



## BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"  
Hryhorii Skovoroda lane, 10,  
Sumy, 40022, Ukraine  
[www.businessperspectives.org](http://www.businessperspectives.org)

**Received on:** 9<sup>th</sup> of September, 2022

**Accepted on:** 31<sup>st</sup> of October, 2022

**Published on:** 22<sup>nd</sup> of November, 2022

© Yevhen Bublyk, Oleksandra Kurbet,  
Roman Yukhymets, 2022

Yevhen Bublyk, Doctor of Economics,  
Senior Researcher, Institute for  
Economics and Forecasting, National  
Academy of Sciences of Ukraine,  
Ukraine. (Corresponding author)

Oleksandra Kurbet, Ph.D., Institute for  
Economics and Forecasting, National  
Academy of Sciences of Ukraine,  
Ukraine.

Roman Yukhymets, Ph.D., Institute for  
Economics and Forecasting, National  
Academy of Sciences of Ukraine,  
Ukraine.



This is an Open Access article,  
distributed under the terms of the  
[Creative Commons Attribution 4.0  
International license](https://creativecommons.org/licenses/by/4.0/), which permits  
unrestricted re-use, distribution, and  
reproduction in any medium, provided  
the original work is properly cited.

**Conflict of interest statement:**

Author(s) reported no conflict of interest

Yevhen Bublyk (Ukraine), Oleksandra Kurbet (Ukraine), Roman Yukhymets (Ukraine)

# GAS FUTURES AS A FACTOR OF THE UKRAINIAN CAPITAL MARKET DEVELOPMENT

## Abstract

The purpose of the paper is to analyze current trends in the gas futures market and the prerequisites for their spreading in Ukraine. The analysis is based on scientific research results, search query time series provided by Google Trends, and statistical databases of derivative markets. The paper reveals the trends in the reshaping of the commodity derivatives market after 2008 in favor of commodity derivatives and the fast-growing volume of gas futures in the EU after 2017. The dual reason for these trends comes from the growing energy challenges and the tightening of financial derivatives regulation. Both reasons depend on real economic activity. This determines the presence of economic prerequisites for the spread of gas futures in the world.

The paper identifies the main institutional prerequisites for the spread of gas futures in Ukraine: an active gas exchange with growing volume of the spot trading and a situational factor of the energy market reforming. Initiatives of the gas market liberalization in Ukraine correspond to the energy market reform in EU. The identified trends, prerequisites, advantages and obstacles for the spread of gas futures allow to generalize proposals for state regulation, such as organizing the Ukrainian energy market as a hub to attract participants from other countries, as well as supporting the spread of gas futures on the capital market through the implementation of clearing mechanisms.

## Keywords

financial development, capital market, derivatives,  
commodities, exchanges, natural gas, energy security

## JEL Classification

G20, G12, Q48

## INTRODUCTION

Prospects for the spread of gas futures are currently determined by two main reasons: the need for the development of the capital market and the strengthening of a country's energy security. After the 2008 global financial crisis, which was partly caused by new financial instruments, the question of the benefits of derivatives, including gas futures, for the capital markets of developing countries has somewhat lost its relevance. But in recent times, there has been a revival of demand for derivatives that are closely related not to speculation, but to the needs of the real sector. Gas futures connect a wide range of economic entities, from households to corporations, with capital market participants. Due to this, gas futures have more opportunities to affect the institutional development of the latter.

Simultaneously, one of the most urgent needs of the real sector is related to the energy market and natural gas supply. In recent years, natural gas has gained special importance in the world, in particular in EU countries and Ukraine. Rising prices and gas supply restrictions due to the Russian invasion in Ukraine endanger energy security and the energy transition policy. The needs of energy security and capital market development actualize the research processes in the derivatives market and gas futures segment.

Due to the modern challenges in the field of energy, despite a significant amount of research on issues related to the derivatives market, the trends, prerequisites and the expected impact of the spread of gas futures have not been sufficiently studied. That is why the implementation of the perspective instrument on the national capital market requires an analysis of modern trends and prerequisites for the spread of gas futures for proper regulation policy development.

## 1. LITERATURE REVIEW

Gas futures are contracts related to a specific commodity, natural gas. They are a type of energy and, more broadly, commodity derivatives; therefore, when analyzing the peculiarities of their distribution and main characteristics, it is necessary to pay attention to the entire group. Energy futures were introduced to the market not so long ago. Hale et al. (2002), Elias et al. (2010), Vo (2019) and others clearly associate their appearance with the deregulation of energy markets in the 1970s and 1980s. Mihaljek and Packer (2010) have shown the rise of energy futures volumes in 1998–2010 up to four times in emerging markets.

The peculiarity of energy derivatives is that they do not represent ownership rights in any asset but, rather, derive their value from the value of some other underlying commodity or other asset. According to Walsh (2010), these financial instruments provide an opportunity to manage risk associated with the volatility in energy prices by allowing a party to secure the price of their energy in advance of the actual period of energy consumption. Cinquegrana (2008) draws attention to one of the main features of commodity futures: Unlike interest rates, inflation rates, stocks, bonds or other financial or meteorological variables, commodity derivatives' underlying assets are physical commodities with finite supply and sizeable storage and transportation costs.

Compared to options, futures are a basic and, therefore, much more common instrument (Kyzym, 2020), but before 2008 the specifics of gas futures had no practical significance. They acted as just another financial asset for speculation or diversification of an investment portfolio (Basu & Gavin, 2010). Equity, interest and exchange rate derivatives, due to higher volatility, were much more common.

In studies carried out before 2008 and shortly thereafter, the rationale for the positive impact of

gas futures did not go beyond derivatives generally and was largely based on the benefits of the free market. There were assumptions that the spread of derivatives improves efficiency and stability in financial intermediation, enhances cross-border lending and opens new opportunities for mitigating currency or other financial instabilities (Mathieson & Roldos, 2004). According to Rodrigues et al. (2012), derivatives markets have a positive influence through: a) development and integration of financial markets; b) expanding business activities in a country; and c) smoothing economic growth volatility. But they attribute this influence to the conclusion that there existed economically motivated demand for derivative products and organized markets on which they could be traded.

Basu and Gavin (2010) confirmed that resulting that commodity derivatives are an asset class that cannot be used to hedge equity risk because of more probability of an equilibrium arbitrage phenomenon that should be expected in a world where no unexploited hedging profit opportunity exists. But as Easwaran and Ramasundaram (2008) stated, apart from these participants who aim to hedge, there must also be someone in the futures market who aims to take risk and profit by doing so.

Wang et al. (2022) investigated the impact of diversification with five types of energy futures from January 2011 to July 2020 on three traditional commodity futures portfolios. Their results showed that diversification increased the returns while simultaneously reducing the portfolio volatility in all portfolios. The diversified portfolios provided higher returns than the traditional portfolios for the same level of risk.

After the crisis, more attention was paid to the systemic risk control. Due to this, the potential advantages of energy futures have an indirect effect on the institutional development of the

capital market and the energy sector. Rizvi et al. (2022) show that the hedging potential provided by natural gas derivatives to cope with the volatility of crude oil prices and the substitution of oil by natural gas can improve the sustainability and stability of financial markets. Also, Nakajima and Toyoshima (2020) measured the relationship between spot natural gas returns and futures returns with different maturities as an indicator of pricing efficiency and found that futures markets outperform the determination of natural gas prices than spot markets. Another advantage of futures is that a properly organized gas futures market with gas exchange not only diversifies the negative impact of natural monopolies and speculators, but also establishes mechanisms for communication, transportation, financing, storage, and pricing (Shi et al., 2016). All this helps to establish capital market stability (Ahmed et al., 2022) and price transparency (Cinquegrana, 2008).

The positive impact of the spread of derivatives on the development of the capital market is less contradiction in studies. Chikwira, et. al. (2021) have empirically tested on the South African data set the relationship between derivative markets growth and economic growth for the period 1996 to 2018 and, among other results, exhibited an unidirectional nexus from derivatives to economic growth. Haiss and Sammer (2010) also explain that this nexus occurs because derivatives allow risk sharing between structurally developed and emerging markets.

Although the financial crisis has primarily been caused by opaque, structured credit-linked securities and bilateral derivatives trading by firms that policymakers considered too big to fail (Basu & Gavin, 2010), policy makers and regulators have started to think about strengthening regulation due to increased transparency and safety both for derivatives and other financial instruments (Motorniuk et al., 2016). Post-2008 regulatory initiatives on commodity derivatives were often aimed at narrowing market share for single contracts that any participant can hold and forcing trading into clearing houses where participants must deposit margin before they can trade (Gibbon, 2013).

An important issue is the determination of a nexus between commodity derivatives and the real sector of economy. Based on the dynamic short-run

and long-run asymmetric interactions and causality between real economic activity and stock and gold markets volatility shocks, Urom et al. (2020) indicated asymmetries in the short- and long-term relationships. Qamruzzaman and Wei (2018) explored the relationship between economic growth, financial innovation, and stock market development of Bangladesh for the period 1980–2016 and confirmed the existence of a long-run association between financial innovation, stock market development, and economic growth. Oliinyk et al. (2019), based on 21 macroeconomic and financial indices of the USA for the period of 2000–2015 confirmed positive correlation of indicators of economic growth and exchange derivatives proving that the exchange market of derivatives in the USA positively influences economic growth.

Recent activities in spreading of energy futures happened in terms of the COVID-19 pandemic, which had interrupted supply chains in the world, caused inflation and growing prices of energy commodities. According to Adekoya and Oliyide (2021), the pandemic has been largely responsible for risk transmission across various commodity and financial markets. Growing prices for natural gas prompt research into the relationship between gas futures spreading and price corrections. Time varying correlations made by Jotanovic and D'Ecclesia (2021) among gas prices do not increase over time, showing that, over the short time, the structural features of single hubs still prevail with respect to a common “target” price.

The introduction of gas futures is closely related to the state energy security issue and natural gas, which is currently the primary energy resource for most small open economies. It has become increasingly important in international trade, especially after the recent financialization in commodity markets (Li, 2019). The natural gas is vital for power generation and more admissible for zero transition requirements (Sadik-Zada & Gatto, 2021). Some of the countries of Eastern Europe show high efficiency development of gas markets with derivative instruments (Goonasinghe et al., 2021). Also, it is proved that hard dependence of small economy on global commodity price volatility causes instability for the Ukrainian economy due to a weak national currency (Korablin, 2017; Anufrieva et al., 2021).

In more detail, the motivating factors for the futures spreading in the Ukrainian gas market are significant transaction costs, which led to the inefficiency of the market model and the degradation of the industry infrastructure (Yukhymets, 2021). In terms of Russian invasion of Ukraine, the issues of gas supply diversification become more important both for EU energy security (Benton et al., 2022; Mišić, 2022) and Ukraine energy security (Novosad et al., 2022; Žuk & Žuk, 2022).

Growing demand for natural gas in terms of energy security promotes the introduction of gas futures on the capital markets of small open economies. The need to stimulate the development of the derivatives market in Ukraine has been repeatedly emphasized in recent works (Prymostka & Krasnova, 2014; Shevchenko & Shevchenko, 2018; Lutsyshyn et al., 2019), containing the main recommendations in this regard. Crucial is the integration of the capital market and the admission of foreign consumers for increasing the liquidity of the commodity derivatives market (Kovacevic, 2020).

Different researchers showed that a short period of international capital inflow has a positive impact on the growth of Ukraine's capital market (Kalach, 2009; Oskolsky, 2011; Shyshkov, 2011; Bublyk, 2020); however, the capital market of Ukraine is still poorly efficient due to the presence of a number of unresolved issues, without the solution of which the formation of an effective and efficient capital market is impossible (Tretyakova et al., 2021). According to Oskolsky (2011), the main reason for this is the lack of a common, unifying basis that means not so much the centralization of the stock exchange segment, but rather the general basis, which is determined by real economic processes and only indirectly by subjective economic or speculative interests. Thus, besides the segment of government obligations, the capital market of Ukraine is structurally unformed (Shyshkov, 2022). It satisfies mostly technical or speculative interests of issuers and organizers (Slobodanyk, 2022).

Various scientific studies in one way or another confirm these conclusions. Krasnova (2014) notes that the Ukrainian capital market has a powerful potential for development, but it cannot be fully

implemented, since it is significantly lagging behind in the development of industrialized countries. The main particularity of this should be the fact that the indicators of the Ukrainian capital market in the time series of 2015–2021 have a low level of correlation with the world and the region indicators, which contradicts the typical relationships of global and regional markets (Frolov et al., 2022).

Moreover, the connectedness of trends of the Ukrainian capital market tends more to the trends of the American market, rather than the European one. Despite the fact that Ukraine belongs to the European region, there is no significant connection or influence of the capital markets of this region on the Ukrainian capital market (Shkolnyk et al., 2021). One of the explanations of this is a significant number of abuses on the capital markets of Ukraine (Koshovyi et al., 2019).

Despite numerous studies on the distribution of gas futures or energy derivatives, studies after 2008 limitedly reflect changes in the development trends of the derivatives market. Generalization and definition of modern trends and their causes are practically absent. Also, very little attention is paid to the analysis of the prerequisites for the spread of gas futures on the Ukrainian capital market. Thus, the purpose of the paper is to analyze modern trends in the gas futures market and the prerequisites for their distribution in Ukraine.

## 2. METHODS

This paper used quantitative methods of economic analysis, such as the use of absolute, average values (graphical visualization of time series dynamics), comparisons and an index method (market volumes and shares). The variables for the analysis of the derivatives market are time-varied data of volumes, structure shares and number of deals in commodity and gas futures markets from 2007 to 2022 derived from the reports of the World Federation of Exchanges (WFE), European Energy Exchange Group (EEX), and The Futures Industry Association (FIA). The analysis of the gas spot market in Ukraine as prerequisite development is based on time-varied data of volumes, participants and number of deals in 2017–

2020 from the reports of the Ukrainian Energy Exchange (UEEX). The share of the largest natural gas retailer of EU in 2013–2020 was analyzed using Eurostat data. The Google Trends analysis tool was used to define trends in dynamics of search queries for “gas futures” in 2004–2022 by standard browser tools through the web-site <https://trends.google.com> and defined by order 4 polynomial trendline. Visualization of analysis results was built using standard Excel diagram tools.

### 3. RESULTS

The main derivatives in organized natural gas markets are futures and option contracts. Both represent an agreement to buy a specified amount of natural gas in the future at a fixed price. But compared to option, futures are the underlying and, therefore, initial instrument. Energy swaps need an already developed market with reliable auction organizers. All that makes futures more suitable for underdeveloped markets.

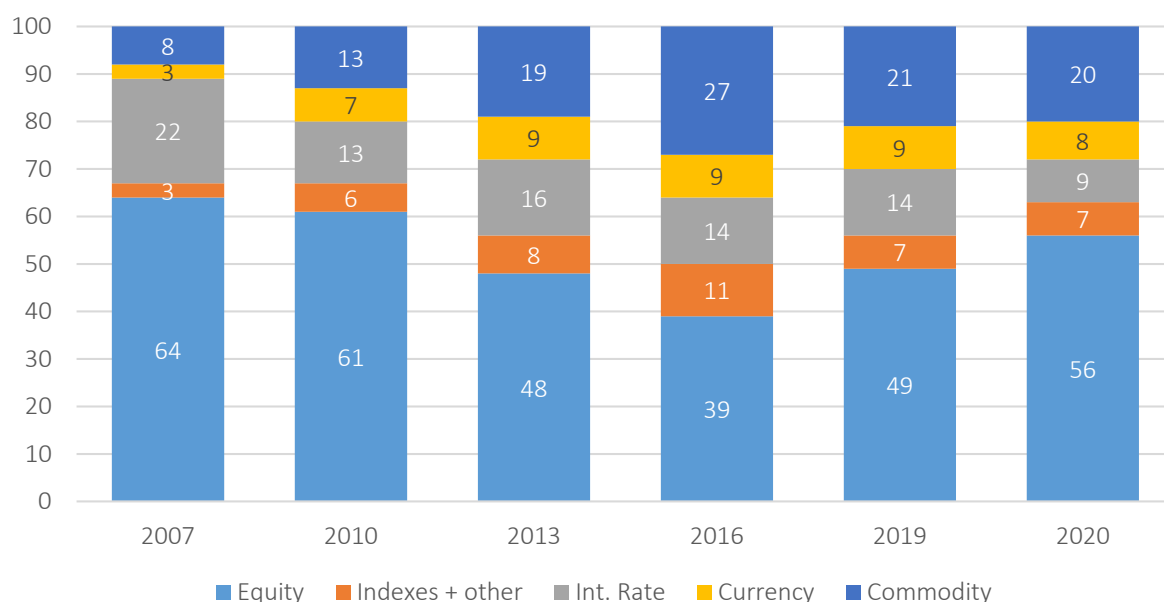
Before the deregulation of energy markets in 1970–1980s, covered by governments, energy markets had a little need for risk. Deregulation brought competition on the energy commodity market. The emergence of such market fundamentals contributed to the rapid spread of futures contracts in the 1990s–2008s. Energy deriv-

atives have grown even more: from USD 50 bln in 1998 up to USD 2.3 trl in 2010 (HKEX, 2020). But until 2008, commodity derivatives and energy derivatives, as part of them, were mostly used as a type of the financial asset and less as contract for reliable supply of energy resources. After the 2008 Global financial crisis, the derivatives market has attracted negative attention due to fraud cases and the near failure of some market participants. But crisis events did not cancel derivatives at all, and their usage was reassessed. Due to the revealed destructiveness, their financial and speculative segment has undergone a noticeable reduction.

The analysis of the derivatives market structure shows an increase in the share of commodity futures and a decrease in the share of equity and interest rate derivatives in the world after the 2008 Global crisis. The share of commodity futures in the market structure increased up to three times: from 8% in 2007 to 20% in 2020, and the number of contracts during this period increased by almost 9 times (see Figure 1).

Despite a certain decrease in the share of commodity derivatives in 2019–2020, since 2007, their share in the total number of transactions has tripled, and the number of transactions has increased 9 times (see Figure 2). Meanwhile, commodity option contracts remain at the level of 2010.

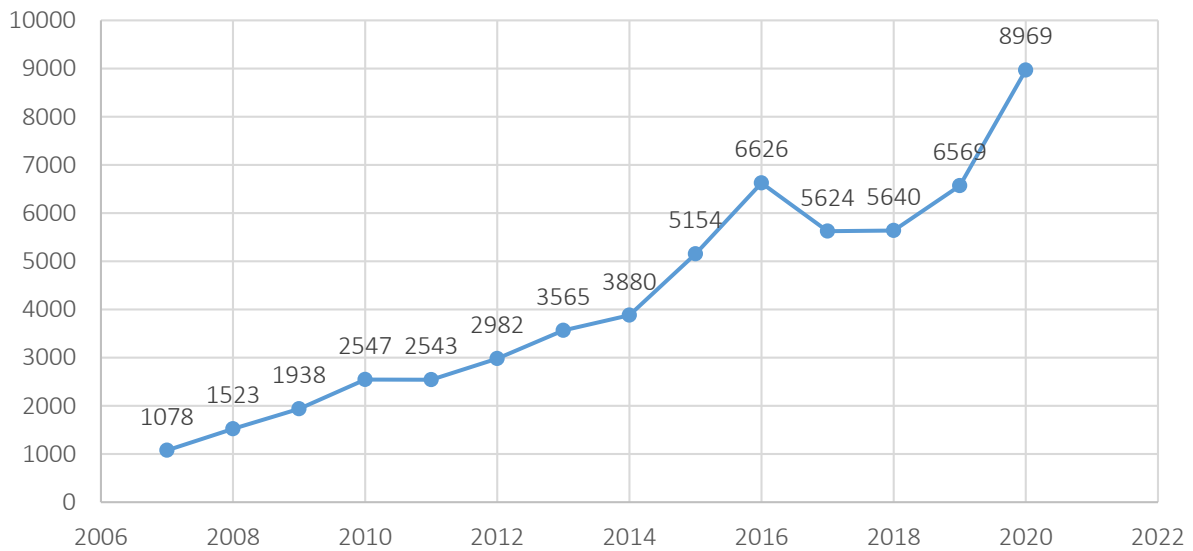
Source: Compiled by the authors according to the WFE.



**Figure 1.** Shares of commodity futures in the derivatives market in 2007–2020, %



Source: Compiled by the authors according to the WFE.



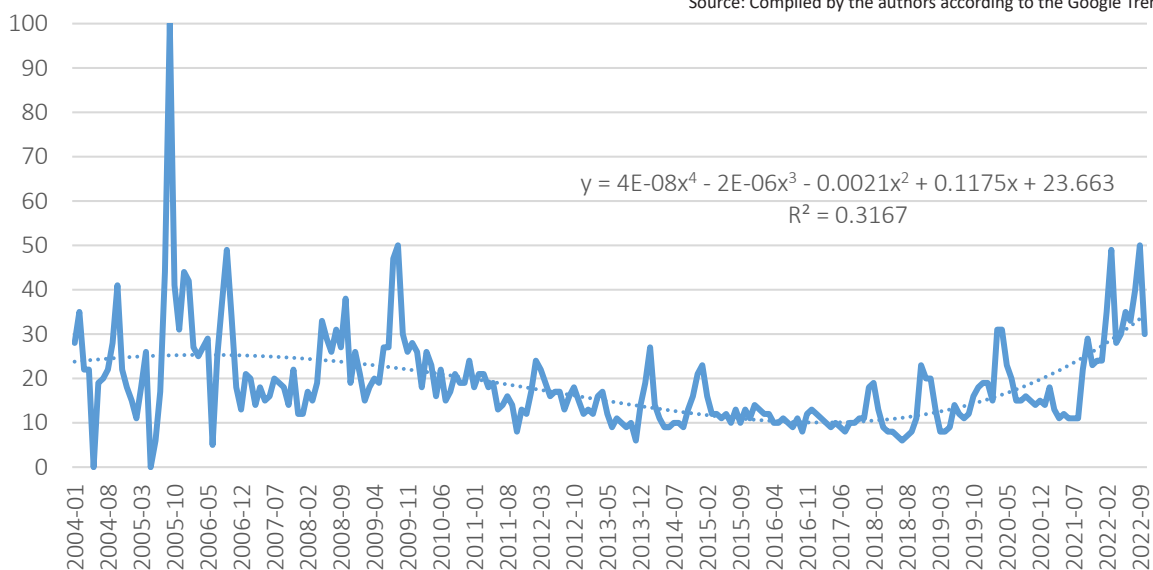
**Figure 2.** Number of commodity futures contracts in 2007–2020, mln

Accelerating worldwide decarbonization agenda after the Paris agreement enforcement caused a growing demand for natural gas since 2017, and the popularity of gas futures also became to grow. Different statistical data show a rapid increase in gas futures popularity in 2017–2022. This period is led by the influence of zero net emission polices due to the Paris agreement, global uncertainty due to the COVID-19 pandemic, the unfolding of the energy crisis and the russian invasion, which caused energy challenge. For instance, Google trends analysis shows a definite

trend on growing searches for the “gas futures” notion (see Figure 3). Dynamics of search queries “gas futures” for 2004–2022 also reflects the exposure of scientific research on the subject.

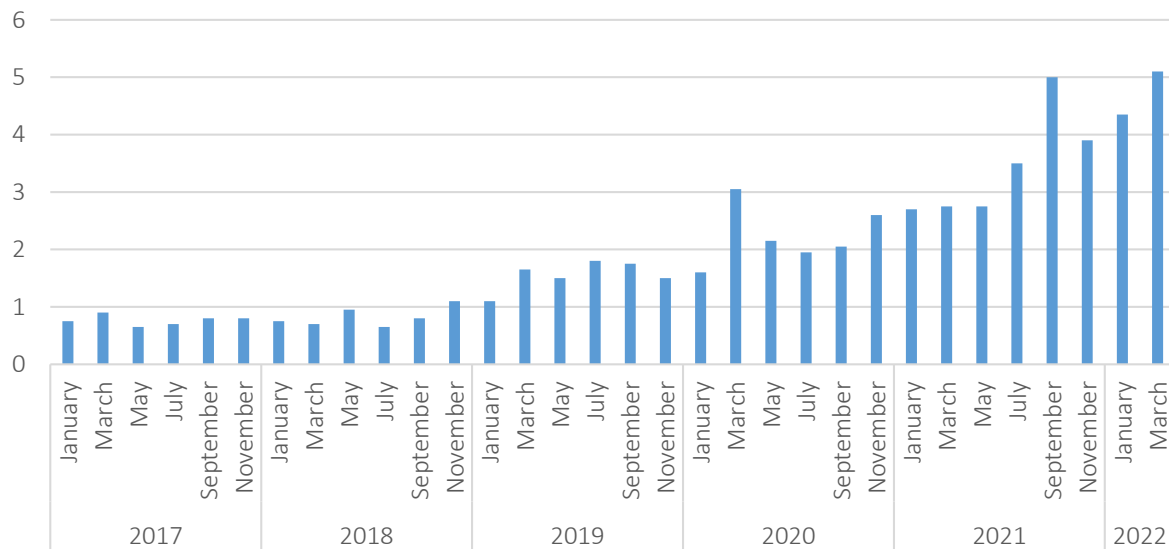
In terms of energy challenges and modern regulatory initiatives, growing emission of gas futures was caused by the growth in real demand for natural gas worldwide and especially in the EU. In terms of the number of contracts, the rapid spread of gas futures can be seen in the EU region (see Figure 4).

Source: Compiled by the authors according to the Google Trends.



**Figure 3.** Google Trends analysis of “gas futures” search queries in the world in 2004–2022 with polynomial trend line

Source: Compiled by the authors according to the FIA.



**Figure 4.** Number of natural gas futures contracts in 2017–2022 in the EU market, mln

During 2017–2020, the average volume of open futures positions with the JKM index on the London and New York exchanges grew 12 times. In the same period, the average volume of gas futures contracts in the TTF hub on the ICE exchange grew by 2.5 times (FIA, 2020). Gas futures contract volumes accelerate growing in 2022. Thus, in July 2022, the volume of derivative contracts for gas on the European market increased fivefold, reaching, compared to July 2021, 351.6 TWh (EEX, 2022).

The spread of gas futures trading in the EU is closely related to the initiatives to create gas hubs. This initiative has been intensively implemented since 2015, when the Paris agreement was endowed, and already has certain results. There are already 16 gas hubs on the territory of the EU, 9 of them are actively increasing trade volumes. At these hubs, natural gas and derivatives are traded on 11 EU exchanges (Heather, 2021). The reform of gas markets in the countries of Western Europe was started in the 1990s, and in the Eastern European countries, the global financial crisis of 2008 prompted such a reform. According to the experience of EU countries in the field of the implementation of derivative instruments in natural gas trading, the few years of growing exposure of futures trading in the EU is a reason that the process of convergence towards a “single price” has not occurred yet (Jotanovic & D’Ecclesia, 2021).

Direct advantages of derivatives, like price leveling or risk hedging, are still controversial in different studies. But there is much evidence of their positive influence on the development of national capital markets. The main directions for improving the institutional characteristics of the national capital market are the connection of its operations with the processes at the real sector of the economy, strengthening the competition mechanism through the diversification of traders and instruments, improving the price mechanism through transparency and predictability of prices and supply volumes, compliance with the interests of state security. Without the reproduction of these conditions, any market will remain inefficient.

The assumption about the positive impact of the introduction of the organized segment of gas derivatives markets has quite practical confirmation. Energy markets of transition countries have been remained exceptionally concentrated, and this acted as a significant obstacle to their full-fledged institutional development in terms of competition. However, recent trends in the gas markets of the transition economies of Eastern Europe show that with the right policies, this can be overcome. Over the past seven years, the market share of the largest gas companies – producers or traders on the market in many post-Soviet countries – has significantly improved and fully corresponds to the level of developed countries (see Table 1).

**Table 1.** Market share of the largest natural gas retailer of the EU in 2013–2020, %

Source: Compiled by the authors according to the Eurostat.

Country	Italy	Spain	Romania	Czech Republic	Portugal	Belgium	France	Croatia	Poland	Estonia	Slovenia	Lithuania	Hungary	Slovakia	Latvia	Bulgaria
2013	26	35	25	39	52	28	52	41	89	96	58	98	21	63	100	78
2020	18	23	24	28	31	32	34	35	44	46	47	49	53	56	67	74

In Ukraine, liberalization reforms in the gas market (Law of Ukraine, 2020) also contributed to a decrease in its concentration, but mostly in the industry segment. If in 2013 the share of NJSC Naftogaz of Ukraine was up to 90%, then, after the reforms carried out in 2018, by 2020 it had fallen to 10-15% (Yukhimets, 2021).

The growth of competition in gas markets requires not so much an increase in the number of organized trading platforms, but an increase and diversification of the number of trading participants. That is why, for the country, the organization of the energy market in the form of a hub, which allows attracting participants from other countries, will become a more profitable basis for the development of the relevant segment of the capital market. It will also contribute to the integration of the stock market into a more developed, highly competitive environment. Diversification of the market contributes to both the diversification of suppliers and financial instruments.

There are two main features that make the spread of gas futures in demand on the Ukrainian market. Firstly, it is the growing challenges in the energy sector, and secondly, it is an unsolved problem of underdeveloped instruments of the capital market. The Ukrainian capital market suffers from a lack of innovative instruments, and gas futures are not represented on it. In 2021, the volume of trading futures contracts on the organized market amounted to UAH 37.2 billion, or 0.8% of the market volume, and the trading of derivatives in 2020 amounted to UAH 61.40 billion, or 0.98% of the total volume of trading outside organized capital markets (NSSMC, n.d.).

Long-term attempts to develop the Ukrainian capital market were limited by the fact that the dominant majority of operations on it had an ex-

remely limited connection with the real sector of the economy. For this reason, even during periods of the highest indices of the domestic capital market, very significant operations on it were fictitious (Shyshkov, 2011). But after the 2008 crises, it became mostly represented by government bonds. In 2007, operations with government bonds of Ukraine accounted for up to 20% of capital market annual operations, in 2012, they accounted for 67.8%, and in 2014 – 87.9% (NSSMC, n.d.).

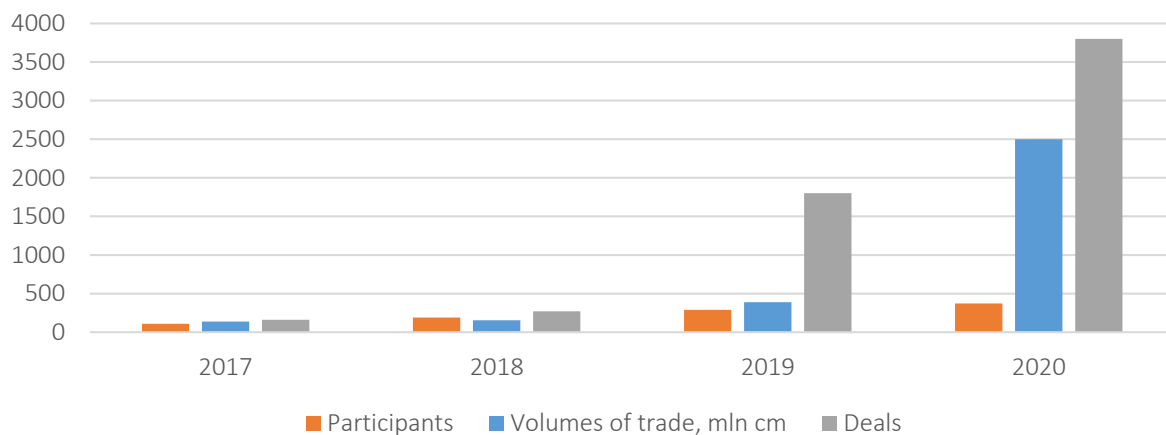
The use of derivatives in Ukraine did not have time to solidify at the rising stage of the capital market development, and the legal framework for their distribution has only just begun to form. The global financial and economic crisis of 2008 cause a sharp break in the structure of the Ukrainian capital market: the share of operations with corporate obligations began to substitute by operations with government bonds.

One of the main prerequisites for the introduction of derivative financial instruments is the presence of a deep market of spot contracts. The second is existing gas storages. Gas storages are widely present in Ukraine but commodity-exchange activity was absent until recent time. But in the conditions of energy challenges, the specified advantages of organized trade in gas contracts are being realized in Ukraine. The gas trading market in Ukraine is affected by the global process. Therefore, a gas exchange is already functioning in Ukraine and the volume of trade in gas contracts is growing at a significant pace. This is confirmed by a significant increase in indicators on the largest gas trading exchange in Ukraine, the Ukrainian Energy Exchange (see Figure 5).

The construction of a national gas hub and the spread of futures in Ukraine is complemented by the current reform of the energy market. This factor creates a special prerequisite for the spread of gas



Source: Compiled by the authors according to the UEEX.



**Figure 5.** Development of gas trading on the Ukrainian Energy Exchange in 2017–2020

futures in Ukraine. Due to it, in 2021 the regulatory field for the use of commodity futures on the gas market was formalized, when the Law of Ukraine On the Introduction of Amendments to the Current Legislative Acts of Ukraine regarding the Clearance of Investments and the Provision of New Financial Instruments came into force (Law, 2020).

The systemic approach to reforming the natural gas market, which was initiated in 2020, resulted in, in addition to the aforementioned law, several other legislative acts that increase the prospects for expanding the corresponding segment of the domestic stock market. This is one of the elements of bringing the Ukrainian legislation in the field of energy and the financial sector, related to spot and futures trading of energy, closer to the best practices in the EU. In particular, the law assures the introduction of a mandatory requirement for state gas producers to sell their products at stock auctions. Thus, state gas producers will be able to meet the needs of householders and act as players in the daily balancing market. These modern trends of the growing role of natural gas futures in terms of energy challenges and existing prerequisites confirm the relevance of using futures contracts for gas supply in Ukraine.

The course of the global financial and economic crisis of 2008 had serious negative consequences for the development of the Ukrainian capital market. Before the crisis total volume of Ukrainian capital market trading increased from 21.4 in 2000 to 106.3% of GDP in 2008. Then sharp break in its volume and structure appeared. Total vol-

ume trading decreased till less than 1% of GDP and the share of corporate bonds has declined to about 10% of market volume (NSSMC, n.d.). There has been established trend towards concentration of both participants and organizers of trading. Legislative framework for derivatives in Ukraine was improved only by 2018, but gas futures in Ukraine still haven't been used in 2022.

## 4. DISCUSSION

Based on the analysis of indicators of the world market of commodity derivatives, the capital market and gas trade in Ukraine, this paper discusses current trends on the gas futures market and the prerequisites for their distribution in Ukraine. Two main modern trends were identified: an increase in the share of commodity futures after 2008, and the rapidly growing volume of gas futures after 2017. The reasons for transformation of the derivative market towards commodity are tightening of regulation, a decrease in the credibility and popularity of financial futures and an increase in volatility in the energy market, and the related needs of hedgers. This assumption is consistent with Motorniuk et al. (2016) and Gibbon (2013) that after 2008, regulators stimulate transmission from index to commodity derivatives by narrowing market possibilities and forcing trading into clearing houses where participants must deposit margin before they can trade. Also, it agrees with the statement of Rodrigues et al. (2012) regarding the need for the motivated demand for a derivative.

The second identified trend is a significant growth of gas futures trading in recent times (almost 5 times during 2017–2022). This trend was caused by a sum of reasons, such as increasing volatility in the energy market, growing demand for natural gas, supply interruptions due to COVID-19, and especially the Russian invasion of Ukraine. These reasons are stated by Jotanovic and D’Ecclesia (2021) and Benton et al. (2022). Another group of reasons includes net zero emission policy (activated by the Paris Agreement entering into force in November 2016) and energy market reform programs in the EU. For all these reasons, there was a rapid growth of gas futures.

An important consequence of the identified trends is the assumption of a tightening of the nexus between the financial and real sectors of the economy in the field of gas futures on the capital markets due to the growth of real demand for energy derivatives. Basic economic reason for rising demand for natural gas connects the interests of hedgers with the processes of the real sector of the economy. Gas futures are based on a material asset that provides processes in the real sector of the economy. This assumption is supported by suggestions of Zakić and Kovačević (2012) as to how commodity securities provide secure delivery of goods; the assertion of Adekoya and Oliyide (2019) regarding the strengthening of the interconnection of commodity markets; Urom, et al.’s (2020) conclusion about the energy market exceptional impact on real economic activity; Mo et al.’s (2018) findings that most of the low-frequency macroeconomic variables are positively related to the long-run variance of commodity futures.

The spread of gas futures in the national capital market requires definite prerequisites. According to Zakić and Kovačević (2012), it requires two institutional prerequisites such as the establishment of an effective commodity-exchange activity and development of the secured storage of commodity products, which enables the creation of commodity securities to ensure safe delivery of goods to the spot and futures market. This statement supports Walsh (2010), pointing that the creation of competitive spot markets for each energy commodity is key to the successful growth of energy derivatives, then pricing will reflect the true cost of supply and energy hubs maintain a liquid market and transparent pricing.

According to this, this paper has identified positive signs of the development of prerequisites for the gas futures spread in the Ukrainian market based on the establishment of an effective commodity-exchange activity as a necessary organizational basis for futures trading. During 2017–2020, the volumes of trading of spot contracts on it increased 16 times, the number of participants increased by 3.4 times, and the number of transactions increased by 23.75 times.

Complementing this statement, the paper distinguished the reform in the energy sector of Ukraine going due to EU frameworks as an important institutional prerequisite. Its impact through the implementation of the Law of Ukraine On the Introduction of Amendments to the Current Legislative Acts of Ukraine regarding the Clearance of Investments and the Provision of New Financial Instruments supports institutional development of exchange gas trading in Ukraine.

Determining a nexus between commodity derivatives and the real sector of the economy is still an important issue requiring further research. Energy market high volatility shows short-run and long-run asymmetric interactions and causality with real economic activity and volatility shocks in the capital markets as stated by Urom et al. (2020) and Mo et al. (2018). Recent trends in the energy market show that both positive and negative shocks from the energy market increase derivatives market volatility. This leads to the suggestion that the energy market as the dominant net-transmitter of both positive and negative shocks is linked to the real sector of the economy.

As for generalization of direct advantages of gas futures for higher returns or hedging, there is no strong evidence of direct advantages of gas futures for higher returns or hedging. Energy futures do not offer significant diversification gains for investors, as stated by Galvani and Plorde (2010). With respect to energy stocks once investors adopt simple dynamic trading strategies that rely on readily available pricing information. Exception is the micro-level in the case of using gas futures as one of different instruments for portfolio diversification. Thus, gas futures mostly have an indirect effect on the

institutional development of the capital market. A positive impact on the institutional development of the national capital market is provided by diversification of participants and instruments, as shown in the paper on the Futures Industry Association data of the European gas market. It is shown that the number of partic-

ipants, suppliers and diversification of instruments had been growing rapidly during last years. An increase in the number of deals and participants diversifies the negative impact of natural monopolies and speculators, improves price transparency, eliminates uncertainty and reduces transaction costs.

---

## CONCLUSION

This paper identified current trends in the development of the gas futures market and the prerequisites for their spread in Ukraine. Two main trends of derivative market development have been identified. The first trend is the growth of the share of commodity derivatives in the world after 2008. The second trend is the fast-growing demand for gas futures during 2017–2022. Generalized reasons for the growth in popularity of commodity derivatives and gas futures are the tightening of the financial derivatives regulation, extended challenges of the COVID-19 pandemic, and the Russian invasion. An additional reason is the EU energy market reform and energy transition programs. Existing challenges in the energy sector strengthen the connection of the gas futures market with the processes in the real sector, adding confirmation to the existing hypotheses regarding the nexus between the commodity derivatives market and the real sector of the economy.

In line with global trends in the gas futures markets, supplemented by the Ukrainian energy market reform and the current EU policy to create gas hubs, Ukraine is developing prerequisites for the widespread use of gas futures. This is confirmed by fast-growing volumes of gas trading on the Ukrainian Energy Exchange. Identified trends and their causes give reasons for the gas futures introduction on the Ukrainian capital market to diversify instruments and the institutional structure, improve transparency of energy market processes and pricing. The organization of the Ukrainian energy market in the form of a hub to attract participants from other countries, supported by derivatives circulation, became a strong factor in Ukraine's integration into the EU energy and capital market.

Further research in this issue can be aimed at the detailed identification of modern trends on the gas futures market and the development of scientific tools that assess its connection to the real sector.

## AUTHOR CONTRIBUTIONS

Conceptualization: Yevhen Bublyk.  
 Data curation: Roman Yukhymets.  
 Formal analysis: Roman Yukhymets.  
 Investigation: Oleksandra Kurbet.  
 Methodology: Yevhen Bublyk.  
 Project administration: Yevhen Bublyk.  
 Resources: Roman Yukhymets.  
 Software: Yevhen Bublyk.  
 Supervision: Yevhen Bublyk.  
 Validation: Oleksandra Kurbet.  
 Visualization: Oleksandra Kurbet.  
 Writing – original draft: Roman Yukhymets.  
 Writing – review & editing: Oleksandra Kurbet.

## ACKNOWLEDGMENT

The paper was funded as part of the “Determination of institutional conditions for the development of the exchange segment of the gas market” research project (No. 0122U002205), conducted at the State Institution “Institute for Economics and Forecasting of the NAS of Ukraine”.

## REFERENCES

1. Acworth, W. (2022). *Data Spotlight – TTF gas futures see record trading amid Russia-related turmoil*. FIA. Retrieved from <https://www.fia.org/marketvoice/articles/data-spotlight-ttf-gas-futures-see-record-trading-amid-russia-related-turmoil>
2. Adekoya, O. B., & Oliyide, J. A. (2021). How COVID-19 drives connectedness among commodity and financial markets: Evidence from TVP-VAR and causality-in-quantiles techniques. *Resources Policy*, 70. <https://doi.org/10.1016/j.resourpol.2020.101898>
3. Ahmed, S., Hasan, M., & Kamal, M. (2022). Russia–Ukraine crisis: The effects on the European stock market. *European Financial Management*. <https://doi.org/10.1111/eufm.12386>
4. Anufrieva, K., Brus, S., Bublyk, Y., & Shapoval, Y. (2021). Ukrainian Financial System Development: The Path To EU. *Economic Studies Journal of the Economic Research Institute at the Bulgarian Academy of Sciences*, 30(3), 38-55. Retrieved from <https://www.ceeol.com/search/article-detail?id=942834>
5. Basu, P., & Gavin, W. T. (2010). What explains the growth in commodity derivatives? *Federal Bank of St. Louis review*, 93(1), 37-48.
6. Benton, T. G., Froggatt, A., Wellesley, L., Grafham, O., King, R., Morisetti, N., Nixey, J., & Schröder, P. (2022). *The Ukraine war and threats to food and energy security*. Chatham House – International Affairs Think Tank.
7. Bublyk, Ye. O. (2020). *Finansova vidkrytist tranzytyvnykh ekonomik [Financial openness of transitive economies]* (324 p.). Kyiv: State Institution “Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine”. (In Ukrainian).
8. Chikwira, C., Rawjee, V. P., & Balkaran, R. (2021). Is there a Causality between Economic Growth Variables and Derivatives Usage?. *Acta Universitatis Danubius. Economica*, 17(1), 108-123. Retrieved from: <https://dj.univ-danubius.ro/index.php/AUDOE/article/download/521/1134>
9. Cinquegrana, P. (2008). *The Need for Transparency in Commodity and Commodity Derivatives Markets* (ECMI Research Report No. 3). Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1490040](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1490040)
10. EEX (European Energy Exchange Group). (n.d.). *Monthly Volumes*. Retrieved from <https://www.eex-group.com>
11. Elias, R. S., Wahab, M. I. M., & Fang, L. (2010). Managing financial risks for natural gas-fired power plants. *7th International Conference on Service Systems and Service Management* (pp. 1-6).
12. FIA (The Futures Industry Association). (n.d.). *News & Data*. Retrieved from <https://www.fia.org/>
13. Flouros, F. (2022). *The Energy Security in Europe. In Energy Security in the Eastern Mediterranean Region* (pp. 63-90). Cham: Palgrave Macmillan. [https://doi.org/10.1007/978-3-031-09603-7\\_3](https://doi.org/10.1007/978-3-031-09603-7_3)
14. Frolov, S., Orlov, V., & Dykha, M. (2022). Rozvytok fondovoho rynku cherez pryzmu vzaiemozv'язkiv fondovykh rynkiv svitu [Development of the Ukrainian stock market in terms of the interrelationships of the stock markets across the world]. *Modeling the Development of the Economic Systems*, 2, 8-18. (In Ukrainian). <https://doi.org/10.31891/mdes/2022-4-1>
15. Galvani, V., & Plourde, A. (2010). Portfolio diversification in energy markets. *Energy Economics*, 32(2), 257-268. <https://doi.org/10.1016/j.eneco.2009.05.015>
16. Gibbon, P. (2013). *Commodity derivatives: financialization and regulatory reform* (DIIS Working Paper. No. 2013:12). Retrieved from [https://pure.dii.dk/ws/files/55981/Commodity\\_derivatives\\_web\\_WP\\_2013.pdf](https://pure.dii.dk/ws/files/55981/Commodity_derivatives_web_WP_2013.pdf)
17. Goonesinghe, J., Aukati, A., Iakovenko, M., & Miroshnychenko, V. (2021). Development of Ukraine's wholesale & retail gas market. Gas release program - Application in Ukraine position paper. USAID. Retrieved from [https://energysecurityua.org/wp-content/uploads/2021/05/ESP-UA-GRP-Position-Paper-v3.1\\_ENG\\_PUB.pdf](https://energysecurityua.org/wp-content/uploads/2021/05/ESP-UA-GRP-Position-Paper-v3.1_ENG_PUB.pdf)
18. Haiss, P., & Sammer, B. (2010). The Impact of Derivatives Markets on Financial Integration, Risk, and Economic Growth. *Proceedings of the 10th Biennial Conference on Regulatory Responses to the Financial Crisis*, conducted by the Bundesbank/Athenian Policy Forum. Frankfurt: The Bundesbank/Athenian Policy Forum. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1720586](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1720586)
19. Hale, D. R., Lee, T., Zyren, J., Joosten, J., Kousser, G., Rasmussen, J., & Hewlett, J. (2002). *Derivatives and risk management in the petroleum, natural gas, and electricity industries*. Energy Information Administration, US Department of Energy. Retrieved from [http://econometricainc.com/wp-content/uploads/2016/08/EIA\\_Derivatives\\_Report.pdf](http://econometricainc.com/wp-content/uploads/2016/08/EIA_Derivatives_Report.pdf)



20. Heather, P. (2021) *European Traded Gas Hubs: German hubs about to merge*. Oxford Institute for energy studies (2021 July Paper NG 170). Retrieved from <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/07/European-Traded-Gas-Hubs-NG-170.pdf>
21. Heren, P. (1999). Removing the government from European gas. *Energy Policy*, 27(1), 3-8.
22. HKEX. (2020). *An overview of the global commodity derivatives market* (Research report) (29 p.). Chief China Economist's Office Hong Kong Exchanges and Clearing Limited.
23. Jotanovic, V., & D'Ecclesia, R. L. (2021). The European gas market: new evidences. *Annals of Operational Research*, 299, 963-999. <https://doi.org/10.1007/s10479-020-03714-5>
24. Kalach, H. (2009). Vplyv finansovo-hlobalizatsii na fondovyi rynek Ukrainy [The impact of financial globalization on the stock market of Ukraine]. *Finansy Ukrainy – Finance of Ukraine*, 1, 115-121. (In Ukrainian). Retrieved from [https://energysecurityua.org/wp-content/uploads/2021/05/ESP-UA-GRP-Position-Paper-v3.1\\_ENG\\_PUB.pdf](https://energysecurityua.org/wp-content/uploads/2021/05/ESP-UA-GRP-Position-Paper-v3.1_ENG_PUB.pdf)
25. Korablin, S. O. (2017). *Makroekonomichna dynamika Ukrainy: pastka syrovynnykh rynkiv [Macroeconomic dynamics of Ukraine: the trap of commodity markets]* (308 p.). Kyiv: Institute for Economics and Forecasting, NAS of Ukraine. (In Ukrainian).
26. Koshoviy, O. H., Tertyshnyk, V. M., & Sheludko, N. M. (Eds.). (2019). *Capital market abuse: economic and legal aspects*. Dnipro: Lira. Retrieved from <http://biblio.umsf.dp.ua/xmlui/handle/123456789/4058>
27. Kovacevic, V., Subic, J., & Janković, I. (2020). Development of soft commodity derivative market in function of the risk management in CEE. *Agrarian Economy and Rural Development - Realities and Perspectives for Romania*, 11, 189-197. Retrieved from <https://mpira.uni-muenchen.de/106303>
28. Krasnova I. (2014). Stock market in Ukraine: state and prospects of development. *Problems of Economy*, 1, 129-134. Retrieved from [https://www.problecon.com/export\\_pdf/problems-of-economy-2014-1\\_0-pages-129\\_134.pdf](https://www.problecon.com/export_pdf/problems-of-economy-2014-1_0-pages-129_134.pdf)
29. Kyzym, M., & Salashenko, T. (2020) The Alternative Model of Competitive Electric Energy Market of Ukraine (Part 1). *Business Inform* 8, 115-124. (In Ukrainian). <https://doi.org/10.32983/2222-4459-2020-8-115-124>
30. Li, B. (2019). Pricing dynamics of natural gas futures. *Energy Economics*, 78, 91-108. <https://doi.org/10.1016/j.eneco.2018.10.024>.
31. Lutsyshyn, Z., Klapkiv, Y., Kucher, T., & Svirskyi, V. (2019). Development of innovative instruments in the financial market of Ukraine. *Revista Espacios*, 40(28). Retrieved from <https://revistaespacios.com/a19v40n28/a19v40n28p22.pdf>
32. Mihaljek, D., & Packer, F. (2010). Derivatives in emerging markets. *BIS Quarterly Review*, December, 43-58.
33. Mišík, M. (2022). The EU needs to improve its external energy security. *Energy Policy*, 165, 112930. <https://doi.org/10.1016/j.enpol.2022.112930>.
34. Mo, D., Gupta, R., Li, B., & Singh, T. (2018). The macroeconomic determinants of commodity futures volatility: Evidence from Chinese and Indian markets. *Economic Modelling*, 70, 543-560. <https://doi.org/10.1016/j.econmod.2017.08.032>
35. Morhachov, I., Koreniev, E., Chorna, O., & Khrystenko, L. (2019). Regional Regulation of Investment Activity in Developing Countries: Example of Ukraine. *Management Theory and Studies for Rural Business and Infrastructure Development*, 41(2), 168-182. <https://doi.org/10.15544/mts.2019.15>
36. Motorniuk, U., Terebukh, M., & Kharchuk, V. (2016). Development trends of the international derivatives market. *ECONTECHMOD: An International Quarterly Journal on Economics of Technology and Modelling Processes*, 5(1), 63-71.
37. Nakajima, T., & Toyoshima, Y. (2020). Examination of the spillover effects among natural gas and wholesale electricity markets using their futures with different maturities and spot prices. *Energies*, 13(7), 1533. <https://doi.org/10.3390/en13071533>
38. Nosić, A., Sedlar, D. K., & Jukić, L. (2017). Oil and gas futures and options market. *Rudarsko-geološko-naftni zbornik (The Mining-Geological-Petroleum Engineering Bulletin)*, 32(4), 45-54. <https://doi.org/10.17794/rgn.2017.4.5>
39. Novosad, O., Matiichuk, L., & Pavlova O. (2022). Goals and main guidelines of energy security in the conditions of the war-time economy. *Herald of Khmelnytskyi National University*, 2(1), 154-160. [https://doi.org/10.31891/2307-5740-2022-304-2\(1\)-21](https://doi.org/10.31891/2307-5740-2022-304-2(1)-21)
40. NSSMC (National Securities and Stock Market Commission). (n.d.). *Analytical data on stock market development (2014-2021)*. Retrieved from <https://www.nssmc.gov.ua/en/news/insights/>
41. Oliinyk, V., Burdenko, I., Volynets, O., & Yatsenko, V. (2019). Organized derivatives market and economical growth: Relationship and impact. *Periodicals of Engineering and Natural Sciences (PEN)*, 7(2), 806-817. <http://doi:10.21533/pen.v7i2.585>
42. Oskolskyi, V. V. (2011). *Dvadsatiletije Ukrainy fondovoy birzhy: itogi, uroki, zadachi [Twentieth Anniversary of the Ukrainian Stock Exchange: Results, Lessons, Tasks]* (243 p.). Kyiv: UFB. (In Ukrainian).
43. Parsons, J. E. (2017). The Fundamentals Underlying Oil and Natural Gas Derivative Markets. *Annual Review of Financial Economics*, 9(1), 283-300.
44. Prymostka, L., & Krasnova, I. (2014). Birzhoviy rynek deryvatyviv v Ukraini: istoriia, suchasnist, perspektyvy rozvytku [Derivatives exchange market in Ukraine: the history, the present, and future development]. *Finansy Ukrainy*, 7, 49-65. (In Ukrainian).



45. Qamruzzaman, M., & Wei, J. (2018). Financial innovation, stock market development, and economic growth: An application of ARDL model. *International Journal of Financial Studies*, 6(3), 1-30. <https://doi.org/10.3390/ijfs6030069>
46. Rizvi, S., Naqvi, B., Boubaker, S., & Mirza, N. (2022). The power play of natural gas and crude oil in the move towards the financialization of the energy market. *Energy Economics*, 112, 106131. <https://doi.org/10.1016/j.eneco.2022.106131>
47. Rodrigues, P., Schwarz, C., & Seeger, N. (2012). *Does the Institutionalization of Derivatives Trading Spur Economic Growth? (February 15, 2012)*. Retrieved from <https://ssrn.com/abstract=2014805> or <http://dx.doi.org/10.2139/ssrn.2014805>
48. Sadik-Zada, E. R., & Gatto, A. (2021). Energy security pathways in South East Europe: Diversification of the natural gas supplies, energy transition, and energy futures. In *From Economic to Energy Transition* (pp. 491-514). Cham: Palgrave Macmillan. [https://doi.org/10.1007/978-3-030-55085-1\\_17](https://doi.org/10.1007/978-3-030-55085-1_17)
49. Shevchenko, O., & Shevchenko, O. (2018). Suchasni tendentsii funktsionuvannia rynku deryvatyviv v Ukraini [Modern trends in the functioning of the derivatives market in Ukraine]. *Infrastruktura rynku – Market infrastructure*, 18, 9-15.
50. Shi, X., Li, Y., & Reshetova, E. (2016). Bottom-up design of a gas futures market in East Asia: Lessons from the Dojima rice exchange. *Natural Gas Industry B*, 3(4), 377-386. <https://doi.org/10.1016/j.ngib.2016.12.003>
51. Shyshkov, S. (2022) Imposition of martial law and its consequences for Ukrainian capital markets. *Ukrainian Society*, 1(80), 63-86. <https://doi.org/10.15407/socium2022.01.063>
52. Shyshkov, S. I. (2011). *Fondovi birzhi Ukrainy: vyprobuвання kryzoiu [Stock exchanges of Ukraine: tested by the crisis]* (206 p.). Kyiv: State Institution “Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine”. (In Ukrainian).
53. Slobodianyk, A., & Mohylevska, O. (2022). Peculiarities of Speculative Operations on the Capital Market in Ukraine. *International Science Journal of Management, Economics & Finance*, 1(2), 8-14. Retrieved from <https://isg-journal.com/is-jmef/article/view/9>
54. Spotlight on CSEE Markets. (n.d.). EEX. Retrieved from <https://www.eex.com/en/markets/power-derivatives-market/csee-power-markets>
55. The Verkhovna Rada of Ukraine. (n.d.). *Law of Ukraine On the Introduction of Amendments to the Current Legislative Acts of Ukraine regarding the Clearance of Investments and the Provision of New Financial Instruments No. 738-IX as of June 19, 2020*. Retrieved from <https://zakon.rada.gov.ua/laws/show/738-20#Text>
56. Tretyakova, O., Kharabara, V., & Greshko, R. (2020). Fondovi rynek Ukrainy: osoblyvosti funktsionuvannia v suchasnykh umovakh [Stock market of Ukraine: peculiarities of functioning in modern minds]. *Ekonomika ta derzhava – The economy and the State*, 5, 103-107. (In Ukrainian). <https://doi.org/10.32702/2306-6806.2020.5.103>
57. UEEX (The Ukrainian Energy Exchange). (n.d.). Retrieved from <https://www.ueex.com.ua>
58. Urom, C., Ndubuisi, G., & Ozor, J. (2021). Economic activity, and financial and commodity markets' shocks: an analysis of implied volatility indexes. *International Economics*, 165, 51-66. <https://doi.org/10.1016/j.inteco.2020.11.005>
59. Vo, D. H., Huynh, S. V., Vo, A. T., & Ha, D. T. T. (2019). The importance of the financial derivatives markets to economic development in the world's four major economies. *Journal of Risk and Financial Management*, 12(1), 35. <https://doi.org/10.3390/jrfm12010035>
60. Walsh, P. (2010). The Future of Energy Derivatives in China. *San Francisco, International Association for Energy Economics*, 31-34.
61. Wang, L., Ahmad, F., Luo, G. L., Umar, M., & Kirikkaleli, D. (2021). Portfolio optimization of financial commodities with energy futures. *Annals of Operations Research*, 1-39. <https://doi.org/10.1007/s10479-021-04283-x>
62. WFE (World Federation of Exchanges). (n.d.). *Derivative reports 2018-2020*. Retrieved from <https://www.world-exchanges.org>
63. Yukhymets, R. S. (2021). *Rynky pryrodnoho hazu Ukrainy ta YeS: liberalizatsiia ta intehtratsiia [Natural gas markets in Ukraine and EU: liberalization and integration]* (196 p.). Kyiv: State Institution “Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine”. (In Ukrainian).
64. Zakić, V., & Kovačević, V. (2012). Importance of commodity derivatives for Serbian agricultural enterprises risk management. Sustainable Agriculture and Rural Development in Terms of the Republic of Serbia. Strategic Goals Realization within the Danube Region, Preservation of Rural Values (pp. 907-924). *International Scientific Meeting. Thematic Proceedings*.
65. Zhang, D. (2018). Energy finance: background, concept, and recent developments. *Emerging Markets Finance and Trade*, 54(8), 1687-1692. <https://doi.org/10.1080/1540496X.2018.1466524>
66. Žuk, P., & Žuk, P. (2022). National energy security or acceleration of transition? Energy policy after the war in Ukraine. *Joule*, 6(4), 709-712. <https://doi.org/10.1016/j.joule.2022.03.009>