RESEARCH ARTICLE

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Corporate Carbon Footprint Environmental Quality and Combating the Covid-19 Pandemic (US Example)

ABSTRACT

Objective: Developed countries with high use of fossil fuels in production can harm the environment by contributing more to the formation of greenhouse gases on a global scale. In this context, it has been emphasized that they have caused an increase in Covid-19 cases. Therefore, this study aims to provide policymakers with a different perspective on the fight against the virus.

Methods: This research covers the United States. The relationship between Coal Industry CO2 (CCO), Natural Gas Industry CO2 (NCO), Power Industry CO2 (ECO), Petroleum Industry CO2 (OCO), and Covid-19 cases (COV) is discussed. Monthly data for the period between 2019 and 2021 were used. The data were compiled from World Health Organization and Our World in Data web resources. In the analyses, the ARDL Boundary Test model was used to capture long-term and short-term causality relationships.

Results: In general, the results show that fossil energy sources such as coal, oil, electricity and natural gas used in industries play an important role in the increase of Covid-19 cases. Among these energy sources, coal is the one that causes the most damage. Coal is followed by oil, electricity and natural gas, respectively. Accordingly, a 1% change in the US economy due to coal used in production leads to a 1.03% change in Covid-19 cases. Similarly, the effect of oil on Covid-19 cases is 0.61%. The impact of industries using electrical energy based on fossil fuels in their production on Covid-19 cases is 0.26%. Natural gas proved to be the fossil fuel energy source with the least impact on Covid-19 cases with a change of 0.069%.

Conclusions: The findings revealed that the increase in fossil fuels used in industries during the relevant period negatively affected air quality and Covid-19 cases. The increase in the number of cases affects the health sector more than any other sector. If this data is associated with future energy sources used in industries (fossil fuels), it will contribute to the creation of public policies that promote a new generation of energy sources in production.

Keywords: COVİD-19 Pandemic, Corporate Carbon Footprint, Greenhouse Gas, USA, ARDL Bound Test.

Kurumsal Karbon Ayak İzi Çevre Kalitesi ve Covid-19 Salgını ile Mücadele (ABD Örneği)

ÖZET

Amaç: Üretimde fosil yakıt kullanımının yüksek olduğu gelişmiş ülkeler, global ölçekte sera gazı oluşumuna daha fazla katkı yaparak çevreye zarar verebilmektedir. Bu bağlamda Covid-19 vakalarında artışa neden oldukları vurgulanmak istenmiştir. Böylece virüsle mücadelede politika yapıcılara farklı bir bakış açısı sunulmak istenmiştir.

Gereç ve Yöntem: Bu araştırma Amerika Birleşik Devletleri'ni kapsamaktadır. Kömür Endüstrisi CO2 (CCO), Doğal Gaz Endüstrisi CO2 (NCO), Enerji Endüstrisi CO2 (ECO), Petrol Endüstrisi CO2 (OCO) ile Covid-19 vakaları (COV) arasındaki ilişki incelenmiştir. 2019-2021 dönemine ait aylık veriler kullanılmıştır. Veriler Dünya Sağlık Örgütü ve Our World in Data web sitelerinden derlenmiştir. Analizlerde uzun ve kısa dönem nedensellik ilişkilerini yakalamaya yarayan ARDL Sınır Testi modeli kullanılmıştır.

Bulgular: Genel olarak sonuçlar, endüstrilerde kullanılan kömür, petrol, elektrik ve doğal gaz gibi fosil enerji kaynaklarının Covid-19 vakalarının artışında önemli bir rol oynadığını göstermektedir. Bunlardan en fazla etkiye sebep olan kömürdür. Kömürü sırasıyla, petrol, elektrik ve doğal gaz takip etmektedir. Buna göre, ABD ekonomisinde üretimde kullanılan kömüre bağlı %1'lik bir değişim Covid-19 vakalarında % 1,03'lük değişime yol açmaktadır. Benzer şekilde petrolün Covid-19 vakaları üzerindeki etkisi % 0,61'dir. Üretiminde fosil yakıtlara bağlı elektrik enerjisi kullanan endüstrilerin Covid-19 vakalarına etkisi %0,26 düzeyindedir. Covid-19 vakalarında % 0,069'luk değişimle en az etkiye sahip olan fosil yakıt enerji kaynağı doğal gaz olduğu tespit edilmiştir.

Sonuç: Sonuç olarak, ilgili dönem boyunca endüstirlerde kullanılan fosil yakıtlardaki artşın hava kalitesini ve Covid-19 vakalarını olumsuz etkilediği yönündedir. Vaka sayısındaki artış diğer sektörlerden farklı olarak sağlık sektörünü daha fazla etkilemektedir. Bu veriler ilerleyen süreçte endüstrilerde kullanılan enerji kaynakları (fosil yakıtlar) ile ilişkilendirilirse, üretimde yeni model enerji kaynaklarını teşvik eden kamu politikaları oluşturulmasına katkı sağlayacaktır.

Anahtar Kelimeler: COVID-19 Salgını, Kurumsal Korbon Ayak İzi, Sera Gazı, ABD, ARDL Sınır Testi

INTRODUCTION

The COVID-19 virus, which first appeared in Wuhan, China in 2019 and has affected the whole world, has led to a large number of cases and deaths. An active mobilization of the fight against the Corona virus has begun all over the world and a pandemic has been declared soon enough (1). The fight against the epidemic was previously carried out within the available possibilities. Later, the epidemic was controlled by developing different vaccination techniques. In addition, studies on drug treatment have been continued. Another method used to combat the epidemic is to study the causes of the disease and how the disease is transmitted. This method, which is also referred to as preventive studies is of as great importance as medical measures in the fight against the epidemic because of the fact that the solution of a problem is possible only by revealing the causes. More research is needed to better understand how the virus spreads, in which environments does it spread the most and why does it spread the most in these environments.

As The World Health Organization states, one of the most dangerous environments for the transmission of the Coronavirus is closed and stuffy environments. The fact that toxic gases produced by the use of fossil fuels have a greenhouse gas effect on the atmosphere causes the world to turn into a closed space in a global sense. In this regard, there is a high risk of developing chronic and infectious diseases, especially in people living in areas exposed to toxic gases.

Almost all of the rise in greenhouse gases in the atmosphere over the last 150 years has been caused by human activities (2). Most of these human-caused greenhouse gas emissions are CO2 gas formed by burning fossil fuels (3). CO2 concentrations in the atmosphere are naturally regulated by many processes that are part of the global carbon cycle. With greenhouse gas emissions, the ability of natural processes to absorb these emissions has decreased. This has led to a constant increase in greenhouse gas concentrations in the atmosphere. CO2 concentrations in the atmosphere have increased by about 40% since the mid-1800s (4).

One of the countries that contributes the most to the formation of the greenhouse effect with the global release of CO2 is the United States (5). The COVID-19 virus, which first appeared in China in 2019 and affected the whole world, has led to a large number of cases and deaths in the United States. As can be seen from Figure 1, the country with the highest cumulative number of cases and deaths in the world is the United States of America (6).

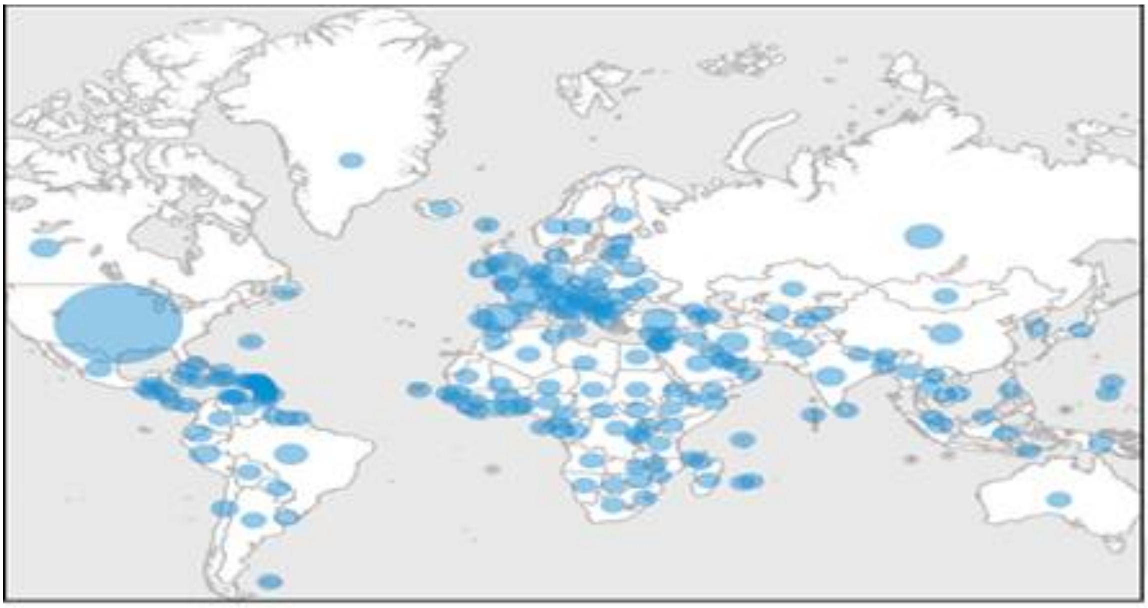


Figure 1. Covid-19 Cases - Cumulative Total (Global), World Health Organization

The uncontrolled spread of COVID-19 in the United States has had a profound economic impact. People's consuming habits have shifted as the number of cases has increased. Therefore, production has come to a standstill. On the one hand, unemployment has increased (7,8). On the other hand, there have been significant increases in market illiquidity and volatility (9). These disruptions in the USA which is arguably one of the most important economies in the world, have adversely affected financial markets in both developed and developing countries, creating major global economic and financial shock waves. (10) Cumulatively, 399 billion tons of CO2 is released into the atmosphere in the United States. This corresponds to 25% of CO2 emissions on a global scale (Figure 2). For these reasons, the United States has been preferred as the subject of research.

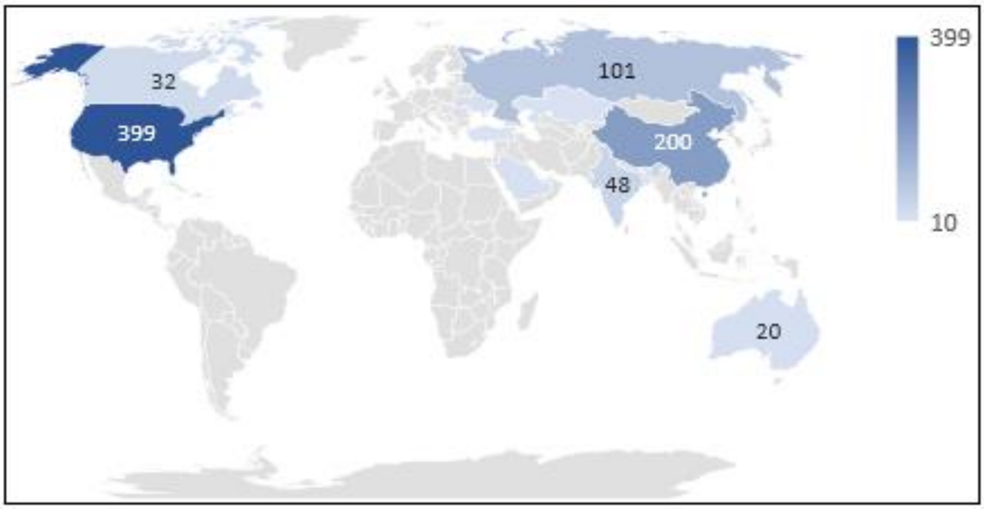


Figure 2. Who contributed most to the global CO2 Emissions?(43).

This research represents the empirical prediction of CO2 threshold levels linked to COVID-19 in the United States. Therefore, our empirical findings are the only ones that can significantly demonstrate the amount of CO2 concentration that can have a negative impact on COVID-19 cases. Previous studies, which are result-oriented studies, confirm the relationship between air pollution and Covid-19 cases. This study, unlike other studies, is an original study that deals with air pollution and Covid-19 cases in a causal dimension and on the basis of corporate activities in the United States. Thus, our intention was to present a different perspective to policy makers in the fight against the virus.

The rest of this article has been edited as follows: Chapter 2 gives a review of the literature. Chapter 3 describes the data and methodology used. Chapter 4 presents the empirical results. Chapter 5 demonstrates the interpretation and discussion of the results. Chapter 6 proposes conclusion statements and policy recommendations.

Literature on Corporate Carbon Footprint And Covid-19 Relationship: CO2 (26%) is defined as one of the most crucial components that create a greenhouse effect in the atmosphere (11). This connection between global temperatures, greenhouse gas concentrations and CO2 has been confirmed throughout history (12). Since the beginning of the Industrial Revolution in the middle of the 18th century, human activities have greatly increased the concentrations of greenhouse gases in the atmosphere. Therefore, the measured level of CO2 concentrations has increased significantly compared to pre-industrial levels. In the formation of greenhouse gases, solar radiation, some of which is reflected back to space, reaches the earth's atmosphere. The rest of the solar energy is absorbed by the land and oceans, warming the earth. Heat radiates from the earth into space. Some of this radiant heat is held by greenhouse gases in the atmosphere, keeping the earth warm enough to sustain life. Human activities such as burning fossil fuels, agriculture and land clearing are increasing the amount of greenhouse gases released into the atmosphere. Such human activities result in the trapping of extra heat and effects such as ocean acidification, which in turn raises the earth's temperature (13).

It has been stated by the World Health Organization that the COVID-19 virus can be transmitted more easily in indoor and airless environments. Indoor spaces are ideal for air-polluting particulate matter. Studies have shown that the risk of transmission of the Covid-19 virus is high in environments with a high concentration of particulate matter (14, 15). Similarly, studies showing that an increase in heat increases the risk of corona virus transmission have been conducted. (16) Found a significant relationship between the average temperature (°C) and the Covid-19 pandemic among the weather components in Indonesia. ($r = 0.392$; $p <.01$). (17) has found that COVİD-19 lethality reduced significantly at air temperatures between 40C and 120C and under relative humidity between 60% and 80%. The location of the United States in the 4-120C isotherm zone from February to March optimally coincided with the most affected geographic regions. (18) Investigated how parameters such as average temperature, precipitation, humidity, wind speed and solar radiation can affect the spread of COVID-19 in Iran. Accordingly, areas with low wind speed, humidity and solar radiation values are subject to a high rate of infection, which facilitates the survival of the virus. (19) When temperatures rise above 28.7 °C, there are more COVID-19-related deaths in Saudi Arabia.

As a result, given the current situation, increasing temperature and relative humidity increase the number of cases. (20) (SARS-COV) investigated the relationship between the survival of the coronavirus on environmental surfaces and the air temperature of survival. Accordingly, the virus remains more on surfaces at 40 ° C compared to 20 ° C; at 20 ° C compared to 4 °C. (21) Average temperature, minimum temperature and air quality are significantly related to the COVID-19 pandemic. (22) Determined that at a relative humidity of 50%, droplets with an initial radius greater than about 50 µm quickly fall to the ground, while smaller, potentially virus-containing droplets shrink in size due to evaporation of water and remain in the air for minutes. (23) Found that in the Gulf States of the Middle East region, the correlation coefficient between temperature and daily cases is related to the increase in daily cases and deaths due to COVID-19.

EMPIRICAL ANALYSIS

Data and Methodology: This research comprises the United States. The relationship between Coal Industry CO2 (CCO), Natural Gas Industry CO2 (NCO), Power Industry CO2 (ECO), Petroleum Industry CO2 (OCO) and Covid-19 cases (COV) variables is discussed. Monthly data for the period between 2019 and 2021 were used. The data were compiled from World Health Organization and Our World in Data web resources. The ARDL Bound Test model and, for this purpose, Eviews-12 program were used for the analyses. The model we use in this study is as follows.

$$ln(COV_t) = \mu_1 + \mu_2 \ln(CCO_t) + \mu_3 ln(NCO_t) + \mu_3 ln(ECO_t) + \mu_3 ln(OCO_t) + \varepsilon_t \quad (1)$$

For time series analysis to be performed, the series must first be stationary. For this purpose, unit root test was performed. Econometrically significant relationships should be found between the variables. For this purpose, it is necessary to ensure the stasis condition of the series. The Augmented Dicky-Fuller (ADF) unit root test is the most commonly applied test. However, (24,25,26) have shown that the ADF test fails if there are structural breaks in the data set. Therefore, in addition to the ADF test, Philips-Perron (PP) test was also used in this study (27). The series were stabilized using both ADF and PP unit tests. For stationary testing, a non-trendy model analysis was performed (28).

$$\Delta y_t = \mu + \delta y_{t-1} + \sum_{j=1}^{p} \delta_i \, \Delta y_{t-j} + \varepsilon_t \quad (2)$$

When PP models do not have a delayed value of the dependent variable, the equation is set as follows;

$$\Delta y_t = \varphi y_{t-1} + \varepsilon_{t^3} \quad (3)$$

After the unit root test is performed, the ARDL boundary test is performed. ARDL consists of two stages in the boundary test approach (29). Firstly, the cointegration relationship between the variables included in the model is investigated by the uncontrolled error correction model (DECM). If a cointegration relationship is found between the variables, the second stage begins. The short-term and long-term coefficients of the model are estimated (30). In the ARDL approach, the variables must be fixed at a first-order maximum. Covid-19 cases were determined as a dependent variable. Coal Industry CO2 (CCO), Natural Gas Industry CO2 (NCO), Energy Industry CO2 (ECO) and Oil Industry CO2 (OCO) were determined as independent variables. The logarithm of the variables was taken. The reason for this is to bring the multiplication-shaped data to the way it is collected, in fact, to the linear format (31).

RESULT

Unit Root Tests: As shown in Table 1, the NCO and OCO series level and the first difference of the COV, CCO and ECO series was stable. That is, NCO and OCO series are I (0), and the COV, CCO and ECO series are I (1).

Table 1. Results of ADF and PP Unit Root Tests

Variables	ADF Test		PP Test	
	Level	First Difference	Level	First Difference
COV		-3.922217		-3.041442
CCO		-6.564742		-6.611678
NCO	-3.139925		-3,237754	
ECO		-3.267364		-3.117984
OCO	-3.496057		-3.524323	

Cointegration Test: First, it is investigated whether there is a cointegration relationship. For this; an unrestricted error correction model (UECM) is created. This model is adapted to our study as follows;

$$\Delta lnCOV_t = \mu_0 + \mu_1 t + \sum_{i=1}^{m} \mu_{2i} \Delta lnCOV_{t-i} + \sum_{i=0}^{m} \mu_{3i} \Delta lnCCO_{t-i} + \sum_{i=0}^{m} \mu_{4i} \Delta ECO_{t-i} + \sum_{i=0}^{m} \mu_{5i} \Delta NCO_{t-i} \sum_{i=0}^{m} \mu_{6i} \Delta OCO_{t-i} + \varepsilon_t \qquad (4)$$

After the cointegration relationship is determined between the series, ARDL models are established to determine the long-term and short-term relationships. First, the number of delays is determined. In the UECM model, t refers to the time, m refers to the number of delays. Critical values such as Akaike, Schwarz and Hannan-Quinn are used to determine the number of delays. The lag length that provides the smallest critical value is determined as the lag length of the model. The VAR model has been instituted to find the delay length. It was found to be 2. Then, has been investigated whether there was an autocorrelation problem in the model. For this, LM test was performed. According to the test results, there were no autocorrelation problems. After determining the number of delays, the cointegration relationship between the series has been examined with the boundary test approach.

Table 2. ARDL (1,1,0,1,2) Boundary Test Results

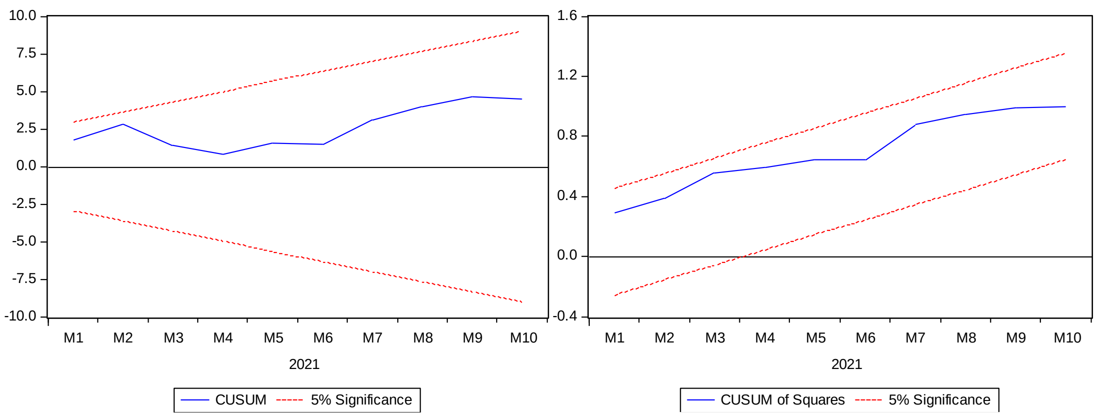
F Statistic	%5 critical values at significance level	
	Lower Limit	Upper Limit
20.30664	2.56	3.49

It belongs to critical values (32). As can be seen from the Table 2, the calculated F statistic exceeds the upper critical value. The existence of a cointegration relationship between the series is determined. Since a cointegration relationship was detected between the series, the ARDL model can be established to determine long-term and short-term relationships. Long-term coefficients of the independent variables can be calculated from this model after estimating the long-term ARDL model. The long-term estimation coefficients calculated within the framework of the long-term ARDL(1,1,0,1,2) model are shown in Table 3.

Table 3. ARDL(1,1,0,1,2) Diognastic Test Results

Test	Statistic	Prob.*
Breusch-Godfrey Autocorrelation	0.478703	0.6363
Breusch-Pagan-Godfrey Varying Variance	0.481885	0.8565
Ramsey RESET	3.249123	0.0927
Jarque-Bera Normality	3.642454	0.1618
Cusum	stable	
Cusumq	stable	

According to Table 3, there is no problem of varying variance, autocorrelation and specification in the model, and the error term is distributed normally. Cusum Test has been performed to test the accuracy of our model. If the Cusum and Cusumsq statistics are within critical limits (between two lines) at a 5% significance level, it signifies that the coefficients in the ARDL model are stable. H0 hypothesis is accepted (33). However, if the Cusum graphs are out of bounds, the H0 hypothesis is rejected. When Cusum and Cusumsq graphs are examined, it can be seen that there is no structural break of the series used in the analysis. According to this; Long-term coefficients calculated according to ARDL Limit Test are stable. Therefore, no artificial variables were used in the model.



Graph 1. CUSUM and CUSUMSQ tests for Parameter Stability

Long Term Relationship: The Wald test is used to test the existence of a long-term relationship between variables. The hypotheses of this test are as follows (34);

$$H_0 : \delta_1 = \delta_2 = \delta_3 = 0 \qquad (5)$$

$$H_0 : \delta_1 \neq \delta_2 \neq \delta_3 \neq 0 \qquad (6)$$

Long-term coefficients of the independent variables can be calculated from this model after estimating the long-term ARDL model (35). Long-term estimation coefficients calculated within the framework of long-term model are shown in Table 4.

Table 4. ARDL (1,1,0,1,2) Long-Run Coefficients

	Dependent Variable: COV-19		
Variables	**Coefficient**	**t-statistics**	**Probability**
CCO	1.030394	1.784897	0.0046
NCO	0.267990	0.067972	0.0028
ECO	0.069104	0.716937	0.0489
OCO	0.619996	1.825734	0.0476

From the coefficients in the table, we can determine which disease is most affected by Cov-19. Accordingly, the coefficient signs of all variables are variable since they are positive. We can say that variables have a positive effect on Cov-19 cases. Accordingly, a 1% change in CCO leads to a 1.03% change in COV cases. A 1% change in ECO leads to a 0.26% change in cases of COV. A 1% change in the NCO leads to a 0.069% change in cases of COV. We can say that a 1% change in OCO leads to a 0.61% change in COV cases.

Short Term Relationship: An error correction model based on ARDL is used to determine the short-term relationships between variables. Therefore, number (7) has been estimated. In the equality, $UECM\ t{-}1$ is the error correction term.

$$\Delta COV_t = c_0 + c_1 ECM_{t-1} + \sum_{i=1}^{m} c_{2i}\, \Delta CCO_{t-i} + \sum_{i=0}^{n} c_{3i}\, \Delta NCO_{t-i} + \sum_{i=0}^{P} c_{4i}\, \Delta ECO_{t-i} + \sum_{i=0}^{n} c_{3i}\, \Delta OCO_{t-i}\, \varepsilon_i \tag{7}$$

ADF probabilit value = 0.005 < 0.05 (small): H0 rejection, H1 accepted. (Phillips-Perron test statistic) Probability value = 0.0000 < 0.05 (small): H0 rejection, H1 Accepted. In this case, error terms are stationary.

Table 5. ARDL Cointegrating and Short-Term Relationship

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
ECM (-1)	-1.015416	0.075111	1.633794	0.0000
dCCO	0.285947	0.175020	1.633794	0.0333
dNCO	-0.138071	0.070154	-1.968119	0.0474
dOCO	0.118215	0.128588	0.919329	0.0096
dECO(-1)	-0.638517	0.151250	-4.221609	0.0018

Here, the notation of the error correction coefficient should be minus, and the probability value should be significant. It is possible to see in the table that this condition is met. If there is a long-term deviation between the variables, the deviation finds the equilibrium again by 77% in the next period.

DISCUSSION

The United States is one of the countries that contributes the most to the formation of the greenhouse effect through global CO2 emissions. (36). This study identified greenhouse gases in the atmosphere as one of the main causes of the Covid-19 transmission rate. Thus, the goal was to determine which fossil fuels used in industrial production (Corporate Carbon Footprint) contributed the most to Covid-19 transmission.

Industrial production is noticeably more advanced in developed countries than in developing countries (37). For this reason, it has been emphasized that developed countries, especially those with a high use of fossil fuels in production, contribute more to the formation of greenhouse gases on a global scale and cause an increase in Covid-19 cases.

Based on this fact, a comparative analysis has been conducted between the Corporate Carbon Footprint and COVID-19 cases in the US, where industrial production is widespread. The findings revealed that the increase in fossil fuels used in industries during the relevant period adversely affected air quality and Covid-19 cases. If these data are linked to energy sources used in industries (fossil fuels), they will help to shape public policies the use of a new generation of energy sources in future production. It shows that fossil energy sources such as coal, oil, electricity and natural gas which are often used in industries play an important role in the increase of Covid-19 cases. Among these energy sources, coal is the one that causes the most damage.

Our findings are supported by some studies in the literature suggesting that coal causes the most air pollution among fossil fuels. In this context, the Energy and Clean Air Research Center (CREA), an independent research organization on the causes of air pollution and its effects on health, conducted a European study in 2021. According to this study. A %10 reduction in the level of particulate matter pollution has prevented an average of 11.000 deaths due to air pollution. The 37% decline in coal-fired electricity production had a significant impact on the emergence of this effect. In this study, coal has been shown to be the primary cause of NO2 pollution and particulate matter pollution in Europe (38). (39) Suggested that 60 percent of the deaths associated with coal-fired power plants in India could be attributed to direct emissions of emitted particulate matter. (40) Found that coal has the biggest percentage of air-polluting fossil fuels in China, and that the N2O emissions in question have significantly increased coronavirus cases. (41) Suggested that fossil fuels caused the greatest damage to the environment in this epidemic, and that coal was the fossil fuel that contributed the most to this damage. (42) Demonstrated that the main hypotheses about the mechanism by which fine particles induce pulmonary inflammation are related to the chemical properties of particles, such as acidity and transition metal ions, as well as the physical properties of ultrafine particulate matter. It has been stated that coal dust is one of the substances that has the most effect on the formation of these particles. (43) Showed that coal produces large amounts of air pollutants, including CO, SO, NOx, particulate matter (PM), and heavy metals during the combustion process.

Coal is followed by oil, electricity and natural gas, respectively. Accordingly, a 1% change in the US economy due to coal use in production leads to a 1.03% change in Covid-19 cases. Similarly, the effect of oil on Covid-19 cases is 0.61%. Industries that use electric energy based on fossil fuels in their production have a 0.26 percent impact on COVID-19 cases. It has been proved that the fossil fuel energy source with the least impact on COVID-19 cases, with a change of 0.069%, is natural gas. This result is supported by studies that identify natural gas as an environmentally friendly energy source among fossil fuels (44 ,45, 46). Unlike other sectors, the health sector has been hit the worst by the increase in Covid-19 cases. The sector's increased workload largely prohibits health professionals from being efficient in their professions, while a lack of adequate equipment or the usage of this equipment only for COVID-19 treatments also causes interruptions in the treatment processes of other diseases. In such a situation, the increase in the number of cases will collapse the health system, as it did in Italy, which was caught off guard in terms of medical equipment and labour when the epidemic struck (47). However, in countries like Germany, which have better health and management systems, the rise in the number of cases will be followed by an isolation and slowdown strategy to prevent the virus from spreading in the long term (48).

CONCLUSION

It is a well-known fact that increased greenhouse gas emissions in the atmosphere play an important role in spreading various diseases, especially COVID-19 (49, 50). The impact of poor air quality on Covid-19 morbidity and mortality will cause a considerable and unexpected additional cost (51).

Under certain conditions, mainly through so-called droplet "aerosol-forming procedures" (1), the COVID-19 virus can become an aerosol. Aerosols are droplet particles smaller than 5 micrometres that can hang in the air, especially in environments with poor air quality (52). In medical facilities where people are being treated for COVID-19, there is an increased risk of infection during medical procedures called aerosol-producing procedures. Therefore, health workers who perform these procedures or are present in the environments where they are performed should take special air protection measures, including the use of appropriate personal protective equipment such as respirators (53).

Policymakers need to conduct results-oriented studies to determine whether COVID-19 cases are related to greenhouse gas emissions generated in the atmosphere. The ecological and economic consequences of using fossil fuels in production and choosing new generation energy sources should be compared and measures should be taken accordingly.

In addition, high tax policies can be applied to reduce the use of fossil fuels in industrial production. Incentive policies such as the possibility of long and low-interest loans, tax exemption, land allocation and reducing bureaucratic activities at the installation stage should be established to encourage the use of renewable energy sources.

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