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Hasanul Banna, Ashraful Alam, Xihui Haviour Chen, Ahmed W. Alam

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Hasanul Banna, Ph.D.
Department of Accounting, Finance, and Banking
Business School
Manchester Metropolitan University
Email: b.banna@mmu.ac.uk
ORCID: 0000-0002-6902-8525

Ashraful Alam, Ph.D.
University of Salford, UK
Email: M.A.Alam@salford.ac.uk

Xihui Haviour Chen, Ph.D.
(Corresponding author)
Edinburgh Business School
The Centre for Social and Economic Data Analytics (CSEDA)
Heriot-Watt University, Edinburgh, UK
Xihui.chen@hw.ac.uk
ORCID: 0000-0003-0723-4574

Ahmed W. Alam, Ph.D.
Assistant Professor of Finance
School of Accounting and Finance
College of Business and Public Management
Kean University, USA
Email: aalam@kean.edu
ORCID: 0000-0002-9888-0936

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Hasanul Banna, Ph.D.
Department of Accounting, Finance, and Banking
Business School
Manchester Metropolitan University
Email: b.banna@mmu.ac.uk
ORCID: 0000-0002-6902-8525

Ashraful Alam, Ph.D.
University of Salford, UK
Email: M.A.Alam@salford.ac.uk

Xihui Haviour Chen, Ph.D
(Corresponding author)
Edinburgh Business School
The Centre for Social and Economic Data Analytics (CSEDA)
Heriot-Watt University, Edinburgh, UK
Xihui.chen@hw.ac.uk
ORCID: 0000-0003-0723-4574

Ahmed W. Alam, Ph.D.
Assistant Professor of Finance
School of Accounting and Finance
College of Business and Public Management
Kean University, USA
Email: aalam@kean.edu
ORCID: 0000-0002-9888-0936

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HIGHLIGHTS

- We investigate the impact of energy security risk (ESR) on economic stability.
- Our results reveal that ESR significantly reduces GDP growth rate (GDPG).
- This negative effect is mainly attributed to countries with preexisting low GDPG.
- Country-level institutional quality moderates this effect.
- The damaging impact of ESR worsens during years of high inflation and war threats.

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ABSTRACT

This paper investigates the impact of energy security risk (ESR) on economic stability. Using multiple global datasets, we provide empirical evidence from an unbalanced panel of 68 countries spanning over a period from 1980 to 2021. Our results indicate that high ESR reduces GDP growth rate (GDPG) from a global perspective. In robustness tests, this effect remains valid across several specifications based on non-U.S. samples, national income-level, alternative measure of economic stability, and a set of endogeneity tests based on propensity score matching estimation. Countries with pre-existing low GDPG mainly suffer from heightened energy insecurity. Numerous country-specific institutional quality estimates. Finally, the damaging impact of ESR worsens during years of high inflation, geopolitical risk and acts, as well as of escalated war threats. We encourage international collaborations to develop a more sustainable energy system, which enhances the security of energy supply and the stability of economy.

Keywords: Energy security; Economic stability; Inflation; War; GDP growth; Keynesian economic theory.

JEL classification: E31, H56, O40, Q40, Q43.

1. Introduction

Energy is an essential element for economic stability, the backbone of nations, and a power source for economies. Thus, ensuring energy security is one of the most critical goals for countries seeking sustainable economic development (Ang et al., 2015; Bahgat, 2006; Le and Nguyen, 2019). The concept of energy security refers to the ability of an economy to guarantee the supply of energy in a sustainable and timely manner at an affordable price without adversely affecting its economic performance (Bielecki, 2002; Bompard et al., 2017; Loschel et al., 2010). Furthermore, many studies have identified energy security as one of the most critical indicators of an economy's stability (e.g., Fang et al., 2018; Khudaykulova et al., 2022; Prohorovs, 2022). The recent Russian-Ukrainian conflict has affected energy production and supply, resulting in unprecedented increases in energy prices, especially in Europe. In addition to a large number of people having been displaced, the military conflict has also created hyperinflation, which has contributed to a high level of interpersonal violence and an increase in the cost of living. Therefore, we are motivated to bring new theoretical and empirical evidence to study the nexus between energy security risk and economic stability in an era of surging inflation and wartime effects from a global perspective. In our study, economic stability is defined as people having access to the services and resources essential to living a healthy life in good and bad times (e.g., financial resources, quality food and housing, and employment that provides a living wage). We employ GDP growth as a measure of economic stability, as it reflects a country's overall economic performance and is generally associated with the availability of essential services and resources (Cherp et al., 2016; Eggoh and Khan, 2014; Khudaykulov and Obrenovid, 2022; Le and Nguyen, 2019). Although GDP growth may not capture every aspect of our definition, a steady and positive GDP growth typically indicates increased productivity, investment, and consumption, which collectively contribute to improved living conditions, more job opportunities, and higher wages. These factors ultimately support the economic stability experienced by the general population. Our study applies Keynesian economic theory and examines the moderating effects of inflation and war on the relationship between energy security and economic stability from a global perspective.

The recent volatility of world energy markets and prices as a result of multiple crises (e.g., COVID-19, the Russian invasion of Ukraine, and hyperinflation) has caused macroeconomic and fiscal instability. In addition to major energy exporting countries (e.g., Saudi Arabia, the UAE, and Russia), fluctuations in the energy markets affect economies that are highly dependent on energy imports (e.g., the EU, China, the US, and India). There is a particular relevance of geopolitical events and inflation associated with energy insecurity to energy-exporting countries that intend to use energy deliveries to further their political objectives (Nasir, 2021; Soliman and Nasir, 2019; Zhang et al., 2023). Energy security is also a concern for developing countries. For example, they continue to be dependent on foreign technical expertise for a variety of reasons, including the inability to adapt imported energy technologies to suit their local demand. Additionally, power stations, pipelines, refineries, and transmission lines can be targeted easily in civil wars, domestic uprisings, and international conflicts. For example, during the Ukraine war, Nord Stream gas pipeline explosions and Zaporizhzhia nuclear power plant attacks have disrupted energy supplies to Europe (Meredith, 2022; Kirby, 2022). Increasing commodity, energy, and food prices have led to inflation reaching a historical high due to an uncertain economic climate and rising operating costs. Consequently, there is a concern about the economic stability.

There are two main contributions we are striving to make with our study. First, we make a significant contribute to the existing body of knowledge by examining the relationship between energy security and economic stability in a global context, while taking into account the influence of inflation and geopolitical risks (e.g., war effects). For example, there is a stream of literature examining the relationships between oil price shocks, energy consumption, and economic growth (e.g., Alam and Murad, 2020; Bhattacharya et al., 2016; Can and Korkmaz, 2019; Tang et al., 2023). There is also a stream of literature that examines these relationships within specific countries (see Dodo, 2018; Fang, 2018; Gasparatos and Gadda, 2009; Isreal Akingba et al., 2018; Iyke, 2015). However, these studies primarily concentrate on the implications for stock markets and return on investment, often overlooking the intricate interplay between energy security, economic stability, inflation, and war effects. Energy security is crucial to economic stability, as it ensures a reliable and sustainable supply of energy to support economic growth and development (Metcalf, 2014; Umbach, 2010; Wang and Liao, 2022). A lack of energy security can lead to supply disruptions, price volatility, and increased dependence on external sources, all of which can negatively impact economic stability. By examining the nexus between energy security and economic stability, our study sheds light on the importance of maintaining a secure energy supply in the face of potential threats and challenges, such as inflation and geopolitical risks. Furthermore, while existing research provides valuable insights into how businesses are affected by uncontrollable external factors (e.g., technological changes, competitions, political factors, and economic conditions), our study delves deeper into the complex relationship between energy security and economic stability, offering new theoretical and empirical evidence on how surging inflation and wars influence this critical interdependence. By doing so, our research highlights the need for policymakers and stakeholders to carefully consider the implications of energy security for overall economic stability, particularly in light of the increasing prevalence of geopolitical risks and macroeconomic challenges.

Second, drawing from a global sample of data, we are the first study to provide empirical evidence of the interactive effects of inflation and geopolitical risks (war effects) on the relationship between energy security and economic stability. Many public and policy concerns have been raised by the current geopolitical landscape and inflationary pressures. While energy security undoubtedly plays a crucial role in maintaining economic stability, the literature has yet to extensively examine its relationship with inflation and geopolitical risks (e.g., wars, economic policy uncertainty, and political instability), particularly through quantitative approaches. In fact, most research on the energy security index uses qualitative approaches (e.g., Sovacool, 2012; Zhang et al., 2021) or offers conceptual discussions on such relationships (e.g., Bielecki, 2002; Khudaykulov et al., 2022; Sovacool and Mukherjee, 2011). Although many studies have examined the relationship between energy security and economic growth using empirical data (e.g., Balitskiy et al., 2014; Gasparatos and Gadda, 2009; Mahmood and Ayaz, 2018, Le and Nguyen, 2019), our study uniquely applies Keynesian economic theory to examine the energy security-economic stability relationship from a global perspective, focusing on the critical influences of inflation and geopolitical risks such as wars. Through this approach, our study provides empirical evidence that can help policymakers and stakeholders gain a deeper understanding of these dynamics, facilitating the development of well-informed strategies to mitigate their negative effects.

Using multiple global datasets, we provide empirical evidence from an unbalanced panel of 68 countries spanning over a period from 1980 to 2021. In our study, we mainly use five different datasets: country-level macroeconomic indicators and institutional quality estimates, country-specific energy security risk indices, global economic policy uncertainty index of Davis (2016), and overall and category-wise geopolitical risk indices introduced by Caldara and Iacoviello (2022). We apply fixed-effects ordinary least squares (OLS) regressions for our baseline multivariate analyses. For robustness, we employ several empirical specifications using non-U.S. samples, excluding countries from different income groups, alternative measure of economic stability, additional control variables, and propensity score matching (PSM) estimation to address potential endogeneity. Furthermore, we conduct a set of separate models to obtain any potential worsening or moderating effects of inflation, geopolitical uncertainty, and wars, as well as of country-level institutional quality measures.

Based on our results, in countries with high levels of energy security risk, the growth in gross domestic product is reduced. This effect remains resilient across several specifications based on a non-U.S. sample, national income-level, alternative measures of economic stability, and a set of endogeneity tests based on PSM regressions. Moreover, the detrimental effect is mainly attributed to the countries with pre-existing levels of low GDP growth. Further analyses reveal that this relationship is moderated by a range of country-specific institutional quality estimates, such as governance effectiveness, regulatory quality, rule of law, voice and accountability, control of corruption, and political stability and absence of violence. Additionally, the damaging effects of ESR are exacerbated in times of high inflation and geopolitical uncertainties, as well as of escalating war threats.

The remainder of this study is organized as follows. Section 2 discusses the literature related to the relationship between energy security and economic stability, as well as how inflation and wars may affect this relationship. In Section 3, the methodology, baseline model, data, and variables are presented. In section 4, the empirical results are presented and discussed. In section 5, the study concludes with policy implications and suggestions for future research.

2. Theory and hypothesis development

2.1 Theoretical underpinning

In accordance with Keynesian economic theory, high oil prices increase transportation costs, which in turn worsen inflation by causing customers to pay a higher-end price for all services and goods due to high production costs and low real wages (Aksakal, 2019; Mallik and Chowdhury, 2022; Qin et al., 2020; Perry and Cline, 2016). Hence, labour power decreases, and a negative relationship is formed between oil prices and economic stability (Tariq and Ahmad, 2021; Wesseh Jr and Lin 2018). On the other hand, a positive relationship is formed between the cost of living and the unemployment ratio (Mohseni and Jouzaryan, 2016; Qiang et al., 2019; Victor et al., 2021). Black swan events (e.g., public health emergencies of international concern, military conflicts, wars, or humanitarian crises) may also trigger supply chain disruptions, resulting in an increase in oil prices and alternative fuels as well as oil product prices (Khudaykulova et al., 2022; Prohorovs, 2022). As a result, companies or countries have to reduce energy consumption or increase production costs, negatively affecting economic stability and productivity.

It was Hamilton (1983) who provided the first evidence that the rise in oil prices could adversely affect macroeconomic efficiency (e.g., high inflation and high production costs in wages and raw materials). Bernanke's (1983) theoretical study shows that companies postpone their investments when they become aware of fluctuations in oil prices and low levels of oil production (Gillespie, 2022; Qiang et al., 2019). According to Ferderer (1996), economic instability caused by a lack of energy security may lead to lower investment demand, which is why energy price is negatively correlated with productivity but positively correlated with inflation (Garratt and Petrella, 2022; Rehman et al., 2019; Talha et al., 2021). Inflation and energy prices may be worsened by uncertainties. For example, the immediate consequences of geopolitical conflicts (e.g., World War II, the invasion of Ukraine, and the Saudi-Yemen conflict) are high inflation, low economic stability, and frequent disruptions of supply chains caused by rising costs and scarcity of raw materials, commodities, energy, operations, and transportation (Qin et al., 2020). There is no doubt that inflation is one of the major future risks facing economies and businesses (Hamilton, 1983; Dodo, 2018; Isreal Akingba, et al., 2018).

An additional transmission channel for oil price shocks to the macroeconomy is wealth shifting from oil-importing to oil-exporting economies (Nasir, 2021; Qiang et al., 2019; Wesseh Jr and Lin, 2018). Increasing oil prices can be regarded as a tax imposed on oil-consuming economies by oil-exporting economies, which ultimately diminishes their domestic energy needs or forces them to seek alternative sources of energy and energy products (e.g., renewable energies, renovates infrastructure, low carbon heating systems) (Bhattacharya et al., 2016; Can and Korkmaz, 2019; Zeb et al., 2014). Accordingly, the decline in demand for traditional energy sources (i.e., oil and gas) will result in lower corporate earnings, which in turn will lead to a higher unemployment rate and a lower GDP growth rate (Cherp et al., 2016). Nevertheless, the higher inflation rate could be further reinforced by the cost of renewable energies or new energy systems. Therefore, as long as we rely on energy sources (both traditional and renewable energy sources), the cost of energy will rise (Sweidan, 2021). Particularly, wars can worsen the divergence of energy sources that causes energy prices to rise as well as increasing commodity prices, putting pressure on global demand. For example, in the wake of the recent military attack on Ukraine, there has been a redundancy of energy supply from Russia to the UK, US, and EU. Consumers pay higher energy import costs as a result of market forces. Hence, governments are urged to provide a supply of energy that is sustainable and affordable for the public.

Expanding on Hamilton's (1983) findings, Kilian (2009) introduced a distinction between oil supply shocks, aggregate demand shocks, and oil-specific demand shocks to explain the impact of oil price shocks on macroeconomic variables. This framework emphasizes that different types of oil price shocks can have varying effects on economic stability. For instance, oil-specific demand shocks driven by changes in global real economic activity can cause a positive co-movement between oil prices and economic variables, while oil supply shocks may lead to stagflation (higher inflation and lower output). In the context of energy security, the role of energy diversification has been increasingly emphasized in the literature (Bhattacharya et al., 2016; Cherp et al., 2016; Sovacool and Mukherjee, 2011). The underlying idea is that a diversified energy portfolio can help countries mitigate the adverse effects of oil price fluctuations on economic stability. In this regard, the role of renewable energy sources in promoting energy security and reducing the vulnerability of economies to oil price shocks has been highlighted by numerous studies (Apergis and Payne, 2014; Zhang et al., 2021). Furthermore, the literature on the relationship between energy security and economic stability has also highlighted the role of energy efficiency improvements (Prado et al., 2016; Sovacool, 2011; Sweidan, 2021). By reducing energy consumption per unit of output, energy efficiency measures can help countries lessen their dependence on imported energy sources and, consequently, their vulnerability to oil price fluctuations.

Other studies have suggested (e.g., Jungherr et al., 2022; Prohorovs, 2022) that monetary policy initiatives can explain the effects of energy security on economic stability. When oil prices are high, central banks may raise interest rates to achieve price stability and slow down inflation rates. In this case, however, there will be a low demand for energy sources, since fewer goods and services will be produced, leading to fewer job opportunities. War effects will worsen the situation. Alternatively, central banks could lower interest rates to compensate for losses in real GDP in order to stabilise productivity. Therefore, inflation may continue to rise (Aksakal, 2019; Perry and Cline, 2016). Consequently, the level of energy security would have a complex impact on economic stability.

As a result, most macroeconomic theories (i.e., Keynesian economic theory) and related studies (e.g., Aksakal, 2019; Perry and Cline, 2016; Prado et al., 2016; Sovacool and Mukherjee, 2011; Zhang et al., 2021) predict that a higher level of energy security increases economic stability. As part of our study, we apply Keynesian economic theory and examine the moderating effects of inflation and war on the relationship between energy security and economic stability in order to extend the existing knowledge in the literature. In doing so, we incorporate the insights from the more recent literature on energy diversification, renewable energy, and energy efficiency.

2.2 The relationship between energy security and economic stability

There has been a considerable amount of literature examining the relationship between energy security and economic stability. In most studies, the relationship is examined in a multivariate framework that takes into account factors such as carbon emissions, renewable technologies, economic development, and urbanization in different research contexts. For example, there are studies researching globally (Karanfil and Li, 2015; Le and Nguyen, 2019); Japan (Gasparatos and Gadda, 2009); sub-Saharan African countries (Kivyiro and Arminen, 2014, Le, 2016); European Union (EU) countries (Balitskiy et al., 2014; Fu et al., 2021); OECD countries (Gozgor et al., 2018); Vietnam (Tang et al., 2016); Nigeria (Iyke, 2015); Bulgaria (Can and Korkmaz, 2019); and Egypt (Wesseh and Lin, 2018).

It is critical that policymakers take into account the empirical findings on the nexus between energy security and economic stability. For example, a number of studies have demonstrated that renewable or green energy consumption is positively correlated with economic stability in 38 major renewable energy-consuming countries (Bhattacharya et al., 2016); BRICS countries (Sebri and Ben-Salha, 2014); Balkan and Black Sea countries (Alam and Murad, 2020); EU countries (Umbach, 2010), US (Sweidan, 2021), and South Asian Association for Regional Cooperation (SAARC) countries (Zeb et al., 2014). The goal of these countries is to maintain economic stability by utilizing alternative energy sources instead of primary energy sources. More specifically, a study by Gasparatos and Gadda (2009) indicates that energy security may play a significant role in Japan's long-term economic stability, even though the Japanese economy is increasingly dependent on obtaining natural resources from developing countries, which may affect the rate at which the economy grows. According to Gasparatos and Gadda (2009), although the price is cheaper in developing countries, demand and supply may not be consistent or stable over time. Using data from 26 EU countries, Balitskiy et al. (2014) find that natural gas is one of the most crucial sources of energy among these countries and economic stability helps maintain energy security. Mahmood and Ayaz (2018) scrutinize the Pakistan economy and report that low energy security (e.g., an increasing supply and demand gap of energy) halts economic development both short-term and long-term. However, the situation may differ for countries that are large energy exporters. For instance, the economies of countries such as Russia, Saudi Arabia, and Iran heavily depend on their energy exports, and any decline in energy prices could adversely affect their economic stability (Jagtap et al., 2022; Khudaykulova et al., 2022; Mohseni and Jouzaryan, 2016; Prohorovs, 2022). In such cases, energy security is a crucial factor that ensures economic stability by stabilising the energy market and ensuring a steady income from energy exports. Moreover, in the case of some developing countries, energy exports may also provide a source of revenue for development, but at the same time, may lead to resource curse and dependence on energy exports, causing volatility in their economies (Khudaykulova et al., 2022). Therefore, the impact of energy security on economic stability may vary depending on a country's dependence on energy exports and its ability to diversify its energy sources.

According to several scholars (such as Bielecki, 2002; Mahmood and Ayaz, 2018; Qin et al., 2020), future energy consumption will increase due to demographic trends, the rapid growth of Asian countries, and the need for transportation. A growing reliance on imported oil by the major consuming countries (e.g., Asian and OECD countries) will increase energy security concerns. The imbalance in energy supply and demand would widen as a result. There has been an increase in the search for alternative sources of energy (Cherp, et al., 2016; Prado Jr., et al., 2016; Zhang et al., 2023; Tang et al., 2023) due to the fact that non-renewable or dirty energy sources (e.g., oil and gas) will eventually run out (Cherp, et al., 2016; Sweidan, 2021). In light of this, there is a growing body of literature concerning the possibility of achieving energy security through the diversification of fuel sources. Renewable energy (e.g., hydroelectricity, geothermal energy, solar power, and wind power) could be a fair market opportunity if traditional energy sources are unavailable. This is a key technology to balance supply and demand issues in economies. According to Cherp et al. (2016), climate policies make energy trade, energy supply, and energy mix less reliant on fossil resources and GDP growth, hence making them more predictable and stable.

As a result of a variety of factors, such as the rapid economic rebound following COVID-19, geopolitical risks, and Russia's invasion of Ukraine, energy markets have tightened in 2021. This resulted in the oil price reaching its highest level since 2008. Inflation has been high, families have been pushed into poverty, and factories have been forced to curtail their production or close their doors due to high energy prices and high import bills. Thus, a healthy lifestyle is hampered by a lack of access to essential resources. Because of sluggish economic growth and instability, some countries are heading toward severe recessions. Therefore, we hypothesize that:

H1: Countries with high levels of energy security risk have lower levels of economic stability.

2.3 The age of surging inflation

BlackRock (2022) forecasts that the EU countries will spend approximately 9.1% of their GDP on energy in 2022. This represents the largest share in 40 years and is more than two times of the 4.4% predicted in the US. For both economies, energy expenditures accounted for approximately 2% of GDP in 2020. Global inflationary pressures are further exacerbated by higher commodity prices (Garratt and Petrella, 2022). Furthermore, the European Central Bank estimates that energy prices have caused half of the recent increase in inflation. Bloomberg UK reports that energy costs will reach a record high of more than 13% of global GDP by 2022, as the cost of keeping the world operating rises (Gillespie, 2022). There has been economic instability due to black swan events (e.g., wars and COVID-19), and changes in interest rates.

While the economy has begun to recover in 2021, a supply shock has slowed growth and increased inflation. It comes to a situation when inflation expectations have reached an unsustainable level. Due to supply concerns and the Ukraine war, energy commodity costs and food prices have surged, with natural gas prices in Europe rising more than 500% since 2021. Low oil production in Russia has also led to price inflation, which in turn will increase an already high inflation rate (Gillespie, 2022). In many countries, rising inflation has led to an increase in short-term interest rates, which has slowed economic stability and eroded consumers' purchasing power. Based on data from Iran, Mohseni and Jouzaryan (2016) conclude that a small but positive inflation rate is economically beneficial. However, they find that a high inflation rate adversely affects economic stability over the long term. There have also been similar results in South Asian countries (i.e., Bangladesh, India, Pakistan, and Sri Lanka), Mallik and Chowdhury (2001) also argue that to promote disinflation is helpful for economic stability in these countries. In the following year, Mallik and Chowdhury (2002) examine the relationship between real income and inflation among seven developed countries (i.e., Australia, Canada, Finland, New Zealand, Spain, Sweden, and the UK) by employing a vector error correction model and cointegration analysis. They note that all of these countries use low or zero-inflation monetary policies to maintain economic stability. In Sri Lanka, Madurapperuma (2016) finds that inflation has had a negative impact on economic stability over the period from 1988 to 2015.

On both sides of the Atlantic, central banks are facing a dilemma due to the war in Ukraine. It is difficult to see inflation as simply temporary and reversible in an environment where financial conditions must be tightened quickly and intensively. Additionally, a possible slowdown in globalization and the transition to a green economy may cause inflation to rise in the medium term. For example, according to Lyu (2019), green economy development and pollution prevention are both essential for controlling inflation in China despite there being a weak negative correlation between them. It is interesting to note that many Spanish stakeholders reject the idea of a carbon tax within the framework of climate change policies due to the already high inflation rate and the high energy intensity of their country (Kahn et al., 2021; Levi, 2021; Savin et al., 2020). According to Savin et al. (2020), the main reasons for people opposing the implementation of the carbon tax are distrust in politicians and the belief that the wealthy do not pay their fair share of taxes, but some people have also raised concerns about environmental issues. However, governments will need to decide how high to raise the interest rates in order to combat inflation because it may deepen a possible short-term financial recession. In the current economic climate, in which hyperinflation is prevalent and central banks are already behind schedule, slowing policy tightening may accelerate the deterioration of inflation expectations and intensifying stagflation even further (Demary and Hüther, 2022; Prohorovs, 2022). Central banks in the region are prioritizing efforts to curb price pressures over policies that promote growth due to high inflation. Inflation may increase structurally, and, in the present case, its decline is primarily dependent on a significant reduction in energy prices, not an increase in interest rates. The rise to prominence of monetary policies in many countries has been driven by a desire to control inflation. Nevertheless, the monetary authorities may only have a limited ability to reduce inflation. It is also important to note that rising interest rates increase the cost of servicing debt for both companies and governments.

The level of corporate debt has been growing globally for decades, making restrictive monetary policy ineffective at curbing inflation (Prohorovs, 2022). Jungherr et al. (2022) find that long-term debt aggravates the effects of monetary policy shocks on inflation. Therefore, central banks note that corporate debt has increased since the COVID-19 pandemic, making businesses more vulnerable to higher interest rates, increased environmental uncertainty, or declining profits, while banks face risks from weak corporate balance sheets. Unlike the US and Japan, few countries are able to print money on their own. Rising interest rates and deteriorating economic stability may threaten countries with high debt levels (e.g., Italy, Portugal, Spain, and especially Greece, with a debt level approaching 200%).

The increase in inflation in 2021 and 2022 was primarily driven by an increase in demand, which led to an increase in energy prices, making it more expensive for consumers to access energy resources. This can negatively impact energy security, as it may reduce affordability and availability of energy, particularly for the most vulnerable populations. In many existing studies (e.g., Talha et al., 2021; Rehman, et al., 2019; Qiang et al., 2019), price and supply shocks in energy and other commodities, as well as basic goods have been found to have a negative impact on the persistence of high inflation. Using a dataset from 1986 to 2019, Talha et al. (2021) find that energy security (e.g., energy consumption and oil prices) and economic stability influence the inflation rate positively in Malaysia. The results of Rehman et al., (2019) indicate that high inflation rates and high oil prices likely contribute to the increase in housing prices in the US, the UK, and Canada. This increase in housing prices can lead to a decrease in demand for housing, which in turn negatively affects energy security, as higher energy prices and inflation put pressure on the availability and affordability of energy resources. By utilizing a nonlinear ARDL approach, Qiang et al. (2019) demonstrate that oil price volatility is a key source of macroeconomic fluctuations (e.g., inflation). This finding suggests that fluctuations in inflation could have a negative impact on energy security, as higher and more volatile energy prices may make it difficult for countries to ensure a stable and affordable energy supply. To boost economic stability under the impact of energy shocks, Wesseh Jr and Lin (2018) use Liberia as an example and suggest that policymakers should strive to implement inflation-reducing policies. It is likely that a high inflation rate in the EU and many other countries will persist for medium or long term, which will pose a serious threat to their economies and businesses, as well as potential undermine their energy security. Thus, we hypothesize that:

H2: The relationship between energy security and economic stability is worsened at the age of surging inflation.

2.4 Wartime impact

There has been a significant impact of military conflicts and wars on global and regional economies in the past (e.g., Kannadhasan and Das, 2020; Isreal Akingba et al., 2018). Kannadhasan and Das (2020), for instance, demonstrate that Asian emerging stock markets are volatile during times of war and terror attacks. Akingba et al. (2018) examine the long-term effects of health capital on economic growth in the post-Second World War period (data from 1980 to 2013), and they conclude that the war has adverse effects on health economics and economic stability. It is explained by Dodo (2018) that multiple militarized conflicts and trade wars lead African countries falling behind in their socioeconomic development as a result of post-war effects. Dodo (2018) points out that war crimes hinder African nations from developing the basic social, and physical infrastructures and structures that can support economic stability and development.

The recent Russian-Ukrainian conflict has disrupted financial markets, putting the improvement of the international economy at risk. Increasing investments in security and defense, along with a new EU energy system, make the economies of Europe most vulnerable. The institutions predict a further 1.5%-point deflation in 2022, resulting in a 1% drop in GDP growth. Due to prolonged inflation caused by costly commodities, the chemistry, motor, and shipping sectors are particularly vulnerable to deflation and civil unrest. European and Central Asian emerging economies are also affected by the conflict. With the lingering effects of COVID-19, they are already facing an economic slowdown. Because of the Russia-Ukirain war spillovers, weaker euro-area growth, monetary, resource, and marketing rundowns, all nations expect growth expectations to decrease (Khudaykulov and Obrenovid, 2022).

The inflationary genie likely to unleash a recession regardless of how policies are responded to (Prohorovs, 2022). The two years of lockdowns have left countries with a shortage of energy, which slows down business activities. Inflation accelerated as a result of these disruptions in world trade. People are saving and spending less because life is becoming more expensive, while investment is declining because lending rates are rising, risks are increasing, and profits are decreasing. In response to the recession, countries develop policy initiatives. According to Victor et al. (2021), the UK's response to the economic crisis led to an even more severe recession in the short term. Meanwhile, policy in India aggravates the economic recession and provokes stagflation because of the wide gap between demand and supply that results from the unemployment-inflation dynamic.

Because Russia exports the most oil and gas and, along with Ukraine, is one of the largest food suppliers, the war, sanctions and embargo exacerbate economic instability. Small businesses and households could only make up a small part of their losses with fiscal support as compensation for shortfall gaps. Nevertheless, according to Rühl (2022), there is no doubt that sanctions against Russia, regardless of how necessary or large they may be for the containment of Russia in the future, will have adverse effects not only on Russia but also on the West, the US, and emerging markets. Therefore, we hypothesize that:

H3: The relationship between energy security and economic stability is deteriorated during periods of wars and escalated geopolitical tensions.

3. Data and methodology

3.1 Sample

We obtain data from numerous sources: the World Bank's (WB) World Development Indicators (WDI) and Worldwide Governance Indicators (WGI), the Global Energy Institute (GEI) of U.S. Chamber of Commerce, and the Economic Policy Uncertainty (EPU) and other indices database of Baker, Bloom, and Davis (BBD). In particular, we collect the country-level macroeconomic variables from WDI. Country-wise institutional quality (IQ) estimates are obtained from WGI. WB offers six different governance estimates at the country level. Global and country specific ESR index scores are collected from GEI. Finally, global economic policy uncertainty (GEPU) and overall and categorical geopolitical risk (GPR) indices are obtained BBD's website.[1] Merging all these datasets leads to a final unbalanced panel of 68 countries spanning over a period from 1980 to 2021.[2]

3.2 Variables and model specification

Our main dependent variable is economic stability, which is measured by a country's *GDPG*. We perceive economic stability from a purely macroeconomic standpoint. A steady growth in real GDP is considered among the best indicators of the financial strength and soundness of any country, which is why we use *GDPG* as the primary measure of economic stability at the country-level. A stable growth rate in GDP indicates a country's strength in terms of capital investments, labor force utilization, productivity, and consumption, which ultimately reflects the economic stability and overall wellbeing of its citizens. In addition, we use the natural logarithm of country-level Z-score (*LN_ZSCORE*) as an alternative measure of economic/financial stability to confirm the robustness of our main findings based on *GDPG*. Our primary explanatory variable is GEI's country-level ESR index score, which measures the degree of energy insecurity a country is exposed to. Since these are risk index scores, a higher (lower) score indicates a lower (higher) energy security. These scores are constructed using historical data, government forecasts, and policies and decisions that may positively or adversely affect a country's overall energy security. With the least index score of 727, the United States secures the first position among all nations, followed by New Zealand and Canada

[1] For more information about these indices, please visit: policyuncertainty.com. The GEPU index is introduced by Davis (2016), whereas the overall and category-wise GPR indices have been developed by Caldara and Iacoviello (2022).

[2] Although WB offers macroeconomic data for 217 countries and territories, this number is initially reduced to 193, following the list of countries recognized by the United Nations (UN). Furthermore, when we merge the WDI/WGI data with the ESR data of GEI, this number is reduced further and comes down to 68, ensuring that only the countries for which ESR data is available are included in our final sample.

having scores of 757 and 802, respectively. GEI uses a total of 29 metrics classified into 8 different categories, i.e., global fuels, fuel imports, energy expenditures, price and market volatility, energy use intensity, electric power sector, transportation sector, and environmental. The final score is calculated using weighted scores in each metric belonging to these eight categories. Our baseline empirical analyses are founded upon the following specification in equation (1):

$$GDPG_{i,t+1} = \beta_0 + \beta_1 * LN\_ESR_{i,t} + \beta_2 * \zeta_{i,t} + \delta_t + \varphi_i + \varepsilon_1 \quad (1)$$

Where, $GDPG_{i,t+1}$ is the future GDP growth rate of country *i* in year *t+1* and $LN\_ESR_{i,t}$ is the natural logarithm of country *i*'s ESR index score in the current year (i.e., year *t*). $\zeta_{i,t}$ is a vector of country-level macroeconomic factors that should be taken into account to isolate the true effect of *LN_ESR* on *GDPG*. In our empirical analyses, we have used government expenses (*GE*) as a percentage of GDP, domestic credit to the private sector (*DCPS*), consumption expenditure (*CE*) as a percentage of GDP, net import and export scaled by GDP, research and development (R&D) expenditure scaled by GDP (*R&D*), real rate of interest (*RR*), Inflation rate (*Inflation*), and unemployment rate estimated by the International Labour Organization (ILO) (*Unemp_ILO*) as country-specific macroeconomic control variables. In addition, we introduce *GEPU* and *GPR* indices as additional regressors to our baseline model to test the resilience of the original findings. δ_t captures year fixed effects (FE) and φ_i indicates country FE. Standard errors (SE) have been clustered at the region level. ε captures the regression error term. All variables are winsorized at the top and bottom 1%. Table 1 presents brief descriptions of the main variables.

[Insert Table 1 about here]

To investigate the role of inflation and war, we interact *Inflation* and war-related variables with *LN_ESR* and obtain the sign and significance on the regression coefficients of these interactions. We use three different variables to measure the threat of war/ war-driven geopolitical tensions: a) the overall GPR index score (*GPR*), b) the geopolitical acts index score (*GPRA*), and c) score on the 'war threats' category of the overall GPR index (*War_Threat*), all developed and introduces by Caldara and Iacoviello (2022). To reveal the moderating effects of country-specific governance quality on the *GDPG-LN_ESR* relationship, we interact *LN_ESR* with the six IQ estimates of WGI, i.e., control of corruption estimate (*CCE*), governance effectiveness estimate (*GEE*), political stability and absence of violence estimate (*PVE*), regulatory quality estimate (*RQE*), rule of law estimate (*RLE*), and voice and accountability estimate (*VAE*).

Table 2 presents the summary statistics of key variables. Mean *ESR* index score (*LN_ESR*) over the sample period is 1,468.478 (6.746) with a standard deviation of 923.563 (1.673). Average *GDPG* (*GDP*) is 3.197% (\$5.75×10^{11}) with a SD of 4.427% (\$1.44×10^{12}). *Inflation* (*GPR*) averages 14.522% (98.946), with a maximum of 411.76% (176.302).

[Insert Table 2 about here]

4. Results

The empirical strategy in this paper has been divided into multiple stages. First, we test our first hypothesis (*H1*) by examining the fundamental relationship between energy security risk and economic stability. We then focus on hypotheses *H2* and *H3* by studying how inflation and war-driven geopolitical risk affect this relationship. Next, we test the robustness of our baseline findings (based on *H1*) by applying different empirical models. In particular, we use an alternative measure of economic stability, sub-samples based on national income-level, sub-samples comprising of countries with different pre-existing economic conditions, include additional control variables that are important factors of economic performance and stability, and conduct a set of endogeneity tests based on PSM estimation. Once we confirm the validity of our primary claims through the robustness tests, we move on to finding country-specific factors (i.e., governance quality) that may potentially moderate the association between energy security risk and economic instability. In particular, we test if the WB's country IQ estimates positively moderate the impact of ESR on GDPG.

4.1 Baseline multivariate tests

Our baseline multivariate regressions analyze the basic relationship between ESR and future economic growth, which indicates a country's economic wellbeing. In particular, we test whether and how an increase in the natural log of current ESR affects the future GDP growth rate of our sample countries. Table 3 reports the results from baseline multivariate tests. In model 1, we regress future *GDPG* (i.e., in year *t+1*) on current *LN_ESR* (i.e., in year *t*), while controlling for a wide range of country-specific macroeconomic variables, such as, government expenses, domestic credit to private sector, imports and exports, consumption expenditure, R&D expenditure, real rate of interest, unemployment estimated by ILO, and inflation rate. Model 2 includes the global economic policy uncertainty and geopolitical risk indices as additional controls.[3] Models 3 and 4 are replications of models 1 and 2, respectively, using sub-samples that excluded the U.S. Since the U.S. is one of the biggest players in the global energy market as well as global economic and political decision-making, it's important to ensure the persistence of our primary findings (in models 1 and 2) using a sub-sample that excludes the U.S. All models incorporate year and country fixed effects, and standard errors that are clustered at the region level.

[Insert Table 3 about here]

Results from our baseline panel regressions indicate that high energy security risk significantly restrains GDP growth, supporting our hypothesis *H1*. This effect is valid for both the full sample and sub-sample excluding the U.S. Moreover, the negative effect of *LN_ESR* remains robust while controlling for *GEPU* and *GPR*. Statistically, a 1-unit increase in current *LN_ESR* causes a 0.151% (0.149%) reduction in next year's *GDPG* using the full-sample (sub-sample excluding USA). These findings are consistent with prior studies such as Gasparatos and Gadda (2009) and Le and Nguyen (2019), who advocated the negative effect of energy insecurity on economic growth from an international perspective.

[3] The impact of economic policy uncertainty has gained enormous amount of research attention since the global financial crisis. On one hand, a large strand of literature focuses on the effect of EPU on a microeconomic perspective. Numerous studies have documented the damaging role that EPU plays in regard to firm performance at global (e.g., Suh and Yang, 2021), national (e.g., Baker et al., 2016; Kang et al., 2014; Tran et al., 2021), and local/state (e.g., Alam et al., 2023a) levels. On the other hand, many scholars have highlighted the macroeconomic and/or asset-pricing implications of EPU (e.g., Baker et al., 2016; Phan et al., 2021; Brogaard and Detzel, 2015). Similarly, a number of adverse geopolitical events since 2000, such as the 9/11 terrorist attack, a series of wars in the Middle East, escalated tensions in borders between major economies like China and India, and lastly, the Russian invasion of Ukraine, have led to surging amount of academic and policy research regarding the substantial impact of geopolitical tensions on firm-level and macroeconomic performance (e.g., Caldara and Iacoviello, 2022; Alam et al., 2023b; Cheng and Chiu, 2018; Phan et al., 2022), as well as on global energy and environmental issues (e.g., Liu et al., 2019; Sohag et al., 2022).

4.2 The role of inflation and war

Next, we move on to testing our hypotheses *H2* and *H3*. In particular, we investigate if the negative association between *LN_ESR* and *GDPG* worsens during periods of high inflation and war-driven geopolitical uncertainty. We use the overall (i.e., global) geopolitical risk index score (*GPR*) introduced by Caldara and Iacoviello (2022). *GPR* is based upon eight different categories, covering a range of geopolitical issues stemming from wars and terror activities. While *GPR* is heavily focused on war-based geopolitical tensions and uncertainties, we separately use the 'war threats' category of the overall index as well as the geopolitical acts sub-index (*GPRA*), to obtain the robustness of our finding based on the composite measure of GPR. We separately interact *Inflation*, *GPR*, *GPRA*, and *War_Threat* with *LN_ESR* and regress *GDPG* on *LN_ESR* along with each of these interaction terms, while controlling for the predefined set of country-level factors and including fixed effects and clustered standard errors. These tests are directed by the following empirical specifications:

$$GDPG_{i,t+1} = \psi_0 + \psi_1 * LN\_ESR_{i,t} + \psi_2 * Inflation_{i,t} + \psi_3 * LN\_ESR_{i,t} * Inflation_{i,t} + \psi_4 * \zeta_{i,t} + \delta_t + \varphi_i + \varepsilon_2 \quad (2)$$

$$GDPG_{i,t+1} = \chi_0 + \chi_1 * LN\_ESR_{i,t} + \chi_2 * GPR_t + \chi_3 * LN\_ESR_{i,t} * GPR_t + \chi_4 * \zeta_{i,t} + \delta_t + \varphi_i + \varepsilon_3 \quad (3)$$

$$GDPG_{i,t+1} = \lambda_0 + \lambda_1 * LN\_ESR_{i,t} + \lambda_2 * GPRA_t + \lambda_3 * LN\_ESR_{i,t} * GPRA_t + \lambda_4 * \zeta_{i,t} + \delta_t + \varphi_i + \varepsilon_4 \quad (4)$$

$$GDPG_{i,t+1} = \gamma_0 + \gamma_1 * LN\_ESR_{i,t} + \gamma_2 * War\_Threat_t + \gamma_3 * LN\_ESR_{i,t} * War\_Threat_t + \gamma_4 * \zeta_{i,t} + \delta_t + \varphi_i + \varepsilon_5 \quad (5)$$

[Insert Table 4 about here]

Table 4 presents the results. Model 1 reports the results based on *Inflation*. *LN_ESR*Inflation* is our variable of interest. The estimated coefficient on *LN_ESR*Inflation* is negative and highly significant at the 1% level. This implies that inflation plays a strong negative role in moderating the *LN_ESR*-*GDPG* relationship, i.e., the negative effect of *LN_ESR* on *GDPG* worsens during periods of surging inflation, supporting our hypothesis *H2*. In particular, 1-unit increase in *LN_ESR*, accompanied by a 1% rise in current *Inflation*, exhibits a further reduction in future *GDPG* by 0.010%. This detrimental impact of inflation on growth is consistent with existing literature (Bick, 2010; Barro, 2013; Eggoh and Khan, 2014). Models 2 and 3 illustrate the findings based on *GPR* and *GPRA*, respectively. Both *GPR* and *GPRA* further restrain *GDPG* when *LN_ESR* increases, providing evidence in favor of our hypothesis *H3*. Statistically, 1-point increase in *GPR* (*GPRA*) leads to an additional reduction in *GDPG* by 0.001% when there is a 1-unit increase in *LN_ESR*. Finally, model 4 uses *War_Threat* as the moderating variable and interacts it with *LN_ESR*. Results indicate that 1-point surge in the war threat index leads to an additional decline in *GDPG* by 0.725% given that there is a unit increase in *LN_ESR*. These results are supported by prior findings (e.g., Wang et al., 2021; Nguyen et al., 2022) who suggest similar effects of inflation and geopolitical tensions and wars on economic and environmental performance.

4.3 Does pre-existing growth matter?

There exists a large strand of literature offering empirical evidence of the determinants of economic growth and stability. Among them, many studies highlight the explanatory power of initial/current output and growth potentials on future economic performance (e.g., Barro, 2003; Moral-Benito, 2012; Makki and Somwaru, 2004). In this section, we examine the influence of pre-existing levels of a country's economic performance on the nexus between energy security and economic wellbeing.

We employ two different approaches to test if a country's pre-existing GDP growth rate matters for the impact of energy insecurity on economic stability. In particular, we examine if countries with high (low) pre-existing *GDPG* suffer less (more) facing a high energy security risk, given that countries that are already suffering from a low growth and weak economic performance may find it difficult to address and overcome the issues arising from increased ESR. In the first approach, we divide our sample countries into two groups, i.e., countries with pre-existing *low* growth (i.e., below median *GDPG* in year *t*) and countries with pre-existing *high* growth (i.e., above median *GDPG* in year *t*). Results based on these two groups of countries are documented in models 1 and 2, respectively, of table 5.

[Insert Table 5 about here]

Models 3 and 4 apply a different approach to define countries with pre-existing low and high degrees of economic stability. In particular, countries that exhibit a *GDPG* in year t that falls within the bottom quartile of year-*t GDPG* are regarded as low-GDPG countries. Similarly, countries having current GDP growth rates that fall within the top quartile of the year-*t GDPD* are defined as high-GDPG countries. The results based on these two sub-samples are reported in models 4 and 5, respectively. In general, the findings indicate that the negative impact of ESR on GDPG is mainly attributed to countries with initially low *GDPG*. Model 1 suggests that countries whose current *GDPG* fall below the median exhibit a 0.368% reduction in next year's *GDPG* given that there is a rise in current ESR. The estimated coefficient on *LN_ESR* in model 2, which represents the sub-sample of countries with above-median current *GDPG*, is also negative but statistically insignificant. Model 3 reports that a one-unit increase in current LN_ESR of low-growth countries causes a 0.602% decrease in their future GDPG; however, interestingly, this effect turns out as positive and economically significant for countries with pre-existing high economic stability. Overall, our findings ally with prior literature (e.g., Evans and Rauch, 1999; Tanner, 2014; Hall and Kanaan, 2021) who emphasize on the importance and economic effects of pre-existing economic conditions on future economic performance.

4.4 Does national income-level make any difference?

The role of national income on future macroeconomic conditions is well evident in the literature (e.g., Biggs et al., 2010; Azzoni, 2001). To find whether the ESR-growth relationship is influenced by national income, we generate sub-samples based on our sample countries' income levels. In particular, we examine if the negative impact of ESR on economic stability sustains for sub-samples excluding high-, middle-, and low-income nations separately. Using the gross national income (GNI) per capita, the WB data classifies all nations into four different income groups: low-, lower-middle-, upper-middle-, and high-income nations. In our analysis, we merged all lower-middle- and upper-middle-income countries into one group and defined them as middle-income nations. Table 6 documents the results from these tests. Model 1 (model 2) uses the sub-sample that excludes all high-income (low-income) nations, whereas model 3 is based on the sub-sample that considers high- and low-income nations only, by excluding all lower and upper middle-income countries. In all models, *GDPG* is regressed on lagged *LN_ESR* along with all country-specific control variables and both year and country FEs and clustered SEs at the region level are incorporated. Results indicate that the baseline relationship holds for both sub-samples excluding high- and low-income countries but turns out to be insignificant for the sub-sample excluding all middle-income nations. Statistically, a 1-unit increase in *LN_ESR* results in 0.322% (0.147%) fall in *GDPG* for all and low- and lower-middle-income (upper-middle- and high-income) nations, while all else being held constant. Overall, these results indicate that the negative effect of ESR on economic stability is more pronounced for middle-income nations than for high- or low-income nations only. These investigations are consistent with many prior studies, such as Brueckner et al., 2015, Balitskiy et al., 2014, and Winter-Nelson, 1995, where heterogeneity in terms of national income level has been considered as an important driver in varying economic performance across nations.

[Insert Table 6 about here]

4.5 Robustness tests

We employ a combination of different tests to check for the robustness of our main model and findings. First, we include additional control variables, such as capital formation (i.e., gross domestic capital investment) (*CI*), labor force participation rate (*LABOR*), tax revenue (*Tax*), inflow and outflow of foreign direct investment (FDI) (*FDI_In* and *FDI_Out*, respectively), and broad money (*BM*) and repeat our baseline models used in table 1. Results from these tests are presented in models 1-6 of table 7. Model 1 includes *CI* and *LABOR* as additional controls, whereas model 2 adds *Tax*, *FDI_In*, *FDI_Out*, and *BM* to model 1. Model 3 repeats model 2 while including *GEPU* and *GPR* as further controlling factors. Models 4-6 repeat the tests in models 1-3, respectively, using the sub-sample that excludes USA. All models reveal a strong negative association between *GDPG* and *LN_ESR*, confirming the resilience of our primary findings in table 1.

[Insert Table 7 around here]

Next, we use *LN_ZSCORE* an alternative measure of economic/financial stability. We use the natural logarithm of the country-level Z-score collected from WDI database. Using Z-score as a measure of financial stability is a standard practice in literature (e.g., Morgan and Pontines, 2014; Ahamed and Mallick, 2019; Phan et al., 2021). We repeat the baseline model replacing *GDPG* by *LN_ZSCORE*, while employing a combination of fixed effects models. Table 8 illustrates the results from all four regression specifications.

[Insert Table 8 about here]

Model 1 regresses *LN_ZSCORE* on *LN_ESR* along with all control variables, while excluding year and country FE and clustered SE. Model 2 repeats model 1 by adding year FE only, whereas model 3 adds country FE and repeats model 2. Finally, model 4 incorporates both year and country FE as well as SE clustered by regions. In all models except model 3, we obtain a significant negative association between *LN_ESR* and *LN_ZSCORE*, suggesting that an increase in energy insecurity leads to substantial losses in a country's financial stability. Statistically, as obtained from the full specification in model 4, a one-unit increase in *LN_ESR* leads to a 0.023% reduction in *LN_ZSCORE*, while holding everything constant.

As our final robustness analysis, we apply propensity score matching estimation to address potential endogeneity. The causal relationship between ESR and economic stability might be plagued with endogeneity. We use a matched sample of countries and investigate whether an increase in ESR leads to reduced growth for groups of countries with similar characteristics. The PSM tests are carried out in two stages. In the first stage, sample countries are matched one-to-one, without replacement, based on a certain set of country-level factors, such as government expenses, domestic credit to private sector, net import, net export, inflation rate, R&D expenditure as a percentage of GDP, and unemployment rate estimated by ILO. In the second stage, this matched sample of countries has been used to reconduct the baseline OLS regressions and check for any inconsistency. In this regard, we generate a dummy treatment variable, *CH_LN_ESR*, which is equal to 1 if a country's *LN_ESR* has been increased from the preceding year, and 0 otherwise. Using *CH_LN_ESR*, we divide our matched sample into two groups of countries, i.e., countries that experienced an increase in their energy security risk from the previous year and countries that did not. $GDPG_{i,t+1}$, which measures the a country's *GDPG* next year, is the main predicted variable in all specifications. The results are documented in Table 9.

[Insert Table 9 about here]

In model 1, we test the link between future *GDPG* and *CH_LN_ESR* for countries matched using the defined set of country-level factors. Model 2 adds all country-level control variables that have been used in previous analyses. Model 3 repeats model 2 while including *GEPU* and *GPR* as additional factors. Finally, models 4 and 5 reiterate models 2 and 3, respectively, for non-U.S. sub-sample. In all models, future *GDPG* exhibits a strong negative association with *CH_LN_ESR*, supporting our baseline findings and hypothesis *H1*. Statistically, model 2 (3) suggests that countries that experience a surge in their ESR index from the past suffer from a 0.753% (0.687%) decline in their GDP growth rate, as compared with countries with similar characteristics that did not experience such increase in their energy security risk.

4.6 Moderating effects of country institutional quality

While it has been evident that inflation and war driven GPR further damages economic stability during times of low energy security, it's important to identify factors that may weaken the adverse consequences. In this regard, we utilize WB's six country-wide IQ and governance estimates (i.e., *CCE*, *GEE*, *PVE*, *RQE*, *RLE* and *VAE*) and interact with *LN_ESR* to examine if they play any positive moderating role. Table 10 furnishes the results based on moderating effects of IQ estimates.

[Insert Table 10 about here]

We find that the detrimental effect of high energy security risk is significantly weakened by all IQ estimates. For example, model 1 of Table 10 shows that countries with a 1-point increase in their *CCE* estimate exhibit a 0.452% less reduction in *GDPG* when their *LN_ESR* increase by 1-unit. Similar increases (i.e., less reductions) in *GDPG* by 0.395%, 0.101%, 0.399%, 351%, and 0.210% are found in cases of unitary increases in *GEE*, *PVE*, *RQE*, *RLE*, and *VAE*. Overall, these results conclude that better institutional quality helps countries to mitigate the reduced growth due to high ESR. These findings add to an extant body of literature (e.g., Butkiewicz and Yanikkaya, 2006; Nguyen et al., 2018; Salman et al., 2019, among others) advocating the rescuing role of country-wide governance and institutional quality in various adverse economic scenarios.

5. Conclusion and practical implications

We are the first study to apply Keynesian economic theory and examine the moderating effects of inflation and war on the relationship between energy security and economic stability from a global perspective. Using multiple datasets (e.g., WDI and WGI databases of WB, GEI of U.S. Chamber of Commerce, GEPU index of Davis (2016), and GPR indices of Caldara and Iacoviello (2022)), we provide empirical evidence from an unbalanced panel of 68 countries spanning over a period from 1980 to 2021. Based on our global sample, we first find that countries with high levels of energy security have higher levels of output growth and hence economic stability. Second, the relationship between energy security and economic stability is worsened in the age of surging inflation. Third, during periods of war and heightened geopolitical tensions, the relationship between energy security and economic stability deteriorated. Thus, all three of our empirical predictions are supported.

Our findings provide insights into policy, social and managerial implications. We consider the policy implications for the sustainable development of the country, ensuring energy security and international collaboration. Our results conclude that strategic issues of energy affect a number of important issues of national and international security. Energy issues now require the attention of both the defense department and other government departments, from macroeconomic issues in oil-importing countries (e.g., unemployment, hyperinflation, and low levels of economic stability) to sensitive military conflicts involving the protection of oil production facilities worldwide. Although more studies are required to explore the full military and political implications of heightened energy security risks (e.g., energy shortages and high energy prices), specific outcomes are already evident. For example, we find that high energy security risk reduces GDP growth rate, especially in countries with pre-existing low growth. Government should also implement effective monetary and fiscal policy to control inflation to ensure stable energy.

In our study, we focus on the global level and find that both inflation and war have significant effects on energy security and economic stability. To achieve economic stability in a sustainable environment, we encourage international collaborations aimed at developing a more sustainable energy system or seeking a new development paradigm. Additionally, developing a diversified mix of green or renewable energy can also reduce an economy's structural vulnerability to commodity volatility. For example, renewable energy capacity could be increased by inventing and implementing more green technologies. It might be costly at first due to the investment in cutting-edge technology and building the infrastructure, but the costs should decrease over time and increase energy security and economic stability.

Our results emphasize the vulnerability of economies to disruptions in energy supply caused by inflation and war. Managers need to assess the risk related to the energy supply chain and should diversify the energy sources. Moreover, managers can also avoid relying on energy suppliers from countries that are prone to inflation and war to ensure a stable energy supply. In addition, managers should have a contingency plan in place to mitigate any issue raised due to inflation or war. These results also suggest that geopolitical uncertainty has a negative impact on the economic stability of a country. Societies can take certain measures to reduce the impact of geopolitical conflicts or avoid such conditions by voicing their concerns. They could pressure the government for meaningful dialogue between countries, foster social trust, and promote mutual respect among societies which contribute to the reducing tensions, managing conflicts, and promoting economic sustainability.

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Table 1
Definitions of key variables.

Variable	Definition	Source
ESR	Country-specific overall energy security risk index	*GEI*
LN_ESR	Natural logarithm of ESR index score	*GEI*
GDPG	GDP growth rate	*WDI*
GDP	Dollar amount of current GDP	*WDI*
LN_ZSCORE	Natural logarithm of country-wise Z-score	*WDI*
GE	Government expenses as a percentage of GDP	*WDI*
DCPS	Domestic credit to private sector	*WDI*
CE	Consumption expenditure as a percentage of GDP	*WDI*
Export	Net export scaled by GDP	*WDI*
Import	Net import scaled by GDP	*WDI*
RR	Real rate of interest	*WDI*
Unemp_ILO	Unemployment rate estimated by ILO	*WDI*
R&D	R&D expenditure as a percentage of GDP	*WDI*
Inflation	Inflation rate	*WDI*
GEPU	Global economic policy uncertainty index	*Davis (2016)*
GPR	Overall geopolitical risk index	*Caldara & Iacoviello (2022)*
GPRA	Geopolitical acts index	*Caldara & Iacoviello (2022)*
War_Threat	Component of GPR stemming from war threats	*Caldara & Iacoviello (2022)*
CCE	Control of corruption estimate	*WGI*
GEE	Governance effectiveness estimate	*WGI*
PVE	Political stability and absence of violence estimate	*WGI*
RQE	Regulatory quality estimate	*WGI*
RLE	Rule of law estimate	*WGI*
VAE	Voice and accountability estimate	*WGI*

Note: This table lists the definitions of key variables. GEI is Global Energy Institute, WDI is the World Development Indicators. WGI is the Worldwide Governance Indicators.

Table 2
Summary statistics.

Variable	N	Mean	SD	Min	Max
ESR	2,856	1,468.478	923.563	1.000	3,028
LN_ESR	2,856	6.746	1.673	0.000	8.016
GDPG	2,621	3.197	4.427	-11.700	17.013
GDP	2,700	5.75×10^{11}	1.44×10^{12}	3.50×10^{9}	1.08×10^{13}
GE	2,550	16.687	5.685	2.577	33.012
DCPS	1,896	64.875	46.348	5.414	191.189
CE	2,548	73.155	11.133	34.910	95.068
Import	2,547	36.473	23.606	6.521	159.268
Export	2,547	38.557	27.256	5.908	176.745
RD	1,254	1.208	1.005	0.042	4.130
RR	1,389	4.725	10.813	-43.051	44.635
Unemp_ILO	2,108	7.533	5.320	0.561	28.340
Inflation	2,521	14.522	49.363	-1.547	411.760
GEPU	1,700	130.101	62.110	62.676	320.046
GPR	2,516	98.946	27.227	50.915	176.302

Note: This table reports the summary statistics of our main variables.

Table 3
Baseline multivariate analyses.

Y = *GDPG*$_{i,t+1}$	(1) *Full sample*	(2) *Full sample*	(3) *Exc. USA*	(4) *Exc. USA*
LN_ESR	**-0.147****	**-0.151****	**-0.145****	**-0.149****
	(0.056)	**(0.054)**	**(0.056)**	**(0.053)**
GE	0.145**	0.086	0.151**	0.093*
	(0.059)	(0.048)	(0.049)	(0.044)
DCPS	-0.053***	-0.051***	-0.051***	-0.049***
	(0.012)	(0.010)	(0.013)	(0.011)
CE	-0.133*	-0.078	-0.125*	-0.069
	(0.062)	(0.054)	(0.063)	(0.056)
Import	0.121*	0.082	0.117	0.077
	(0.060)	(0.058)	(0.062)	(0.060)
Export	-0.101	-0.065	-0.097	-0.061
	(0.056)	(0.053)	(0.057)	(0.054)
R&D	-0.047	0.299	-0.151	0.212
	(0.566)	(0.642)	(0.582)	(0.673)
RR	-0.059***	-0.039	-0.061***	-0.041
	(0.012)	(0.022)	(0.012)	(0.022)
Unemp_ILO	0.180***	0.170***	0.189***	0.179***
	(0.027)	(0.029)	(0.026)	(0.030)
Inflation	-0.010	-0.005	-0.009	-0.004
	(0.005)	(0.006)	(0.005)	(0.006)
GEPU		0.018**		0.018**
		(0.005)		(0.005)
GPR		0.024***		0.026***
		(0.004)		(0.004)
Constant	6.098*	0.922	5.198	-0.187
	(3.029)	(3.373)	(3.137)	(3.640)
N	616	603	591	579
R-squared	0.625	0.626	0.626	0.626
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Note: This table reports the results from our baseline multivariate investigations. Future GDP growth rate (*GDPG*) is the dependent variable and the log of country-specific overall energy security risk index score (*LN_ESR)* in the current period is the main independent variable. Model 3 (model 4) is the replication of model 1 (model 2) using a sub-sample that excludes USA. Table 1 offers the definitions of the variables. All models include year fixed effects, country fixed effects, and standard errors clustered at the region level. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 4
The role of inflation and war

Y = *GDPG*$_{i,t+1}$	(1) *Inflation*	(2) *GPR*	(3) *GPRA*	(4) *War_Threat*
LN_ESR	-0.027	-0.032	-0.058	0.016
	(0.072)	(0.053)	(0.044)	(0.114)
Inflation	0.059**	-0.010	-0.010	-0.015***

	(0.017)	(0.005)	(0.005)	(0.004)
LN_ESR*Inflation	**-0.010*** **			
	(0.002)			
GPR	0.026***	0.034***		
	(0.004)	(0.005)		
LN_ESR*GPR		**-0.001***		
		(0.001)		
GPRA			0.012***	
			(0.002)	
LN_ESR*GPRA			**-0.001****	
			(0.000)	
War_Threat				7.797***
				(1.629)
LN_ESR*War_Threat				**-0.725*** **
				(0.163)
GE	0.133*	0.139*	0.138*	0.257*
	(0.057)	(0.058)	(0.057)	(0.119)
DCPS	-0.055***	-0.052***	-0.052***	-0.056***
	(0.013)	(0.012)	(0.012)	(0.012)
CE	-0.134*	-0.129*	-0.128*	-0.139**
	(0.068)	(0.062)	(0.061)	(0.056)
Import	0.133	0.118*	0.117*	0.085*
	(0.069)	(0.060)	(0.059)	(0.039)
Export	-0.104	-0.099	-0.098	-0.090*
	(0.060)	(0.056)	(0.055)	(0.037)
R&D	-0.037	-0.021	-0.012	-0.392
	(0.576)	(0.587)	(0.600)	(0.723)
RR	-0.057***	-0.058***	-0.058***	-0.049**
	(0.013)	(0.012)	(0.012)	(0.017)
Unemp_ILO	0.210***	0.178***	0.178***	0.326***
	(0.041)	(0.028)	(0.027)	(0.053)
Constant	3.502	3.903	5.092	2.907
	(3.580)	(3.856)	(3.632)	(3.516)
N	616	616	616	616
R-squared	0.630	0.625	0.625	0.341
Year FE	Yes	Yes	Yes	No
Country FE	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Note: In this table, we document the role of inflation and war-based geopolitical tensions on the impact of energy security on economic stability. In particular, we investigate if the ESR-economic stability relationship deteriorates further in times of high inflation and geopolitical risk stemming from wars. Model 1 presents the results based on inflation, whereas model 2 (3) reports the same for geopolitical risk (geopolitical acts). Finally, model 4 repeats the empirical specification of model 3 by replacing *GPRA* by *War_Threat*. Results indicate that the damaging effect of heightened ESR on a country's economic growth worsens during years of high inflation, geopolitical uncertainty, and war threats. Standard errors are presented in parentheses. *, **, and *** refer to statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5

Does pre-existing GDP growth matter?

Y = $GDPG_{i,t+1}$	(1)	(2)	(3)	(4)
LN_ESR	**-0.368*** **	**-0.082**	**-0.602*** **	**0.256*** **
	(0.077)	**(0.064)**	**(0.075)**	**(0.063)**
GE	0.154	0.076	0.354	1.028**
	(0.253)	(0.094)	(0.274)	(0.358)
DCPS	-0.057***	-0.038***	-0.067***	0.030
	(0.007)	(0.010)	(0.013)	(0.051)
CE	-0.000	-0.111*	-0.352***	0.071

	(0.160)	(0.047)	(0.060)	(0.177)
Import	0.023	0.108***	0.284**	-0.137
	(0.080)	(0.023)	(0.110)	(0.148)
Export	0.029	-0.126***	-0.277**	0.137
	(0.081)	(0.032)	(0.080)	(0.147)
R&D	-0.781	-1.125**	0.539	-3.053**
	(1.404)	(0.314)	(2.289)	(1.228)
RR	-0.063**	-0.048	-0.087***	-0.101
	(0.020)	(0.033)	(0.020)	(0.107)
Unemp_ILO	0.153	0.084	0.571***	0.216
	(0.105)	(0.141)	(0.098)	(0.227)
Inflation	-0.009	-0.040**	0.004	0.091***
	(0.006)	(0.011)	(0.006)	(0.012)
Constant	1.359	11.600**	26.637**	-30.625*
	(5.068)	(4.304)	(10.144)	(13.409)
N	326	290	141	125
R-squared	0.656	0.614	0.780	0.723
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes

Notes: The above table reports the results using sub-samples based on pre-existing GDPG. Model 1 (2) includes countries with pre-existing GDPG below (above) the median. Model 3 (4) considers only the countries whose GDPG belong to the bottom (top) quartile. All models include year and country FE and standard errors clustered at the region level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6

Countries with varying income levels.

Y = $GDPG_{i,t+1}$	(1) *Exc. high income*	(2) *Exc. low income*	(3) *Exc. middle income*
LN_ESR	**-0.322****	**-0.147****	**-0.066**
	(0.112)	**(0.056)**	**(0.122)**
GE	0.375**	0.145**	0.146
	(0.121)	(0.059)	(0.125)
DCPS	-0.033	-0.053***	-0.043***
	(0.025)	(0.012)	(0.009)
CE	-0.200**	-0.133*	-0.056
	(0.062)	(0.062)	(0.065)
Import	0.145*	0.121*	0.016
	(0.061)	(0.060)	(0.063)
Export	-0.154**	-0.101	-0.009

	(0.039)	(0.056)	(0.049)
R&D	-1.724	-0.047	1.370**
	(1.546)	(0.566)	(0.446)
RR	-0.010	-0.059***	-0.099**
	(0.010)	(0.012)	(0.028)
Unemp_ILO	0.175	0.180***	0.207
	(0.120)	(0.027)	(0.105)
Inflation	0.005	-0.010	-0.063***
	(0.003)	(0.005)	(0.007)
Constant	7.794	6.098*	4.840
	(4.908)	(3.029)	(2.948)
N	303	616	313
R-squared	0.659	0.625	0.627
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes

Note: This table reports the results based on countries' income levels. Model 1 (model 2) excludes high (low) income countries, whereas model 3 considers both high- and low-income countries by excluding all middle-income nations. In all models, *GDPG* is regressed on *LN_ESR*, along with all macro-specific control variables. Table 1 offers the definitions of all variables. All models incorporate year FE, country FE, and clustered SE. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 7

Robustness test – 1: Additional control variables

Y = *GDPG*$_{i,t+1}$	(1)	(2)	(3)	(4)	(5)	(6)
LN_ESR	**-0.170****	**-0.274*** **	**-0.237*** **	**-0.167****	**-0.256*** **	**-0.222*** **
	(0.063)	**(0.065)**	**(0.055)**	**(0.065)**	**(0.060)**	**(0.048)**
GE	0.132**	0.188	0.149	0.135**	0.198	0.166
	(0.046)	(0.183)	(0.174)	(0.039)	(0.162)	(0.156)
DCPS	-0.050**	-0.074***	-0.076***	-0.048**	-0.072**	-0.076**
	(0.016)	(0.019)	(0.019)	(0.017)	(0.021)	(0.021)
CE	-0.248*	-0.303**	-0.240**	-0.239*	-0.303**	-0.238*
	(0.106)	(0.120)	(0.094)	(0.106)	(0.121)	(0.099)
Import	0.235*	0.297**	0.238**	0.230*	0.301**	0.240**
	(0.109)	(0.101)	(0.079)	(0.111)	(0.100)	(0.081)
Export	-0.225*	-0.270***	-0.207**	-0.222*	-0.273***	-0.207**
	(0.103)	(0.069)	(0.059)	(0.105)	(0.070)	(0.062)
R&D	-0.322	0.339	0.941	-0.436	0.182	0.840
	(0.630)	(0.817)	(0.835)	(0.680)	(0.847)	(0.886)
RR	-0.054***	0.005	0.046	-0.057***	0.005	0.047
	(0.013)	(0.041)	(0.049)	(0.014)	(0.043)	(0.050)
Unemp_ILO	0.158***	0.166**	0.158**	0.172***	0.172**	0.166**
	(0.031)	(0.046)	(0.049)	(0.031)	(0.050)	(0.051)

Inflation	-0.008	-0.000	0.007	-0.008	0.001	0.007
	(0.006)	(0.011)	(0.012)	(0.005)	(0.011)	(0.012)
CI	-0.138*	-0.150*	-0.131	-0.137*	-0.152	-0.130
	(0.068)	(0.075)	(0.107)	(0.070)	(0.081)	(0.111)
LABOR	-0.034	-0.030	-0.014	-0.033	-0.026	-0.011
	(0.038)	(0.034)	(0.035)	(0.040)	(0.035)	(0.036)
Tax		0.329**	0.279**		0.322**	0.268**
		(0.103)	(0.086)		(0.109)	(0.094)
FDI_In		0.040	0.059		0.035	0.056
		(0.040)	(0.034)		(0.039)	(0.032)
FDI_Out		-0.086**	-0.099**		-0.081**	-0.095**
		(0.031)	(0.027)		(0.032)	(0.027)
BM		0.029***	0.036***		0.027***	0.035***
		(0.005)	(0.007)		(0.005)	(0.007)
GEPU			0.011***			0.011***
			(0.002)			(0.003)
GPR			0.022**			0.023**
			(0.007)			(0.007)
Constant	19.836**	28.327***	15.022	18.735*	25.743*	18.768
	(8.005)	(7.132)	(9.640)	(8.215)	(10.554)	(11.205)
N	591	433	424	566	408	400
R-squared	0.627	0.666	0.668	0.628	0.664	0.667
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table illustrates the results from further robustness analyses using additional control variables. Model 1 includes capital investment (*CI*) and labor force participation rate (*LABOR*) as additional controls. Model 2 adds tax revenue (*Tax*), FDI inflow and outflow (*FDI_In* and *FDI_Out*, respectively), and broad money (*BM*) to model 1. Model 3 includes GEPU and GPR as we have done in models 2 and 4 of Table 3. Models 4-6 repeat models 1-3 using sub-sample excluding USA. Standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 8

Robustness test – 2: Alternative measure of economic stability

Y = *LN_ZSCORE*$_{i,t+1}$	(1)	(2)	(3)	(4)
LN_ESR	**-0.054****	**-0.054****	**-0.023**	**-0.023****
	(0.025)	**(0.025)**	**(0.014)**	**(0.006)**
GE	0.050***	0.053***	0.076***	0.076**
	(0.008)	(0.008)	(0.014)	(0.024)
DCPS	-0.007***	-0.007***	-0.004***	-0.004
	(0.001)	(0.001)	(0.001)	(0.002)
CE	0.004	0.004	-0.032***	-0.032**
	(0.005)	(0.005)	(0.006)	(0.011)
Import	-0.008	-0.008	0.006	0.006
	(0.005)	(0.005)	(0.004)	(0.005)
Export	0.013***	0.014***	-0.010**	-0.010**
	(0.005)	(0.005)	(0.004)	(0.003)
R&D	-0.136***	-0.123***	-0.048	-0.048
	(0.045)	(0.046)	(0.073)	(0.061)
RR	-0.013***	-0.014***	0.004*	0.004***
	(0.003)	(0.003)	(0.002)	(0.001)
Unemp_ILO	-0.044***	-0.045***	0.024***	0.024*
	(0.008)	(0.009)	(0.007)	(0.010)
Inflation	-0.013***	-0.014***	0.004*	0.004***
	(0.004)	(0.004)	(0.002)	(0.001)

Constant	2.684***	2.315***	2.938***	2.938***
	(0.431)	(0.485)	(0.397)	(0.382)
N	352	352	352	352
R-squared	0.350	0.379	0.924	0.924
Year FE	No	Yes	Yes	Yes
Country FE	No	No	Yes	Yes
Clustered SE	No	No	No	Yes

Note: This table reports the results from our first set of robustness tests. Natural logarithm of country-specific Z-score (*LN_ZSCORE*) is the explained variable, whereas *LN_ESR* is the explanatory variable in all models. Model 1 (model 4) excludes (includes) year FE, country FE, and clustered SE. Model 2 incorporates year FE only, whereas model 3 includes both year and country FE. Table 1 defines all variables. Standard errors have been clustered at the region level and are reported in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 9
Robustness test – 3: PSM regressions

Y = $GDPG_{i,t+1}$	(1)	(2)	(3)	(4)	(5)
CH_LN_ESR	**-0.650****	**-0.753****	**-0.687***	**-0.768****	**-0.676***
	(0.243)	**(0.299)**	**(0.303)**	**(0.307)**	**(0.311)**
GE		-0.082	-0.085	-0.074	-0.079
		(0.049)	(0.050)	(0.048)	(0.050)
DCPS		-0.008	-0.008	-0.008	-0.009
		(0.005)	(0.005)	(0.005)	(0.005)
CE		-0.178***	-0.172***	-0.182***	-0.175**
		(0.043)	(0.045)	(0.046)	(0.048)
Import		0.107**	0.101**	0.111**	0.104**
		(0.037)	(0.040)	(0.037)	(0.040)
Export		-0.128***	-0.121**	-0.131***	-0.123**
		(0.034)	(0.037)	(0.034)	(0.037)
R&D		-0.059	-0.022	-0.107	-0.058
		(0.344)	(0.337)	(0.366)	(0.356)
RR		-0.019*	-0.008	-0.018*	-0.008
		(0.008)	(0.006)	(0.008)	(0.006)
Unemp_ILO		0.021	0.022	0.020	0.021
		(0.040)	(0.040)	(0.041)	(0.040)
Inflation		-0.008**	-0.001	-0.007*	-0.000
		(0.003)	(0.004)	(0.003)	(0.004)
GEPU			0.014**		0.014**
			(0.005)		(0.006)
GPR			0.023***		0.025***

			(0.006)		(0.006)
Constant	2.801*	18.350***	15.905***	18.274***	15.813***
	(1.371)	(3.986)	(3.018)	(4.302)	(3.128)
N	922	569	557	545	534
R-squared	0.347	0.452	0.453	0.452	0.451
Year FE	Yes	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes	Yes

Note: In this table, we illustrate the results from PSM regressions. We use a matched sample of countries, who are matched on-to-one, without replacement, based on a defined set of country-level factors, such as govt. expenses, domestic credit to private sector, net import and export, inflation rate, R&D spending, and unemployment rate estimated by ILO. We then split these countries into two groups, i.e., treatment and control, based on a dummy variable, *CH_LN_ESR*, which is equal to 1 if a country has experienced a rise (deterioration) in its *LN_ESR* (energy security profile) from the previous year. $GDPG_{i,t+1}$ is the predicted variable in all models. Models 4 and 5 repeat models 2 and 3, respectively, using non-U.S. samples. Standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 10
Moderating effect country-level institutional quality

	(1)	(2)	(3)	(4)	(5)	(6)
LN_ESR	-0.083	-0.155**	0.089	-0.185**	-0.084	-0.169
	(0.070)	(0.061)	(0.0[illegible]3)	(0.065)	(0.070)	(0.104)
CCE	-1.315					
	(1.401)					
LN_ESR*CCE	**0.452*** **					
	(0.097)					
GEE		-3.173***				
		(0.76[illegible])				
LN_ESR*GEE		**0.3[illegible]5*** **				
		(0.078)				
PVE			-0.712**			
			(0.213)			
LN_ESR*PVE			**0.101*** **			
			(0.026)			
RQE				-1.890		
				(1.134)		
LN_ESR*RQE				**0.399*** **		
				(0.044)		
RLE					-1.778	
					(1.173)	
LN_ESR*RLE					**0.351*** **	
					(0.083)	
VAE						-0.335
						(0.206)
LN_ESR*VAE						**0.210***
						(0.107)
GE	0.123	0.109	0.126*	0.110	0.111	0.133*
	(0.071)	(0.066)	(0.063)	(0.067)	(0.070)	(0.064)
DCPS	-0.049***	-0.053***	-0.052***	-0.052***	-0.053***	-0.051***
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
CE	-0.113*	-0.098	-0.099	-0.092	-0.095*	-0.110*

	(0.047)	(0.059)	(0.053)	(0.050)	(0.046)	(0.055)
Import	0.123	0.117	0.112	0.116	0.120	0.111
	(0.072)	(0.073)	(0.071)	(0.070)	(0.063)	(0.071)
Export	-0.083	-0.081	-0.083	-0.078	-0.081	-0.082
	(0.057)	(0.060)	(0.057)	(0.058)	(0.051)	(0.057)
R&D	0.139	0.178	0.138	0.343	0.270	0.543
	(0.821)	(0.608)	(0.662)	(0.745)	(0.719)	(0.858)
RR	-0.048**	-0.049**	-0.054**	-0.051**	-0.050**	-0.050**
	(0.014)	(0.018)	(0.015)	(0.015)	(0.015)	(0.016)
Unemp_ILO	0.204***	0.167***	0.154***	0.174***	0.170***	0.168***
	(0.021)	(0.034)	(0.035)	(0.019)	(0.023)	(0.027)
Inflation	-0.051**	-0.062**	-0.058**	-0.055**	-0.058**	-0.057**
	(0.017)	(0.021)	(0.023)	(0.017)	(0.019)	(0.021)
Constant	5.567**	4.765	4.729	5.383**	4.673**	6.609**
	(1.682)	(2.483)	(2.541)	(2.055)	(1.819)	(2.205)
N	558	558	558	558	558	558
R-squared	0.652	0.648	0.644	0.648	0.647	0.646
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes	Yes	Yes

Note: In this table, we document the results from the moderating effects of WGI's country-level governance estimates on the *LN_ESR-GDPG* relationship. Standard errors, which are reported in parentheses, have been clustered at the region level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Energy security and economic stability: The role of inflation and war

HIGHLIGHTS

- We investigate the impact of energy security risk (ESR) on economic stability.
- Our results reveal that ESR significantly reduces GDP growth rate (GDPG).
- This negative effect is mainly attributed to countries with preexisting low GDPG.
- Country-level institutional quality moderates this effect.
- The damaging impact of ESR worsens during years of high inflation and war threats.