

## ORIGINAL

# Past themes and future trends in the economic dimension of COVID-19 research: a co-word analysis

*Temas pasados y tendencias futuras en la dimensión económica de la investigación sobre COVID-19: un análisis de co-palabras*

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## Abstract

**Background:** This article aims to describe the development of research focusing on the economic dimension of COVID-19 from 2020 to 2023 (July), identifying the main themes and how they have evolved. It also aims to identify gaps in the literature to propose the future research agenda.

**Methods:** A total of 2456 publications were analyzed using the Web of Science database. The analysis utilized the R program's bibliometrix package and the Scimat program in conjunction. The study data were examined in four periods: 2020, 2021, 2022, and 2023 (July) to observe the evolution of concepts.

**Results:** The analysis revealed that the dominant themes in respective periods were motor themes, namely economics, lockdown, pandemic, and economics in that order. It was observed that the year 2022 had the highest number of studies conducted.

**Conclusion:** While the years 2020 and 2021 might be considered the most impactful years of the COVID-19 pandemic, considering the publication timelines and the time it takes for the pandemic's economic effects to materialize, the higher number of studies in 2022 could be attributed to this delay. Additionally, although the pandemic started to be controlled in some countries with the commencement of vaccination campaigns in 2022, the persistence of variants and the course of the pandemic led to continued economic uncertainty. Authors interested in working in this field might primarily focus on mental health; those seeking more niche areas could explore economic policy uncertainty and economic themes. Furthermore, the decreasing or emerging themes appeared weakly structured and could be linked to specific research interest areas that could be significant for the entire research domain. Thus, studying the economic crisis theme related to COVID-19 is recommended.

**Key words:** COVID-19, economic, co-word analysis, bibliometric.

## Resumen

**Antecedentes:** Este artículo tiene como objetivo describir el desarrollo de la investigación centrada en la dimensión económica de COVID-19 desde 2020 hasta 2023 (julio), identificando los principales temas y cómo han evolucionado. También tiene como objetivo identificar lagunas en la literatura para proponer la agenda de investigación futura.

**Métodos:** Se analizaron un total de 2456 publicaciones utilizando la base de datos Web of Science. El análisis utilizó el paquete bibliométrico del programa R y el programa Scimat en conjunto. Los datos del estudio se examinaron en cuatro períodos: 2020, 2021, 2022 y 2023 (julio) para observar la evolución de los conceptos.

**Resultados:** El análisis reveló que los temas dominantes en los respectivos períodos fueron temas motores, a saber, economía, confinamiento, pandemia y economía en ese orden. Se observó que el año 2022 tuvo el mayor número de estudios realizados.

**Conclusión:** Si bien los años 2020 y 2021 podrían considerarse los años más impactantes de la pandemia de COVID-19, considerando los plazos de publicación y el tiempo que lleva que los efectos económicos de la pandemia se materialicen, el mayor número de estudios en 2022 podría atribuirse a este retraso. Además, aunque la pandemia comenzó a controlarse en algunos países con el inicio de las campañas de vacunación en 2022, la persistencia de variantes y el curso de la pandemia llevaron a una continua incertidumbre económica. Los autores interesados en trabajar en este campo podrían centrarse principalmente en la salud mental; aquellos que buscan áreas más especializadas podrían explorar la incertidumbre de la política económica y temas económicos. Además, los temas en disminución o emergentes parecían débilmente estructurados y podrían estar vinculados a áreas específicas de interés investigativo que podrían ser significativas para todo el dominio de investigación. Por lo tanto, se recomienda estudiar el tema de la crisis económica relacionada con COVID-19.

**Palabras clave:** COVID-19, económico, análisis de co-palabras, bibliométrico.

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## Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), responsible for the COVID-19 disease in 2019, is the seventh coronavirus known to transmit from other hosts like bats and rodents to humans<sup>1</sup>. In March 2020, following the assessment of the rapid global spread and severity of the deadly virus, the WHO Director-General declared COVID-19 a pandemic, alongside additional social distancing measures to curb its spread<sup>1</sup>. As countries imposed stringent restrictions to halt the virus's spread, the COVID-19 pandemic rapidly crippled economic activity, nearly grinding it to a halt. Alongside rising health and human losses, the already evident economic damage represents the most significant economic shock the world has faced in decades<sup>2</sup>. Since the peak of COVID-19, economic concerns have been on the rise worldwide. Research has shown that economic distress could lead to serious psychological and physical health issues that need to be considered by clinical professionals and policymakers<sup>3</sup>. Moreover, with technological advancements, information about the pandemic has been disseminated globally within a short span of time.

Initial estimations predicted that major economies might lose around 2.4% to 3.0% of their Gross Domestic Product (GDP) due to the COVID-19 pandemic in 2020<sup>4</sup>. Consequently, reduced incomes and high uncertainty have made it challenging for numerous businesses worldwide to sustain their financial operations<sup>5</sup>. Governments responded to curb the spread of the virus by implementing various policies such as travel bans, quarantines, and closing internal and external borders. However, the impacts of the disease and the measures taken to combat it raised concerns about preparedness for pandemics<sup>6</sup>.

The COVID-19 pandemic has led to the emergence of numerous new publications in the fields of medicine and science. Since the outbreak's onset, research on COVID-19 has rapidly escalated, resulting in the publication of numerous scientific articles. This rapid increase has directed scientists and researchers across the globe to engage in this subject due to the pandemic's severity and rapid spread. Consequently, the synthesis of the general literature on COVID-19 in an economic context has become imperative.

## Methodology

This study aims to explore research areas and thematic trends in publications focused on the economic dimension of COVID-19 using co-word analysis. The study sought to answer the following questions:

1. What are the thematic developments of COVID-19's economic dimension in research?
2. What are the future research directions for the economic dimension of COVID-19?

Co-word analysis was introduced to the literature by Callon et al. (1986). It's a method used in text mining and natural language processing fields<sup>11</sup>. This analysis unveils relationships and connections between words by examining the frequency of words appearing together in a specific text. It's considered an effective method for content analysis and text mining<sup>7-9</sup>. Co-word analysis is employed to comprehend conceptual structures in large datasets, detect textual similarities, and uncover new ideas or discoveries. It serves to exhibit connections between research themes and scientific disciplines<sup>10</sup>.

The fundamental steps of co-word analysis are as follows:

**Data Collection:** Collect text data related to the topic of interest. This data can include articles, books, blog posts, social media entries, or other text-based sources.

**Text Data Preprocessing:** Preprocess the collected text data. This step involves cleaning processes like removing unnecessary characters, punctuation marks, stop words, and numbers. Additionally, transforming words to lowercase and applying stemming or lemmatization to words can be performed.

**Calculation of Word Frequencies:** Calculate the frequency of words in the cleaned text data. This helps identify which words are more frequently used.

**Creation of Word Relationships:** In co-word analysis, each word is associated with the co-occurrence of other words. This relationship is based on the frequency of two words appearing together in the same text.

**Formation of Co-Occurrence Matrix:** Based on the word relationships, a co-occurrence matrix is formed. This matrix includes the co-occurrence frequencies of words in the text.

**Statistical Analysis:** Conduct necessary statistical analyses based on the co-occurrence matrix. These analyses are used to understand relationships between words.

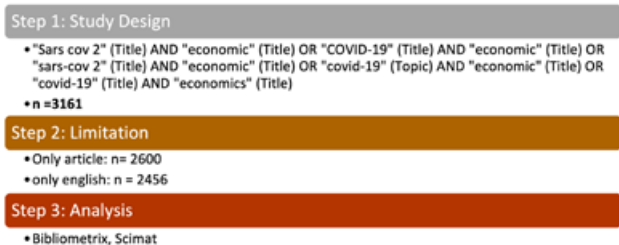
**Visualization:** Typically, analysis results are presented using visualization methods. Visual tools like heatmaps, network graphs, etc., can be employed to clearly illustrate word relationships.

This method proves highly valuable in analyzing large datasets and identifying significant topics within text. Co-word analysis-based studies are used to explore connections between texts, and they find application in various fields such as content management, marketing strategies, and healthcare improvements.

In this study, a search was conducted in the Web of Science database for the period between January 1,

2020, and August 2, 2023. Keywords were searched using the “title” option, as depicted in **figure 1**, yielding an initial 3161 records. After filtering for English-language articles and excluding non-article types, 2456 studies were included for analysis. The analysis employed the bibliometrix package.

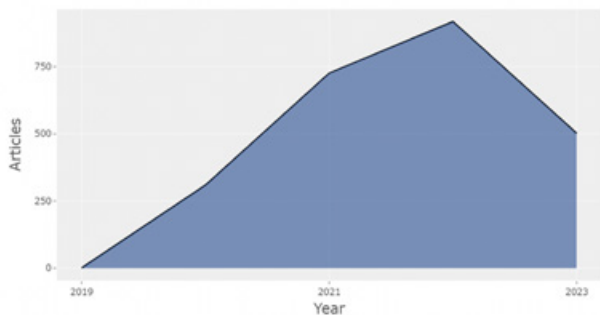
**Figure 1:** Search strategy.



## Results

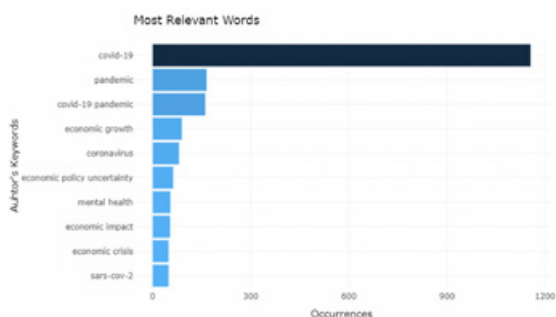
**Figure 2** displays the publication counts of articles over the years. Accordingly, the highest number of publications, 918, occurred in the year 2022. In 2021, there were 726 publications, while 309 were produced in 2020. Although there seems to be a decline in publications in 2023, it's challenging to make a general assessment since data up to July have been considered. The publications notably experienced a significant leap from 2020 to 2021, showing a remarkable increase of 135%.

**Figure 2:** Number of publications by years.



**Figure 3** presents the most frequently used keywords. According to this figure, the most commonly used keyword is “COVID-19” with a count of 1156. Following this are the keywords “Pandemic,” “COVID-19 pandemic,” and “Economic growth.”

**Figure 3:** Most frequently used keywords.



**Figure 4** depicts the network map of author keywords created by Bibliometrix. Keywords are divided into five clusters. The most frequently used cluster is represented by the color red, symbolizing the interplay between “COVID-19” and the economy. The blue cluster represents Economic Growth, the orange cluster signifies Sustainable Development, the green cluster represents Mental Health, and the purple cluster embodies Health Economics.

The formation of keywords was analyzed using the co-occurrence matrix in the ScimAT software. Similarities between clusters were calculated based on the “equivalence index.”

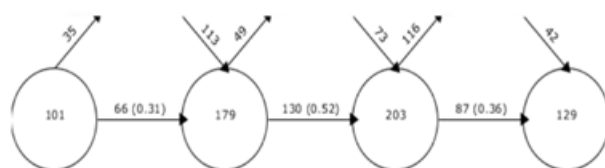
**Figure 4:** Co Occurrence network.



**Figure 5** illustrates the development of themes in studies related to the economic dimension of COVID-19. It shows the emergence of themes in a total of four time periods: 2020, 2021, 2022, and 2023 (July). The figure uses upward arrows to indicate disappearing terms, downward arrows to represent new terms, numbers within parentheses to denote the number of themes in the respective period, and horizontal arrows to show themes inherited from the previous period.

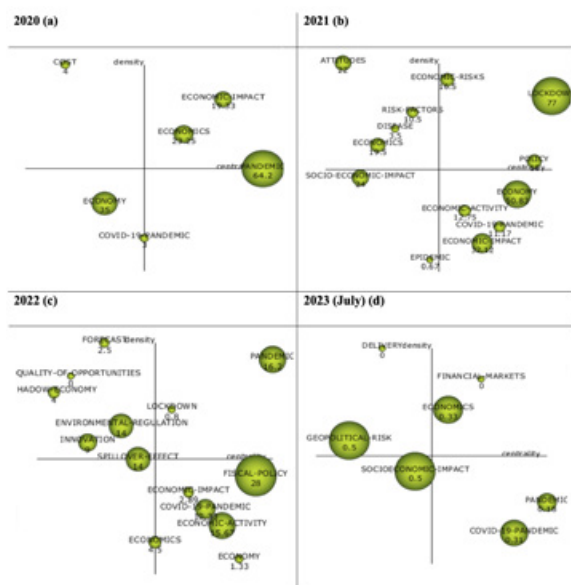
In 2021, out of the 179 themes, 73% (n=130) were carried over to the 2022 period, making it the period with the highest transfer of themes. The highest number of themes, 203, appeared in the year 2022. The year 2021 witnessed the introduction of the most new terms, with 113 themes. However, as the transition occurred from 2022 to 2023, 57% of the themes were lost, resulting in the highest loss of terms in this transition.

**Figure 5:** Thematic overlapping map of studies on the economic dimension of COVID19.



In **figure 6**, thematic maps with author keywords using SciMAT for research examining the economic dimension of COVID-19 are presented for four different years. **Table I** includes the themes of the periods. Clusters represent themes, and the numbers within them indicate the volume of the corresponding literature. As the number and cluster size increase, the usage of the theme also increases. The horizontal axis represents centrality, indicating the strength of the relationship with other themes. The larger the centrality, the more central it is in the research field and closely related to other themes. The vertical axis represents density, which indicates the degree of relationship among keywords within a theme. Higher density signifies closer internal connections and more mature theme development. The two-axis plane is divided into four quadrants<sup>13</sup>.

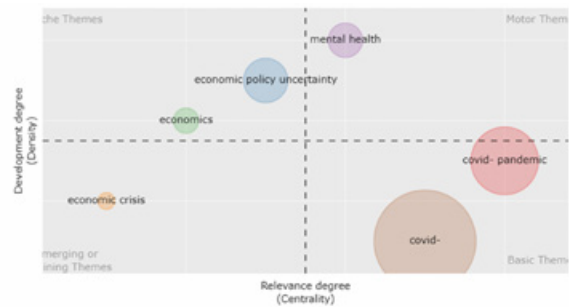
**Figure 6:** The overall thematic map of studies related to the economic aspect of COVID-19.



The map is divided into four distinct themes: niche (top left), motor (top right), decreasing or emerging (bottom left), and foundational themes (bottom right). Motor themes and foundational themes are directly related to the research field, but while motor themes encompass well-developed research topics, foundational themes are less mature. Niche themes encompass well-developed research subjects but pertain to more marginal topics rather than the core domain. Decreasing or Emerging Theme: The terms “decreasing theme” and “emerging theme” are used to describe spatial patterns displayed on the map. Decreasing Theme: A decreasing theme depicts a model in which a specific feature or phenomenon diminishes in size or intensity from one area to another. Emerging Theme: An emerging theme illustrates a model in which a specific feature or phenomenon increases in size or intensity from one area to another<sup>14</sup>.

**Figure 7** displays the overall thematic map of studies related to the economic dimension of COVID-19. This map was generated by Bibliometrix. According to the map, motor themes include mental health, thematic themes encompass COVID-19, niche themes address economic policy uncertainty, and emerging or declining themes involve economic crisis.

**Figure 7:** The overall thematic map of studies related to the economic aspect of COVID-19.



**Table I:** Themes by period.

|                                     | 2020      | 2021                  | 2022                       | 2023 (temmuz)         |
|-------------------------------------|-----------|-----------------------|----------------------------|-----------------------|
| <b>Motor Theme</b>                  | Economics | lockdown,<br>economy- | pandemic-<br>fiscal policy | economics             |
| <b>Basic Themes</b>                 | -         | Attitudes             | Environmental regulation   | COVID 19 pandemic     |
| <b>Niche Themes</b>                 | Cost      | Socio Economic Impact | -                          | geopolitical risk     |
| <b>Emerging Or Declining Themes</b> | Economy   | -                     | -                          | Socio Economic Impact |

## Discussion

This study presents a co-word analysis of research conducted to comprehend the impact of the COVID-19 pandemic on the economy. The study analyzes data from four periods: 2020, 2021, 2022, and 2023 (July), with the aim of observing the development of concepts over these years. This article serves as a crucial source of information to assess current trends and research areas in studies related to the economic dimensions of the COVID-19 outbreak.

In the year 2020, it was observed that the central and most prominent concept was “economics.” In the initial period of 2020, the number of terms was comparatively lower than in the subsequent periods. This was due to the new onset of the COVID-19 pandemic and the lower number of studies conducted during that time.

In the year 2021, the concept that saw the most significant growth as a central theme was “lockdown.” The impact of



lockdown measures on the economy, stemming from the crucial step of combating the COVID-19 outbreak, led to it becoming a frequently used theme in studies. Studies on COVID-19 lockdown and the economy have been conducted by authors such as Atalan (2020), Gupta et al. (2021), Yaish et al. (2021)<sup>18,19,20</sup>. Research in this area showed a substantial increase of 135% compared to the first period. Additionally, this period witnessed the introduction of 113 new terms. It is believed that as the effects of the pandemic became more evident, the number of studies also increased. Particularly during this time, many countries initiated financial stimulus packages and rescue measures to prevent economic collapse and support businesses. Central banks lowered interest rates and provided liquidity, with the goal of supporting economic recovery.

In the third period, 2022, studies (n=918) examining the economic dimension of COVID-19 and related themes (n=203) reached the highest level, with the most significant theme identified as "pandemic." The pandemic started to come under control in certain countries with the initiation of vaccination campaigns. However, due to the emergence of variants and the unpredictable course of the pandemic, economic uncertainty persisted.

In the latest period, the most prominent theme resurfaced as "economics," similar to the first period. As the transition from 2022 to 2023 occurred, themes experienced a 57% decline, with the highest loss in the number of terms used and a decrease in publication numbers. Although the popularity of the topic seems to have diminished compared to the previous period, it should be noted that the data for 2023 only covers a seven-month span, making comparisons with previous periods challenging.

The overall thematic map of studies related to economic dimension of COVID 19 created by Bibliometrix revealed that prominent motor themes included "mental health," thematic themes encompassed "COVID," niche themes addressed "economic policy uncertainty," and emerging or declining themes involved "economic crisis." Studies by Gong et al. (2022), Zajacova ve diğeri (2020), Alradhawi (2020) and Salameh (2020) have been conducted on mental health and economics of COVID 19<sup>21,22,23,24</sup>. Studies have been carried out on the COVID 19 economic policy uncertainty in the studies conducted by Iyke (2020), Al-Thageb (2022), Ahmed and Sarkodie (2021)<sup>25,26,27</sup>. In the studies conducted by Borio (2020), Ozli (2021), Adams-Prassl (2020), studies were carried out on the COVID 19 economic crisis<sup>28,29,30</sup>.

A study conducted by Zhong and Lin (2022) analyzed literature published since December 2019 to explore the economic impact of COVID-19. Bibliometric analysis and social network analysis methods were utilized. The study identified themes such as "financial market," "economic policy uncertainty," "coronavirus disease," "air quality," and "economic recovery scenario." Another study by Alshater et al. (2022) revealed that the most frequently used keywords

included "COVID-19," "crisis," "economic impact," "crisis management," and "viral disease." Furthermore, a study by Mahi et al. (2021) examined pandemics starting from 1974 and included 1636 publications. The study found that the most impactful keywords were "impact," "health," "United States," "risk," "epidemic," and "mortality"<sup>15,16,17</sup>.

In the conducted co-occurrence analysis, the themes have been categorized into 5 themes as follows: COVID-19 and the economy, economic growth, sustainable development, mental health, and health economy.

### Conclusions and limitations

In this study, research focusing on the economic dimension of COVID-19 has been examined through co-word analysis using complex software tools. This article has investigated shifts in themes during the course of the pandemic and its aftermath. Authors aspiring to work in this field can link the motor theme of mental health to the economic aspect of the COVID-19 pandemic.

The COVID-19 pandemic has been a significant event leading to global economic downturn and job losses. The economic aspect of the pandemic has been managed through government measures and economic support. However, the effects of the pandemic and the reshaping process continue to unfold. During this process, economic policymakers, businesses, and society need to work on long-term solutions that enhance resilience, promote economic justice, and facilitate recovery. This study strengthens academic research and highlights crucial gaps in the literature on the COVID-19 pandemic's intersection with economics. Furthermore, it provides insights into future research directions.

Nonetheless, this study has certain limitations. It covers articles published in the English-language Web of Science database in this field. The selection of articles was based on the guarantee of double-blind peer review. Additionally, if conferences were selected, the possibility of re-publication as articles could introduce duplication issues. The limitations should be considered, as the chosen database and software tools might have influenced the findings. The evaluation of 2023 is based only on data from a span of 7 months, thereby revealing a weakness in the study's ability to compare with other periods.

### Competing interests

All authors declare no competing interest.

### Funding

Not applicable

### Authors' contributions

The study has been conducted solely by the author.

### Ethical Approval

Ethics committee approval is not required because secondary data has been used in the study.

## References

1. WHO. Coronavirus disease (COVID-19) pandemic. World Health Organization. Available online: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>. Accessed on, 10. 2020;
2. World Bank. The Global Economic Outlook During the COVID-19 Pandemic: A Changed World Washington, DC: World Bank. 2020;
3. Bareket-Bojmel L, Shahar G, Margalit M. COVID-19-related economic anxiety is as high as health anxiety: findings from the USA, the UK, and Israel. *International Journal of Cognitive Therapy*. 2021;14:566-74.
4. Azevêdo DG. Trade set to plunge as Covid-19 pandemic upends global economy. In WTO trade forecast press conference. 2020;8
5. Verma S, Gustafsson A. Investigating the emerging COVID-19 research trends in the field of business and management: A bibliometric analysis approach. *Journal of Business Research*. 2020;118:253-61.
6. Leach M, MacGregor H, Scoones I, Wilkinson A. Post-pandemic transformations: How and why COVID-19 requires us to rethink development. *World Development*. 2021;138:105233.
7. Munoz-Leiva F, Porcu L, Barrio-García SD. Discovering prominent themes in integrated marketing communication research from 1991 to 2012: A co-word analytic approach. *International Journal of Advertising*. 2015; 34(4):678-701.
8. Zupic I, Čater T. Bibliometric methods in management and organization. *Organizational Research Methods*. 2015;18(3):429-72.
9. Feng J, Zhang YQ, Zhang H. Improving the co-word analysis method based on semantic distance. *Scientometrics*. 2017;111:1521-31.
10. Khasseh AA, Soheili F, Moghaddam HS, Chelak AM. Intellectual structure of knowledge in iMetrics: A co-word analysis. *Information Processing & Management* 2017; 53(3):705-20.
11. Callon M, Rip A, Law J. (Eds.). Mapping the dynamics of science and technology: Sociology of science in the real world. Springer.1986;
12. Holmes EC, Goldstein SA, Rasmussen AL, Robertson DL, Crits-Christoph A, Wertheim J. O, et al. The origins of SARS-CoV-2: A critical review. *Cell*. 2021;184(19):4848-56.
13. Shen, X, Tao Y, Wang Y, Obore N, Yu H. Research hotspots and thematic trends in the management of pre-eclampsia: a bibliometric analysis from 2000 to 2022. 2023;
14. Arslan Aras İ. Sağlıkta İnfomal Ödemelerin Tematik Harita Analizi. *İşletme Akademisi Dergisi*. 2023;4(2):189-202.
15. Zhong M, Lin M. Bibliometric analysis for economy in COVID-19 pandemic. *Heliyon*. 2022 Sep 25;8(9):e10757. doi: 10.1016/j.heliyon.2022.e10757.
16. Alshater MM, Atayah OF, Khan A. What do we know about business and economics research during COVID-19: a bibliometric review. *Economic Research-Ekonomska Istraživanja*. 2022;35(1):1884-912.
17. Mahi M, Mobin MA, Habib M, Akter S. A bibliometric analysis of pandemic and epidemic studies in economics: future agenda for COVID-19 research. *Social Sciences & Humanities Open*. 2021;4(1):100165.
18. Atalan A. Is the lockdown important to prevent the COVID-19 pandemic? Effects on psychology, environment and economy-perspective. *Annals of Medicine and Surgery*. 2020;56:38-42.
19. Gupta A, Zhu H, Doan MK, Michuda A, Majumder B. Economic impacts of the COVID- 19 lockdown in a remittance-dependent region. *American Journal of Agricultural Economics*. 2021;103(2):466-85.
20. Yaish M, Mandel H, Kristal T. Has the economic lockdown following the Covid-19 pandemic changed the gender division of labor in Israel?. *Gender & Society*. 2021;35(2):256-70.
21. Gong Y, Liu X, Zheng Y, Mei H, Que J, Yuan K, et al. COVID-19 induced economic slowdown and mental health issues. *Frontiers in Psychology*. 2020;13:777350.
22. Alradhawi M, Shubber N, Sheppard J, Ali Y. Effects of the COVID-19 pandemic on mental well-being amongst individuals in society-A letter to the editor on "The socio-economic implications of the coronavirus and COVID-19 pandemic: A review". *International Journal of Surgery (London, England)*. 2020;78:147.
23. Salameh P, Aline HA JJ, Badro DA, Abou Selwan C, Randa AOUN, Sacre H. Mental health outcomes of the COVID-19 pandemic and a collapsing economy: perspectives from a developing country. *Psychiatry Research*. 2020;294:113520.
24. Zajacova A, Jehn A, Stackhouse M, Choi KH, Denice P, Haan M, Ramos H. Mental health and economic concerns from March to May during the COVID-19 pandemic in Canada: Insights from an analysis of repeated cross-sectional surveys. *SSM-Population Health*. 2020;12:100704.
25. Iyke BN. Economic policy uncertainty in times of COVID-19 pandemic. *Asian Economics Letters*. 2020;1(2).
26. Al-Thaqeb SA, Algharabali BG, Alabdulghafour KT. The pandemic and economic policy uncertainty. *International Journal of Finance & Economics*, 27(3). 2022;2784-2794.
27. Ahmed MY, Sarkodie SA. COVID-19 pandemic and economic policy uncertainty regimes affect commodity market volatility. *Resources Policy*. 2021;74:102303.
28. Borio C. The Covid-19 economic crisis: Dangerously unique. *Business Economics*. 2020;55:181-90.
29. Ozili PK. Covid-19 pandemic and economic crisis: The Nigerian experience and structural causes. *Journal of Economic and Administrative Sciences*. 2021;37(4):401-18.
30. Adams-Prassl A, Cloyne J, Dias MC, Parey M, Ziliak JP. The COVID-19 Economic Crisis. *Fiscal Studies*. 2020;41(3):489.