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Article

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Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/>

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The Impact of Covid-19 on Pricing in the Global Oil Market

Larisa G. Chuvakhina^{1*}, Irina Z. Yarygina², Olga E. Ustinova³, Valentina N. Mironova¹,
Zhanna V. Ivanovskaya¹

¹Department of World Economy and International Business, Financial University Under the Government of the Russian Federation, Moscow, Russia, ²Department of World Finance, Financial University Under the Government of the Russian Federation, Moscow, Russia, ³Department of Management and Innovation, Faculty of Higher School of Management, Financial University Under the Government of the Russian Federation, Moscow, Russia. *Email: l-economm@mail.ru

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ABSTRACT

This article is devoted to analysing current factors affecting prices in the global oil market for the period from December 2019 to July 2022. The study focuses on the processes taking place in the economy of the United States and the eurozone countries, which led to an increase in inflation in response to the economic crisis caused by COVID-19 and their impact on current oil prices. It analyses the traditional and non-traditional measures of the US and Eurozone monetary policies designed to stimulate business activity and bring their economies out of recession. It is observed that the actions of financial regulators contributed to the growth of inflation rates, especially in the energy sector. The paper emphasizes the growing crisis in the United States and the eurozone countries, which in the future may lead to a decrease in the consumption of energy resources, including crude oil and petroleum products, which will negatively affect the stability of the global oil market. The influence of factors of the growth of US dollar inflation and measures aimed at regulating the physical volume of oil production in the framework of OPEC+ deals, which affect pricing in the world oil market, is compared using the correlation analysis. As a result of the study, it is concluded that during the analysed period there is a shift of factors affecting pricing in the world oil market from monetary to supply-demand factors in the commodity market. The current inflationary pressure of the US dollar and the euro, combined with a reduction in oil supplies to the world market due to the restrictions imposed, makes it difficult to predict oil prices and leads to an increase in the volatility of oil quotes.

Keywords: World Oil Market, Inflation, COVID-19, USA, Eurozone

JEL Classifications: F50, F10, Q40

1. INTRODUCTION

The key factor that changed the price dynamics of world oil quotations during the COVID-19 period was the decline in global demand for hydrocarbons due to the stagnation of production and the disruption of supply chains, which resulted in a decrease in fuel consumption in countries. The downturn in production and business activity acted as a multiplier, pushing Brent and WTI oil futures to record lows in April 2020 as WTI prices hit negative levels (WTI, 2022). With a stable economy, not subject to restrictive measures caused by COVID-19, cheap oil would become an accelerator of growth, as it would lead to lower

production costs, household utility bills and reduced transportation costs. However, the impact of the pandemic has caused a halt in production, and a reduction in transport links and logistics flows to a minimum. The incomes of the population, and with them the purchasing power of the population, began to decline. The decline in consumption led to a decrease in energy demand, which caused a collapse in world oil prices and a drop in the profitability of oil production.

The solution to such a complex problem as the global economic downturn and the collapse of the world oil market was reflected in the policy of cheap money and direct regulation of the supply

of oil on the world market by the largest consumer countries. Thus, in 2020, monetary programs were implemented in the United States and the eurozone aimed at reducing the debt burden and stimulating demand. In addition, the Federal Reserve (Fed) lowered the target rate to a minimum, the growth of which resumed only in the spring of 2022. In parallel with the implementation of stimulating monetary policy in 2020, deals were concluded between the largest oil-producing countries to reduce production, followed by a gradual increase in oil production. Partially, these agreements are being implemented at the present time, which ensures the stabilization of the oil market by controlling the physical volumes entering the world market.

2. THEORETICAL ASPECTS OF THE STUDY

Most researchers studying price dynamics in the world oil market are inclined to assert that the factors affecting the cost of oil are changeable. Researchers such as (Masters, 2008), and (Cifarelli and Paladino, 2009) believe that the main factor affecting oil volatility is the actions of speculators. Hamilton (Hamilton, 2005) is inclined in his assessment that the key drivers of price values in the world oil market are the classical supply and demand factors of the commodity market. (Kaufmann, 2011) analyzes the complex interplay of factors leading to changes in price targets in the oil market, which together are based on demand and speculative pressure.

Recently, more and more researchers are paying attention to the relationship between the cost of oil and fluctuations in financial instruments of the stock and commodity markets. Thus, (Fratzcher et al., 2014) in their study, when constructing a number of econometric models based on daily data, come to the conclusion that a change in the value of the US dollar by 1% leads to an increase in oil prices by 0.73%. However, in addition to this, the change in the dollar exchange rate affects the price values of other financial instruments, which leads to the movement of capital from one market to another, for example, from the oil market to the stock market and vice versa.

Researchers (Yoshino and Alekhina, 2019) conclude that the largest oil consumers in the last 20 years have a greater influence on the cost of oil than exporting countries, and the strengthening of the US dollar had a negative impact on oil quotes. In other words, the last two decades are characterized by the fact that demand in the oil market has a greater impact on price dynamics than supply.

3. RESEARCH

The United States was one of the first global oil players to launch an expansionary monetary policy in response to the economic downturn caused by COVID-19. The uniqueness of the monetary policy of the United States, as it's known, lies in the fact that, by determining the target rate, the Fed affects the cost of oil denominated in dollars and at the same time sets the cost of both the dollar and, accordingly, oil in other currencies.

The sharp economic downturn has required the US financial regulator to take unprecedented action to increase the dollar supply, which includes both traditional and non-traditional measures. The key pricing mechanisms in the paper oil market, where the United States is the main player, are in the hands of the American financial regulator. The dynamics of oil quotes largely depends on the movement of the Fed's key rate (Chuvakhina, 2022). The actual target rate was lowered by the Fed from 1.55% to 0.04% in no time. As of December 30, 2019, the interest rate was 1.55%, and by March 9, 2020, the figure had reached 1.09%. Two weeks later, on March 23, 2020, the rate was 0.15%, continuing to decline until April 27, 2021, reaching 0.04% (FRED-ER, 2022). Remaining in the range from 0.04% to 0.1% for 99 weeks from April 27, 2021, to March 24, 2022, the target rate allowed for an increase in the money supply by \$4,766.10 trillion, or 31% from December 2019 to April 2021, if we take the entire period from December 2019 to March 24, 2022, as a whole, then the growth in the money supply amounted to 6,479.9 trillion US dollars or 42% relative to the beginning of the period (FRED-ER, 2022). This significant increase in the money supply was also achieved through unconventional monetary policy stimulus measures. In 2020, the Fed launched a series of programs that, along with the target rate, helped flood the economy with cheap money. The Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF) were the main programs in terms of the expected amount of monetary incentives. Under these programs, the monetary stimulus was to reach \$750 billion (SMCCF, 2021). In addition to repurchasing unsecured bonds, the Fed also focused on repurchasing secured loans under the TALF (Term Asset-Backed Securities Loan Facility) program in the amount of \$100 billion (TALF, 2021). While PMCCF and SMCCF were focused on buying back corporate bonds, TALF was about restructuring individuals' debts. In addition to the unconventional measures outlined above, the Fed launched the Municipal Liquidity Facility (MLF) program, aimed at buying out the debt obligations of states and municipalities (MLF, 2021).

Faced with similar problems in the economy, the eurozone, represented by the ECB, launched measures to promote monetary stimulus. Unlike the United States, the European regulator was more focused not on lowering interest rates, which since September 18, 2019, were already at the historical minimum Main Refinancing Operations (MRO) rate of 0% and a negative value for the deposit facility of minus 0.5% (ECB, 2022), but on the introduction of a number of incentive programs (Aguilar et al., 2020). Solving the problems of the economic downturn with monetary methods, the ECB increased the money supply by 2,634.44 trillion euros, or by 20% compared to December 2020 by March 2022 (M3, 2022). Thus, the two major world currencies, by increasing the money supply, tried to reduce the depth of the economic recession and at the same time contributed to the growth of the cost of oil quotations through inflationary pressure. Figure 1, made by authors based on the data provided by Fed (M2SL, 2022; M3, 2022), OPEC basket price (OPEC BP, 2022), WTI, Urals and Brent futures historical data (WTI, 2022; Urals, 2022; Brent, 2022) shows the crude oil price dependence on monetary dynamics.

In parallel with the process of monetary stimulus, which to 1° or another affected all the economies of the world, key players in the oil market tried to stabilize oil prices by restricting supply.

The global oil crisis contributed to the unification of the main competitors in the oil market, forcing them to act together. This was largely facilitated by a sharp decline in the cost of oil on the world market. If at the end of December 2019, the cost of Brent was \$66 per barrel, and WTI was \$61 per barrel, then as of April 22, 2020, the price of Brent fell to \$15.98 (Brent, 2022), with a negative WTI value of -40.32 on April 20, 2020 (WTI, 2022). From April 9 to April 12, 2020, negotiations were held to limit oil production within the framework of OPEC+, which were joined on an ad hoc basis by a number of major oil-producing countries: the USA, Canada, Mexico, Norway, Brazil and Argentina (Belova, 2020). In consequence of the negotiations, an agreement was reached, as a result of which the cumulative decline in oil production should be reduced to 9.7 million barrels per day. The agreement was designed for two months from May 1, 2020, to June 30, 2020. From July 1, 2020, to December 31, 2020, the OPEC+ countries agreed that the reduction in production will amount to 7.7 million barrels per day. Further, the reduction for OPEC+ countries will be 5.8 million barrels per day until April 30, 2022 (OPEC, 2022).

Following this transaction, global production in June 2020 decreased by 13.056 million barrels per day, or 16% compared to December 2019 (EIA-Oil, 2022). In June 2021, the decrease in production compared to December 2019 was 8%. As of March 2022, the decrease by December 2019 was 3%, which indicates the intensification of stabilization of world oil production. Figure 2 has been elaborated by the authors in accordance with the data from Energy Information Administration (EIA) on crude oil (EIA-Oil, 2022) and presents the dynamic of crude oil production.

Currently, the OPEC+ agreement continues to operate with the adjustment of oil production among the participants. Thus, at the last two meetings on June 2 and June 30, 2022, the participants reached an agreement on a cumulative increase in production volumes to 648 thousand barrels per day (Voronov, 2022). According to the latest data, global oil production as of March 2022 amounted to 80.551 million barrels per day (EIA-Oil, 2022). It is assumed that by the end of 2022, global production will reach 100.335 million barrels per day, which is comparable to the production of the pre-covid 2019 in the amount of 100.274, with production in 2020 and 2021 of 93.848 and 95.616 million barrels per day, respectively (EIA-STE0, 2022).

One of the short-term pricing factors in the oil market seems to be restrictions on the supply of Russian oil to the markets of Western countries. Meanwhile, the current actions of the US and the EU regarding restrictions on Russian oil imports only exacerbate the trends that the Fed and the ECB started as part of the cheap money policy. Spinning the inflationary spiral, the US and Europe tried to save the present at the expense of the future. Both in the Old World and the New World, the key accelerator of inflation is inflation in the energy sector, which began long before the introduction of restrictions on Russian oil supplies. Thus, in the United States, the average price of gasoline from March 9, 2020, when the actual

Figure 1: Crude oil price dependence on monetary base dynamics

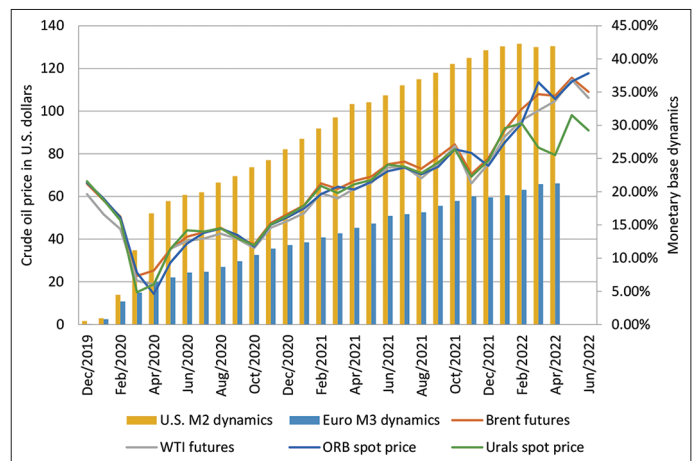
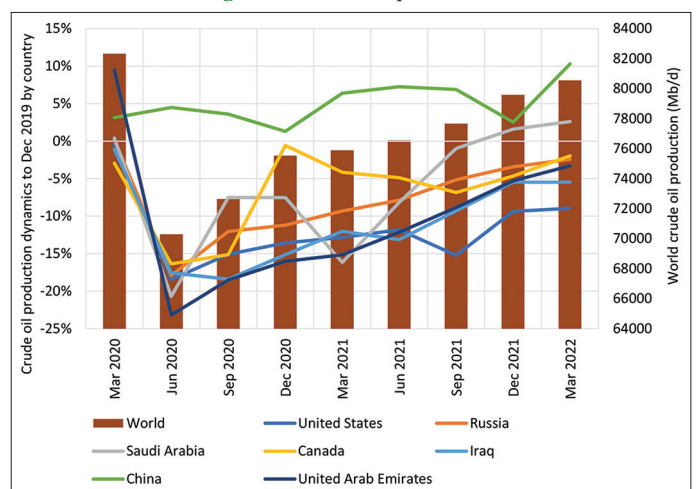
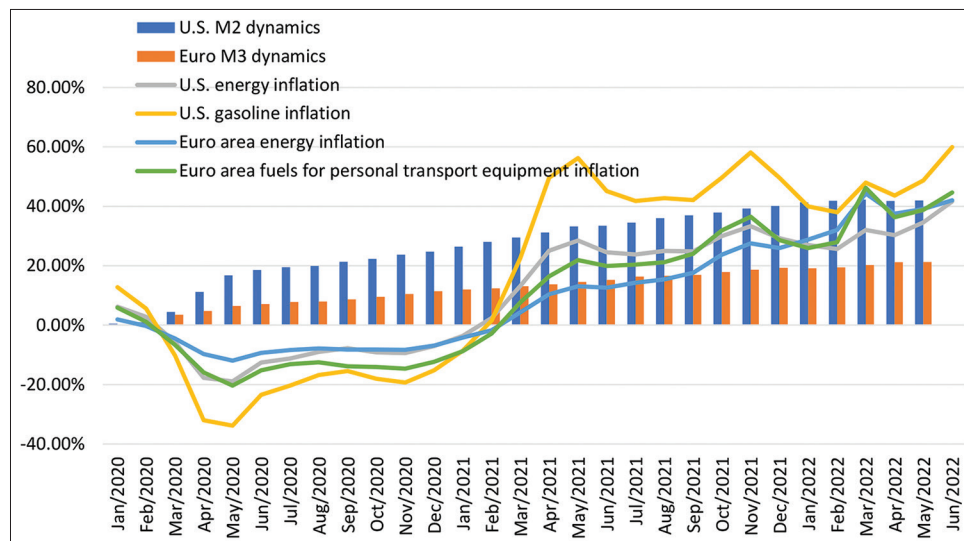


Figure 2: Crude oil production



target rate began to decline, to July 11, 2022, increased by 105% from \$2.213 to \$4.533 per gallon (EIA-Fuel, 2022). As can be seen from Figure 1, since March 2021, inflation in the energy sector of the United States and the Eurozone has become positive, which signals that an increase in the money supply has begun to affect price growth, while the fastest in the energy sector, namely in the prices of gasoline and diesel. At the end of June 2022, the inflation rate for gasoline in the US reached 59.9%, in the Eurozone the same indicator was 44.6%. At the same time, the headline inflation rate as of June 2022 was 9.1% in the US and 8.6% in the Eurozone (HICP, 2022; CPI-U, 2022). In an effort to reduce the cost of gasoline within the country, the United States is actively selling strategic oil reserves, thereby reducing world oil prices. An active decline in US oil reserves begins in mid-March 2022. If on March 11, 2022, there were 991.420 million barrels, then on July 15, 2022, American reserves amounted to 906.758 million barrels (EIA-US, 2022). Figure 3, made by the authors, demonstrates the monetary aggregate influence on energy inflation from January 2020 to June 2022 based on the data provided by Fed (M3, 2022; M2SL, 2022), Eurostat (HICP, 2022) and U.S. Bureau of Labor Statistics (CPI-U, 2022).

Restrictions on the supply of Russian oil have led to a redistribution of world energy flows, to a reorientation of oil supplies from the European and American markets to the Asian ones.

Figure 3: Monetary aggregate influence on energy inflation

At the same time, it should be noted that starting from March 2022, Urals oil is traded at a discount to Brent, WTI and OPEC Reference Basket (ORB). Table 1 shows the crude oil prices in USD on Brent (2022), WTI (2022), Urals (2022) and OPEC Reference Basket (ORB) (OPEC-BP, 2022).

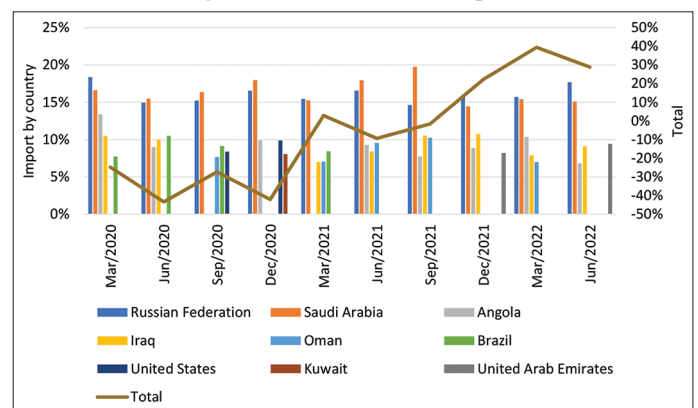
It should be taken into account that Asian countries and, first of all, China and India intend to continue the policy of purchasing oil at an additional discount, regardless of the country of origin. Great interest is shown in the purchase of oil from Saudi Arabia. It's not only about increasing the volume of deliveries but also about the possibility of converting payments into yuan. China's motivation is that the country is the world's largest oil consumer. Figure 4, designed by the authors, demonstrates the dynamic of China's crude oil import from March 2020 to June 2022 in accordance with the China customs (GACC, 2022).

The current reorientation of Asian countries to Urals oil is ensured by its significant discount to the reference oil grades.

Under these conditions, the United States is trying to pursue its line of introducing a price ceiling for Russian oil in order to control the level of oil quotations. It is proposed to link delivery insurance and freight cost to the price of oil shipped by sea. The possibility of implementing this approach has geographical limitations, since, despite the fact that the main insurers of maritime cargo flows are located in Europe, in the Asia-Pacific countries, insurance is issued by local companies based on sovereign transactions of the participating countries (Budris, 2022).

In addition, there are problems with determining the country of origin of oil. For example, recently tankers have been temporarily turning off geolocation devices, which makes it extremely difficult to control their unloading in certain ports. It is also practised to mix different grades of oil or transfer oil from tanker to tanker on the high seas (Cho, 2022).

If unified measures are not developed to limit the price ceiling, then unilateral measures may lead to an increase in the cost of

Figure 4: China's crude oil imports**Table 1: Crude oil price in US dollars**

Date	Brent futures	WTI futures	Urals spot price	ORB spot price
January 2022	91.21	88.15	92.04	85.41
February 2022	100.99	95.72	94.28	94.22
March 2022	107.91	100.28	82.91	113.48
April 2022	107.14	104.69	79.41	105.64
May 2022	115.6	114.67	98.03	113.87
June 2022	109.03	106.22	90.99	117.72

ORB: OPEC reference basket

oil, since the introduction of this restriction will reduce the access of Russian oil to world markets and lead to a further increase in prices. First of all, this concerns Europe, where the rise in energy prices is already beginning to affect the industrial activity of the largest economies. The chain reaction of production cuts against the backdrop of rising inflation in the energy sector will lead, on the one hand, to an increase in unemployment and a burden on social spending in the budgets of the eurozone countries, and on the other hand, it will make European goods uncompetitive on the global market, since they will include additional costs, caused by rising energy prices (RIA, 2022).

The fears of European countries about the possibility of their economies moving towards recession are reinforced by the

exchange rate dynamics of the EUR/USD currency pair. For the first time since December 2002, the euro fell against the dollar below \$1.01. After 20 years, the main currencies of the world have become equal to each other (Kommersant, 2022). In this case, this means that the single European currency began to depreciate against the US dollar. Naturally, this is a harbinger of an economic downturn, as investor confidence in the Eurozone's ability to withstand a possible recession has been significantly shaken. It's also a wake-up call for the oil market, as a weaker euro against the US dollar means Europeans will have to pay more of their currency for the US dollar to buy oil. This means that the costs of the economy, and hence the budget, will continue to grow, increasing the risks of an economic recession and crisis.

In the current environment, the United States feels more confident than European countries. Having unleashed an inflationary spiral of cheap money in response to COVID-19, Americans today began to reduce the money supply. The rapid increase in the actual target rate from 0.08% in February 2022 to 2.33% on July 29, 2022, pushed Treasury yields to new price horizons (FRED-ER, 2022). This means that by increasing the interest rate, the Fed sells treasuries from its balance sheet, reducing the cost of bonds on the open market, making them more accessible to investors around the world, attracting more and more investments in their own debt securities, ensuring the export of dollar inflation. Against the backdrop of their own problems, Eurozone participants are becoming key consumers of dollar inflation, that is, the main holder of treasuries, which further contributes to the depreciation of the euro against the dollar. Thus, the share of the eurozone in foreign holders of treasury bonds increased from 17% in the pre-covid December 2019 to 18% in May 2022, which made the Eurozone the main holder of treasuries against the backdrop of a decrease in the share of China and Japan over the same period from 16% to 13% and from 17% to 16%, respectively (Treasury, 2022). Apparently, fearing a possible, complete embargo on Russian oil, the Eurozone countries are hedging their risks by purchasing US dollars at a favourable rate. Figure 5, made by the authors, shows the curve of target rate vs. yield based on the data provided by the Fed (FRED-MY, 2022; FRED-ER, 2022).

However, despite seemingly successful US actions to tame its own inflation at the expense of European partners, the US economy is

beginning to give alarming signals. Against the backdrop of an increase in the actual target rate, the yield of 20-year treasuries began to overtake the performance of 30-year bonds. This means that investors' confidence in the long-term growth of the US economy is in question, and given rising energy-driven inflation, the outlook is bleak, as evidenced by a second consecutive quarter of decline in US GDP, which is generally considered the start of a recession (Gura, 2022). On the one hand, the United States is trying to influence the decline in oil prices by reducing the money supply but is faced with a decline in business activity due to an increase in the cost of loans for business development. On the other hand, they are trying to control the cost of oil, but by imposing restrictions on free competition in the global market, they provoke a shortage, which contributes to an increase in oil prices. The ability to pass on their inflationary problems to the Europeans also has its limitations related to the stability of the Eurozone economy. Without abandoning attempts to dump world oil prices, the United States is selling its strategic oil reserves, which sooner or later will have to be replenished, which levels out the current volumes of the sale of reserves. In an effort to get out of the vicious circle of inflationary pressure and opposing their interests to the laws of market competition, the United States is trying to persuade the countries of the Persian Gulf to increase oil production in order to reduce the level of quotations. However, the leadership of Saudi Arabia, as the main supplier of oil to the world market, despite American pressure, expresses its commitment to its obligations under the OPEC+ deal (Mur, 2022).

Given the emerging trends, it can be assumed that American interests lie in economic survival, primarily at the expense of the Europeans, both in the form of consumers of dollar inflation and in the form of expanding the sales market for energy carriers from the United States. Trying to solve their problems by stagnation of the European economy, the Americans are reducing the economic growth potential of all countries of the world focused on the export of their goods to the European market, causing a multiplier effect that increases the export potential of dollar inflation against the backdrop of an increase in the actual target rate, which leads to increased volatility of oil quotes. and reduction of forecast factors of world oil price dynamics.

Considering these events from the point of view of correlation analysis, it can be noted that the influence of the United States on the price dynamics of Brent oil is shifting from monetary regulation factors to direct control over the supply of crude oil volumes, which are superimposed by global trends. Monetary factors include the yield of treasury bonds with a maturity of 10 years, 20 years, and 30 years. As the size of the physical supply of oil volumes, data on US commercial oil reserves were taken. The global factor is the EUR/USD currency pair. The correlation is based on weekly data for the period from January 05, 2020 to July 17, 2022. At the same time, the correlation values were obtained both for the entire period and shorter periods corresponding to the trend movements of oil quotes for the purpose of a more detailed analysis. The significance range of the obtained correlation values is set from -0.6 to -0.6 (Table 2).

Analyzing the data for the entire period on the yield of American Treasuries, it can be highlighted that a positively significant

Figure 5: Target rate vs. yield curve

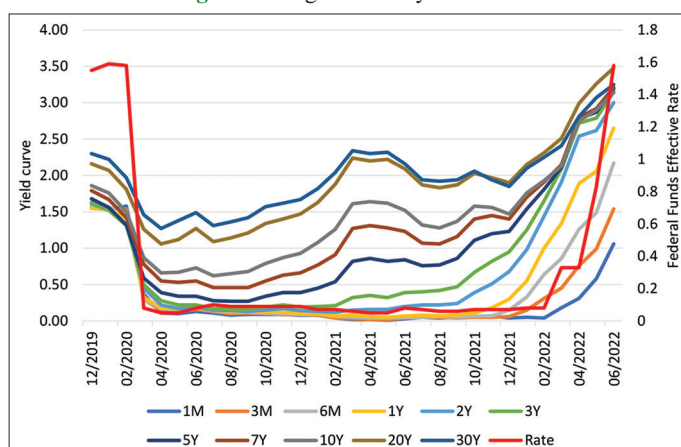


Table 2: Correlation values

Factors	All periods	January 05, 2020 –April 19, 2020	April 26, 2020 –November 28, 2021
Treasury securities at 30-year	0.869	0.961	0.819
Treasury securities at 20-year	0.906	0.961	0.872
Treasury securities at 10-year	0.902	0.968	0.898
U.S. stocks of crude oil	–0.890	–0.810	–0.854
EUR/USD	–0.381	0.324	0.315
Factors	December 05, 2021–March 20, 2022	March 27, 2022–June 05, 2022	June 12, 2022 –July 17, 2022
Treasury securities at 30-year	0.900	0.743	0.671
Treasury securities at 20-year	0.915	0.754	0.561
Treasury securities at 10-year	0.874	0.630	0.756
U.S. stocks of crude oil	–0.912	–0.876	0.761
EUR/USD	–0.781	–0.498	0.968

Source: Authors' calculation

correlation with oil price dynamics indicates a loss of control over the management of oil prices through monetary factors on the part of the United States. A decrease in the actual target rate reduces the yield on treasury bonds and should lead to an increase in the cost of oil. Therefore, the correlation should be negative, but the obtained values indicate the opposite. First of all, this is the impact of COVID-19, which provoked a reduction in oil demand and caused a global economic downturn. As mentioned above, the United States reacted to this by lowering the interest rate, but this did not have an immediate effect on the growth of oil prices, since the factors affecting the price of oil went beyond monetary incentives. Thus, the rate cut caused a decrease in the yield of treasuries along with a drop in the price of oil. Further, the effect of raising the actual target rate is observed in the last two periods, when the positive values of the correlation began to decline. This means that Treasury yields have become faster than the rise in oil prices, but not strong enough to affect the decline in oil prices. The reason for this lies in the introduction by the United States of an embargo on the supply of oil from Russia and the partial accession to these restrictions by European countries. On the one hand, the increase in the interest rate of the Fed was supposed to reduce oil prices, but the shortage of oil supply on the market caused by sanctions practically nullified the effect of US monetary incentives.

Faced with the lack of effect from monetary stimulus, the US began to try to influence the market by changing the physical supply of oil through the sale of its own strategic reserves (U.S. Stocks of Crude Oil). If we take the correlation data on the level of oil reserves in the US with the dynamics of oil quotations for all the periods considered, except for the last one, we can note a highly significant negative correlation. These values are explained by the fact that the growth of reserves indicated that there was no demand for oil in the United States, that is, demand was declining, which led to a decrease in the cost of oil. However, in the last period 06/12/2022–07/17/2022, a significant positive correlation value can be observed. This fact just says that by selling off its strategic reserves, the United States directly affects the cost of oil on the world market. Thus, the decrease in reserves indicates not an increase in demand for oil caused by its consumption within the United States, but an increase in the supply of oil on the world market.

The EUR/USD currency pair looks more volatile in terms of the obtained correlation values among all factors. This is due to the high liquidity of currencies, which is why the number of factors affecting them is the largest among all financial assets. In the context of the oil market, based on the obtained correlation values, it can be noted that if the correlation is not significant for the entire period, then for the last period the correlation indicator shows a direct and high dependence. This suggests that the higher the euro against the dollar, the higher the price of oil. Considering the factors analysed above, we can conclude that against the backdrop of a very likely weakening of the euro, European countries are more actively buying oil, while the euro is still high against the US dollar, thereby hedging their risks against the background of a future increase in energy prices caused by a restriction on the consumption of hydrocarbons from Russia.

In general, the result of the correlation analysis for the period under study indicates the loss of the key impact of the US monetary factor on pricing in the world oil market and the shift in the factors regulating the level of world quotations in favour of supply and demand for goods in the commodity market.

4. CONCLUSION

The competition for dominance between key players in the oil market today is largely superimposed on the delayed effects of the economic downturn caused by the impact of COVID-19.

Unwinding the inflationary spiral, the United States laid the foundation for further rapid growth in prices in the world oil market. Now, faced with the rapid growth of inflation, especially in the energy sector, the Fed has switched to a policy of expensive money, trying to tame world oil prices, seeking to regain control over the regulation of oil quotations using monetary instruments and ensure the export of dollar inflation, primarily at the expense of countries. Europe by reducing the cost of Treasuries.

The US attempt to regain control over pricing in the world oil market is limited by sanctions imposed by the United States itself, which forces them to replace the dropped volumes of physical oil from the world market using their own reserves. This, in turn, shifts the balance of factors that regulate world quotes from monetary

regulation in favour of supply and demand for physical volumes of oil, where OPEC+ is the key player.

As a result, a vicious circle is formed for the United States, where the desire to reduce oil prices runs into sanctions and restrictions on the supply of oil, which the United States themselves are trying to replace with their own oil, the reserves of which will have to be replenished, which will lead to a new branch of price growth on the world market. At the same time, the US is trying to solve its economic problems at the expense of its traditional partners, which only brings additional uncertainty to the global oil market. Consequently, it turns out that if the US does not have the ability to control price dynamics, then high volatility is better than predicted quotes.

Thus, the current US actions aimed at controlling price dynamics in the oil market lead to high volatility in oil quotes. It can be assumed that the current situation will create conditions for further growth in oil prices on the world market.

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