

Russian and Ukraine conflict effect the crude oil market and financial markets are examined from the perspectives of the countries that import and export crude oil

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Abstract

This essay examines how the conflict between Russia and Ukraine has affected the price of crude oil and the stock markets of both importing and exporting nations. We use a multi-fractal detrended fluctuation analysis (MF-DFA) to look at how well the crude oil market performed both before and after the conflict started. Additionally, using the technique of multi-fractal detrended cross-correlation analysis, we evaluate the cross correlations between the crude oil market and stock markets in the exporting and importing nations before and after the conflict (MF-DCCA). We conclude that the efficiency of the crude oil market has been lower after the Russia-Ukraine conflict than previously by measuring the generalized Hurst exponents, mass exponents, and multi-fractal spectrums.

Keyword- Oil price, war conflict, financial market and countries economic growth.

Introduction

Most countries dealing with climate change face significant challenges in decarbonizing their economies. Decarbonization can be accomplished through a "energy transition," which is the transition away from the production and use of fossil fuels and toward cleaner, more sustainable energy sources [1]. According to UNEP's Emissions Gap Report 2021 [2,] global GHG emissions fell by 5.4% in 2020, but are expected to rebound by 4.8% in 2021 to pre-COVID levels of 59.1 Gt CO₂e in 2019, primarily due to fossil CO₂ emissions from the energy and industrial sectors. The report emphasises the critical role of decarbonization in achieving a successful energy transition to a low-carbon economy [2]. Despite the potential for significant reductions in GHG emissions, decarbonization of the energy sector is challenging.

For developing countries, additional barriers to energy transition include competitive fossil fuel prices, a lack of financial resources and policy support, and the unreliability of renewable energy sources [4]. The occurrence of geopolitical and economic shocks is another set of challenges to energy transition. During the COVID-19 pandemic, for example, several countries restructured their investment structures by increasing medical and health expenditures while withdrawing funds from renewable energy projects [5,6]. During the 2008 global financial crisis, economic stimulus plans resulted in large-scale funds flowing to fossil fuel industries, while public support for renewable energy was reduced in the form of subsidies and feed-in tariffs [5,7]. Meanwhile, Fischhendler et al. [8] contended that geopolitical conflicts have two consequences.

The Center for Disaster Philanthropy's (CDP) response to this crisis is focused on humanitarian needs that arise, particularly among [internally displaced peoples](#) (IDPs) and [refugees](#). We are not looking at the conflict itself except for how it affects population movement and humanitarian needs. To that end, this profile is not providing detailed updates about the status of the war as we believe that is better done by news media.

The United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) said in their [Dec. 19 Ukraine Situation Report](#), "Regular waves of attacks on energy infrastructure continue to cause destruction and leave millions of people across Ukraine with no electricity, disrupting water supply and heating systems, while temperatures have fallen below zero in most parts of the country. The attacks have also damaged other civilian infrastructure, including homes, as well as killed and injured civilians across Ukraine over the past couple of weeks."

Disruption to utilities poses significant humanitarian challenges. Human Rights Watch has raised concerns about Russian attacks on the energy grid and the [harm done to civilians](#) and Amnesty International called for Russia to "[end its unlawful targeted assaults](#) on civilian infrastructure."

In October, a [spokesperson for the UN High Commissioner for Human Rights](#) said, "Attacks targeting civilians and objects indispensable to the survival of civilians are prohibited under international humanitarian law." Humanitarian organizations, including [CARE](#), have warned that the severe winter weather and continued attacks on civilian energy infrastructure could lead to a second refugee crisis.

The war has severely impacted social cohesion, community security and the resilience of local communities, especially women and girls. Lack of access to social services including schools and strained community resources have increased the care burden of local women who responsible for the care for children, disabled and elderly family members.

As women continue to bear different and additional burdens of war, they must be represented in all decision-making platforms on de-escalation, conflict prevention, mitigation and other processes in pursuit of peace and security for the people of Ukraine and beyond.

Since the invasion of Ukraine, over 150 historical sites have been identified as severely damaged or destroyed according to UNESCO, including the Ivankiv Historical and Local History Museum and its collection; the Holy Mountains Lavra, a seventeenth-century monastery in Eastern Ukraine; and the historic center of Chernihiv, which is on the Tentative List for World Heritage status.

With an initial seed grant of \$500,000 from Helen Frankenthaler Foundation, World Monuments Fund's (WMF) Ukraine Heritage Response Fund will support Ukrainian heritage professionals and provide supplies necessary to protect Ukrainian heritage places. When safe to do so, physical conservation projects will be necessary to stabilize and rehabilitate many important cultural sites across Ukraine. WMF is preparing now for those future needs by building a strong foundation of financial support that can be deployed for physical conservation work at cultural heritage sites.

Protection of the Black House

Albert's House, or the Black House, is a sixteenth-century structure in Lviv's Market Square. In 2019, the Lviv Historical Museum completed an AFCP-supported project to preserve the Black House, including its main facade, courtyard, lobby, and collection of stone sculptures. The inner courtyard of the Black House was also excavated, and an exhibition of stone architectural and sculptural fragments from Lviv buildings was created. Today, the building façade, festooned with intricate sculpture, is particularly vulnerable to damage from nearby explosions from ballistic missiles.

With support from the U.S. Department of State through the U.S. Ambassadors Fund for Cultural Preservation (AFCP) and the U.S. Embassy in Kyiv, WMF is working with the Lviv Historical Museum and Friends of the Lviv Historical Museum to build a strong external structure to protect the decorative façade while reflecting the history and aesthetic of the Market Square.

Fire Extinguishers to Protect Ukraine's Wooden Churches

Ukraine is home to more than 2,500 wooden churches, or tserkvas, the largest number in the world. Eight of Ukraine's wooden churches are included on the UNESCO World Heritage List of Wooden Tserkvas of the Carpathian Region in Poland and Ukraine. They are often located in remote rural communities and are particularly vulnerable to fire, especially in extreme conflict situations.

In response to requests from professionals on the ground, WMF partnered with the International Council on Monuments and Sites (ICOMOS) International, the Foundation to Preserve Ukraine's Sacral Arts (FTPUSA), Heritage Emergency Rescue Initiative

(HERI), the NGO Tustan, and the Center to Rescue Ukraine's Cultural Heritage to deliver 440 water-mist fire extinguishers that will serve to protect up to 200 tserkvas throughout Ukraine. The extinguishers were sourced from the fire safety provider Safelincs in the UK, who in providing the equipment below cost price, donating accessories and covering transport costs to Poland, allowed the delivery of a significantly larger number of extinguishers than would otherwise have been possible. The Polish Committee for Ukrainian Museums, through the Warsaw Rising Museum and the Instytut Pawła Włodkowica, supported transport logistics, provided warehousing in Poland, and organized onward transport by truck to Ukraine. The extinguishers will be distributed by Ukrainian partners, the Center to Rescue Ukraine's Cultural Heritage, the Heritage Emergency Response Initiative (HERI), and ICOMOS Ukraine.

Provision of Supplies to Monitor Damage to St. Sophia of Kyiv

The St. Sophia of Kyiv Cathedral dates back to the eleventh century and is part of the St. Sophia of Kyiv National Sanctuary Complex. Due to the ongoing war in Ukraine, the cathedral and its surroundings are susceptible to severe damage.

As a result, WMF has partnered with Cultural Emergency Response (CER), with local support from the Heritage Rescue Emergency Initiative (HERI) and personnel from the St. Sophia of Kyiv National Conservation Area, to deliver monitoring equipment to the St. Sophia of Kyiv National Sanctuary Complex.

Installation of a Temporary Cover for the Holy Trinity Church in Zhovkva

The Holy Trinity Church in Zhovkva dates back to 1720 and was under restoration when the war in Ukraine started in February 2022. As a result, work abruptly halted. To prevent further damage to the church, the upper parts of the building were temporarily covered with plastic sheeting.

In order to provide additional protection for the church over an extended period of time, WMF committed to funding the installation of a temporary waterproof membrane to protect the interior spaces of the church. It will be installed in locations where the roof was removed prior to the start of the conflict to protect Holy Trinity from inclement weather. This project was undertaken in partnership with the charitable foundation International Cooperation for Zhovkva and the Borys Voznytsky Lviv National Art Gallery.

On June 21, 2013, during the 37th session of the UNESCO World Heritage Committee in Cambodia, the Holy Trinity Church was added to the UNESCO World Heritage List of Wooden Tserkvas of the Carpathian Region in Poland and Ukraine.

Digitization of the the State Archive of Kyiv Oblast

WMF has partnered with Archival Information Systems and the State Archive of Kyiv Oblast (SAKO) to preserve the latter's efforts to digitize parts of its collections in order to make documents available for researchers and safeguard the contents of vulnerable objects from potential damage during the war. Efforts have focused on the State Register

of Civil Status Acts (which has digitized 232 files so far) and the Maps and Drawings of Kyiv Province collection (which has digitized 361 files).

Damage Assessment of Cultural Heritage in Kyiv, Chernihiv, and Sumy Oblasts

Available registers of cultural sites affected by the war list up to 600 entries. However, none of these registers is complete. In order to better assess the situation on the ground in the wake of the invasion, WMF has partnered with HERI and the NGO Tustan to conduct a cultural heritage damage assessment in three particularly hard-hit regions of Ukraine. Analysis of the findings will allow for the development of strategies for emergency stabilization and mid-term preservation and lay the foundations for post-conflict recovery.

Winterization Efforts

In November 2022, WMF and CER, with backing from the Ministry of Foreign Affairs of the Netherlands, partnered to support the winterization of several historic sites in the Ukrainian oblasts of Kyiv, Sumy, and Chernihiv. Having been damaged by Russian artillery during the war, these buildings are now at further risk from ice and snow unless preventative measures are taken to shield the exposed interiors from precipitation and prevent the structures from further degradation and potential collapse. The following sites are being supported for emergency winterization:

The Okhtyrka Local History Museum

Over a century old, this regional museum in northeastern Ukraine suffered a major blow when Russian bombs hit Okhtyrka's historic center in March of 2022. The blast severely damaged the roof, blew out the building's windows, and affected the exhibits inside. To safeguard the museum from further damage due to winter weather, WMF and CER have signed a memorandum of understanding with the museum and are partnering with Initiatives for Development, a local NGO, to implement the project to protect this important heritage site.

Housed in a striking Gothic Revival Building, Chernihiv's Museum of Antiquities possessed a rich collection of artifacts thanks to the work of founder Vasyl Tarnovsky. Prior to the Russian Revolution, it was the only museum devoted to Ukrainian culture in the Russian Empire. Though the collection was moved when the building was converted into a regional library in 1978, the site retained both its splendid ornamentation and its reputation for historic richness.

In March of 2022, Russian shelling resulted in the collapse of part of the building's roof and walls. Experts have already conducted comprehensive onsite surveys in preparation for the installation of a fence, the removal of debris, and the filling in of the crater left by the bombing. WMF and CER are supporting the winterization of the site, including shielding the partly ruined building from further damage and medium-term stabilization, in partnership with the Chernihiv Regional Military Administration and the LLCs K.D.K. BUD and Project Innovations.

The Bohdan and Varvara Khanenko National Museum of Arts

Originally comprising the private collection of philanthropists Bohdan and Varvara Khanenko, this Kyiv museum is one of Ukraine's most important artistic institutions, featuring works from across the globe. The nineteenth-century buildings in which the collection is housed are also of great architectural value.

The Khanenko Museum was among a number of important cultural institutions that suffered damage during a missile attack on the Ukrainian capital in October of 2022. WMF and CER will support emergency actions to protect the museum, including its damaged metal roof tiles and roof lanterns, among other activities, in collaboration with the LLCs K.D.K. BUD and Project Innovations.

Identifying and Addressing Critical Needs

Following meetings with both regional and global partners, including UNESCO, ICOMOS, International alliance for the protection of heritage in conflict areas (ALIPH), the Smithsonian Institution, and Blue Shield International, among others, WMF has identified the following critical needs:

Short-term: Equipment and Supplies. The most immediate needs for heritage professionals in Ukraine are supplies needed to protect sites from collateral damage.

Medium-term: Documentation and Assessment of Damage. Once conflict subsides, heritage site managers will be faced with the challenge of taking stock of the damage and assessing the most urgent restoration needs. WMF has created a Ukraine Taskforce within the organization, dedicated to monitoring the situation and coordinating with

Ukrainian professionals and various international stakeholders. In support of the taskforce's work, WMF also recruited a Ukraine Heritage Crisis Specialist, Kateryna Goncharova, to help lead efforts to respond to the impact of the ongoing conflict in Ukraine on the country's cultural heritage sector.

Long-term: Restoration and Rehabilitation Projects. While the full extent of damage remains to be seen, we are already aware of dozens of heritage sites that have suffered varying degrees of destruction. We aim to develop projects that support recovery once the conflict subsides.

WMF also continues to participate in UNESCO and other international emergency response coordination meetings mobilizing international partners to ensure the complementarity of all actions taken to address short-, medium-, and long-term needs at heritage sites around Ukraine.

Discussion

The findings of the analysis of the effects of international conflicts on energy transition provide a number of discussion points. The first section discusses renewable energy as an energy transition strategy. The following section goes over the valuation results for NPV and ROV calculations. The levers that influence NPV and ROV are then presented. The final section examines the effects of an international conflict, such as the Russia-Ukraine conflict, on investment decisions in energy transition projects.

First, this study concentrated on renewable energy investment as a strategy for energy transition. The energy transition is the transition to environmentally and economically sustainable energy technologies that aid in climate change mitigation [55]. Renewables, energy storage, electrified transportation, energy-efficient built environments, hydrogen, nuclear, sustainable materials, and carbon capture are among these technologies.

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