indirectly. The direct impact on the economy can be seen in a variety of ways, such as collateral damage, infrastructure destruction, agriculture and trade related damage, industrial and manufacturing decline.

The indirect effects on the economy are a decline in the investment, fluctuations in the process of the development, lower rate of production, a rise in unemployment with increasing costs of the restricting, rebuilding and rehabilitation of the internally displaced persons (IDPs). All these factors, both direct and indirect have an impact on people. Moreover, it has an impact on their livelihood and their employment.

The importance of our study looks at potential causes of unemployment. Specifically, we look at economic and non-economic factors. We are particularly interested in the impact of military conflicts, technological disasters, natural disasters, inflation, and wholesale prices.

The main purpose of this study is to explore the impact of natural and technological disasters on unemployment in Pakistan and to analyze whether this impact has a lag.

The study assumes that the number of deaths and the number of people affected by natural and technological disasters have a significant impact on the unemployment rate in Pakistan, and this impact has a lag. By combining time series economic models with regression analysis, the impact of disasters on unemployment rates is quantified. Explore how natural disasters (e.g., earthquakes, floods) and technological disasters (e.g., factory accidents, technological failures) have long-term impacts on unemployment in Pakistan through mechanisms such as damage to infrastructure, impact on economic activities, and long-term health consequences. Compare the different impacts of natural disasters and technological disasters on unemployment rates, with particular attention to the longer-term and significant impacts that technological disasters may have due to their direct impact on economic activities.

To study the impact of military conflicts on the unemployment rate in Pakistan and to analyze whether military conflicts as a significant source of economic and social shock, has a direct impact on unemployment rate. Based on the research results, policy recommendations are provided to governments and relevant agencies to formulate effective post-disaster reconstruction and employment policies and reduce the long-term negative impact of disasters on the economy. It emphasizes the importance of strengthening disaster prevention and infrastructure construction and puts forward specific policy measures to enhance economic resilience and stabilize the employment rate.

This study aims to fill a gap in the research on the impact of disasters on unemployment rates in disaster economics and labor economics, especially focusing on the lag of disaster impacts, and provide a new theoretical and empirical basis for related fields.

This study, through in-depth analysis of Pakistan's economic data over the past 30 years, combined with external shock factors such as natural disasters, technological disasters and military conflicts, aims to fully reveal the specific impact mechanism of these factors on Pakistan's unemployment rate and provide a scientific basis for policymakers.

The paper proceeds as follows. In the next section we reviewed literature. Section 3 shows unemployment and disasters trends in Pakistan. Section 4 provide an overview of the data used as well as descriptive statistics. Section 5 presents our empirical results. Section 6 gives our concluding remarks and policy recommendations.

2. Literature Review

2.1. Natural & Technological Disaster

Recent research looks at the various impacts of military conflicts, crime and natural disasters on Pakistan, they also reveal many of the institutional failures. However, in the current paper we look to how technological disasters and natural disasters directly impact unemployment rates in Pakistan.

Ahiase et al. [1] illustrated that heavy flooding in 2023 caused destruction and revealed several institutional gaps and regulatory weaknesses that need to be overcome in disaster response and preparedness. They mention that there is a growing need for the government to make institutional reforms and make national policy changes in order to prevent further disasters.

Ahmadi et al. [2] analyses the Disaster Management Act (PNDMA 2023) and found that the Act does not clearly describe disaster risk reduction and as well as for the budgetary mechanisms there are no directions for disaster risk management (DRM) in the country.

Akbari-Kasgari et al. [3] analyses how earthquake risk perception depends upon people's age. Additionally, they find that this disparity in perception differs among communities They recommend projects and programs to create preparedness for risk reduction and public awareness.

Baig et al. [4] investigates how disaster impacts economic growth. They identify several procedures that look to minimize disaster risk. Such procedures are examined as priorities and approaches for economics within the disaster mitigation policy framework.

Cong et al. [5] examine technological disasters from biotechnology to cyber-risks. They utilize prediction methodology in order to test event trees in a framework of probabilistic safety assessment (PSA). Nevertheless, even the safest analysis struggle to account for the evolving risks caused by cascade effects and inter-connected networks such as nuclear risks.

Cvetkovic & Sisovic [6] analyses the macroeconomic impact of terrorism in Pakistan. Their study evaluates the long term and short-term links and relationship among the economic factors and terrorism. The study conducted by the Dabiri et al. [7] confirmed that poverty in South Asia is related terrorism incidences.

Di Nallo & Koksal [8] show that the sustainability of a country with the low inflation rate may be related to a reduction in terrorism. Conversely, the policy makers of the Pakistan are ought to reform in the policy for the growth of economy for reduction in the incidence of terrorism for the better economy. Their observations indicate that countries, which are better off economically, tend to have less terrorism than those, which lack economic stability.

2.2. Economic Indicators and Unemployment

Drake et al. [9] suggested that population growth is directly proportional to unemployment and while foreign direct investment and literacy rate impact is inversely proportional to unemployment. Often it is observed rural areas unemployment rate is greater because of fewer industries in rural areas as compared to urban areas. Thus, when disaster strikes it is often the rural areas that will take a brunt of the impact on unemployment. Furthermore, these rural areas are often the last areas to receive any aid. There are several other factors that could potentially impact employment.

Flomo et al. [10] shows that persons which are holding high degree having less unemployment as compared to the lower degree holders. The household head and size of household, marital status, higher salary and trainings are reducing the risks of the unemployment.

Fukuchi & Chiba [11] suggests that fluctuations in the oil price could affect interest rate in Pakistan.

Galarza Torres et al. [12] discusses how gross domestic product (GDP) and unemployment have a negative relationship and investigate this relationship relative to Okun's law.

Horikoshi et al. [13] provides suggestions of growth classifications regarding Pakistan for policies of economic reform.

Hossain et al. [14] looks at economic factors, which could cause an uplift crime in Pakistan. They look at potential stressors related to population growth, literacy and education, GDP, salaries household consumption that have a significant positive impact on the crime.

Hunter et al. [15] found that unemployment and interest rates are both inversely proportional to the inflation rate in the economy.

Jaafari et al. [16] shows that the unemployment rate does not depend on interest and inflation rate, research concluded that inflation negatively impacts unemployment and GDP, and the correlation is inverse. It is concluded inflation is insignificant in levels of unemployment and GDP in the macroeconomics factors of Pakistani economy.

According to the Lee et al. [19] the long run relationship between the expenditure of the government, growth of economy and inflation which are showing the positive impact on the expenditure of the government. In case of the short term the inflation is not affecting the growth of economy.

Jayarajan & Gangadharan [17] suggested that four independent variables such as GDP growth rate, employment rate, government expenditure and rate of interest are significant and other two independent variables such as deficit of budget and increase of taxes is not significant which denotes that the fiscal policy has significant impact on the inflation.

Kliuchnyk & Lymonova [18] shows energy, industries, natural gas, import and export is affecting the borrowing and loan of the government, which eventually affects the inflation in Pakistan. It showed that economic growth in Pakistan is positively related to the inflation.

Lee et al. [19] suggests that inflation is negatively affects the growth. Melese et al. [23] suggest policymakers for make specific bounds for the inflation to have better effects for the economy growth.

The Influence of Natural and Technological Disasters on Unemployment in Pakistan, we can create several hypotheses for this study. Here are a few reasonable hypotheses:

***H1*: *The death toll from natural has a positive lagged impact on unemployment rate in Pakistan*.**

Rationale: Research shows that the economic impact of disasters may not be felt immediately when the disaster occurs, but may gradually appear over time.

Disasters may cause infrastructure damage, business disruptions, and health impacts, which take time to recover and may lead to increased unemployment.

H2**:** *The number of people affected by natural disasters has impact on Pakistan's unemployment rate in the short term, but it may turn positive in the long term*.

Rationale: In the short term after a disaster, the need for reconstruction may lead to a temporary drop in unemployment. However, in the long term, the damage to agriculture, infrastructure and the economy caused by the disaster will gradually become apparent, which may lead to an increase in unemployment.

H3**:** *The death toll from technological disasters has a more significant impact on unemployment than natural disasters*.

Rationale: Technological disasters (such as factory accidents, technical failures, etc.) tend to affect economic activities and infrastructure more directly, leading to longer-term economic impacts, and therefore may have a more significant impact on unemployment rates.

H4**:** *The impact of the military conflicts on Pakistan's unemployment rate is significant*.

Rationale: Although military conflicts can have severe economic and social consequences, its impact on unemployment can vary depending on the complexity of the military conflicts. In some cases, military conflicts can stimulate job growth in certain industries, while in other cases it can lead to economic disruption and job losses.

H5: *Changes in inflation and wholesale price index have direct impact on unemployment rate in Pakistan*.

Rationale: Research suggests that these economic indicators may be buffered through other economic mechanisms and do not directly translate into an impact on the unemployment rate.

These hypotheses are intended to further explore the specific impacts of natural and technological disasters and military conflicts on unemployment in Pakistan and provide directions for future empirical research.

3. Unemployment and disasters trends in Pakistan

3.1. Unemployment

The unemployment is major and important variable which is denoting the conditions pertaining to the economy. Lim et al. [20] shows the high rate of unemployment is reflecting that the wages and earnings of the people are not utilizing completely the human resource and their abilities. The unemployment can be defined in various ways. IMF defines that, "Unemployment is measured annually as percentage of labor force that cannot find a job."

According to International Labor Organization (2001) the situation of unemployment is where a person is searching for work with wages or a full time or part time job and that person is striving to find that job for one month or called as unemployed, having age of sixteen or above and being ready to join that job within the short notice of two weeks. According to Mao et al. [21] those people who are willingly does not wish to work such as retired workers, underage children and students those are not counted into the category of the unemployed people.

Moreover, Martinez-Rivera et al. [22] shows the unemployment can be defined as situation in which the unemployed person wants to work on the desired job or work, and he/she is unable to find that desired work or job vacancy.

Melese et al. [23] discussed the causes of the employment can be crime, poverty, social and political instability. Consequently, according to Mgammal et al. [24] it is important to solve the issues regarding the unemployment that which factors are affecting the unemployment.

Figure 1. Unemployment in Pakistan from 1993–2023

Source: ILO Database 2024

The figure 1 indicates history of unemployment of Pakistan from 1993 to 2023, the lowest in record is 2.6 percent in December 1993 and the highest was 7.8 percent in June 2002.

The unemployment rate remained around 6 percent in last four years. The rise of unemployment was rapid during the decade of the 1993 because the growth of the economy was lowered, and conditions were not feasible during that period in Pakistan. During the 2000s various variables such as crisis of energy, global recession, crime and law uncertainty, macroeconomic factors were highly responsible for the continuous unemployment hike in Pakistan.

Mizrak & Cam [25] shows the privatization procedure was initiated with the help of WB/IMF to restructure the main organizations which are public sector for adjusting their structure to make them profitable and take out of deficit situation are caused extra burden on the unemployment rate and generally affected the growth related to the economy of Pakistan. The main focus of this study and research to do exploration and highlighting many variables and factors which are the root causes for the high unemployment in the country of Pakistan.

3.2. Relationship between military conflicts and unemployment

The costs which are indirect and direct related to the economy are affected by the terrorism.

Mogane & Zitha [26] shows the cost which are direct such as collateral damage, infrastructure destruction, manufacturing decline, human causalities, agriculture production decline and fluctuations in the smooth operation of the activities which are related to economy.

Mohan & Saud [27] discussed the costs which are indirect are affecting the slower time of the production, investment, lower development and joblessness in and rehabilitation process of the internally displaced people (IDPs).

The general effect of the terrorism on the economy of the country is huge and it leads towards the poverty, unemployment, homelessness and other social factors such as crime by Mostafavi-Dehzooei & Asadi [28]. As mentioned by the Ministry of Finance, the Pakistan involvement in the military conflicts has brought vast impact on the joblessness along with uplift in the poverty in the rural areas.

The economy of the Pakistan is having indirect and direct impact due to terrorism. The direct costs are including var-

ious factors such as collateral damage, damage to the infrastructure, agriculture productions, human casualties and fluctuations in the activities which are related to the economy.

Nguyen et al. [29] mentioned the indirect costs which are declining the investment, lower pace of the development, decreasing time of production with the higher rate of the unemployment and rehabilitation of the internally displaced persons (IDPs).

If we look at the history of military conflicts of Pakistan from 1993 to 2023, we will see that military conflicts occurred three times between 2004 and 2006, and the highest number of military conflicts occurred four times between 1994 and 1995.

3.3. Natural Disasters and Unemployment

Pakistan is basically agriculture economy-based country. The majority of the population is residing in the rural areas. The rural areas residents are having major source of income as agriculture. Unfortunately, the Pakistan is not having perfect policies regarding the indigenous people.

Perrone et al. [30] mentioned the happening of the natural disasters such as floods and earthquake are destroying vast lands which are cultivated. The mentioned disasters are the major cause of the increase in the rate of the unemployment in the rural areas.

Pleninger [31] showed most of the traders which are doing trading in the rural areas are affected by this situation with lack of the policy and planning. The government is responsible for the restructuring and rehabilitation of the affected people from the natural disaster to smooth their lives at the same pace again.

It is estimated by the ILO that the worst earthquake which occurred during the year of 2005 which resulted the job loss around 1.1 million. Rehbein & Ongena [32] discussed the mostly jobs are affected in the rural areas where the services and agriculture has become low in terms of productivity with leaving many semi-skilled and unskilled labor.

Earlier to the earthquake around 1.4 million individuals were working in the agriculture sector and around 730000 human resource was utilized by the services sector along with industry employing around 230000 workers. The estimates shows that the around 40–50 percent workers from them probably lost their jobs due to the earthquake.

The heavy floods in the country of the Pakistan during the month of the July 2023 has produced major issues for the economy and political stability of the country. The economy of the country has fallen suddenly with the rapid issues of the joblessness with bringing the social instability and inflation in the double digits. This massive flood has affected around 21 million people, moreover the crises of the energy also brought burden on the economy in general. This sudden event displaced around 6 million people with 11 million people requiring the support for the rehabilitation.

According to the United Nations (UN) it has affected the life of 21 million people where around 1600 people lost their lives with having 1.7 million houses grounded. Apart from the human casualties these disasters became the historical disaster in the history of Pakistan which has affected the economy of Pakistan.

The recent crises of the country are bringing the inequity into the region along with the drastic downfall in the economy of the country caused by the flood. The damages which affected the commercial activities, taxes and revenue also created the unemployment with increasing the poverty due to lower levels of the wages.

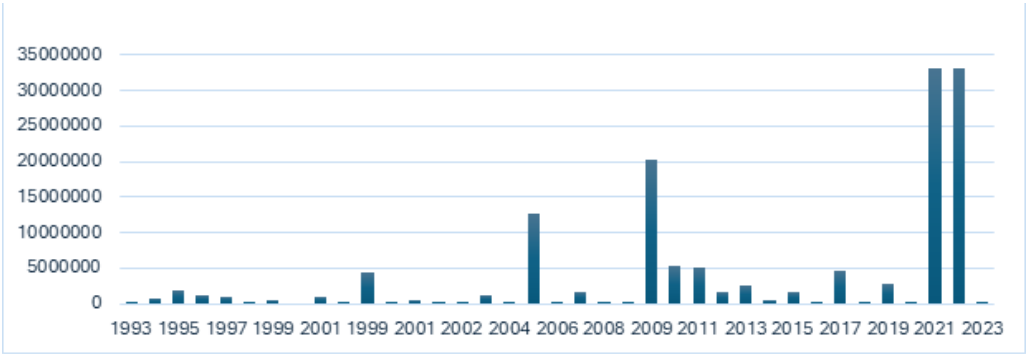

Figure 2. Natural Disaster Affected People in Pakistan from 1993–2023

Source: Data from EM-DAT international disaster database 2024

As we can see in the figure 2 history of Pakistan people affected by natural disasters from 1993 to 2023, natural disasters have occurred in three times of years from 1994, 2005 and 2023 where the highest affected people of 20359496 had occurred in 2023. In 2023 there was flood in Pakistan that is why there was the highest affected people from natural disaster.

3.4. Technological Disasters and Unemployment

The technological disaster is said to be in the event of the malfunction or interruption in the structure which is related to the technology or possibly a huge error made by a human being during controlling or managing the technology. The disaster which is technological can affect the household or individual for attaining the jobs and smooth operations of various service-related sectors eventually affecting the economy of the country in general.

The disasters pertaining to the technology cannot be predicted because of their nature of course. The households or individuals are affected in general because they might lose their jobs which are related to the technology can bring unemployment and other tensions.

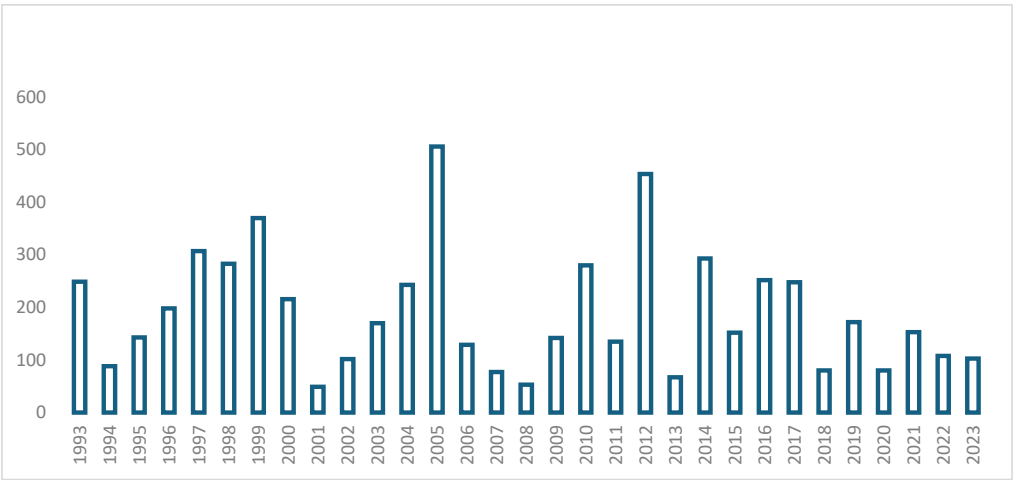

Figure 3. Technological Disaster Deaths in Pakistan from 1993–2023

Source: Data from EM-DAT international disaster database 2024

If we take a look at the figure 3 history of Pakistan technological disasters from 1993 to 2023, technological disasters have occurred in seven times of years from 1993, 1994, 1995, 1997, 2005 and 2023 where the highest deaths of 407 had occurred in 1993 and the lowest deaths of 128 had occurred in 1997.

4. Data and Methods

Particularly when it comes to economic statistics, emerging nations like Pakistan frequently have a dearth of data. For this reason, we only utilize observations from 1993 to 2023 owing to data availability for Pakistan and for data analysis we used Stata software. The primary variables in our study are shown in Table 1 with descriptive statistics. Table 1 shows that there has been a great deal of instability in Pakistan within the last thirty years.

In the following analysis we look at how unemployment in Pakistan has been influenced by economic as well as non-economic factors. Temporal Trends in Unemployment and the Incidence of Military conflicts and Disasters (1993–2023) Figure 4 shows trends over unemployment with military conflicts, natural & technological disaster indicators.

Table 1. **Descriptive Statistics**

Statistic	N	Mean	St. Dev.	Min	Max
pi	30	8	4	3	20
omega	30	32	24	7	100
U	30	5	2	3	8
war	30	0	0	0	1
TD	30	38	90	0	407
Nat	30	1,462,198	4,691,124	0	20,359,496

Source: Developed by author

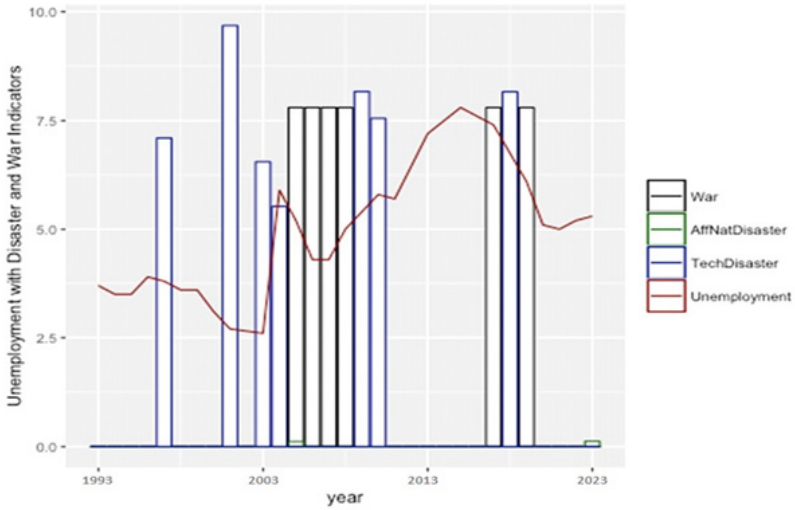

Figure 4. Temporal Trends in Unemployment and the Incidence of Military conflicts and Disasters (1993–2023)

Source: Figure made by author upon statically data from sources

In order to conduct our analysis, we utilize three regression equations. dependent variable is unemployment rate and independent variables includes lagged terms of inflation, wholesale price index changes, military conflicts presence, technological disaster deaths, and the number affected by natural disasters. So, models have three separate regression models are considered, with each including different combinations of these variables.

The first equation looks at how the economic variable interact with the log first difference of unemployment (ΔU); TD_t (Deaths from Technological Disasters): The immediate effect of technological disaster deaths is insignificant, but lagged deaths (TD_{t-1}) have a significant positive effect in models 2 and 3, indicating a lagged impact on increasing unemployment.

Specifically, how past unemployment, inflation (π) and the log second difference of wholesale price index ($\Delta^2\omega$) impact unemployment in Pakistan.

ND_t (Number Affected by Natural Disasters): Immediate effects are not significant, but lagged effects (ND_{t-1}) are significant and negative in models 2 and 3, suggesting that the initial impact of natural disasters might reduce unemployment or the data captures recovery and reconstruction efforts which temporarily boost employment.

W_t (War): Presence of military conflicts appears to have a negative, but not statistically significant, coefficient, suggesting no clear impact on unemployment rates.

These variables help us account for how "normal" economic activity impacts unemployment in Pakistan. Surprisingly, as seen in Table 1, standard economic variables have no impact on the unemployment in Pakistan. Therefore, we need to look at certain events that pertain to Pakistan that may explain unemployment.

The second equation looks at non-economic variables. Specifically, the presence of a military conflict (W) in a given year, the number of dead from technological disasters (TD) and the per capita number of individuals affected by natural disaster (ND).

$$\Delta U_t = \alpha_0 + \beta_1 \Delta U_{t-1} + \beta_2 \pi_t + \\ + \beta_3 \pi_{t-1} + \beta_4 \Delta^2 \omega_t + \beta_5 \Delta^2 \omega_{t-1} + \varepsilon_t. \quad (1)$$

$$\Delta U_t = \alpha_0 + \beta_1 \Delta U_{t-1} + \beta_2 W_t + \\ + \beta_3 W_{t-1} + \beta_4 TD_t + \beta_5 TD_{t-1} + \\ + \beta_6 nat_t + \beta_7 nat_{t-1} + \varepsilon_t. \quad (2)$$

$$\Delta U_t = \alpha_0 + \beta_1 \Delta U_{t-1} + \beta_2 \pi_t + \\ + \beta_3 \pi_{t-1} + \beta_4 \Delta^2 \omega_t + \beta_5 \Delta^2 \omega_{t-1} + \\ + \beta_6 W_t + \beta_7 W_{t-1} + \beta_8 TD_t + \\ + \beta_9 TD_{t-1} + \beta_{10} ND_t + \beta_{11} ND_{t-1} + \varepsilon_t. \quad (3)$$

Our third equation combines the previous two equations to show how economic and non-economic terms together impact unemployment. The definitions of these variables and the location of the databases for which they can be found are located in Table 2. The results of the analysis can be seen in Table 3 is discussed in the next section.

Table 2. **Variable Description and Sources**

Variable	Description	Source
Π	Inflation, consumer prices (annual %)	International Monetary Fund Database
Ω	Wholesale price index (2023 = 100)	International Monetary Fund Database
U	Unemployment total (% of total labor force)	United Nations Development Program Database

End of table 2

Variable	Description	Source
W	Dummy variable for Intra-State Military conflicts	Correlates of War Database
TD	Dead from technological disaster	EM-DAT International Disaster Database
ND	Number affected by natural disaster	EM-DAT International Disaster Database

Source: Developed by author

5. Results

5.1. Regression Results

In this section we have discussed the results of our time series analysis based on the equations in the previous section. Our analysis shows that the only significant variables are the number of dead from technological disaster from the previous year (TD_{t-1}) and the per capita value of individuals affected by natural disaster in the previous year (ND_{t-1}) (Table 3).

Table 3. **Regression Results**

	Unemployment Rate		
	(1)	(2)	(3)
ΔU_{t-1}	–0.006 (0.226)	0.093 (0.158)	0.091 (0.192)
π_t	0.013 (0.026)		–0.001 (0.020)
π_{t-1}	0.003 (0.026)		–0.020 (0.018)
$\Delta^2 \omega_t$	–0.567 (1.722)		0.078 (1.399)
$\Delta^2 \omega_{t-1}$	0.051 (1.511)		1.524 (1.081)
W_t		–0.047 (0.075)	–0.004 (0.095)
W_{t-1}		–0.018 (0.071)	–0.076 (0.089)
TD_t		–0.00005 (0.0003)	–0.0001 (0.0003)
TD_{t-1}		0.002*** (0.0003)	0.002*** (0.0003)
ND_t		–0.471 (0.922)	–0.685 (1.062)
ND_{t-1}		–3.669*** (1.158)	–3.494** (1.379)

End of table 3

	Unemployment Rate		
	(1)	(2)	(3)
Constant	–0.028 (0.119)	0.001 (0.028)	–0.097 (0.082)
Observations	28	29	28
R2	0.026	0.678	0.721
Adjusted R2	–0.196	0.571	0.530
Residual Std. Error	0.199	0.117	0.125
F Statistic	0.116	6.328***	3.767***

Note: $p<0.1$; $p<0.05$; $p<0.01$

Source: Developed by author

What we see is that in the when there is a technological disaster in the previous year; there was an increase in unemployment the following year. This could be since after any technological disaster there are closing of factories or more regulation on an industry causing job loss. It should be said that this is where the government could increase funding to help foster grow or help with new job placement.

Furthermore, even though the current period technological disaster variable is insignificant it has the correct sign. Meaning that in the year of a technological disaster there is a need to clean-up crews and thus lowering unemployment.

P-values indicated within parentheses, where *** suggests a p-value <0.01, ** suggests a p-value <0.05, and not marked values are not significant. F Statistic: All models show significant overall fit, indicating that the models are statistically significant at the global level but may vary in individual predictor significance.

5.2. Interpretation of Significant Results

Lagged Technological Disaster Deaths (TD_{t-1}). Statistically Significant and Positive: This result indicates that the number of deaths from technological disasters in a previous period has a delayed positive impact on the unemployment rate. The implication is that the economic repercussions of such disasters, such as loss of infrastructure, business disruptions, or long-term health consequences, likely emerge after initial disaster response phases. This can lead to reduced economic activity and higher unemployment as communities and industries take time to recover.

Lagged Number Affected by Natural Disasters (ND_{t-1}). Statistically Significant and Negative: This finding suggests that the aftermath of a natural disaster, while initially devastating, may lead to a decrease in unemployment in subsequent periods. This is likely due to reconstruction efforts and increased demand for labor in sectors like construction, emergency services, and other recovery-related activities. The increase in employment opportunities during the rebuilding phase can temporarily alleviate unemployment.

5.3. Interpretation of Non-Significant Results

Current and Lagged Inflation (π and π_{t-1}). Non-significant: Inflation does not appear to have a direct or immediate ef-

fect on unemployment rates in these models. This could suggest that other factors, possibly structural aspects of the economy or policy responses to inflation, buffer the impact of inflation on employment levels.

Change in Wholesale Price Index ($\Delta^2 \omega_t$ and $\Delta^2 \omega_{t-1}$). Non-significant: Fluctuations in wholesale prices, both current and past, do not show a significant influence on unemployment. This might indicate that wholesale price changes are either too indirect or absorbed through other economic mechanisms that do not translate directly to employment changes.

Military conflicts (W_t and W_{t-1}). Non-significant: The presence or absence of battle does no longer extensively affect unemployment costs on this analysis. This might be due to the complex nature of struggle's economic effect, in which in a few cases, military sports would possibly increase employment in positive sectors, at the same time as in others, it leads to monetary disruption and loss.

The technique emphasizes how intricately economic signs, the effects of disasters, and unemployment prices interact. The not on time monetary repercussions of catastrophes are highlighted via huge results from lagged variables, implying that the immediately results of failures and monetary indicators won't absolutely constitute their have an impact on employment. This has tremendous ramifications for policy.

Economic Policy and Disaster Response. The delayed financial effects of catastrophes have to be taken into account by way of governments and groups when developing their planning and response plans. It can be vital to increase the period of monetary relief and assistance applications on the way to cope with the not on time consequences on unemployment.

Infrastructure and Prevention: By making investments in robust infrastructure and safeguards in opposition to natural and technological failures, employment levels can be stabilized with the aid of decreasing the lengthy-time period monetary outcomes of these activities.

Employment projects: In addition to presenting brief-time period assistance, put up-disaster employment initiatives need to be deliberate to facilitate lengthy-term employment as impacted regions gradually get better.

In conclusion, even as modifications in unemployment quotes are not constantly really correlated with the on-the-spot consequences of monetary shocks and disasters, those events behind schedule repercussions though spotlight important economic vulnerabilities and necessities. Therefore, on the way to promote extra strong and strong economies, effective policy interventions need to foresee and address these not on time repercussions.

6. Discussion

This study reveals the significant impact of natural and technological disasters on unemployment in Pakistan, which is consistent with previous observations in the literature. In particular, the study points out that the lagged effect of natural and technological disasters has a significant impact on unemployment, which is consistent with the literature on the long-term impact of disasters on economic activities.

Studies have shown that unemployment rates may temporarily decline in the short term after natural disasters due to reconstruction efforts, which is consistent with the view in some literature that post-disaster reconstruction activities drive employment.

However, our research also points out that in the long run, the destructive impact of natural disasters on the economy will gradually emerge, leading to an increase in unemployment, which is consistent with the long-term negative impact of disasters on economic activities emphasized by most studies. The impact of technological dis-

asters (such as factory accidents, technical failures, etc.) on unemployment rates is particularly significant in this study, especially the number of deaths lagged by one year has a significant positive impact on unemployment rates.

This finding is consistent with the view in the literature that technological disasters cause long-term disruptions to economic activities, emphasizing the threat of technological disasters to economic stability.

6.1. Limitations of this study

Although this study has made some valuable findings in revealing the impact of natural disasters and technological disasters on unemployment rates, there are still some limitations. This study is limited by data availability and only uses data from 1993 to 2023. This limits our analysis of more recent disaster impacts and fails to capture some potential trends.

This study failed to include disaster and unemployment data from other countries, and therefore cannot fully assess the prevalence and heterogeneity of the impact of disasters on unemployment. Although we have considered a variety of economic and non-economic factors, we may still have missed some variables that have an important impact on the unemployment rate, such as policy changes, social structure changes, etc.

The relationship between disasters and unemployment rate may be affected by a variety of complex factors. Although this study controlled some variables through the regression model, it is still difficult to completely remove all interference factors.

6.2. Confirmation and rejection of hypotheses

Our study confirms the hypothesis that natural and technological disasters have a significant impact on unemployment in Pakistan. In particular, we find that the lagged effect of the number of deaths from technological disasters has a positive impact on unemployment, while the lagged effect of the number of people affected by natural disasters has a negative impact on unemployment (possibly due to reconstruction activities).

This study fails to directly support the hypothesis that military conflicts have a significant impact on unemployment. Although military conflicts have occurred many times in Pakistan's history, our regression results show that the impact of military conflicts on unemployment is not significant. This may be due to the complexity of military conflicts and the different effects of different military conflicts on economic activities.

In summary, this study has made some valuable findings in revealing the impact of natural and technological disasters on unemployment in Pakistan, but there are also some limitations. Future research can further expand the data sources, include more variables and cross-national comparisons to more comprehensively assess the impact of disasters on unemployment. At the same time, corresponding policy intervention measures can be further explored for the specific impact mechanisms found in this study.

7. Conclusion

The economy of Pakistan is about to experience instability. The government's latest strategy is bringing with it a number of economic problems, including a persistently lower rate of economic growth, income inequality, bad health care, greater rates of inflation and unemployment, and a lower percentage of literacy. Natural catastrophes, conflicts, and the incapacity of the relevant authorities to address these problems are the main causes of the dire circumstances. This study examines the impact of natural, technical, and armed catastrophes on unemployment rates in Pakistan.

This study explores the impact of natural disasters, technological disasters, and

military conflicts on Pakistan's unemployment rate by deeply analyzing Pakistan's economic data over the past 30 years. The study uses a time series economic model combined with regression analysis to reveal the complex impact mechanism of these factors on unemployment. The following is a summary of the main findings of this study and its theoretical and practical significance.

The research shows that the number of deaths from technological disasters in the previous year has a significant positive lagged effect on the unemployment rate in the following year. This means that the economic losses, infrastructure damage, and long-term health impacts caused by technological disasters may not be immediately apparent in the early stages of economic recovery, but these impacts are gradually exposed over time, leading to an increase in unemployment.

Unlike technological disasters, natural disasters may cause damage in the short term, but in the long term, the number of people affected by natural disasters (data from the previous year) has a significant negative lagged impact on the unemployment rate. This may be because post-disaster reconstruction activities increase the demand for labor, thereby temporarily alleviating unemployment.

The results of regression analysis show that the existence or absence of military conflicts has no significant impact on the unemployment rate. This may be because the impact of military conflicts on economic activities is complex and diverse, sometimes stimulating employment growth in some areas, while suppressing economic activities in other areas. Changes in the inflation rate and the wholesale price index have no significant impact on the unemployment rate, suggesting that other factors, such as economic structure or policy responses, may be buffering the impact of these economic indicators on the job market.

Theoretical significance. This study is the first one to systematically analyze the specific impact of natural disasters, technological disasters, and military conflicts on unemployment in Pakistan, filling the gap in research in this field. The research results enrich the theoretical framework of disaster economics and labor economics, especially the theoretical discussion on the lag effect of disasters. In addition, the study emphasizes the complex impact mechanism of disasters on the economy, which is not limited to the direct impact when the disaster occurs, but also includes the long-term economic consequences after the disaster.

Practical significance. When formulating disaster response strategies, the government and relevant agencies should fully consider the delayed economic impact of disasters and formulate long-term economic assistance and reconstruction plans to alleviate unemployment. In response to technological disasters, the government should strengthen supervision and safety measures for high-risk industries, reduce the risk of disasters, and set up special funds for post-disaster business recovery and worker reemployment. Investing in solid infrastructure and disaster prevention measures can reduce the long-term negative impact of disasters on the economy, stabilize employment levels and promote economic resilience. During the post-disaster reconstruction phase, the government should plan specific employment projects that not only provide short-term assistance but also focus on long-term employment solutions to meet the employment needs of disaster-stricken areas.

This study provides important insights into the impact of disasters on the job market and provides valuable references for policymakers. Future research can further expand data sources, add variables and cross-national comparisons to more comprehensively assess the impact of disasters on unemployment rates.

References

1. Ahiase, G., Andriana, D., Agbemava, E., Adonai, B. (2024). Macroeconomic cyclical indicators and bank non-performing loans: does country governance matter in African countries? *International Journal of Social Economics,* Vol. 51, Issue 1, 62–80. https://doi.org/10.1108/ijse-11-2022-0729

2. Ahmadi, S., Ghanbari Movahed, R., Gholamrezaie, S., Rahimian, M. (2022). Assessing the Vulnerability of Rural Households to Floods at Pol-e Dokhtar Region in Iran. *Sustainability,* Vol. 14, Issue 2, 762. https://doi.org/10.3390/su14020762

3. Akbari-Kasgari, M., Khademi-Zare, H., Fakhrzad, M.B., Hajiaghaei-Keshteli, M., Honarvar, M. (2022). Designing a resilient and sustainable closed-loop supply chain network in copper industry. *Clean Technologies and Environmental Policy,* Vol. 24, 1553–1580. https://doi.org/10.1007/s10098-021-02266-x

4. Baig, A.M., Riaz, M., Moazzam, A., Bokharey, I.Z. (2024). Effect of COVID-19 lockdown on health of women in Pakistan — Socioeconomic perspective. Pakistan *Journal of Medical Sciences,* Vol. 40, No. 3, 347–352. https://doi.org/10.12669/pjms.40.3.8312

5. Cong, Z., Feng, G., Chen, Z. (2023). Disaster exposure and patterns of disaster preparedness: A multilevel social vulnerability and engagement perspective. *Journal of Environmental Management,* Vol. 339, 117798. https://doi.org/10.1016/j.jenvman.2023.117798

6. Cvetkovic, V.M., Sisovic, V. (2024). Understanding the Sustainable Development of Community (Social) Disaster Resilience in Serbia: Demographic and Socio-Economic Impacts. *Sustainability,* Vol. 16, Issue 7, 2620. https://doi.org/10.3390/su16072620

7. Dabiri, M., Sarvari, H., Chan, D.W.M., Olawumi, T.O. (2022). Developing a hybrid risk assessment method for prioritizing the critical risks of temporary accommodation sites after destructive earthquakes. *Habitat International,* Vol. 128, 102667. https://doi.org/10.1016/j.habitatint.2022.102667

8. Di Nallo, A., Koksal, S. (2023). Job loss during pregnancy and the risk of miscarriage and stillbirth. *Human Reproduction,* Vol. 38, Issue 11, 2259–2266. https://doi.org/10.1093/humrep/dead183

9. Drake, L., Liunakwalau, H.M., Vila, P. (2022). Locating the traditional economy in Port Vila, Vanuatu: Disaster relief and agrobiodiversity. *Asia Pacific Viewpoint,* Vol. 63, Issue 1, 80–96. https://doi.org/10.1111/apv.12333

10. Flomo, A.Z.B., Papyrakis, E., Wagner, N. (2023). Evaluating the economic effects of the Ebola virus disease in Liberia: A synthetic control approach. *Journal of International Development,* Vol. 35, Issue 6, 1478–1504. https://doi.org/10.1002/jid.3736

11. Fukuchi, N., Chiba, S. (2022). Utilization of Mental Health Support Systems in the Aftermath of Disasters in Japan: Statistical Data of the Miyagi Disaster Mental Health Care Center. *International Journal of Environmental Research and Public Health,* Vol. 19, Issue 17, 10856. https://doi.org/10.3390/ijerph191710856

12. Galarza Torres, S.P., Carrillo Punina, A.P., Aragón Taco, J.E., Noroña Gallo, D.M. (2023). Military Leadership in the Ecuadorian Army. *In: Applied Technologies. ICAT 2022*. Communications in Computer and Information Science, Vol. 1755. Edited by M. Botto-Tobar, M. Z. Vizuete, S. M. León, P. Torres-Carrión, B. Durakovic. Springer, Cham., 344–359. https://doi.org/10.1007/978-3-031-24985-3_25

13. Horikoshi, N., Maeda, M., Iwasa, H., et al. (2022). The Usefulness of Brief Telephonic Intervention After a Nuclear Crisis: Long-Term Community-Based Support for Fukushima Evacuees. *Disaster Medicine and Public Health Preparedness,* Vol. 16, Issue 1, 123–131. https://doi.org/10.1017/dmp.2020.161

14. Hossain, B., Shi, G., Ajiang, C., Sarker, Md.N.I., Sohel, Md.S., Sun, Z., Yang, Q. (2022). Climate change induced human displacement in Bangladesh: Implications on the livelihood of displaced riverine island dwellers and their adaptation strategies. *Frontiers in Psychology,* Vol. 13, 964648. https://doi.org/10.3389/fpsyg.2022.964648

15. Hunter, L., Gerritsen, S., Egli, V. (2023). Changes in eating behaviours due to crises, disasters and pandemics: a scoping review. *Nutrition & Food Science,* Vol. 53, Issue 2, 358–390. https://doi.org/10.1108/nfs-12-2021-0385

16. Jaafari, A., Mafi-Gholami, D., Yousefi, S. (2024). A spatiotemporal analysis using expert-weighted indicators for assessing social resilience to natural hazards. *Sustainable Cities and Society,* Vol. 100, 105051. https://doi.org/10.1016/j.scs.2023.105051

17. Jayarajan, A., Gangadharan, N. (2022). We Don't Sleep on Rainy Nights. *Contemporary Voice of Dalit.* https://doi.org/10.1177/2455328x221135312

18. Kliuchnyk, R., Lymonova, E. (2022). The peculiarities of poverty research in the countries of the world. *Academy Review,* Vol. 2, 24–35. https://doi.org/10.32342/2074-5354-2022-2-57-2

19. Lee, C.-C., Wang, C.-W., Ho, S.-J. (2022). Financial aid and financial inclusion: Does risk uncertainty matter? *Pacific-Basin Finance Journal,* Vol. 71, 101700. https://doi.org/10.1016/j.pacfin.2021.101700

20. Lim, H., Shin, S.H., Ji, H. (2022). The effect of natural disasters on household economic hardship during a pandemic. *Journal of Consumer Affairs,* Vol. 56, Issue 4, 1525–1560. https://doi.org/10.1111/joca.12480

21. Mao, W., Shalaby, R., Agyapong, B., Obuobi-Donkor, G., Da Luz Dias, R., Agyapong, V.I.O. (2024). Devastating Wildfires and Mental Health: Major Depressive Disorder Prevalence and Associated Factors among Residents in Alberta and Nova Scotia, Canada. *Behavioral Sciences,* Vol. 14, Issue 3, 209. https://doi.org/10.3390/bs14030209

22. Martinez-Rivera, W., Carvalhaes, T., Jevtic, P., Reddy, T.A. (2023). A treatment-effect model to quantify human dimensions of disaster impacts: the case of Hurricane Maria in Puerto Rico. *Natural Hazards,* Vol. 116, 2033–2068. https://doi.org/10.1007/s11069-022-05753-6

23. Melese, M., Simegn, W., Esubalew, D., et al. (2024). Symptoms of posttraumatic stress, anxiety, and depression, along with their associated factors, among Eritrean refugees in Dabat town, northwest Ethiopia, 2023. *Bmc Psychology,* Vol. 12, 62. https://doi.org/10.1186/s40359-024-01554-7

24. Mgammal, M.H., Al-Matari, E.M., Alruwaili, T.F. (2023). Value-added-tax rate increases: A comparative study using difference-in-difference with an ARIMA modeling approach. *Humanities & Social Sciences Communications,* Vol. 10, 121. https://doi.org/10.1057/s41599-023-01608-y

25. Mizrak, S., Cam, H. (2022). Determining the factors affecting the disaster resilience of countries by geographical weighted regression. *International Journal of Disaster Risk Reduction,* Vol. 81, 103311. https://doi.org/10.1016/j.ijdrr.2022.103311

26. Mogane, V.R., Zitha, H.E. (2023). The Impact of international migration on South Africa as a developing economy. *Politikon,* Vol. 50, Issue 3, 273–287. https://doi.org/10.1080/02589346.2023.2253405

27. Mohan, K., Saud, S.J. (2024). Risk Assessment of Landslides During Reconstruction and Rehabilitation Phase at Iritty Taluk of Kannur District, Kerala. *Proceedings of SECON'23. Structural Engineering and Construction Management.* Lecture Notes in Civil Engineering, Vol. 381. Edited by M. Nehdi, M. K. Hung, K. Venkataramana, A. Jiji, P. E. Kavitha, B. R. Beena. Springer, Cham., 139–143. https://doi.org/10.1007/978-3-031-39663-2_10

28. Mostafavi-Dehzooei, M.H., Asadi, G. (2024). The effects of precipitation shocks on rural labour markets and migration. *Climate and Development,* 1–13. https://doi.org/10.1080/17565529.2024.2324949

29. Nguyen, C.P., Nguyen, N.D., Wongchoti, J. (2023). A look beyond climate risk exposure: the impact of incapacity to cope with natural hazards on financial development. *Environmental Science and Pollution Research,* Vol. 30, 58058–58076. https://doi.org/10.1007/s11356-023-26621-1

30. Perrone, D., Fischer, R., Florek, J. (2023). COVID-19-Related Shifts in Polysubstance Use. *Substance Use & Misuse,* Vol. 58, Issue 11, 1314–1323. https://doi.org/10.1080/10826084.2023.2181034

31. Pleninger, R. (2022). Impact of natural disasters on the income distribution. *World Development,* Vol. 157, 105936. https://doi.org/10.1016/j.worlddev.2022.105936

32. Rehbein, O., Ongena, S. (2022). Flooded Through the Back Door: The Role of Bank Capital in Local Shock Spillovers. *Journal of Financial and Quantitative Analysis,* Vol. 57, Issue 7, 2627–2658. https://doi.org/10.1017/s0022109022000321

33. Ryan, R. (2023). Discretionary Extensions to Unemployment Insurance Compensation and Some Potential Costs for a McCall Worker. *Risks,* Vol. 11, Issue 10, 171. https://doi.org/10.3390/risks11100171

34. Shariati, A., Guerette, R.T. (2023). Findings from a natural experiment on the impact of covid-19 residential quarantines on domestic violence patterns in New Orleans. *Journal of Family Violence,* Vol. 38, 203–214. https://doi.org/10.1007/s10896-022-00380-y

35. Stanojevic, K., Radovanovic, G., Makajic-Nikolic, D., Savic, G., Simeunovic, B., Petrovic, N. (2022). Selection of the optimal medical waste incineration facility location: A challenge of medical waste risk management. *Vojnosanitetski Pregled,* Vol. 79, Issue 2, 125–132. https://doi.org/10.2298/vsp200521072s

INFORMATION ABOUT AUTHORS

Shah Mehmood Wagan

PhD Student, Business School, Sichuan University, Chengdu, China (Wangjiang campus, Chengdu, Sichuan, China, 610065); ORCID https://orcid.org/0009-0003-0449-2655 e-mail: shah.mehmood04@outlook.com

Sidra Sidra

Master Student, Business School, Sichuan University, Chengdu, China (Wangjiang campus, Chengdu, Sichuan, China, 610065); ORCID https://orcid.org/0009-0003-1689-3296 e-mail: sidra_scu@outlook.com

FOR CITATION

Wagan, S.M., Sidra, S. (2024). The Influence of Natural and Technological Disasters on Unemployment in Pakistan. *Journal of Applied Economic Research,* Vol. 23, No. 4, 929–950. https://doi.org/10.15826/vestnik.2024.23.4.037

ARTICLE INFO

Received August 9, 2024; Revised August 23, 2024; Accepted September 3, 2024.

УДК 331.43

Влияние природных и техногенных катастроф на безработицу в Пакистане

Ш. М. Ваган ✉, ***С. Сидра***

Сычуаньский университет,
г. Чэнду, Китай
✉ *shah.mehmood04@outlook.com*

Аннотация. Природные и техногенные катастрофы оказывают значительное влияние на безработицу в Пакистане и являются важными факторами экономической нестабильности. Экономика Пакистана сейчас переживает критическую фазу нестабильности. Действующему правительству приходится сталкиваться с рядом экономических и социальных проблем, в частности высоким уровнем безработицы. В исследовании выдвигается гипотеза о том, что количество смертей и количество людей, пострадавших от стихийных бедствий, оказывают существенное влияние на уровень безработицы, причем это влияние имеет временное отставание. В исследовании рассматривается экономическая статистика Пакистана за последние 30 лет. Мы используем программное обеспечение Stata для уравнений регрессии для изучения уровня безработицы, инфляции, изменений индекса цен, участия в военных действиях, смертей от техногенных катастроф и последствий стихийных бедствий. Исследование показывает, что количество смертей в результате природных и техногенных катастроф оказывает значимое влияние на уровень безработицы, предполагая при этом, что экономические последствия таких бедствий могут проявиться после начальных этапов реагирования. Авторы пренебрегли изучением влияния последних событий на рынок труда из-за отсутствия доступа к данным. В данном исследовании впервые исследуется влияние природных и техногенных катастроф на безработицу. Наше исследование заполняет пробел в изучении влияния стихийных бедствий на уровень безработицы в экономике стихийных бедствий и экономике труда, подчеркивая временное отставание последствий стихийных бедствий. Результаты исследования обеспечивают научную основу для правительства и соответствующих учреждений при формулировании экономической политики восстановления занятости после стихийных бедствий. Мы также обосновали рекомендации по усилению профилактики стихийных бедствий и строительству инфраструктуры для снижения долгосрочного негативного воздействия стихийных бедствий на экономику.

Ключевые слова: безработица; стихийное бедствие; техногенная катастрофа; инфляция; рабочая сила; Пакистан.

Список использованных источников

1. *Ahiase G., Andriana D., Agbemava E., Adonai B.* Macroeconomic cyclical indicators and bank non-performing loans: does country governance matter in African countries? // International Journal of Social Economics. 2024. Vol. 51, Issue 1. Pp. 62–80. https://doi.org/10.1108/ijse-11-2022-0729

2. *Ahmadi S., Ghanbari Movahed R., Gholamrezaie S., Rahimian M.* Assessing the Vulnerability of Rural Households to Floods at Pol-e Dokhtar Region in Iran // Sustainability. 2022. Vol. 14, Issue 2. 762. https://doi.org/10.3390/su14020762

3. *Akbari-Kasgari M., Khademi-Zare H., Fakhrzad M. B., Hajiaghaei-Keshteli M., Honarvar M.* Designing a resilient and sustainable closed-loop supply chain network in copper

industry // Clean Technologies and Environmental Policy. 2022. Vol. 24. Pp. 1553–1580. https://doi.org/10.1007/s10098-021-02266-x

4. *Baig A. M., Riaz M., Moazzam A., Bokharey I. Z.* Effect of COVID-19 lockdown on health of women in Pakistan — Socioeconomic perspective // Pakistan Journal of Medical Sciences. 2024. Vol. 40, No. 3. Pp. 347–352. https://doi.org/10.12669/pjms.40.3.8312

5. *Cong Z., Feng G., Chen Z.* Disaster exposure and patterns of disaster preparedness: A multilevel social vulnerability and engagement perspective // Journal of Environmental Management. 2023. Vol. 339. 117798. https://doi.org/10.1016/j.jenvman.2023.117798

6. *Cvetkovic V. M., Sisovic V.* Understanding the Sustainable Development of Community (Social) Disaster Resilience in Serbia: Demographic and Socio-Economic Impacts // Sustainability. 2024. Vol. 16, Issue 7. 2620. https://doi.org/10.3390/su16072620

7. *Dabiri M., Sarvari H., Chan D. W.M., Olawumi T. O.* Developing a hybrid risk assessment method for prioritizing the critical risks of temporary accommodation sites after destructive earthquakes // Habitat International. 2022. Vol. 128. 102667. https://doi.org/10.1016/j.habitatint.2022.102667

8. *Di Nallo A., Koksal S.* Job loss during pregnancy and the risk of miscarriage and stillbirth // Human Reproduction, 2023. Vol. 38, Issue 11. Pp. 2259–2266. https://doi.org/10.1093/humrep/dead183

9. *Drake L., Liunakwalau H. M., Vila P.* Locating the traditional economy in Port Vila, Vanuatu: Disaster relief and agrobiodiversity // Asia Pacific Viewpoint. 2022. Vol. 63, Issue 1. Pp. 80–96. https://doi.org/10.1111/apv.12333

10. *Flomo A. Z.B., Papyrakis E., Wagner N.* Evaluating the economic effects of the Ebola virus disease in Liberia: A synthetic control approach // Journal of International Development. 2023. Vol. 35, Issue 6. Pp. 1478–1504. https://doi.org/10.1002/jid.3736

11. *Fukuchi N., Chiba S.* Utilization of Mental Health Support Systems in the Aftermath of Disasters in Japan: Statistical Data of the Miyagi Disaster Mental Health Care Center // International Journal of Environmental Research and Public Health. 2022. Vol. 19, Issue 17. 10856. https://doi.org/10.3390/ijerph191710856

12. *Galarza Torres S. P., Carrillo Punina A. P., Aragón Taco J. E., Noroña Gallo D. M.* Military Leadership in the Ecuadorian Army // In: Applied Technologies. ICAT 2022. Communications in Computer and Information Science, Vol. 1755. Edited by M. Botto-Tobar, M. Z. Vizuete, S. M. León, P. Torres-Carrión, B. Durakovic. Springer, Cham., 2023. Pp. 344–359. https://doi.org/10.1007/978-3-031-24985-3_25

13. *Horikoshi N., Maeda M., Iwasa H., et al.* The Usefulness of Brief Telephonic Intervention After a Nuclear Crisis: Long-Term Community-Based Support for Fukushima Evacuees // Disaster Medicine and Public Health Preparedness. 2022. Vol. 16, Issue 1. Pp. 123–131. https://doi.org/10.1017/dmp.2020.161

14. *Hossain B., Shi G., Ajiang C., Sarker Md.N.I., Sohel Md.S., Sun, Z., Yang, Q.* Climate change induced human displacement in Bangladesh: Implications on the livelihood of displaced riverine island dwellers and their adaptation strategies // Frontiers in Psychology. 2022. Vol. 13. 964648. https://doi.org/10.3389/fpsyg.2022.964648

15. *Hunter L., Gerritsen S., Egli V.* Changes in eating behaviours due to crises, disasters and pandemics: a scoping review // Nutrition & Food Science. 2023. Vol. 53, Issue 2. Pp. 358–390. https://doi.org/10.1108/nfs-12-2021-0385

16. *Jaafari A., Mafi-Gholami D., Yousefi S.* A spatiotemporal analysis using expert-weighted indicators for assessing social resilience to natural hazards // Sustainable Cities and Society. 2024. Vol. 100. 105051. https://doi.org/10.1016/j.scs.2023.105051

17. *Jayarajan A., Gangadharan N.* We Don't Sleep on Rainy Nights // Contemporary Voice of Dalit. 2022. https://doi.org/10.1177/2455328x221135312

18. *Kliuchnyk R., Lymonova E.* The peculiarities of poverty research in the countries of the world // Academy Review. 2022. Vol. 2. Pp. 24–35. https://doi.org/10.32342/2074-5354-2022-2-57-2

19. *Lee C.-C., Wang C.-W., Ho S.-J.* Financial aid and financial inclusion: Does risk uncertainty matter? // Pacific-Basin Finance Journal. 2022. Vol. 71. 101700. https://doi.org/10.1016/j.pacfin.2021.101700

20. *Lim H., Shin S. H., Ji H.* The effect of natural disasters on household economic hardship during a pandemic // Journal of Consumer Affairs. 2022. Vol. 56, Issue 4. Pp. 1525–1560. https://doi.org/10.1111/joca.12480

21. *Mao W., Shalaby R., Agyapong B., Obuobi-Donkor G., Da Luz Dias R., Agyapong V. I. O.* Devastating Wildfires and Mental Health: Major Depressive Disorder Prevalence and Associated Factors among Residents in Alberta and Nova Scotia, Canada // Behavioral Sciences. 2024. Vol. 14, Issue 3. 209. https://doi.org/10.3390/bs14030209

22. *Martinez-Rivera W., Carvalhae, T., Jevtic P., Reddy T. A.* A treatment-effect model to quantify human dimensions of disaster impacts: the case of Hurricane Maria in Puerto Rico // Natural Hazards. 2023. Vol. 116. Pp. 2033–2068. https://doi.org/10.1007/s11069-022-05753-6

23. *Melese M., Simegn W., Esubalew D., et al.* Symptoms of posttraumatic stress, anxiety, and depression, along with their associated factors, among Eritrean refugees in Dabat town, northwest Ethiopia, 2023 // Bmc Psychology. 2024. Vol. 12. 62. https://doi.org/10.1186/s40359-024-01554-7

24. *Mgammal M. H., Al-Matari E. M., Alruwaili T. F.* Value-added-tax rate increases: A comparative study using difference-in-difference with an ARIMA modeling approach // Humanities & Social Sciences Communications. 2023. Vol. 10. 121. https://doi.org/10.1057/s41599-023-01608-y

25. *Mizrak S., Cam H.* Determining the factors affecting the disaster resilience of countries by geographical weighted regression // International Journal of Disaster Risk Reduction. 2022. Vol. 81. 103311. https://doi.org/10.1016/j.ijdrr.2022.103311

26. *Mogane V. R., Zitha H. E.* The Impact of international migration on South Africa as a developing economy // Politikon. 2023. Vol. 50, Issue 3. Pp. 273–287. https://doi.org/10.1080/02589346.2023.2253405

27. *Mohan K., Saud S. J.* Risk Assessment of Landslides During Reconstruction and Rehabilitation Phase at Iritty Taluk of Kannur District, Kerala // Proceedings of SECON'23. Structural Engineering and Construction Management. Lecture Notes in Civil Engineering, Vol. 381. Edited by M. Nehdi, M. K. Hung, K. Venkataramana, A. Jiji, P. E. Kavitha, B. R. Beena. Springer, Cham., 2024. Pp. 139–143. https://doi.org/10.1007/978-3-031-39663-2_10

28. *Mostafavi-Dehzooei M. H., Asadi G.* The effects of precipitation shocks on rural labour markets and migration // Climate and Development. 2024. Pp. 1–13. https://doi.org/10.1080/17565529.2024.2324949

29. *Nguyen C. P., Nguyen N. D., Wongchoti J.* A look beyond climate risk exposure: the impact of incapacity to cope with natural hazards on financial development // Environmental Science and Pollution Research. 2023. Vol. 30. Pp. 58058–58076. https://doi.org/10.1007/s11356-023-26621-1

30. *Perrone D., Fischer R., Florek J.* COVID-19-Related Shifts in Polysubstance Use // Substance Use & Misuse. 2023. Vol. 58, Issue 11. Pp. 1314–1323. https://doi.org/10.1080/10826084.2023.2181034

31. *Pleninger R.* Impact of natural disasters on the income distribution // World Development. 2022. Vol. 157. 105936. https://doi.org/10.1016/j.worlddev.2022.105936

32. *Rehbein O., Ongena S.* Flooded Through the Back Door: The Role of Bank Capital in Local Shock Spillovers // Journal of Financial and Quantitative Analysis. 2022. Vol. 57, Issue 7. Pp. 2627–2658. https://doi.org/10.1017/s0022109022000321

33. *Ryan R.* Discretionary Extensions to Unemployment Insurance Compensation and Some Potential Costs for a McCall Worker // Risks. 2023. Vol. 11, Issue 10. 171. https://doi.org/10.3390/risks11100171

34. *Shariati A., Guerette R. T.* Findings from a natural experiment on the impact of covid-19 residential quarantines on domestic violence patterns in New Orleans // Journal of Family Violence. 2023. Vol. 38. Pp. 203–214. https://doi.org/10.1007/s10896-022-00380-y

35. *Stanojevic K., Radovanovic G., Makajic-Nikolic D., Savic G., Simeunovic B., Petrovic N.* Selection of the optimal medical waste incineration facility location: A challenge of medical waste risk management // Vojnosanitetski Pregled. 2022. Vol. 79, Issue 2. Pp. 125–132. https://doi.org/10.2298/vsp200521072s

ИНФОРМАЦИЯ ОБ АВТОРАХ

Ваган Шах Мехмуд

Аспирант, Школа бизнеса, Сычуаньский университет, г. Чэнду, Китай (кампус Ванцзян, Чэнду, Сычуань, Китай, 610065); ORCID https://orcid.org/0009-0003-0449-2655 e-mail: shah.mehmood04@outlook.com

Сидра Сидра

Студент магистратуры, Школа бизнеса, Сычуаньский университет, г. Чэнду, Китай (кампус Ванцзян, Чэнду, Сычуань, Китай, 610065); ORCID https://orcid.org/0009-0003-1689-3296 e-mail: sidra_scu@outlook.com

ДЛЯ ЦИТИРОВАНИЯ

Ваган Ш. М., Сидра С. Влияние природных и техногенных катастроф на безработицу в Пакистане // Journal of Applied Economic Research. 2024. Т. 23, № 4. С. 929–950. https://doi.org/10.15826/vestnik.2024.23.4.037

ИНФОРМАЦИЯ О СТАТЬЕ

Дата поступления 9 августа 2024 г.; дата поступления после рецензирования 23 августа 2024 г.; дата принятия к печати 3 сентября 2024 г.