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THE INFLUENCE OF MONETARY POLICY
ON THE FORMATION OF OIL PRICES

The relationship between monetary uncertainty and price volatility in the global crude oil market has attracted considerable attention in recent years. Understanding this relationship is extremely important for both policy makers and market participants and investors. The purpose of this article is to explore a modern approach to regime switching in order to shed light on the dynamic interaction between monetary uncertainty and price volatility in the crude oil market. If we consider that oil is one of the main sources of energy in the world, and the price of oil plays an important role in the global economy, then the formation of oil prices depends on many factors, including supply and demand, political stability in the production regions, geopolitical events, climate change and, of course, monetary policy. The scientific significance of the article lies in the fact that it allows for a deeper understanding of the relationship between the economic policy of central banks and the dynamics of commodity prices. The practical significance lies in the fact that understanding the impact of monetary policy on oil prices can be useful for both government agencies and businesses.

In this research methodology, an empirical method of work was used, in which the influence of monetary uncertainty on the volatility of world crude oil prices was considered. We also touch upon the issue of political uncertainty on the price of oil during the pandemic. The relevance of this article lies in the fact that the price of oil is one of the key indicators for the global economy, the study of the impact of monetary policy on this market is important. The price of oil can influence monetary policy in various ways. For example, changes in the interest rates of central banks affect investors and their decisions to invest in oil companies. In addition, monetary policy also affects the exchange rate, which also has an impact on the price of oil. In conclusion, it can be said that studying the impact of monetary policy on oil prices is important for both science and practice, and may lead to the development of more effective methods of economic and business management.

Key words: monetary policy, oil price uncertainty, crude oil, stock market, system modernization, political uncertainty, COVID-19.

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Мұнай бағасының қалыптасуына монетарлы саясаттың әсері

Әлемдік шикі мұнай нарығындағы монетарлық белгісіздік пен бағаның құбылмалылығы арасындағы байланыс соңғы жылдары айтарлықтай назар аударды. Бұл қатынасты түсіну саясаткерлер үшін де, нарық қатысушылары мен инвесторлар үшін де өте маңызды. Бұл мақаланың мақсаты-монетарлық белгісіздік пен шикі мұнай нарығындағы бағаның құбылмалылығы арасындағы динамикалық өзара әрекеттесуге жарық түсіру үшін режимдерді ауыстырудың заманауи тәсілін зерттеу. Мұнай әлемдегі негізгі энергия көздерінің бірі болып табылады және мұнай бағасы әлемдік экономикада маңызды рөл атқарады деп есептесек, мұнай бағасының қалыптасуы көптеген факторларға, соның ішінде сұраныс пен ұсынысқа, өндіріс аймақтарындағы саяси тұрақтылыққа, геосаяси оқиғаларға, климаттық өзгерістерге және, әрине, ақша-несие саясатына байланысты. Мақаланың ғылыми маңыздылығы-бұл орталық банктердің экономикалық саясаты мен шикізат бағасының динамикасы арасындағы байланысты тереңірек түсінуге мүмкіндік береді. Практикалық маңыздылығы-ақша-несие саясатының мұнай бағасына әсерін түсіну мемлекеттік органдар үшін де, бизнес үшін де пайдалы болуы мүмкін.

Зерттеудің бұл әдістемесінде шикі мұнайдың әлемдік бағасының құбылмалылығына монетарлық белгісіздіктің әсерін қарастыратын жұмыстың эмпирикалық әдісі қолданылды. Пандемия кезіндегі мұнай бағасына қатысты саяси белгісіздік мәселесін де қозғаймыз. Бұл мақаланың өзектілігі мұнай бағасы әлемдік экономика үшін негізгі көрсеткіштердің бірі болып табылады, монетарлық саясаттың осы нарыққа әсерін зерттеу өте маңызды. Мұнай бағасы ақша-несие саясатына әртүрлі жолдармен әсер етуі мүмкін. Мысалы, орталық банктердің пайыздық мөлшерлемелерінің өзгеруі инвесторларға және олардың мұнай компанияларына инвестициялау туралы шешімдеріне әсер етеді. Сонымен қатар, ақша-несие саясаты валюта бағамына да әсер етеді, бұл мұнай бағасына да әсер етеді. Қорытындылай келе, ақша-несие саясатының мұнай бағасына әсерін зерттеу ғылым үшін де, тәжірибе үшін де маңызды және экономика мен бизнесті басқарудың тиімді әдістерінің дамуына әкелуі мүмкін деп айтуға болады.

Түйін сөздер: монетарлы саясат, мұнай бағасының белгісіздігі, шикі мұнай, қор нарығы, жүйені жаңғырту, саяси белгісіздік, COVID-19.

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Влияние монетарной политики на формирование цены на нефть

Взаимосвязь между монетарной неопределенностью и волатильностью цены на мировом рынке сырой нефти привлекает значительное внимание в последние годы. Понимание этой взаимосвязи крайне важно как для политиков, так и для участников рынка и инвесторов. Цель данной статьи - изучить современный подход к переключению режимов, чтобы пролить свет на динамическое взаимодействие между монетарной неопределенностью и волатильностью цены на рынке сырой нефти. Если учесть, что нефть является одним из основных источников энергии в мире, и цена на нефть играет важную роль в мировой экономике, то формирование цены на нефть зависит от многих факторов, включая спрос и предложение, политическую стабильность в регионах добычи, геополитические события, климатические изменения и, конечно на монетарную политику. Научное значимость статьи заключается в том, что она позволяет глубже понять взаимосвязь между экономической политикой центральных банков и динамикой цен на сырьевые ресурсы. Практическое значение заключается в том, что понимание влияния монетарной политики на цены на нефть может быть полезным как для правительственных органов, так и для бизнеса.

В данной методологии исследования была использован эмпирический метод работы, в котором рассмотрено влияние монетарной неопределенности на волатильность мировых цен на сырую нефть. Так же затрагиваем вопрос о политической неопределенности на цену нефти в период пандемии. Актуальность данной статьи заключается в том что цена на нефть является одним из ключевых показателей для мировой экономики, изучение влияния монетарной политики на этот рынок имеет важное значение. Цена на нефть может влиять на монетарную политику различными способами. Например, изменение процентных ставок центральных банков влияет на инвесторов и их решения о вложении средств в нефтяные компании. Кроме того, монетарная политика также влияет на курс валют, что также оказывает влияние на цену на нефть. В заключении можно сказать, что изучение влияния монетарной политики на цены на нефть имеет важное значение как для науки, так и для практики, и может привести к развитию более эффективных методов управления экономикой и бизнесом.

Ключевые слова: монетарная политика, неопределенность цены на нефть, сырой нефть, фондовый рынок, модернизация системы, политическая неопределенность, COVID-19.

Introduction

Crude oil is one of the key commodities influencing global economic growth, financial stability and inflationary pressures. The volatility of crude oil prices has significant implications for various stakeholders, including governments, businesses and consumers. Decisions in the area of monetary uncertainty, on the other hand, have a profound impact on market sentiment and general economic conditions. Therefore, studying the relationship between these two factors is of great importance.

The monetary regulator, represented by the central bank, sets the interest rate for the economy in the short term and affects the money supply with its instruments. Their coordinated decisions should support the macroeconomic stability of the country, avoiding imbalances or distortions in the economy.

Since 2015, the National Bank of Kazakhstan (NBK) has officially switched to inflation targeting mode when conducting monetary policy. This means, on the one hand, moving away from a fixed exchange rate regime, and on the other, the active use of classical monetary instruments: the base rate, open market operations and macro prudential standards - to influence inflation or price growth in the economy, which in turn directly affects the financial stability of Kazakhstan.

As a result of asynchronous actions by the government and the National Bank, for example, in the case of the base rate, the effect of the transmission mechanism of the interest rate channel on inflation is strongly limited by uncontrolled price growth factors in the form of import inflation, as well as permanently high price expectations among economic agents. This arises due to the structural problems of the economy of Kazakhstan: the high dependence of the country's export revenues on the sale of finished raw materials and a high share of the import component in intermediate and final consumption. Monthly surveys of the National Bank of the Republic of Kazakhstan show that in recent years, expected and perceived inflation has consistently exceeded the level of official price growth in the economy, which indicates the absence of an element of anchoring expectations among economic agents.

In 2023, against the background of non-fulfillment of the tax revenue plan, the scheme of extra-budgetary withdrawal of funds from the National Fund through the purchase of a stake in the national company KazMunayGas was applied for the first time. Further, funds from capital transactions were sent to the budget by dividends from the Fund of the National Bank "Samruk-Kazyna".

In general, it has to be stated that the coordination of monetary policy in the economy of Kazakhstan is extremely weak, which is reflected not only in the fiscal dominance of the government through the constant increase in government spending and withdrawals from the National Fund, but also in the fact that the monetary regulator, in conditions of low efficiency of the transmission mechanism of monetary policy through open market operations, occupies the main market share of primary government securities (Forbes Kazakhstan, 2024).

Unlike the United States, government regulation is the main engine for the Kazakh economy and only a small role is played by the private sector due to the lack of large companies that could have their weight on the economic stabilization of the country. In this regard, this topic is not only relevant in developed consumer countries such as the United States, Europe and China, but it is also important for those countries whose budget is directly related to the price of crude oil. We continue to form and develop advanced clusters of our economy in this direction. In this regard, one of the President's messages outlined the following steps towards the development of the country's oil sector, which clearly shows the economic importance of crude oil prices: It is necessary to ensure the creation of a complex of deep oil refining at the Atyrau refinery worth $ 1.7 billion, which will increase gasoline output by almost 3 times – up to 1.7 million tons, and diesel fuel – up to 1.4 million tons and provide Kazakhstan with these types of fuel (Presidential Address, 2012) to increase the share of oil refining.

As for the largest oil consumers in the world today, the United States and China are. They are significantly ahead of other countries such as India, Russia, Germany, Japan, etc. In order to develop and strengthen economic cooperation between the United States and Kazakhstan on issues of American-Kazakh business cooperation in the period 1997 to 2009, it was formed to informally advise the Leadership of the Republic of Kazakhstan through discussions, written memoranda, reports and analytical summaries in the following areas:

1) macro and microeconomic policy;
2) monetary and fiscal policy;
3) economic legislation;
4) investment attraction programs, including the development of economic incentives and investment mechanisms;
5) strategic planning, including the development of basic industries, especially high-tech sectors, agriculture, financial sector and infrastructure, etc.

When conducting macroeconomic policy in Kazakhstan, big players such as Kenneth Derr, Chevron Corporation, and Paul J. came to business cooperation. Fribourg - Continental Grain; John B. Hess - Amerada Hess; Richard Cheney - Halliburton Company; William J. Lowry - Amoco Corporation; Lucio A. Noto - Mobile Corporation, David Rockefeller - Council for Relations with Foreign Countries, etc. The task of which is to develop and submit to the President of the Republic of Kazakhstan proposals and recommendations for the implementation of the Development Strategy of the Republic of Kazakhstan until 2030, as well as to solve global problems of sustainable development of the country in terms of ensuring economic growth, effective methods of environmental management and social reforms; interaction with international economic and financial organizations, specialists

involved in consultations on foreign economic cooperation and integration of Kazakhstan into the world economic community (information legal system of the National Assembly of the Republic of Kazakhstan).

The introduction of the right monetary policy can become a strong driver of investment at the company level. Recent data indicate that the investment effects of monetary policy are far from uniform and vary in many ways depending on such characteristics at the company level as age, profitability and leverage. Samer Adra, Yang Gao and Jiayi Yuan, in their study "Local Policy Uncertainty and the Firm's Investment Response to Monetary Policy Letters on Economics", say that they expand this analysis by presenting the first study of the role of local economic policy uncertainty in shaping the firm's investment response to monetary shocks (Samer Adra et al. 2024).

The growing uncertainty of local economic policy increases the sensitivity of the firm's investments to monetary shocks. This effect is due to the precautionary trend caused by uncertainty, which increases the firm's propensity to reduce investments in response to restraining monetary shocks. This effect is more pronounced for geographically connected firms experiencing financial difficulties.

Despite growing economic integration, most firms remain geographically connected and vulnerable. Moreover, recent events, such as the COVID-19 pandemic, have confirmed the view that differences at the state level in overcoming uncertainty have tangible consequences for how firms invest, hire employees and survive economic difficulties.

For example, in the United States, the COVID-19 pandemic has led to a sharp increase in political uncertainty, pushing (on average) 2.7 times the peak before COVID and (on average) more than four times the previous peak. Political uncertainty has increased more dramatically with stricter quarantine measures – as evidenced by the number and duration of self-isolation orders, business closure orders, restaurant closure orders, and school closure orders. This blocking effect is significant compared to the differences in the spikes in political uncertainty during the pandemic era in different states. Surprisingly, political uncertainty does not show a noticeable response to the severity of the pandemic, as measured by the number of deaths from COVID per capita in cities (S.R. Baker et al. 2022).

How does increasing political uncertainty at the state level affect a firm's investment response to monetary policy? To answer this question, it is necessary to recognize that policy uncertainty leads to precautionary delays on the part of companies engaged in irreversible investments (Gulen and Ion, 2016). In terms of real-world options, growing political uncertainty increases the value of being able to postpone irreversible investments, especially for firms whose business prospects depend heavily on local policy decisions.

States that imposed stricter restrictions during the pandemic saw a larger jump in unemployment, due to the severity of the pandemic and political uncertainty. The greater increase in policy uncertainty at the state level during the pandemic was also accompanied by a large increase in unemployment. As we discuss, there are good reasons to be careful when drawing causal conclusions from these patterns. However, they emphasize the value of additional research on how the severity of quarantine and policy uncertainty during the pandemic affected unemployment and other outcomes.

Literature review

Oil price volatility poses a great risk to economic institutions and devastating shocks to the global economy from the side from which it is easy to get information about how oil prices affect other components of the financial market, including stocks, mortgages, precious metals and other consumer goods. He believes that there is a significant amount of empirical data confirming the theoretical relationship between oil prices and capital on the example of stock markets. For example, a revolutionary analysis conducted in Chang et al., 2022, showed that oil has a detrimental effect on the stock market of industrialized countries. A number of studies using quantitative methods such as regression analysis (QR), capital asset pricing model (CAPM) and vector analysis (VAR) confirm this conclusion (Xiao Bai et al., 2022).

According to experts, oil volatility contains indications that significantly exceed those provided by conventional macroeconomic factors and can be used to predict volatility in the stock market (Pan et al., 2023). Using a VAR structure with quantile regression for time-varying variables, it has recently been tested how oil volatility flows into natural gas futures trading. However, overflowing significantly delays the start of the revolution in shale oil (Ullah et al., 2020). The report found compelling evidence of a spillover from the oil markets. Although most of these studies use GARCH or RV-based models to determine oil price volatility, a broader line of empirical research recommends using OVX.

GARCH or RV-based models require stock market volatility to be determined based on previous price data, so they provide only limited insight into upcoming economic risks. When using a forward benchmark, such as OVX, additional data is provided on both historical and current market prospects (Antonakakis, N.,2020).

Methodology

Empirical analysis indicates that there is a significant relationship between monetary policy uncertainty and price volatility in the global crude oil market. The results show that during periods of high monetary uncertainty, the volatility of crude oil prices tends to increase and vice versa, when monetary uncertainty is low, volatility in the crude oil market is relatively stable. This conclusion highlights the importance of taking monetary factors into account when assessing the dynamics of crude oil prices.

Understanding the relationship between monetary policy uncertainty and crude oil volatility has a number of implications. First, policymakers can use this knowledge to develop effective monetary policies that take into account the impact on energy markets. Secondly, investors and market participants can use this information to make informed decisions about investments in crude oil. Finally, businesses can evaluate their risk management strategies in light of the interaction between monetary policy uncertainty and crude oil price volatility.

To study the relationship between the uncertainty of monetary policy and the volatility of the price of crude oil, a modern approach using regime switching models is used. Mode-switching models allow you to capture potential changes in the relationships between variables over time. The analysis includes various indicators of monetary uncertainty, such as exchange rate volatility, inflation uncertainty and central bank policy uncertainty, as well as their impact on crude oil.

This segment explains the specific forecasting framework that was used during the study:
− Non-commuting GARCH
− MS-GARCH models

The models presented above do not take into account the change of modes between time sequences. As a result, consider the following FTP-MS-GARCH standards.

We also use this technique to get the daily volatility of stocks, for example, in the oil market. Many studies have used sliding approaches to obtain non-selective volatility. Two subsamples are created from the entire sample - the calculated and forecast windows. As a test sample, we select 70% of each data set, from which we conclude that the calculation period begins in January 2000. The division time is March 2014, and the planned window covers the remainder of the dataset.
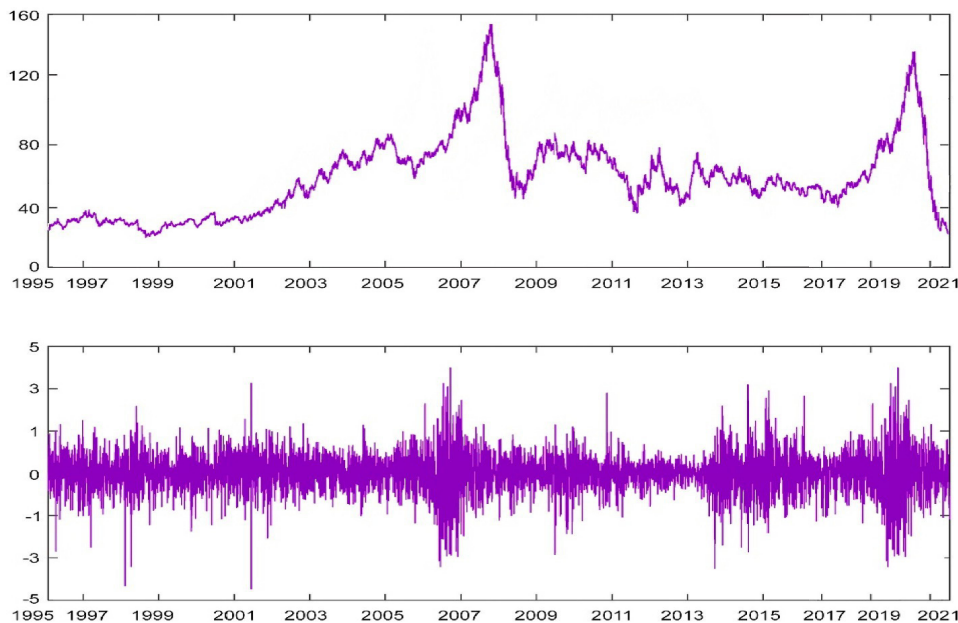

Figure 1 – Daily West Texas intermediate (WTI) futures prices (top) and yields (bottom).
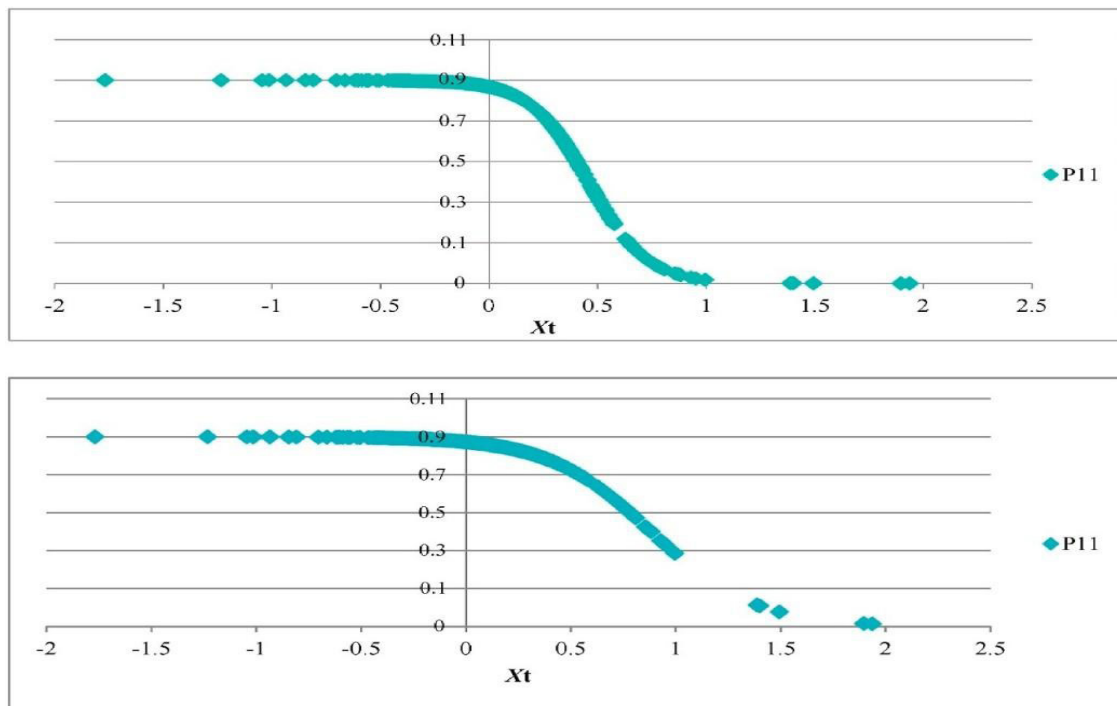Note – compiled based on the source (Menyang Yu et al.2023)

Figure 2 – The US monetary uncertainty index (top) and the first difference (bottom).
Note – compiled based on the source (Menyang Yu et al.2023)

The probability of regime change will change when the MUI changes based on a posteriori probability between both states that depend on it (Maghyereh and Abdoh, 2020). The state variables between the two situations seem to respond significantly to the change in MUI, since all coefficients (except 0) are statistically significant.

Oil volatility tends to persist in a stormy regime, which is experiencing great liquidity problems. This study is consistent with the researchers' view that when shareholders experience greater economic pressure during a storm, their emotions are more likely to be driven by fear (Singh et al., 2020). Obviously, oil volatility was higher during the turbulent events associated with monetary uncertainty.

As a result of the study of the factors influencing the volatility of oil prices on the country's monetary policy, 6 signs of the M1-M6 models were identified, which are presented in this table.

The figure shows the results of experiments with six models, designated as Model 1 - model 6. To assess the superiority of models 2 and 3 over models 1 and 2, a likelihood ratio of 1 (LR1) was used. To compare models 5 and 6 with models 1 and 2 and 3 and 4, respectively, likelihood coefficients 2 and 3 (LR3) were used. The training set is used to evaluate the parameters of the model, and the testing set is used to evaluate the effectiveness of the model. The model is trained on a training set and then used to predict on a test set (Falavigna and Ippoliti, 2023). The accuracy of the forecasts is estimated by comparing them with the actual results on the test set. Out-of-sample forecasting is an important tool when choosing a model, as it allows different models.

It is also useful for identifying over-fitting, which occurs when a model comes too close to training data and performs poorly on new data (Sharif et al., 2020).

The data in the figure reflects the results outside the sample. The reliability is 90%. The * sign marks cases when a null idea is rejected with 1% significance.

The figure shows the results of an investment approach for an individual focused on the balance between average return and risk. The various levels of risk aversion, denoted by the Greek letter gamma (γ), are represented by the values 3, 6 and 9. The report presents the results of the effectiveness of the strategy through CER and SR, which are measures of the success of the investment approach (Bakshan et al., 2017).

	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
$\omega 1$	0.0080***	- 0.0018	1.0148***	- 0.0291***	1.1409***	0.0894*
$\omega 2$	-	-	0.0050***	1.4299***	0.0051***	- 0.0057*** $\alpha 1$
	0.0571***	0.1100***	0.1368***	0.1192***	0.1728***	0.2887*** $\alpha 2$
	-	-	0.0404***	- 0.1008	0.0386***	0.0539*** β_1
	0.9327***	0.9880***	0.0462***	0.9540***	0	0.2145
$\beta 2$	-	-	0.9459***	- 0.2889	0.9475***	0.9953*** $\gamma 1$
	-	- 0.3857***	-	- 0.3996***	-	- 0.3956** $\gamma 2$
	-	-	-	1.9885	-	- 0.8996**
P11	-	-	0.9595***	0.9973***	-	-
P22	-	-	0.9948***	0.9541***	-	-
$\delta 0$	-	-	-	-	3.4027***	3.5802***
$\lambda 0$	-	-	-	-	- 7.4322	- 4.0615 $\delta 1$
	-	-	-	-	5.5339***	5.5823***
$\lambda 1$	-	-	-	-	- 2.8446***	- 2.6828***
L.L.	- 4260.200	- 4246.600	- 4232.100	- 4230.400	- 4227.600	- 4214.200
A.I.C.	8526.4	8501.2	8482.2	8482.9	8477.2	8454.3
B.I.C.	8544.9	8525.9	8537.8	8550.8	8545.1	8534.6
Л.Р.1.	-	-	56.2000***	32.4000***	-	-
Л.Р.2.	-	-	-	-	65.2000***	64.8000***
Л.Р.3.	-	-	-	-	9.0000*	32.4000***

Figure 3 – Results of sample assessments.
Note - This figure is compiled by the source (Mengyan Yu et al. 2023).

	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
S.R.	0.6864	0.6906	0.6906	0.6906	0.6906	0.6964
D.o.C.	14.9100***	15.1541***	15.0932***	15.0633***	14.9188***	15.4648***
The panel A: length = 4500						
S.R.	0.6673	0.6794	0.6754	0.6754	0.6693	0.6894
D.o.C.	9.0007***	9.4585***	9.3602***	9.3602***	9.0773***	9.7862***

Figure 4 – Success rates vary with different window estimates.
Note – This figure is compiled by the source (Mengyan Yu et al. 2023).

		Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
QLike	*TR*	0.0000	0.0649	0.0000	0.0000	0.0000	1.000
	TSQ	0.0000	0.0649	0.0000	0.0013	0.0000	1.000
М.С.Э.	*TR*	0.0055	0.0161	0.0055	0.0055	0.0055	1.000
	TSQ	0.0218	0.0218	0.0218	0.0218	0.0218	1.000
M.A.E.	*TR*	0.0089	0.0089	0.0089	0.0000	0.0000	1.000
	TSQ	0.013	0.013	0.013	0.0037	0.0037	1.000
H.M.S.E.	*TR*	0.0000	0.0000	0.0000	0.0000	0.0000	1.000
	TSQ	0.0000	0.0000	0.0000	0.0000	0.0000	1.000
H.M.A.E.	*TR*	0.0000	0.0000	0.0000	0.0000	0.0000	1.000
	TSQ	0.0000	0.0000	0.0000	0.0000	0.0000	1.000
S.R.		0.7049	0.7049	0.7009	0.7069	0.6996	0.7123
D.o.C.		18.0905***	18.2695***	17.7021***	18.2782***	17.6150***	18.5791***

Figure 5 – Dynamics of the WTI spot price outside the sample data.
Note – the drawing was compiled by the source (Mengyan Yu et al. 2023).

	$\gamma = 3$		$\gamma = \mathbf{6}$		$\gamma = \mathbf{9}$	
	C.E.R.	S.R.	C.E.R.	S.R.	C.E.R.	S.R.
Model-1	0.9191	0.3714	0.9185	0.3714	0.9183	0.3714
Model-2	0.9192	0.4038	0.9186	0.4038	0.9183	0.4038
Model-3	0.9194	0.4621	0.9186	0.4621	0.9184	0.4621
Model-4	0.9195	0.4592	0.9187	0.4592	0.9184	0.4592
Model-5	0.9192	0.4155	0.9185	0.4155	0.9183	0.4155
Model-6	**0.9198**	**0.5557**	**0.9189**	**0.5557**	**0.9185**	**0.5557**

Figure 6 – Comparison of the economic results of competing models.
Note – This figure is compiled by the source (Mengyan Yu et al.2023)

In the MCS simulation, the confidence level of consent was set at 90% (see Table 5).

(Chang et al., 2022e) In addition, Inspired Achievement (SR) is another possible predictive metric that we are considering in light of Herrera's research. In order to find out whether the development is statistically significant, we additionally use the experimental Direction-of-Change (DOC) test from (Wang et al., 2017).

Financial uncertainty has significantly increased the volatility of the oil market. The impact of monetary uncertainty on oil market volatility has already been noted in the work (Y. Li and Um air, 2023), and our results confirm their conclusions. The results obtained indicate that the volatility of world oil prices may be influenced by changes in monetary policy and economic indicators. Secondly, a regime-switching approach was used

to identify and define several market regimes, each of which is characterized by unique volatility. The results obtained indicate the presence of two separate regimes, one of which is characterized by minimal volatility, and the other by high volatility. It has been shown that changes in the degree of uncertainty of monetary policy affect these regimes. The multiplicity of market regimes in the context of oil price volatility is consistent with the conclusions drawn in the work (Wang et al., 2022).

In addition, the researchers compared the results obtained using the GARCH method with the results of other approaches. The mode-switching Model GARCH has surpassed the standard model GARCH in data fit and volatility prediction accuracy. In accordance with the results of the work (Safari and Davallou, 2018), which emphasizes the usefulness of mode-switching models to reflect the dynamics of oil price volatility, we have shown that oil prices tend to switch from one mode to another. We used the mode switching paradigm to represent the dynamic and unpredictable nature of volatility. Using this method, several market modes can be distinguished, each of which is characterized by a characteristic level of volatility. In our study, we found two separate volatility modes (low and high). It has been shown that changes in the degree of monetary uncertainty affect these regimes. Our results are consistent with the results obtained in the work (Chang et al., 2022a), which examined the relationship between oil price volatility and various market regimes.

In addition, the oil market is certainly seen as an indicator of danger. It also has a time-varying effect on macroeconomic factors, which increases the ability of the M5 and M6 models to predict oil volatility. Moreover, we include this effect in the model and determine whether its use can improve the accuracy of forecasts. The answer is positive (L.I. Tenkovskaya, 2023), therefore, when modeling the active relationship between MUI and the unpredictability of unrefined fuel, it is recommended to include transitions of variable modes. From the analysis of forecasts, it can be concluded that, given the impact of oil shocks on financial markets, the authorities should pay special attention to the development of monetary uncertainty (Ahmad, T. et al.2020). Meanwhile, the assessment of the oil surge is useful for understanding the impact of monetary uncertainty on the economic environment. However, policy makers must make appropriate policy decisions over time due to various time fluctuations that increase financial tensions and volatility of crude oil. On the other hand, increased monetary uncertainty may cause market volatility due to some external disruptions in the oil industry. Crude oil traders may tend to be passive. Better forecasting of crude oil volatility can help investors reconfigure their portfolios in advance and avoid significant economic losses.

Results and discussion

Currently, Kazakhstan's oil market is going through a period of transformation caused by various factors such as changes in the global economy, technological innovations and changing consumer preferences. The political situation in neighboring countries is particularly acute, such as Russia's war with Ukraine, EU sanctions against Russia and much more. Due to the unstable situation in a number of other countries, Kazakhstan is forced to look for ways of other transit routes bypassing Russia to ensure the safe transportation of oil to the eurozone to the main oil buyer.

The oil crisis was the main cause of the recession of the 1970s, which mainly affected the economies of Western countries. Since then, there have been many publications devoted to the study of the impact of oil price shocks on macroeconomic variables. However, the debate on this front continues due to conflicting empirical evidence and the general macroeconomic effects of oil price shocks in both developed and developing countries (Morana, 2017).

Fluctuations in oil prices have a significant impact on the economy and the financial sector. An increased concentration of unpredictability in oil prices indicates instability or activity in oil markets. Given the uncertainty of oil prices, business companies can make or reject a number of economically important decisions, such as investments, production volume, and a tendency to spend a lot (Li and Sun, 2020). Therefore, the volatility of oil prices will eventually have negative consequences for the economy or the monetary sphere (Chang et al., 2022d). It can be assumed that there is a significant connection, given that the debt burden and the unpredictability of oil prices regularly go hand in hand. The study of the relationship between oil and other global financial groups has traditionally been given great attention.

However, the new level of oil instability during the COVID-19 crisis has revived the attention of researchers to this topic. According to the results, the price of Brent oil also fell to $81.6 per barrel (-2.5%) after a member of the Board of Governors of the Federal Reserve, Christopher Waller, said that the reduction of interest rates in the United States

could be postponed for at least two more months. This, in turn, may limit economic growth in the United States and, consequently, the demand for oil from one of its main consumers. Also, some pressure on the quotes could be exerted by the ongoing negotiations on a truce in Gaza in Paris, the successful results of which could contribute to ending the Middle East conflict and, as a result, reduce the risk premium inherent in prices.

Forecasting oil volatility has long been an urgent problem. Past research has found evidence that monetary uncertainty or an indicator leads to economic recessions. Increased MUI rates are able to increase the cost of loans.

How else does oil volatility react to economic pressures? These facts can be interpreted as follows. First, MUI significantly increases the ability to anticipate changes in oil volatility. An increase in the volatility of the financial system can affect the productivity of the global economy, as well as the supply-demand structure of oil, one of the most important sources of energy, since it is inextricably linked to economic activity. Therefore, the supply-demand structure of crude oil is significantly influenced by the uncertainty of monetary policy, which, accordingly, affects the volatility of oil prices. The dangers of other financial markets have increased as the financialization of the oil industry increases, economic macroeconomic factors can directly affect changes in stock prices for unrefined fuel, model TVTP-MS-GARCH is working, so why? The question of the structural decomposition of oil volatility has long been a matter of concern. The logical explanation of elements such as exceptional cases causing temporary, permanent, modifications and changes in the numerical characteristics of price volatility. Motivated by previous research, they show that models that include the switching method significantly increase the accuracy of forecasting compared to models that do not (Aye, G.K. et al., 2014). The results emphasize the importance of taking into account monetary factors when studying the dynamics of crude oil prices.

It is worth paying attention to the fact that oil prices are not only dependent indicators, they are also capable of radically changing economic conditions. There are scientific studies proving that oil price shocks affect the stock markets of developed and developing countries, stock prices of individual companies, in particular energy companies, and exchange rates (Barron'S, 2023). It is known that oil at affordable prices has a negative impact on the environment.

It can be assumed that there is a significant connection, given that the debt burden and the unpredictability of oil prices regularly go hand in hand. The study of the relationship between oil and other global financial groups has traditionally been given great attention. Thus, the transformation of the oil market in Kazakhstan reflects the changing conditions and requirements of the modern economy, and companies and the government of the country are actively working to adapt to the new conditions.

Financial globalization has a significant impact on the oil market, leading to changes in the structure and dynamics of this market. One of the key aspects of the transformation of the oil market in the context of financial globalization is the increase in competition among oil producers from all over the world.

Currently, there is a need to search for new economic indicators that can change world oil prices. This is due to the fact that from 2014 to the present, according to the results of researchers, it has been proved on the world market that oil prices no longer depend on supply and demand (L.I. Tenkovskaya, 2023).

Financial instruments such as futures and options allow oil market participants to protect themselves from the risks of changes in oil prices. This helps to reduce price fluctuations and increase market transparency. In addition, financial globalization promotes the development of new technologies in the oil production and refining industry, which increases production efficiency and reduces costs.

In the context of financial globalization, investments in infrastructure development and oil transportation also play an important role, which contributes to the expansion of the world market and an increase in trade volumes. Thus, the transformation of the oil market in the context of financial globalization leads to its more efficient functioning, increased competition and increased transparency, which ultimately has a beneficial effect on the entire industry (Kamilla Aznabakieva, 2024). Thus, it can be concluded that the oil market of Kazakhstan is in the process of active transformation. This is influenced by various factors such as changes in global demand, technological innovations, geopolitical events and strategic government decisions.

For the successful development of the oil industry in Kazakhstan, it is necessary to take into account all these factors and make competent strategic decisions. It is important to continue investing in new technologies and developing our own production facilities in order to increase

competitiveness in the global market. In addition, it is important to develop partnerships with other countries and companies in order to expand sales markets and diversify oil supplies. This is the only way to ensure stable growth and sustainable development of the oil industry in Kazakhstan.

Conclusion

This article examines the impact of monetary policy on the formation of oil prices in modern conditions. Understanding these relationships will enable policymakers, investors and businesses to better navigate the complexities of the crude oil market. Continued research in this area will contribute to the development of the economies of the countries. Monetary policy is one of the main instruments of state regulation of the economy and has an impact on the formation of oil prices in modern conditions of Kazakhstan.

One of the main mechanisms for the impact of monetary policy on the price of oil is the management of interest rates. For example, if the central bank reduces interest rates, this may lead to a decrease in the cost of bank loans and stimulate investment in oil production, which in turn may affect the volume of oil production and, as a result, its price.

On February 23, 2024, the USDKZT pair decreased to 450.05 tenge per dollar (-0.41 tenge) with a trading volume of $167.8 million (+$11.8 million). Participants in the local currency market probably assessed the decision of the PREP committee to reduce the base rate immediately by 50 bps, to 14.75%. Meanwhile, the NBK noted that despite the steady slowdown in global inflation and price growth within the country, about inflationary factors (stable domestic demand, uncertainty of fiscal policy, high inflation expectations) they are still being saved. Against this background, the regulator signaled a possible pause in the cycle of easing monetary conditions in Kazakhstan.

It is well known how fluctuations in crude oil prices affect the global economy and financial markets. The relationship between oil shocks and other sectors of the global monetary system, in particular investment markets, has been studied in a number of earlier studies, bond markets, precious metals, exchange rates, interest rates and banking institutions. Interestingly, the susceptibility of the financial system to oil shocks cannot be accurately predicted if one focuses only on one sector of the financial markets, the study warns. However, this can give confusing signals. But despite all the difficulties of calculations to identify problems and solve oil shocks and much more, many countries set themselves the following tasks:

− ensuring wide reproduction of the entire raw material base of the oil industry;

− the appropriate use of oil reserves;

− energy saving;

− minimizing losses at all stages of the technological process;

− an increase in the number oil companies in foreign markets;

− deepening of oil refining;

− creation and improvement of new producing oil fields.

Of course, this significantly increases the risks of non-fulfillment of the set tasks in development. That is why it is necessary to involve the state itself in this industry and integrate the monetary system in such a way that it can quickly respond to certain shocks. This is the only way the oil and gas sector can become as efficient as possible, all available and promising reserves of petroleum products will be used productively, as well as reducing the energy intensity of GDP (Expocentre Fairgrounds, 2024).

As a result of taking into account periodic regime changes, investors in the crude oil market can manage their portfolio more flexibly and refrain from risky investments, balancing MUI and volatility of crude oil, which affects authorities controlling fiscal uncertainty and cost control in capital markets to a greater extent. In addition, we suggest that policy makers get an idea of the severity of the economic burden. Oil volatility has been an important parameter for some time now, showing the risks of the business environment. In addition, the volatility of oil, as a rare energy carrier, is easily affected by the development of the global economy, and many note that almost any kind of financial uncertainty and uncertainty can have a significant impact, stimulating the global financial system. This will transfer the risk of the business system to the crude oil market, as well as gradually complicate the study and training of actions in the crude oil markets. At the same time, several scientists are building numerous indices of monetary anxiety, reflecting the volatility and unpredictability of the financial market. A significant number of the Economic Stress Index (MUI) indicates that the financial market is becoming more volatile. In these circumstances, investors may face more stress on the financial sector than usual (Liang,C.,et al.,2022). In this regard, more and more research is devoted to the use of MUI to identify the mechanism that affects both the price of oil and the uncertainty of monetary policy.

Since the United States economy is relatively the largest, the US dollar is the first world currency, and the economic development of the United States is based on the monetary incentives of the US Federal Reserve System, it can be assumed that world oil prices expressed in US dollars will increasingly fall under the influence of American monetary policy. To test this hypothesis, a multiple linear regression equation has been calculated, proving the formation of Brent crude oil prices using indicators of the monetary policy of the US Federal Reserve System. Although the presented equation is not without drawbacks, it is already able to explain the behavior of the independent variable in the form of Brent crude oil prices. It is known that over time (for example, since the beginning of 2016), the correlation between oil prices and the indicators of the monetary policy of the United States only increases. But in this scientific article, the equation of multiple linear regression is given, calculated according to data from 2014-2023, because during this period, supply and demand no longer influenced oil prices on the world energy market. It is advisable to continue research in this area and investigate the dependence of these indicators in later periods. In connection with the above text, investors are advised to pay attention to the policy of the US Federal Reserve System when creating their investment strategy (Fischer, R. et al., 2022).

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