The Factors that Influenced the Recession of U.S. Crude Oil Prices in 2020

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Compared to historical U.S. crude oil price fluctuations, a noticeable drop occurred in April of 2020 and gave rise to many direct and indirect economic issues. In the past few years, this recession was one of the most significant drops, and it heavily surrounded the epidemic of the decade. Due to Covid-19's significant role in this decline, most indirect issues were unique to this specific drop. However, many other factors contributed to this downturn. This paper aims to explore the factors that led to this recession in U.S. crude oil prices in 2020 and delves into the various economic issues this drop produced. The main factors are the stock markets and U.S. dollar value, the gasoline storage and production surplus, unemployment, oil news, environmental policies, and the Saudi Arabia and Russia oil price war. Then, this paper will discuss possible methods to regain crude oil and petroleum stability, oil crash prevention, and whether the U.S. government intervention assisted or hindered oil markets.

Introduction

At the beginning of 2020, the price per barrel of oil was $70, which decreased to $-37 in April, then rose to $43 in November[1]. Covid-19, one of the greatest components of the decline, shook the country, with its confirmed cases totaling 103.4 million and 1.1 million deaths in the United States[2]. Backed in a corner, with limited possibilities to battle this virus, the U.S. government called for a lockdown. As the world shut down, economies and businesses stopped operating. Additionally, this prevented transportation, the primary source of gasoline consumption, and restricted workers from their jobs, diminishing the country's GDP by 31.7% and oil prices[3]. The quick drop in demand for gasoline created a surplus in oil supply, resulting in a substantial recession in oil prices in 2020. As financial markets fell, barrels rapidly filled oil storages, unemployment rose, oil price news outlets added to the existing pressure, environmental policies made transportation more costly, and the Saudi Arabia-Russia oil price war assisted in turning the globe into economic shock. The crude oil price fell relative to the declining state of the economy, as they go hand in hand, which is a critical component of the fall in crude oil prices. No single factor caused the recession in crude oil prices; several elements contributed inconclusively and simultaneously in 2020.

There are limited solutions for how citizens battle the declining prices, especially from a unique phenomenon like Covid-19. In the last 50 years, there has not been a pandemic that has affected the global economy at a scale like Covid-19, except for the human immunodeficiency virus (HIV), based only on death count[4]. HIV attacks the immune system and has been ongoing for forty years because there is no cure[4]. This study will compare the only global-scale pandemic in the last five decades, HIV's, to Covid-19's impact on oil prices.

This research aims to discuss the factors that caused the decline in U.S. crude oil prices in 2020, their relation to Covid-19, why they are major contributors, and their post-pandemic effects, with the goal of answering the question: "What were the major factors and how did they contribute to the U.S. oil price drop in 2020?" There were primary and secondary factors: the primary drivers were the U.S. dollar and stock market, gasoline production and storage, and unemployment, and the secondary contributors were oil news, environmental policies, and the Saudi Arabia-Russia oil price war. An analysis of the exponential decline in oil prices provides insight into this unique oil crisis and the economic issues of oil markets caused by Covid-19 to prepare the U.S. government and economy better to combat other potential pandemics and oil price recessions. This research will allow for more accurate predictions of future oil prices, especially during pandemics.

Method

Extensive research collected data from a combination of literature reviews between 2019 and 2022. Additionally, data extracted from news articles, such as The New York Times, U.S. Bureau of Labor Statistics, Investopedia, and The Economist, were used to discuss U.S. citizens' reactions and concerns during the recession and its effects after the pandemic; only articles published in 2020 were used. However, one of the sources was used to inform accurate data of 2023 for background information purposes, and two other sources were used

to discuss previous strategies on oil price stability. The keywords used when researching were "crude oil fluctuations," "oil price recession 2020", "factors that influence crude oil prices," and "crude oil price fluctuations post-pandemic" in databases of the National Institutes of Health, the National Library of Medicine, Google Scholar, and Statistica. Data selection was from the most widely recognized and commonly cited sources. Only literature reviews were used to establish the basis for understanding the economy's role in crude oil price fluctuations and what major factors contributed to the 2020 crude oil price decline. They were all cataloged in Excel sheets for further analysis and narrowed down to only sources with direct connection to the six subtopics of analysis. News articles help to provide a further examination, background context, visual graphs, data sets, predictions, and information to fill in the knowledge gaps left by the literature reviews. All U.S. oil market-related figures depicted were generated and based on the Energy Information Administration (EIA), with the exception of one solely focused on oil prices outside of the U.S. All Covid-19-based charts were generated from The New York Times.

Analysis

U.S. Dollar and Stock Markets

Although there is no direct correlation between stock markets and oil prices, the pandemic created economic inactivity, indirectly affecting both the stock market and oil prices[5]. As an Investopedia Article stated, "the U.S. Dollar has been a bedrock of the global economy and a reserve currency for international trade and finance"[6]. The dollar's value fluctuates depending on economic activity and international trade, and its demand rises when there is active trade or foreign investing, increasing the value to meet consumer demands. Since the U.S. Dollar is the most commonly used currency in the world, the higher the dollar value, the more oil per barrel the United States can obtain per dollar, and the same is reversed. Due to the inactive economic transactions from the pandemic, the dollar value dropped substantially. In equal reaction, the entire stock market and the economy crashed due to the drastic decrease in transactions, as discussed above6. Figures 1 and 2 display exponential declines around February to June, where covid cases peaked at a little over 500,000, both in the stock market S&P 500 and the U.S. dollar value, and rebounded starting in June[7]. As shown, from January to June of 2020, Figures 1 and 2 illustrate similar drops and rebounds, demonstrating a correlation.

In the last fifty years, HIV was the only other pandemic that affected nations across the world[4]. However, during times of Covid-19 and the last decade, HIV has steadily declined. On the other hand, the stock markets and U.S. dollar value increased, which usually does not indicate disruption signals. Additionally, massive stock market crashes like Black Monday in 1987 and the global financial crisis in 2008 had no correlating drops with HIV cases. In conclusion, according to the last fifty years, this market response was unique to Covid-19.

In addition to economic inactivity, the pandemic also caused panic, which "plays just as equal a role in stock market volatility"[10]. Since the stock market immensely contributes to the economy, if it crashed, it would create a downturn in the economy as a whole. This deflation could decrease oil demand, and investors would reduce investments in crude oil and petroleum, which is what occurred. As Figure 1 illustrates, the stock market reached its bottom in around March and April; a study by Nicomedes and Avila in March confirmed moderate feelings of anxiety and prominent feelings of worry, cautiousness, panic, and shock[11]. These increased signs of panic during this time correlate with the drop in stock market value and spike in stock market volatility, mainly because investors feared their losses[10]. This reaction significantly contributed to a chain of disinterest in the stock market.

Gasoline Production and Storage

Gas is primarily derived from crude oil or petroleum liquids—currently, the U.S. imports about 8.32 million barrels per day from 80 different countries3. Canada, Mexico, and Saudi Arabia are the top contributors, so their economic and political strength and issues are considered when accessing crude oil price fluctuations.

While many countries import gasoline from other oil-producing countries, the U.S. implements both. The process of transforming raw crude oil or petroleum liquids into gasoline is essential for understanding gas price fluctuations. The oil is either drilled domestically or imported from allied countries. It is taken to refineries, where this compound is broken down and reconstructed into gasoline. After being transported by pipeline, tankers, or trucks to refinery storages, it can be transported to other storage units, then directly to gas stations, terminal storages, or kept in the initial unit. Therefore, these storage units are vital in transporting gasoline and crude oil. However, in April 2020, as illustrated in Figure 3, a surplus in supply quickly filled up oil storage. The largest and most critical oil storage in the U.S., Cushing, Oklahoma, had 21 million barrels of remaining space, with a maximum capacity of 80 million barrels[12].

Gasoline plays a key role in people's everyday lives as it is used for advanced transportation and manufacturing. In March, the gasoline demand dramatically plummeted. When storage units get filled with excess gasoline, it limits the mobility of transporting it to various other storages, the exportation of gasoline, and storage for imported gasoline. This rising issue pressures oil companies and the national government to

Fig. 1 U.S. Stock Market SP 500 percent change from January to June of 2020 Source: NYT[8]

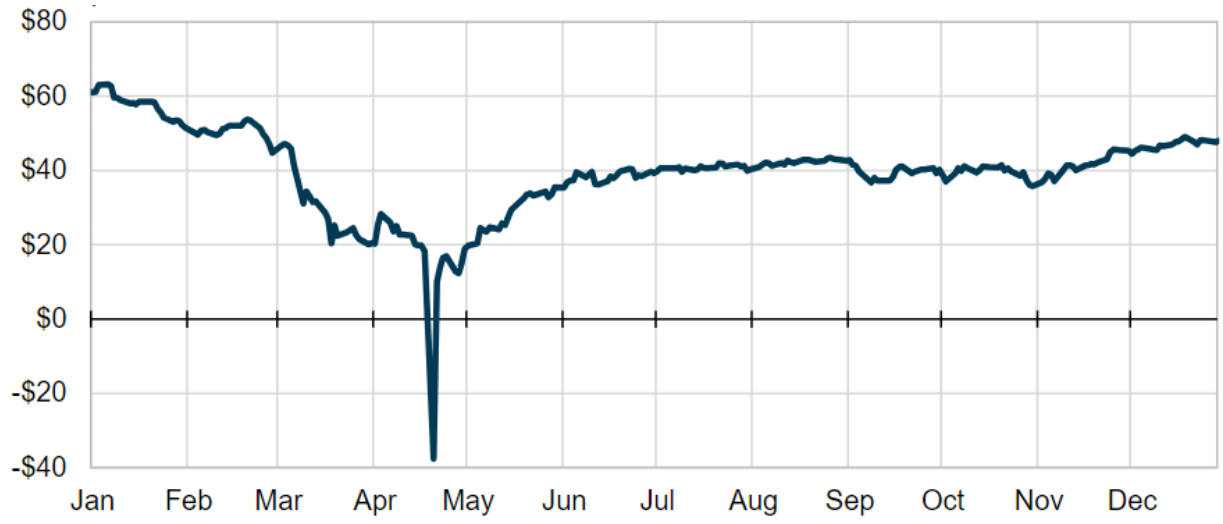

Fig. 2 WTI crude oil per barrel price fluctuation in 2020 Source: EIA[9]

sell the surplus of barrels before storage capacity is reached. Thus, the solution would be to drop the price per barrel in order to sell the oversupply. However, many other dominant economies were closing off their borders as well. In fact, by the end of March, about 51.8% of scheduled flights were canceled, which is immensely different from the 0.3% of cancel-

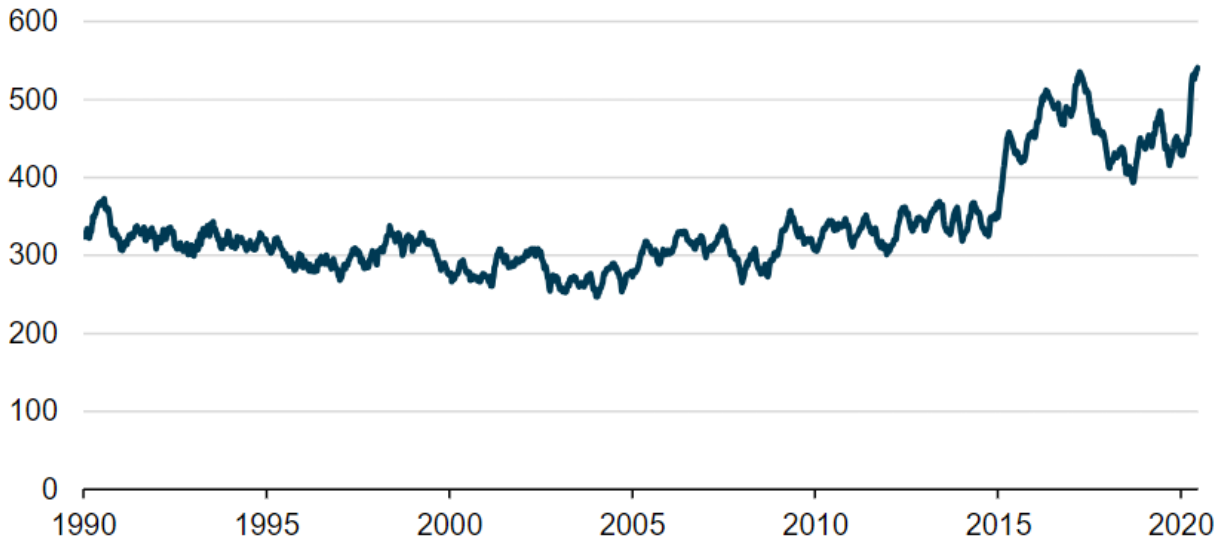

Fig. 3 Crude oil barrels in millions in storage in the past decade Source: EIA [13]

lations at the beginning of the month [14]. The 51.8% of cancellations occurred in the same period as when oil prices plummeted, which further demonstrates a correlation [14]. Similarly to the U.S., those countries had an oversupply of crude oil, so they were not looking to purchase more from other countries. On the other hand, the U.S. was trying to cut production, but refineries were not slowing down soon enough. In summary, transportation is essential for oil prices.

Furthermore, as storage space was quickly filling up, its storage price increased, making it more difficult to transport and store the surplus. April 20, 2020, is the last trading day for West Texas Intermediate (WTI) futures contracts, and "traders who were not willing to physically deliver needed to liquidate their contracts before the expiration date" [15]. Nobody wanted oil because there was no space to store it. There is a WTI contract requirement where all oil must be transported directly to Cushing, Oklahoma, which further limited storage capacity, increased transportation costs, restricted transportation mobility, and raised prices for storage space. This led many traders to exit the oil market, and future contracts dropped massively. The WTI market also mandated that storage and transport must abide by and placed additional limitations and further transportation costs. With less trading in the oil markets, oil prices fell relative to the demand.

Unemployment

The most likely reason for the spike in job loss was a temporary layoff, which led to the heart of the economic inactivity, the Families First Coronavirus Response Act (FFCRA) [16]. It was effective on April 1, 2020, to combat the spread of the coronavirus through paid leave [17]. The U.S. government issued this act in hopes of preventing the rise of Covid-19 cases, which, in turn, ultimately shut down the economy. Essentially, this act provided employees with paid sick or family and medical leave, which motivated employees to accept paid leave, causing unemployment rates to skyrocket [18]. Without employees operating businesses, which make up the bulk of the economy, the economy will suffer significantly. Employees make up the labor cycle so that money flows throughout the markets. When employees are paid, they spend that earned money on house bills, food, entertainment, personal necessities, and other products and services. As individuals spend more, businesses produce more to meet the high product demand. When businesses produce more, they hire more employees. Thus, it starts the cycle over again [19]. However, when no employees are working to circulate money, the cycle comes to a halt. Therefore, inflation, demand, supply, GDP, stock markets, employment, and oil markets all decrease because they rely on each other. They all make up the economy; for example, if one or more pieces of an engine are missing, the whole engine collapses, which happened to the economy in 2020. The FFCRA specifically disrupted the labor cycle, which caused many other economic factors, like business closures and layoffs, to take place.

This rise in unemployment contributed to many businesses failing or shutting down. Due to the fact that the economy and oil markets share a correlation, the economic crash brought down oil markets. In the second quarter of 2020, the unemployed averaged 20.6 million, higher than the peak of the Great Recession [16]. By the end of the year, 100.5 million people were not in the labor force, an increase of 4.9 million from

the year before [16]. Hundreds of businesses shut down or failed, causing the overall economy to dip [16]. During this time, employment was scarce, so fewer employees were operating oil refineries. However, unemployment contributed to the economic crisis because so many layoffs led many businesses to fail, not because there were not enough workers operating the oil refineries to meet production. Due to the substantial number of layoffs, fewer people needed to drive to their jobs, resulting in less demand for gasoline [16].

Oil News and Media

The media and news outlets influence oil price fluctuations more than most people think. Since television news outlets, article publishers, social media, and websites are where people obtain most of their news announcements, it goes without saying that the media has a massive influence over people's lives. During the pandemic, screen time on the internet sharply increased due to lockdown isolation, so more civilians were open to the media and grew dependent on it. From January to April, the most active communication of false news was on social media platforms. For example, some individuals alleged that they created the cure and tried to sell it online, while others accused Bill Gates of creating the virus [20]. This dynamic circulation of misinformation correlates with the crude oil price drop, specifically in April, as shown in Figures 2 and 6. This form of misinformation initiated havoc, questioning the credibility of covid tests and whether they were real. Many individuals constructed false narratives surrounding Covid-19, resulting in a spike in positive covid cases. This news "undermine[d] the best practices for controlling the spread of the coronavirus" and "support[s] the whole idea of not trusting the infection numbers or trusting the death count" when, in reality, the Covid-19 tests were considered accurate [21]. The stirred mistrust in the atmosphere caused people to disobey protocols, and the number of covid cases surged. Consequently, the lockdown was extended, and the economic inactivity would continue to leave long-term effects, even after the pandemic cleared. This also deteriorates the credibility of reliable news sites, contributing to the increasing Covid-19 cases and the lengthened quarantine time. This false information builds turmoil in the existing pressure on the economy, especially the oil markets.

The news also influences the U.S. Dollar value. Economists and energy managers analyze GDP data, payroll data, the Consumer Confidence Index (CCI), and inflation data to help predict impending fluctuations. The Government heavily relies on these predictions as they are, most of the time, accurate and can help the nation prepare for impending drops and rises. Investors also use this information for risk assessment, and due to the negative, resulting predictions in oil prices, investors transferred their assets elsewhere. Without investments in oil, the demand for it tends to weaken and fall.

Environmental Policies

High oil prices are usually not due to the limited oil supply, but mandated policies. Therefore, many people consider environmental policies a factor that raises crude oil prices. Undoubtedly, drilling for oil harms the planet, and in response, the government employs policies to protect ecosystems, terrestrial and aquatic life, and the atmosphere. However, this makes it difficult for gasoline production, and the prices rise. During the pandemic, most legislation was brought to a halt, so there were not many policies obstructing the oil production path to create a noticeable difference.

However, after April, the Trump Administration rolled back over 100 environmental policies that allowed more carbon emissions and weakened wetland protection [22]. Figure 4 displays the explanation of each section of rollbacks. Without these policies to limit carbon emissions, the demand for crude oil will rise again; thus, the price will rise as well. Additionally, with fewer restraints, it is easier to access and transport crude oil as costs for transportation and regulation will be reduced, increasing demand [23]. Despite this, as they have historically, environmental policies continue to expand, which will negatively impact the oil production industry in the long run [24].

Saudi Arabia and Russia Oil Price War

The U.S. received 8.32 million barrels of oil and petroleum per day in 2020, about 41% of its oil consumption [26]. Because it relies on importation from other countries, those countries' oil production and economies are taken into account when assessing the U.S. oil importation. During the pandemic, when oil prices peaked in March and April 2020, Saudi Arabia and Russia were feuding over production cuts and oil prices. It started when the Organization of Petroleum Exporting Countries (OPEC), Saudi Arabia's allies, gathered at the 178th Meeting of the Conference and proposed to cut 1.5 million barrels per day in March to stabilize the oil markets due to the decrease in demand from the lockdown [15]. OPEC encouraged other countries, including Russia, to cut production along with them; however, Russia instead increased its oil production, and the West Texas Intermediate crude oil price fell by 10%. In response, Saudi Arabia increased their output by 2.6 million barrels per day, and Russia increased theirs by 0.3 million. For visual context, this is illustrated in Figure 5; around March, OPEC oil production increased and then drastically decreased. Then, U.S. President Donald Trump threatened to withdraw military support from Saudi Arabia and OPEC if they did not cut oil production. This disagreement lasted until April 2020, when Saudi Arabia and Russia settled an agreement to cut oil production by 10 million barrels per day [15]. In

	Completed	In progress	Total
Air pollution and emissions	19	8	27
Drilling and extraction	11	8	19
Infrastructure and planning	10	1	11
Animals	9	2	11
Toxic substances and safety	6	2	8
Water pollution	4	7	11
Other	5	6	11
All	64	34	98

Fig. 4 The number of environmental policy rollbacks in each category Source: NYT[25]

this time of distress, the oil war substantially added more pressure to the declining oil prices. Although conflicts are difficult to avoid, the unfortunate timing of this occurrence would leave long-term consequences, a surge that would make a difficult recovery for the nation, and the degradation of the welfare of oil producers[15]. Since the United States was not a significant conflicting power in this war, it was not a considerable factor compared to the other factors discussed, specifically to the U.S. Despite the fact that this war was ongoing outside of the U.S., the global market influenced the U.S. market, which is why the Saudi Arabia and Russia oil price war was a factor in the recession of 2020.

Discussion

As displayed in Figure 6, one of the most notable downturns in crude oil prices was in 2020. The significant factors that caused the 2020 oil price recession were the stock market and the U.S. dollar contributing to the crash, limited storage capacity from an oversupply, unemployment rates that left businesses to fail, oil news that increased stress on the market, environmental policies that prevented oil drilling, and the Saudi Arabia-Russia oil price war.

Another factor that affected the decline of oil prices in 2020 and intertwined throughout this study is the basic principles of supply and demand, which is the first and most obvious explanation many people conclude. However, this research extends past the surface of supply and demand and explores other factors not often discussed and their correlation. Economic issues in 2020 largely centered around problems derived from Covid-19; therefore, it is imperative to develop ways to better prepare for or potentially prevent another pandemic so that the U.S. could recover quickly. The faster the recovery, the faster oil prices will return to their value before the pandemic. A method to accelerate recovery is the pan-

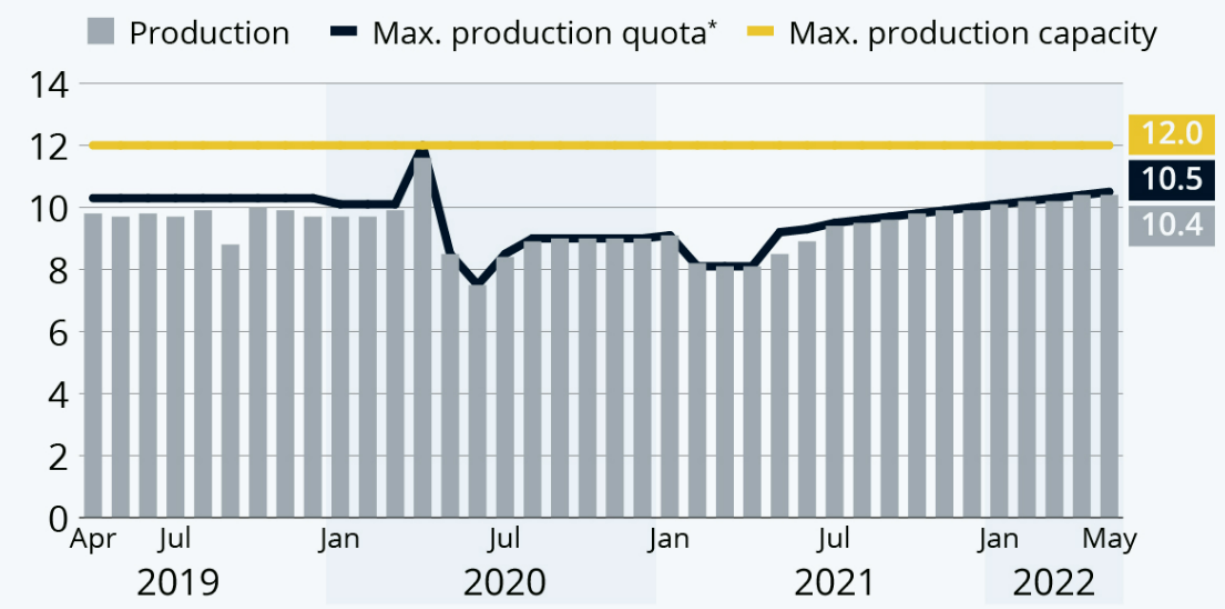

Fig. 5 OPEC's oil production from 2019-2022 Source: Statista[27]

Fig. 6 Crude oil prices over the last decade Source: EIA[28]

demic response plan that the Occupational Safety and Health Administration (OSHA) had previously constructed[29]. However, at the beginning of Covid-19, it was not set into motion and resulted in countless unnecessary deaths[30]. Many government officials, researchers, and citizens thought that researchers could develop a vaccine quickly enough to prevent the spread of the infection. However, the response plan should have been initiated as soon as possible; a slow response increases oil uncertainty, and oil market recovery becomes long-term and more complex. Alternatively, a quick response will leave fewer long-term consequences on the U.S. oil markets and allow for a secure, healthy recovery.

The U.S. Government intervention in the coronavirus outbreak was adequate and justified, perhaps even necessary, in this situation. Without a leading figure to guide citizens through this time of hardships, uncertainty and chaos would have broken out. Without the government, there would have been more deaths, extended lockdowns, and increased panic. In fact, according to the Harvard School of Public Health, more than 8 in 10 people "strongly support federal action to

expand access to food stamps and to bolster support for testing and vaccination efforts"[31]. In summary, it was beneficial for the government to intervene. In the case of the oil market, it was damaging when the government interfered; it distorted and weakened the market. However, predictions are sometimes false, and there are times like during the pandemic, when large price swings occur, the oil market will not be able to handle the volatility. That is when the U.S. government should intervene using the Strategic Petroleum Reserve to cushion drops and raises. Additionally, the government could actively strengthen oil market structure and efficiency by "improv[ing] transparency both on physical demand and supply as well as financial positioning may have real benefits in reducing needless volatility and improving price discovery"[32]. This could reduce stress on the market and build a stronghold that might last even after a brutal hit.

One of the main factors of the recession was exaggerated oil news and media. False news would prolong the period of economic inactivity. Therefore, researchers must acquire the most accurate information in order to combat these issues better, which is why "open data sharing of scientific information is a minimum requirement." This not only aids researchers but also gains the public's trust and reduces the chance of misinformation[33]. Educating researchers can result in better predictability outcomes, which allows the government to better prepare for other potential incoming crashes.

Once Covid-19 died down, "unemployed people were more likely to remain unemployed than they were before the pandemic"[16]. The U.S. economy, along with almost every economy across the globe, struggled to reopen its market, restart production, and lift the nation out of a depression. This demonstrates the destructive impact of Covid-19 on people's motivation to get back into the labor force, but it paved a new path for remote jobs that are still widely used today. However, this reduced oil consumption, as driving was unnecessary when people worked from home. Unfortunately, this played a part in the oil industry's extended and challenging recovery and will likely remain. Although the FFCRA increased unemployment, this act also encouraged employee spending. By granting money, the government hoped citizens would ignite the labor cycle. The government financially helped people pay rent and other bills for those who permanently or temporarily lost their jobs. However, an unintentional consequence was a decrease in demand and gas consumption. Overall, the negatives of the FFCRA outweighed the positives.

Another method of handling oil crashes is not to invest and develop other energy sources. This could offset the balance of gasoline and create other avenues of energy that will decrease the demand and consumption of oil. These changes will weaken the market's response system and decrease production and prices[32].

The U.S. government should maintain relationships with rising oil giants like Saudi Arabia. These connections allow for more production, importation, and exportation to keep the money circulating. They could also help coordinate impending crashes and advise each other on how to prepare for them[32]. It improves trading and investment, and this would help keep the U.S. informed on major disturbances in OPEC, an organization of the world's leading oil-producing countries[32].

Countries that do not heavily rely on oil income, for example, most European countries, did not suffer as great of a consequence as those that rely on oil exportations, Middle Eastern countries. European countries have some of the lowest amounts per barrel to balance out their budget for 2020[34]. In fact, countries like Lithuania, Finland, and Norway had some of the lowest economic GDP decline percentages, with a decrease of 3.7% for Lithuania, 5.2% for Finland, and 5.3% for Norway[35]. On the other hand, countries that rely on oil revenue to drive their economy result in economic depression when oil prices are low. Other countries in Asia, for example, China, were not heavily influenced by this recession. Due to its economic situation, which has fewer oil reserves because of fear of deflation, China utilized these low prices to regain and reposition oil reserves[36]. This recession did not significantly impact the country's economy because it had "deeper structural problems in the economy" that go beyond the scope of this paper[36]. Although China has many ongoing economic hardships due to political instability, its issues are less severe than those of Iran, Mexico, and sub-Saharan African Countries[35,36]. For countries that do not have a large amount of oil reserves, the surplus resulting from the recession should be utilized to increase oil stability, like China did with their situation.

Another option is to let supply and demand run independently because "producers and consumers respond to price changes because these changes communicate information"[32]. This is more time-efficient and productive, resulting in less time for environmental policies to pass. Thus, more oil can be produced with fewer restrictions, and prices will rise. More production allows greater oil security.

A fiscal policy should be pursued mainly to increase health care, reduce taxes, and gain income support, which was a beneficial feature in the United States' recovery during 2020 and in the past[37]. The increase in temporary spending would be from buffers: grants, liquid assets, and loans. The government could cut back spending on unimportant areas to fund these fiscal plans and to prepare for periods of low oil prices. However, the "size and nature of the policy response should be tailored to individual country circumstances," like economic situation, income and revenue, and entitlement programs[37]. Additionally, the government should allow for more flexible laws during this time so a fiscal response can be carried out faster and resources can be distributed quicker[37]. Similar to

China, these low oil prices allow the U.S. to reduce energy subsidies without raising retail prices, so the funds can be directed toward economic recovery. This allows for more safety nets to be put in place for the future and better financial positioning for long-term recovery [37].

Conclusion

The U.S. government should not intervene in the oil market volatility based on the security of the oil market. It is a careful line that the government should acknowledge when to cross or not cross, and the factors that should be considered when evaluating are the U.S. Dollar value and Stock Market's fluctuations, gasoline production and storage capacity, unemployment, oil media, environmental policies, and the Saudi Arabia-Russia oil price war. Strategies that were beneficial were utilizing fiscal policies for economic recovery, financial repositioning, limiting oil revenue dependency, and enacting the Covid-19 response plan as soon as possible for quicker economic recovery. Each method varies depending on each country's status. Researchers can observe countries with strong defense systems during the crash and integrate those techniques into their own response systems. Overall, no single factor caused the recession; a combination of many incidents snowballed into this result.

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