



A comparative analysis of the performances of macroeconomic indicators during the Global Financial Crisis, COVID-19 Pandemic, and the Russia-Ukraine War: The Ghanaian case

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ABSTRACT

The recent downturn of the Ghanaian economy has been numerous attributed by the government and policymakers to past global shocks. By using a descriptive approach, this study aimed to examine the performances of macroeconomic indicators of the Ghanaian economy during the three most recent and impactful global shocks – the Global Financial Crisis (GFC), the COVID-19 pandemic, and the Russia-Ukraine war. Through comparative analysis, the study shows under which shock an indicator was trending downwards, upwards, or stable – on average. The study found that relative to the other shocks, cocoa and gold prices increased most under the GFC, and therefore, their exports were also averagely more favourable under the GFC, but timber exports and oil and gas imports were trending downwards. Exports of timber and timber products and imports of oil and gas increased under the COVID-19 shock but gold export and trade balance declined, on average, during the COVID-19 shock. Exchange rate, oil and gas prices, and food and non-food inflation were found to have been unprecedentedly high during the Russian-Ukraine war compared with all other shocks, and this reflects the worst record of economic growth during the Russian-Ukraine war compared with all other shocks. Appropriate recommendations are made for policymakers to enhance domestic food and non-food production to curb inflation and add value to commodity exports to improve economic growth and trade balance.

Introduction

In the last two decades, the global economy has suffered from three main distinct shocks that have affected global economic activities. The first is the Global Financial Crisis (GFC) which began in late 2007 in the United States of America (USA) and is the severest socio-political-economic phenomenon since the 1950s. According to [Dominguez et al. \(2012\)](#), financial flows declined dramatically during the GFC, for example, domestic and overseas financing for emerging markets dried out by mid-2008 and many export-dependent countries experienced a sharp GDP contraction. The second shock is the novel CoronaVirus (COVID-19) pandemic that began in December 2019 in China. It is deemed as one of the most chaotic socio-health-economic shocks since the likes of the Black Death (1347–1351), HIV/AIDS (1980s), and the

Spanish Flu (1918–1919), which killed about 50 million humans globally ([Shultz et al., 2022](#)). COVID-19 directly affected both the health of humans and economic activities. There were over 233 million confirmed cases, about 4.7 million deaths, and more than 6.1 billion vaccinations worldwide ([Shultz et al., 2022](#)). Although its monetary impacts vary across countries, its current and future economic cost is estimated to be over USD10 trillion. The main transmission channels of the pandemic on the global economy are the restrictions on international mobility, disruption of the global value chain and reduction in cross-country financial flows, leading to a contraction in GDP per capita of more than 90 % of economies worldwide ([Yeyati & Filippini, 2021](#)). The latest global shock is the Russia-Ukraine war which has been the driving force of inflationary pressures in many developed countries and slowed down economic recovery from the COVID-19 pandemic, especially in the labor

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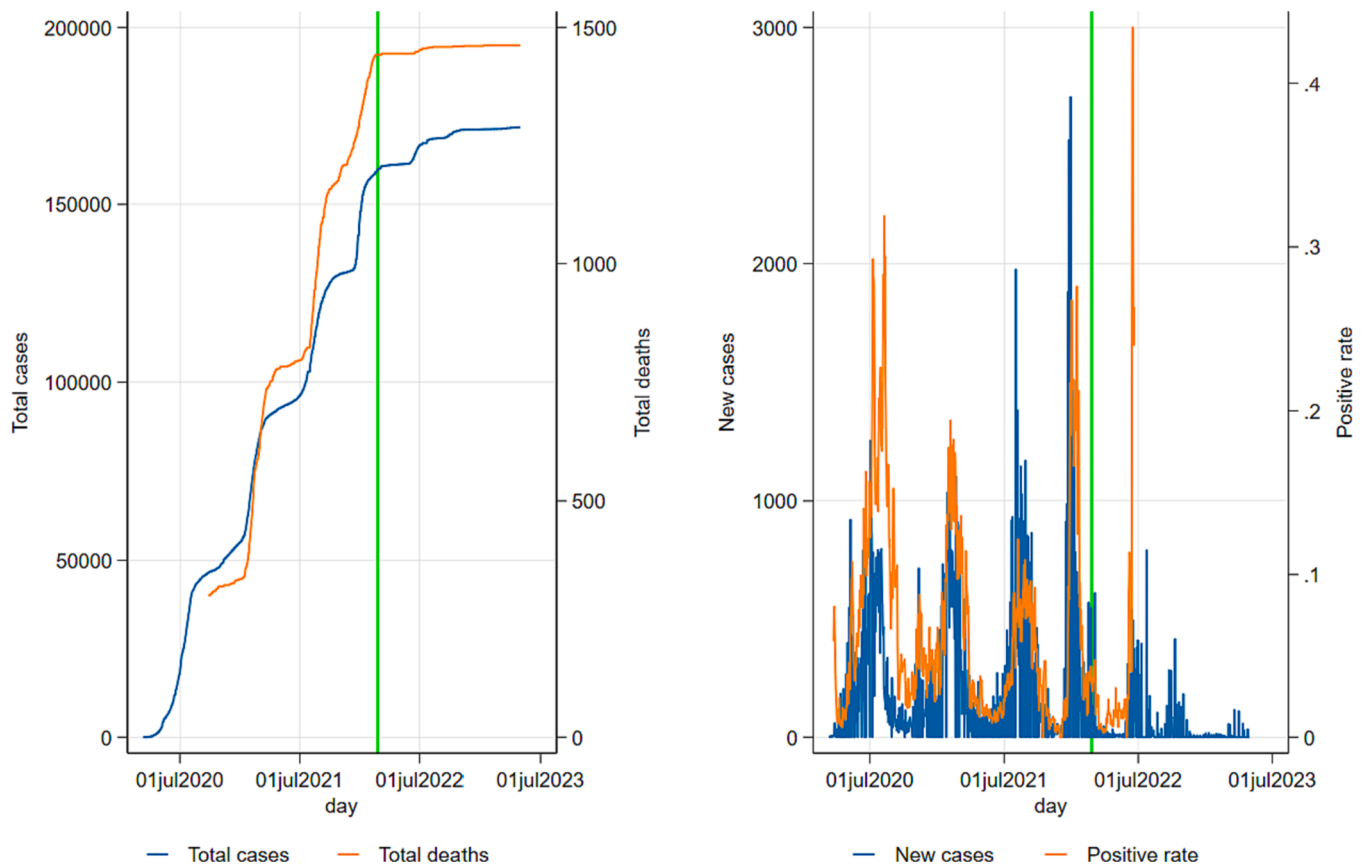


Fig. 1. Ghana's COVID-19 cases and related death rates Source: Authors' construct with data from Our World in Data (2023).

market (Prohorovs, 2022).

Though the GFC began in late 2007 in the USA, Ghana's Finance Minister acknowledged in the 2009 budget statement that Ghana experienced the effect of the GFC from early 2008 with the severest impact occurring in mid-2008. Domestic inflation increased from 16.5 % in 2008 to 19.3 % in 2009 with GDP per capita growth declining from 6.6 % in 2008 to 2.2 % by the end of 2009, causing a recession (World Bank, 2021). Unlike COVID-19 which restricted the movement of goods and services, the GFC did not. Consequently, international trade increased from 70 % in 2008 to 72 % in 2009 and total export earnings rose by 26.6 % between 2007 and 2008 (World Bank, 2021).

Shultz et al. (2022) argue that Ghana is one of Africa's strongest and most stable economies, however, her macroeconomic performance during the COVID-19 exposed her vulnerabilities to shocks, just like other developing economies. Ghana's first COVID-19 case was recorded on 12th March 2020 (left panel of Fig. 1) and as of May 2020, the total cases recorded were 2074. Total deaths increased from 301 in September 2020 to 1306 by the end of December 2021. Similarly, it is observed from the right panel of Fig. 1 that the number of new cases continued to rise from 112 in April 2020 to 853 by June 2020. As a result of the lockdown and restrictions, over 404,200 workers lost their jobs between April and July 2020 (Aduhene & Osei-Assibey, 2021). This worsened inequality, as about 75 % of the affected jobs were small traders, daily workers, and wage labourers. In addition, some salaried workers lost about 50 % of their monthly income. According to the World Bank, Ghana's trade (% GDP) dropped from 77 % in 2019 to 39 % in 2020, foreign direct investment (FDI) declined from 5.7 % to 2.7 %, and GDP growth contracted from 6.5 % in 2019 to 0.5 % by the end of 2020 (World Bank, 2021). Due to the lockdown and the restriction on local mobility, the average price of agricultural produce increased to about 20 % by the end of 2019 (Aduhene & Osei-Assibey, 2021).

As the Ghanaian economy was resurrecting from the pandemic, the

emergence of the Russia-Ukraine war impeded its economic recovery progress. Ghana imports about 60 % of its iron ore from Ukraine, hence the war has disrupted the building and construction industry as imports fell drastically (Mhlanga & Ndhlovu, 2023). Duho et al. (2022) highlighted that the rise in commodity and fertilizer prices is because the war cascades into food prices, especially those made from cereal, resulting in uncontrollable inflation in subsequent periods. Data from the World Bank shows that inflation tripled from 10 % in 2021 to 31.3 % in 2022 (World Bank, 2021). Cocoa ranks among the top commodities exported to Russia and Ukraine. In 2020, cocoa and cocoa preparations exported to Russia and Ukraine were valued at USD 72.5 million and USD 32.5 million, respectively (Duho et al., 2022). Thus, since the war, demand for cocoa could decline with consequential effects on the income gains for the country. The combined effects of input and energy prices would make it difficult to reduce the inflationary pressures in Ghana.

Many researchers have investigated the impact of GFC, COVID-19 or the Russia-Ukraine war on various macroeconomic variables in developing countries (Mhlanga & Ndhlovu, 2023; Aduhene & Osei-Assibey, 2021; Anyanwu & Salami, 2021; Aryeetey & Ackah, 2011; Brambila-Macias & Massa, 2010). However, none of these studies has conducted a comparative analysis of all the shocks in a single study. Performing a comparative analysis between these three unique crises in Ghana is crucial because each of these crises exposes which sector of the economy is most vulnerable to each distinct shock – being it financial, health, or war. Studying these vulnerabilities helps governments, institutions, and businesses to address structural weaknesses to insulate the economy against similar future shocks. Also, the comparison would serve as a strong foundation to analyze possible causal effects which could inform policymakers about which policies to initiate or enforce to combat the adverse effects of these shocks. This could help shape future crisis management strategies and refine policy recommendations. Furthermore, studies on Ghana on individual crises considered a limited

number of macroeconomic variables such as GDP (Amewu et al., 2020), inflation, stress and fear, and employment (Aduhene & Osei-Assibey, 2021) without considering important variables such as exports of cocoa, gold, and timber, oil and non-oil imports, trade balance and non-food inflation. This limits the arguments on the performances of macroeconomic variables under these novel shocks in Ghana. These variables are important because most of them are the backbone of the Ghanaian economy. It is therefore important to conduct further research that provides a descriptive comparison of the macroeconomic position of Ghana under these novel shocks in a single study.

In light of the above, this study aims to investigate the performance of several macroeconomic indicators under each shock. As a descriptive exercise, we compare the average performance of each indicator throughout each shock as well as compare the trend of each indicator at the beginning of the shock with the trend at the end of the shock. This helps us capture the short and long-run trends in the average performance of each indicator under each shock. This study contributes to literature in many ways: First, it provides coherent insights into the severity of each shock and the variables that were most affected simultaneously. Second, the short- and long-run comparison also implicitly informs how effective the policies implemented by the government at the emergence of the shock might have been before the end of the shock. Third, unlike other studies that considered a limited number of macroeconomic variables, this current study expands the variables to provide a comprehensive understanding of these shocks on macroeconomic factors of the Ghanaian economy using tables and figures to easily appreciate the trend and performance of these variables over time under each crisis. Lastly, it is important to mention that this study is the maiden work that has compared the dynamics of macroeconomic indicators in Ghana under each shock in a single study. In doing so, this study provides insight into the following question: “What was the performance and trend of various macroeconomic indicators of Ghana under the last three global shocks?”.

The rest of the study is organized as follows. Section 2 presents the theoretical and empirical reviews of the subject matter. Section 3 presents the data and methodology while section 4 outlines the dynamics and impacts of the shocks across each macroeconomic variable. Lastly, section 5 presents the conclusion and policy recommendations based on the observations from the study.

Literature review

This section is devoted to the review of empirical and theoretical literature on the impact of GFC, COVID-19 and the Russia-Ukraine war on various macroeconomic indicators. The first section focuses on the theoretical literature review and the second section outlines the empirical literature on the three shocks in developing countries, including Ghana.

Theoretical literature review

The impact of recession on macroeconomic variables was outlined in the New Keynesian model. This model suggests that the fundamental cause of recession is a fall in aggregate demand because of a decline in private investment, causing firms to produce below their capacity (Harvey, 2002). This implies that any shock that influences aggregate demand may impact the economy. The GFC, the COVID-19, and the Russia-Ukraine war directly impacted aggregate demand. For instance, the GFC reduces capital flow, especially from developed to developing countries (Dominguez et al., 2012), affecting investment and production. Also, COVID-19 affected consumer behavior and the demand for goods and services as many lost their jobs (Aduhene & Osei-Assibey, 2021, Bukari et al., 2021). This, coupled with the global restrictions, led to a drop in production as household aggregate demand dipped significantly.

The neoclassical growth model considered labor and capital as

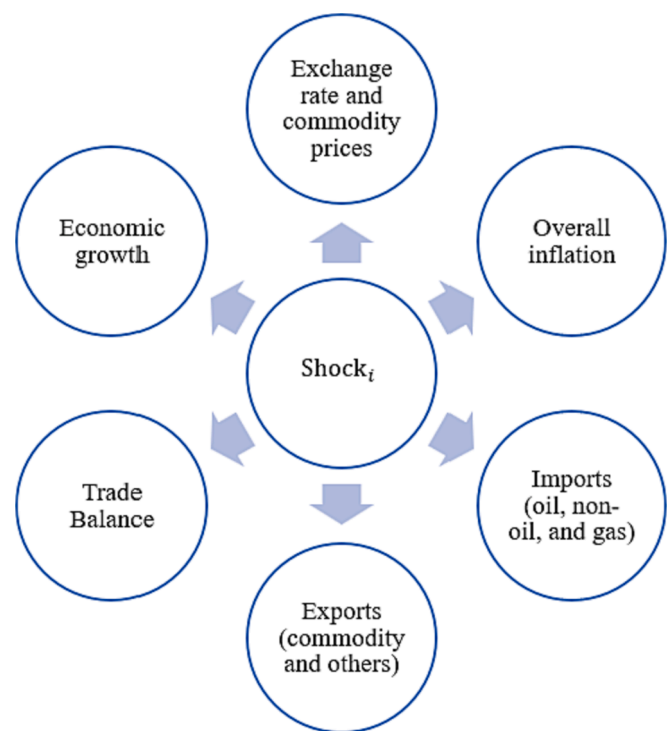


Fig. 2. Conceptual framework for the macroeconomic variables Source: Authors' construction.

essential production inputs. The central theme of the model is that sustained economic growth is driven by capital accumulation, technological progress, and efficient resource allocation (King & Rebelo, 1989). The COVID-19 pandemic restricted the flow of capital goods and labor which are the most important ingredients of the neoclassical growth model as it influences economic growth. Hence, economic growth in many countries, including advanced countries such as the USA, significantly declined (Li et al., 2022). Koopman and Székely (2009) mentioned that the immediate impact of the GFC is its impact on investment and slower capital accumulation, which reduced investment and affected many other macroeconomic variables such as GDP, inflation, and trade balance.

The ongoing Russia-Ukraine war has already affected commodity prices such as wheat, fertilizer and oil since Russia is among the world's largest oil suppliers (Duho et al., 2022). From the demand side, the high food and input prices would result in higher inflationary pressure and a surge in interest rates and consequently retard business growth and expansion. From the supply side, the increase in energy prices due to the war would increase production costs and restrain domestic and overseas investment. Since crude oil is viewed as an essential input in the economy's production in the neoclassical growth model (Ben et al., 2016), the high oil price would increase production costs, leading to a decline in firms' profits.

Conceptual framework

Fig. 2 is a simplified pictorial depiction of the macroeconomic variables under consideration in this study. The current study hypothesized that each $shock_i$ (where i = GFC, COVID-19, Russia-Ukraine) has had unique direct implications on these indicators and could affect the dynamics of these variables. However, the intensity of the disturbance in a macroeconomic indicator varies based on the type of shock. For instance, the COVID-19 shock led to an instant pause of firm activities and, a ban on goods and human mobility to and from Ghana as well as most trade partners of Ghana. As a result of high demand over supply, domestic food and non-food inflation began to increase leading to a rise

in overall inflation. Regarding trade balance, for example, the conflict has disrupted exports of key commodities like oil, natural gas, wheat, and fertilizers from Russia and Ukraine. Countries that rely heavily on imports of these commodities like Ghana are likely to experience higher import bills, worsening their trade balance. COVID-19 created uncertainty, reducing global demand for currencies of severely impacted countries. Currencies of commodity exporters also declined as prices fell initially. The Russia-Ukraine conflict has strengthened the US dollar as a reserve currency, appreciating the dollar against other major currencies. Any country heavily reliant on Russian or Ukrainian trade could see currencies depreciate.

Empirical review

Global financial crises and macroeconomic performance in developing countries

Despite the impact and extent of the GFC, the literature on developing countries, especially those in Africa and Ghana is limited. [Aja-kaiye et al. \(2009\)](#) examined the impact of the crisis on social sectors in Ghana and Nigeria. Their analysis indicates that while exports in Nigeria fell significantly, that of Ghana rose by 22 %. In a related study, [Nkama \(2009\)](#) examined the impact of the GFC in Cameroon and showed that the crisis diminished export revenue, increased inflation, and interrupted jobs in many sectors. Using descriptive analysis, [Gockel \(2010\)](#) investigated the economic impacts of the GFC across various sectors in Ghana. The outcome showed that the economy performed relatively well in terms of commodity exports as cocoa exports increased by 67 % and earnings from gold export increased by 29.6 %. In addition, the average price of timber increased by 17.64 %, which triggered its exports from USD 249.0 million in 2007 to USD 309.0 million in 2008. As a result of the export earnings, GDP was relatively stable at the time of the crisis but the country's financial sector and its ability to borrow weakened while remittances inflow rose from USD 1.3 billion to USD 8.3 billion in 2008. Conversely, [Antwi-Asare et al. \(2010\)](#) reported that the crises reduced remittances, foreign aid, foreign direct investment (FDI) and reduction in wages, especially in the informal labor market. Furthermore, the simulations from the general equilibrium model disclosed that economic development slowed down by 3.8 %. In Africa, [Aryeetey and Ackah \(2011\)](#) analyzed the impacts and transmissions of the GFC on African economies. The authors reported that the crisis reduced the aggregate output on the continent and that trade and remittance inflows were largely affected. Similarly, [Allen and Giovannetti \(2011\)](#) considered the transmission channels of the GFC to African countries and recorded that trade was the main route of the impact of the crisis on African nations, although foreign aid inflows were affected.

[Kenawy and el Ghany \(2012\)](#) explored the socio-economic effects of the GFC on employment and the productivity of other sectors such as banking, tourism, oil, air transport and the chemical industry in Egypt. On average, their analysis indicates that the GFC negatively affected employment and productivity in other sectors. [Dominguez \(2012\)](#) and [Dominguez et al. \(2012\)](#) examined the impact of the GFC on foreign reserve management and decisions using cross-country data for developed and developing countries to assess the role of reserves in managing crises. The result of the study shows that the average reserves for many countries were stable, however, most emerging economies depleted their reserves during the crises which affected their local currencies negatively. [Rena and Msoni \(2014\)](#) examined the GFC and its economic impact on South Africa and reported that the economy went into recession in 2008/09 due to the crises. The authors further reported that about a million jobs were lost and the unemployment rate was above 25 %.

COVID-19 and macroeconomic performance

Beyond the human tragedy of the COVID-19 pandemic, it had a devastating economic impact that has drawn the attention of many

researchers to analyze the implications on macroeconomic indicators. Using qualitative and quantitative interviews, [Babuna et al. \(2020\)](#) revealed that the pandemic led to a loss of Ghs117 million in the insurance industry in Ghana. In a related study, [Afriyie et al. \(2020\)](#) examined the challenges, experiences, and opportunities of the pandemic in relation to its fatalities and healthcare. They revealed that the lockdown and track and trace systems helped minimize the spread of the virus, hence, only 85 deaths were reported by June 2020. [Ataguba \(2020\)](#) revealed that in countries such as Nigeria, the falling oil prices led to the devaluation of local currency. Also, the high commodity prices and decline in production engineered inflationary pressures in many African countries. [Amewu et al. \(2020\)](#) utilized the social accounting multiplier matrix (SAMM) to probe the economic cost of the COVID-19 pandemic in Ghana. The results from the SAMM analysis showed that GDP fell by 27.9 % and an additional 3.8 million Ghanaians became poor. Concerning the socio-economic implication of the pandemic in the Ghanaian marketplaces, [Asante and Mills \(2020\)](#) found that there were increases in general prices of basic goods due to the lockdown and strains on production. [Ozili \(2020\)](#) also investigated the socio-economic impact, policy response and opportunities of the COVID-19 pandemic in Africa. The result revealed that the COVID-19 crisis led to a reduction in stock market prices which restricted financial flows into many African countries. In addition, oil prices reduced significantly, which affected oil-exporting countries such as Nigeria and Angola. In Ghana, [Aduhene and Osei-Assibey \(2021\)](#) explored the socio-economic impact of COVID-19 on the Ghanaian economy using descriptive analysis. The finding from their study indicates that about 42,000 people lost their jobs in the first two months of the outbreak and the tourism sector lost USD171 million. In continental space, [Anyanwu and Salami \(2021\)](#) investigated the impact of the COVID-19 pandemic on African countries, including Ghana. The authors showed that the pandemic has affected many African countries which reflected in the decline in GDP growth, loss of jobs, and increase in general prices of goods and services across the continent. [Shultz \(2022\)](#) revealed that although the pandemic was threatening, Ghana employed measures to reduce its impact. For instance, in early April, the country provided free public water, 50 % reduction in electricity bills, and 50 % increase in the salaries of health workers.

Russia-Ukraine war and macroeconomic performance

Country-specific empirical analysis of the war on Ghana is scanty. Most research is on developing countries, including Ghana. For instance, [Maijama' and Musa \(2022\)](#) performed an empirical investigation on the impact of the war on crude oil prices and how Nigeria as an exporter of crude oil can utilize this opportunity of surge in crude oil prices in the international energy market by increasing its production capacity the authors noted that crude oil prices has increased since the emergence of the war and that Nigeria should take advantage of the oil prices and increase its oil export to generate revenue for development. At the regional level, [Duho et al. \(2022\)](#) investigated the impact of the Russia-Ukraine war on African countries. The outcome showed that in West Africa, Ghana and Nigeria have benefited from the high oil prices. However, the benefits have been eroded by the high commodity prices. Specifically, in Ghana, the increase in cereal and fertilizer prices has cascaded into inflation as experienced from March to December 2022. Similar dynamics were observed for countries such as Côte d'Ivoire and South Africa according to the authors. This result is in tandem with [Ali et al. \(2022\)](#), who reported that oil-exporting countries may gain from price hikes. However, food and oil importers like Morocco may suffer from the increase in prices.

[Mhlanga and Ndhlovu \(2023\)](#) examined the implications of the Russia-Ukraine war on Sustainable Development Goals (SDGs) in Africa using accounts from academic literature and grey literature analysis. Their investigation showed that the continent is experiencing high food prices, energy shortages, and commodity price hikes due to disruptions in the supply chain of vital inputs such as fertilizer and oil. Additionally, the war has disrupted the construction industry, especially in Ghana, as

the supply of iron ores has reduced. [Arndt et al. \(2022\)](#) investigated the impact of the war on food, fertilizer and fuel prices on global poverty and food security, especially in developing countries using countrywide economy models. It was revealed from their study that in the short term, the crises affected agrifood systems, poverty, and food insecurity in 19 countries, pushing 22.3 and 27.9 million people into the hunger and poverty zones, respectively. Similarly, [Arndt et al. \(2023\)](#) reported that the Russia-Ukraine war has increased palm oil prices by 68 %, and wheat prices by 113 %. Also, their results showed that real crude oil rose by 34 %, natural gas (88 %) and fertilizer prices doubled (101 %). These price hikes have impacted inflation in many developing countries.

In summary, the empirical evidence reviewed herein presents an interesting dynamic of the GFC, the COVID-19 pandemic and the Russia-Ukraine war on Ghana and other developing countries. Regarding the war, the main variables affected were oil and commodity prices. The effect is inflationary pressures in developing countries including Ghana. COVID-19, on the other hand, directly disrupted exports and imports of goods and services, employment, consumption, and production. Furthermore, the empirical literature showed that the GFC had exchange rate implications and disrupted financial flows for investment. The most important observation was that none of the literature has comprehensively performed a comparative analysis of the dynamics of macroeconomic variables under these three most impactful shocks in the last two decades in a single study. This gap in the literature on developing countries, especially Ghana, reinforces the significance of this study.

Methodology and data description

This section presents the methodology used for the analysis as well as the description of the variables under study.

Methodology

The primary aim of this study is to examine the performance of macroeconomic indicators of Ghana under the most impactful recent global shocks. By doing so, we compare the weighted average changes in various macroeconomic indicators throughout each shock and discuss under which shock an indicator had the severest, mildest, or favourable average performance. To disentangle the short- and long-term trends, we refer to the last quarter of each shock as the long-run to compare the performance of each indicator from the time of the incidence of the shock with the endline of the shock. To achieve the objectives of the study, we employed descriptive and graphical approaches following [Li et al. \(2022\)](#) and [Aryeetey and Ackah \(2011\)](#). As the focus of the current study is to consider the performances of macroeconomic indicators under each shock and not to capture the impacts of the shocks as causal, this descriptive approach is regarded as appropriate. The weighted averages of each indicator under each shock are presented in tables while the trends are shown in figures. This method is easy to comprehend since it does not require any prior knowledge of econometrics or statistics, hence, it is suitable for both academic and non-academics. The method allows researchers and policymakers to quickly grasp the key trends and patterns in macroeconomic indicators without the need to analyze raw data in detail. This visual clarity can facilitate rapid decision-making post crises. Moreover, the trends shown in graphics help appreciate the possible correlation and behaviour of the indicators during the shocks.

Data description and measurement

The study used monthly data spanning 2008 M1 to 2023 M4. The data was then divided based on the three shocks. The study focused on 2008 M1 to 2009 M12 for the GFC following the arguments of [Domínguez et al. \(2012\)](#) and [Gockel \(2010\)](#), the period from 2020 M3 to 2022 M1 is used for the COVID-19 analysis, and 2022 M2 to 2023 M4 for the

Table 1

Variable description and sources.

Variables	Description and measurement	Sources
Exchange rate	Domestic currency per US\$, period average	IFS
Cocoa price	International prices of cocoa beans (US\$/tonne)	BoG
Gold price	International gold prices (US\$/fine ounce)	BoG
Crude oil price	International Brent crude oil prices (US \$/barrel)	BoG
Oil and gas imports	Merchandise imports oil & gas (Millions of US\$)	BoG
Non-oil import	Merchandise imports of non-oil (Millions of US \$)	BoG
Total import	The sum of all imports	BoG
Cocoa export	Merchandise exports of cocoa beans (Millions of US\$)	BoG
Gold export	Merchandise exports of gold (Millions of US\$)	BoG
Timber and timber product export	Merchandise exports of timber and timber products (Millions of US\$)	BoG
Other export	These include manganese, diamonds, residual fuel oil, electricity, bauxites, etc. (Millions of US \$)	BoG
Total export	The sum of all exports (commodities and non-commodities)	BoG
Trade balance	Export less imports (Millions of US\$)	BoG
Food inflation	Prices of consumable food (measured in %)	BoG
Non-food inflation	These include alcohol, housing and utilities, health, education, clothing, and footwear,	BoG
Overall inflation	Overall index (2018 Average = 100)	BoG
Economic Growth	Bank of Ghana composite index of economic activity (Real Growth, %)	BoG

Note: IFS is International Financial Statistics (IFS), and BoG is Bank of Ghana. Source: Authors' construction

Russia-Ukraine war due to data availability. It is acknowledged that each of these shocks could have an aftermath effect. However, this study is focused on the performance of the variables under consideration only throughout the shocks. The total number of deaths from the pandemic was relatively stable from the beginning of the war (see green line in [Fig. 1](#)), which served as the motivation to choose the duration of the pandemic shock. The variables are categorized into exchange rate and commodity prices (cocoa, gold, crude oil), trade variables (imports, exports, and trade balance) and other macroeconomic indicators (inflation and GDP). [Table 1](#) provides a detailed description and sources of the data, while [Table 2](#) provides the overall summary statistics.

[Table 2](#) provides the summary statistics for the overall periods considered in the study. All the variables have positive averages. Specifically, oil, cocoa, and gold prices recorded averages of 77.99, 2563.42 and 1348.28, respectively, while the average exchange rate was 3.554 GHS/USD. Also, non-oil imports, oil and gas imports and total imports had averages of 868.12, 217.36 and 1085.26, respectively. Regarding the export variables, the average for cocoa export is 137.28, gold is 390.26, other export is 218.02, timber export is 16.03 and total export is 993.69. Other macroeconomic variables such as trade balance, food and non-food inflation, and real GDP averaged -91.77, 11.26, 16.61 and 10.64, respectively. The negative value for trade balance indicated that the country is running a trade deficit over the sample period. That is, Ghana imported more than it exported to other countries. Furthermore, cocoa price, gold price, total import, non-oil import, total export, gold export and trade balance recorded the highest standard deviations, indicating that these variables have high variability around their averages. This is reasonable since most of these indicators are susceptible to shocks ([Younger, 2016](#)). In terms of dispersion, total import, non-oil import, and trade balance are normally distributed based on the p-value of the Jarque-Bera normality test. [Table 2](#) further shows that gold price, total import, non-oil import, total export, gold export, and other exports are skewed to the left while the rest of the variables are rightly skewed.

Table 2
Descriptive Statistics (overall sample).

Variables	Obs	Mean	Std. Dev.	Min	Max	JB	Skew	Kurt
Oil price	196	77.99	25.196	26.63	134.79	0.000	0.189	1.956
Cocoa price	196	2563.42	392.523	1607.72	3430.35	0.019	0.048	2.299
Gold price	196	1348.28	337.269	630.61	2000.69	0.019	-0.08	2.302
Exchange rate	196	3.554	2.351	0.92	13.07	0.000	1.19	4.816
Total import	196	1085.46	250.969	483.05	1706.98	0.808	-0.006	2.738
Non-oil import	196	868.12	205.999	346.75	1381.73	0.919	-0.059	2.858
Oil gas import	196	217.36	91.424	11.91	580.28	0.000	0.975	4.36
Total export	196	993.69	346.48	305.39	1928.93	0.002	-0.446	2.321
Cocoa export	196	137.28	90.059	0.72	361.62	0.001	0.358	2.215
Gold export	196	390.26	139.447	106.32	724.68	0.008	-0.13	2.26
Other export	196	218.02	58.879	74.42	335.06	0.012	-0.558	2.799
Timber export	196	16.033	4.905	6.07	36.44	0.000	1.061	4.598
Trade balance	196	-91.77	269.284	-733.06	666.99	0.326	0.166	2.623
Food inflation	196	11.265	9.979	0.87	61.00	0.000	3.247	14.339
Non-food inflation	196	16.61	7.807	7.00	49.9	0.000	1.765	7.211
Economic growth	196	10.64	13.755	-10.47	73.36	0.000	2.048	7.752

Note: Obs = observation, Std. Dev = Standard deviation, Min = minimum, Max = Maximum, Skew = Skewness, Kurt = Kurtosis and JB = p-value of Jarque-Bera normality test.

Source: Authors' construction with data from BoG and IFS.

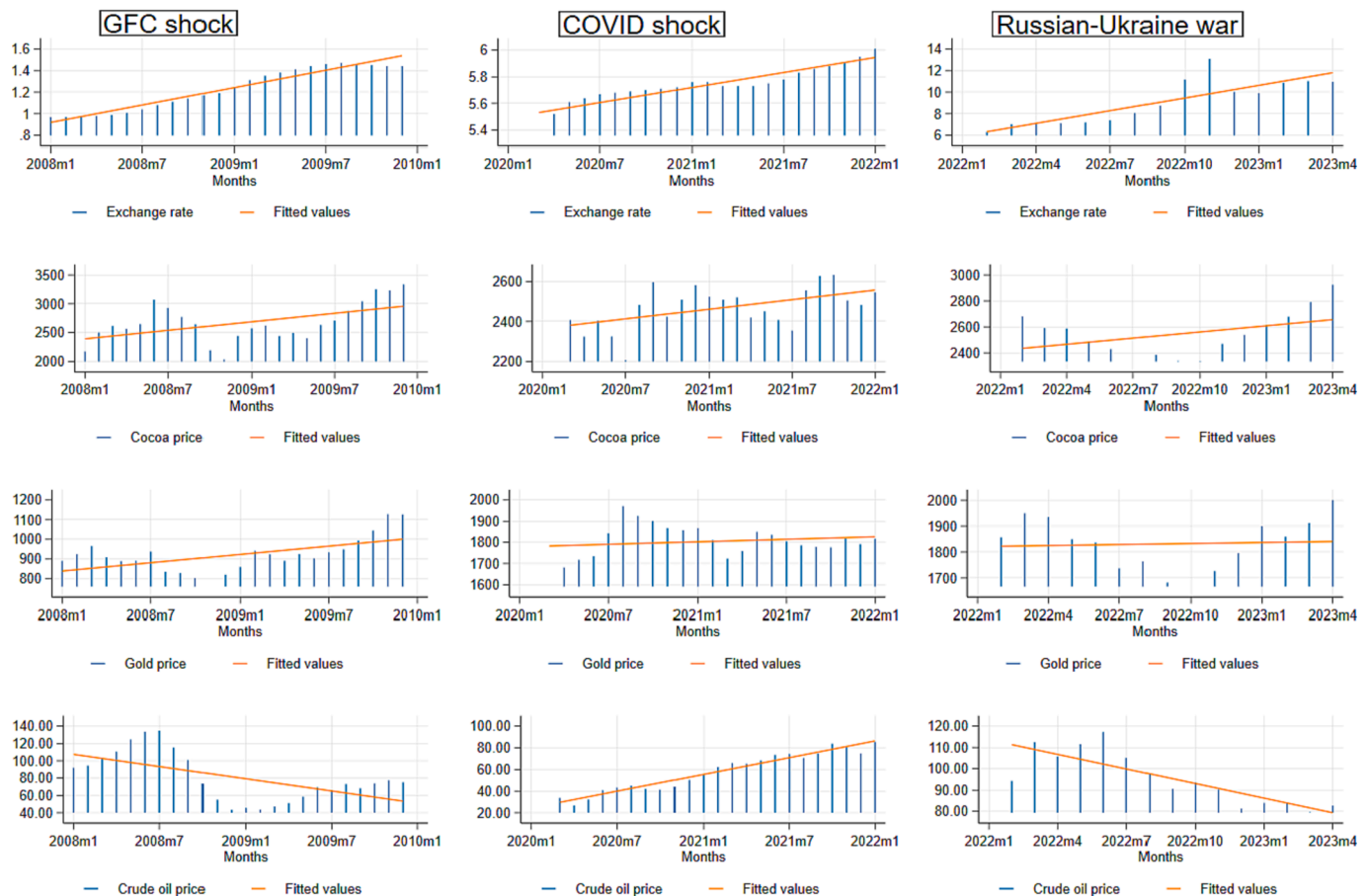


Fig. 3. Performance of exchange rate and commodity prices Source: Authors' construction with data from BoG and IFS.

Discussion of the various macroeconomic variables

This section presents the discussions of the graphical dynamics of the macroeconomic variables under consideration. It is classified into three. The first subsection considers how exchange rate and international commodity prices performed uniquely under the various shocks, followed by the performances of exports and imports, as well as the average performances of trade balance, domestic inflation, and growth.

Performances of commodity prices and exchange rate

Fig. 3 shows the behaviour of exchange rate and international commodity prices under each crisis. It is observed that exchange rate trends positively under each shock implying a consistent depreciation of the Ghanaian currency relative to the USD on average while cocoa and gold prices fluctuate significantly across the three shocks. Oil prices, on the other hand, had a positive trend under COVID-19 but a negative trend under both the GFC and the Russia-Ukraine war. However, we

Table 3

Mean values of indicators under each shock.

	GFC shock	COVID shock	Russia-Ukraine War
Crude oil price	80.418	57.995	95.359
Cocoa price	2675.587	2469.221	2545.526
Gold price	920.43	1804.458	1831.514
Exchange rate	1.228	5.738	9.066
Total imports	740.858	1094.857	1171.088
Non-oil imports	602.358	900.011	796.605
Oil and gas imports	138.5	194.845	374.483
Total exports	462.892	1200.693	1455.813
Cocoa exports	110.311	124.335	134.821
gold exports	199.901	490.835	559.228
other exports	132.223	210.201	250.575
Timber and timber products exports	20.457	12.511	12.493
Trade balance	-277.966	105.838	284.724
Food inflation	15.437	11.465	40.667
Non-food inflation	19.648	9.43	34.353
Economic growth	11.573	10.875	-1.015

Source: Authors' construction using data from BoG and IFS.

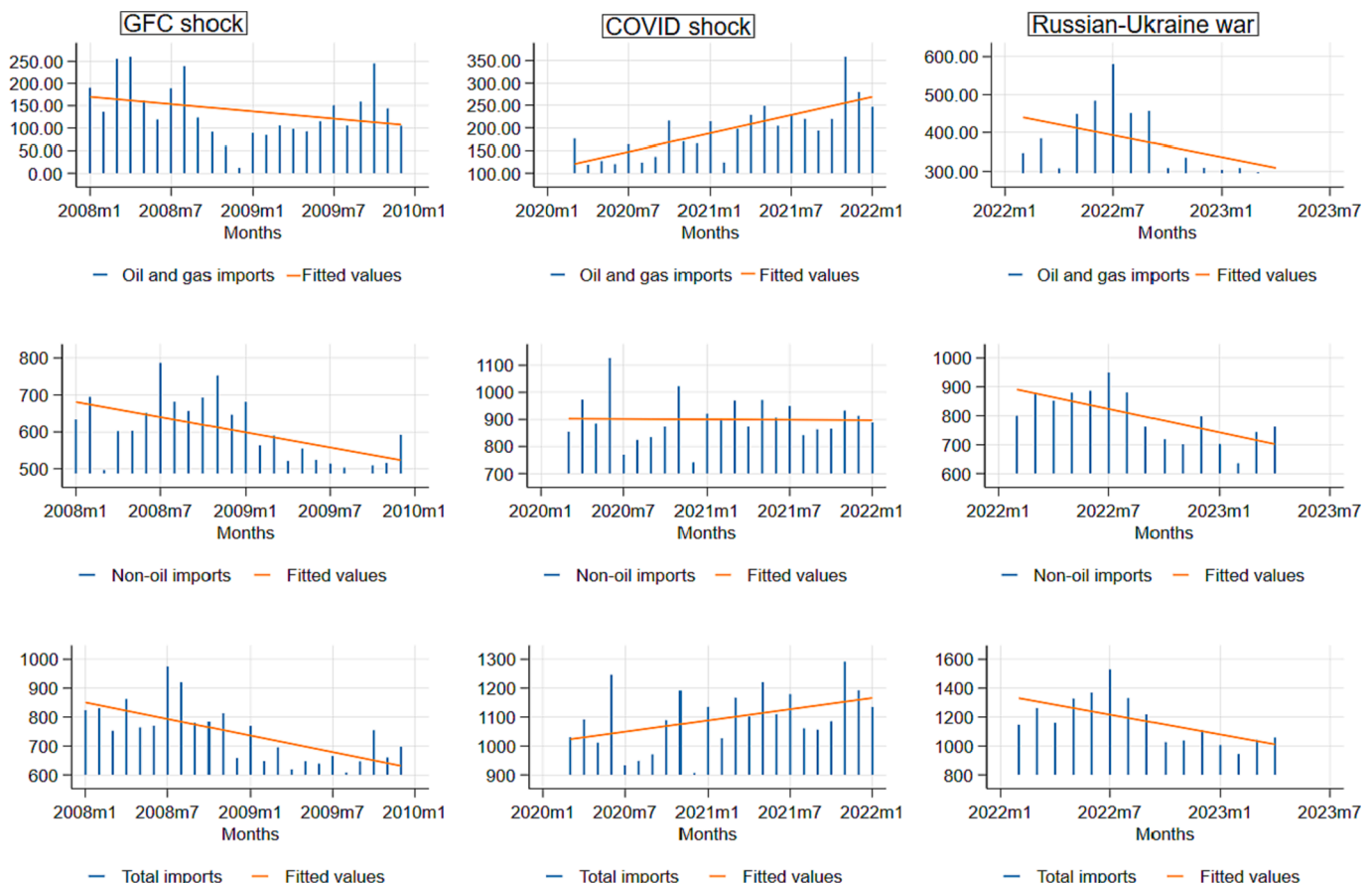
observe relative stability in the rate of depreciation since the beginning of 2023 despite the escalating global effect of the Russian-Ukraine war. Cocoa prices increased in the first half of the GFC but decreased during the second half of 2008. There was also a mild decline in the first half of 2009 but a boost in prices during the second half of the year. During the period of the COVID-19 shock, cocoa prices initially declined in the first half of 2020, but prices increased afterwards and remained relatively stable before beginning to decline again after November 2020. The

decline persisted up to July 2021 and then increased for a short period.

From 2021Q4, cocoa prices have consistently declined, and the breaking of the war saw a further decline in cocoa prices till October 2022. Prices have however been appreciating since 2022Q4. Gold prices faced the same trend as cocoa prices during the GFC and war era but there were significant fluctuations during the COVID-19 era. Gold prices appreciated at the early beginning of COVID-19 but faced a long decline from August 2020 to April 2021. Gold prices remained relatively stable from the second half of 2021 till the war started. Oil price on the other hand kept appreciating from early 2008 till it suffered a persistent decline throughout the GFC. However, oil prices kept rising from the month Ghana recorded its first COVID-19 case and began to decline when the war started. Prices have declined persistently.

The fitted monthly averages in Fig. 3 inform that relative to the other shocks, during the GFC, cocoa and gold prices appreciated on average - which is favourable for the economy since Ghana is a net exporter. This could be because the GFC restricted financial flows across the globe (Dominguez et al., 2012), making many countries rely on gold for external reserve backing, which drove the demand for gold and hence increased gold prices from 2008Q4. The upward trajectory for exchange rate for all three shocks is an indication of how fragile the Ghanaian economy has been in the past decade as it is very responsive across all the shocks. This is in line with the assertions of Ataguba (2020), Maijama' and Musa (2022), Arndt et al. (2023), and Mhlanga and Ndhlovu (2023) that developing countries are susceptible to exchange rate fluctuations driven by imports and food prices.

Also, during the GFC, as many economies were affected in mid-2008, the drive towards economic recovery was high for all economies from early 2009. Thus, international demand for products like cocoa increased which consequently drove its price in 2009. However, the restriction on international mobility of both persons and commodities

**Fig. 4.** Performance of imports Source: Authors' construction with data from BoG.

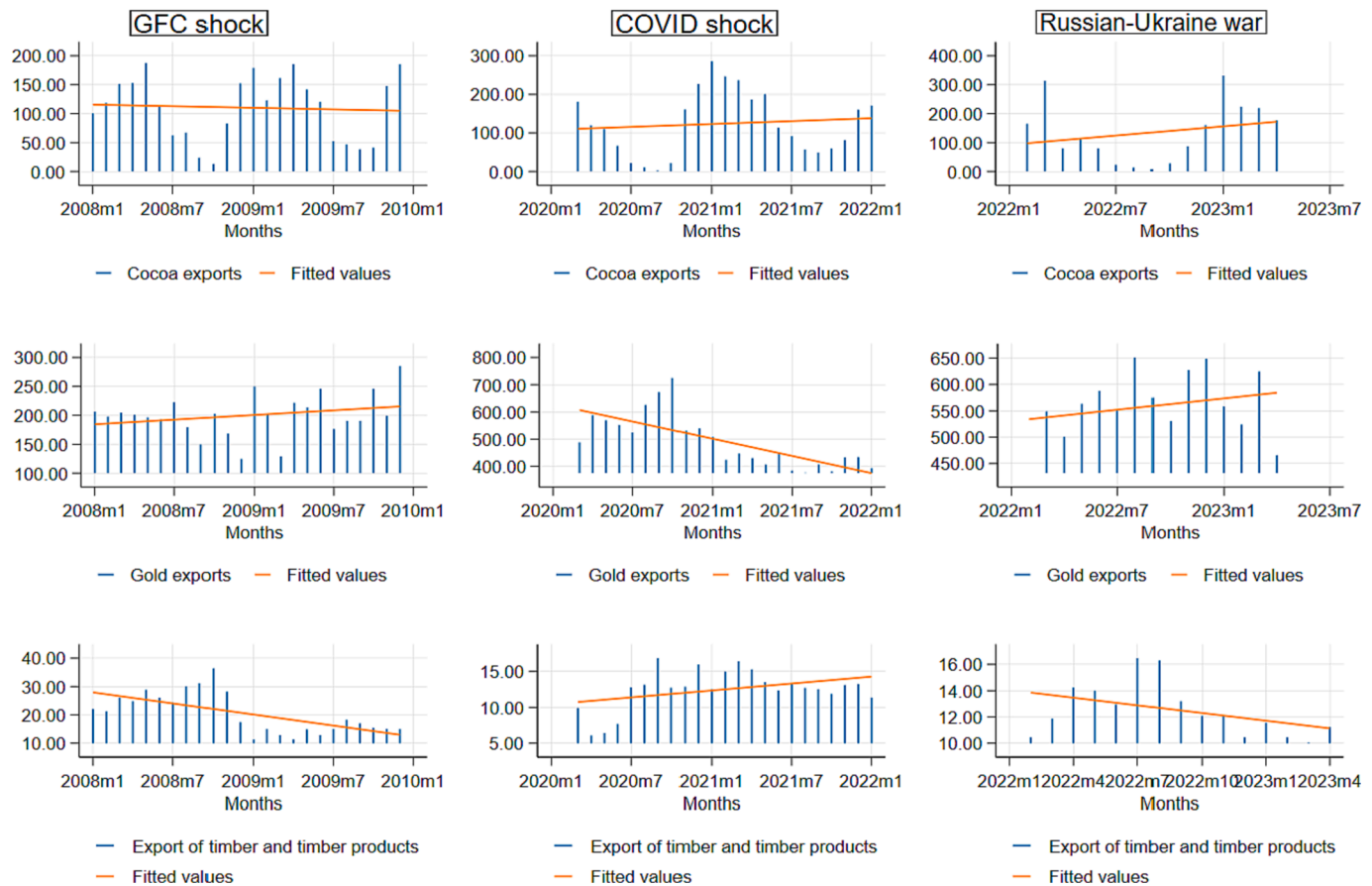


Fig. 5. Performance of export indicators Source: Authors' construction with data from BoG.

relatively stabilized the cocoa trade and thus, a mild increase in its prices was realized. Again, the results could be attributed to the recent globalization of the Ghanaian economy as well as the overdependence of the economy on the international market (Aryeetey & Ackah, 2011; Duho et al., 2022). Due to the significant role of Russia in the supply of oil to the world, it is not surprising that oil prices were averagely higher for the period of the war than under any other shock. Table 3 summarizes the weighted mean values of each indicator under each shock and confirms that the highest average cocoa price was observed during the GFC while the highest average exchange rate and prices of oil and gold occurred during the Russia-Ukraine war.

Performances of imports of oil and gas and non-oil commodities

Fig. 4 shows the dynamics of imports under the three shocks. During the GFC, the import of oil and gas was generally high in 2008Q1 but declined from 2008Q2-Q4 and began to rise in the early part of 2009. On the contrary, the import of oil and gas was steadily increasing throughout the COVID-19 era and continued to increase in the early part of the war but steadily declined after 5 months of the onset of the war. As a result of the war, oil prices were relatively high in 2022Q2, however, they declined from early 2023. On the other hand, non-oil imports were averagely stable in 2008 during the GFC but recorded a significant negative trend throughout 2009. During the COVID-19 period, non-oil imports were generally stable on average but moderately increased at the beginning of the war and steadily declined 5 months into the war. As oil and gas form a greater share of the overall import basket of Ghana, the overall import was significantly driven by the shape of the oil and gas import.

The fitted monthly averages in Fig. 4 indicate that oil and gas imports were trending downwards under the GFC and the war crises (even in the

long run) but were trending positively and steadily under the COVID-19 crisis. Also, there was a sharp decline in oil and gas imports at the emergence of the Russia-Ukraine war (i.e., short-run) because of the cut in oil supply, coupled with unprecedented depreciation in the cedi and poor economic growth. For non-oil imports, the fitted averages show a declining trend under the GFC and the war crisis but had a stable trend on average during COVID-19. Considering the overall import, a negative trend was observed during the GFC and the war crisis, but a positive trend was observed during the COVID-19. Moreover, this result is also confirmed by the recent globalization of the Ghanaian economy and its increased overdependence on the foreign market, making the country vulnerable to global shocks. The weighted means in Table 3 confirm that the average performance of oil and gas imports was highest during the war while non-oil imports were highest during the COVID-19 era.

Performances of commodity exports (cocoa, gold, timber and timber products, and other exports)

From Fig. 5, the export of cocoa beans increased in the first 5 months of 2008 during the GFC followed by a sharp and steady decline till October 2008 after which a positive trend was recorded. However, after 2009Q1, it dipped and persisted till the end of the year. From the onset of COVID-19 in Ghana, exports of cocoa beans instantaneously declined till November 2020 after which it began to rise, but a consistent decline was experienced again throughout 2021 as trade restrictions reduced. Though cocoa exports rose at the beginning of 2022, there was an immediate decline from March 2022 till 2022Q4. Additionally, cocoa exports have steadily declined since the beginning of 2023, as the war intensifies. Also, the export of gold under GFC was generally stable with a sharp decline in 2008Q4. As the shock dissipated and global economies began to perform, the export of gold began to improve in 2009. During

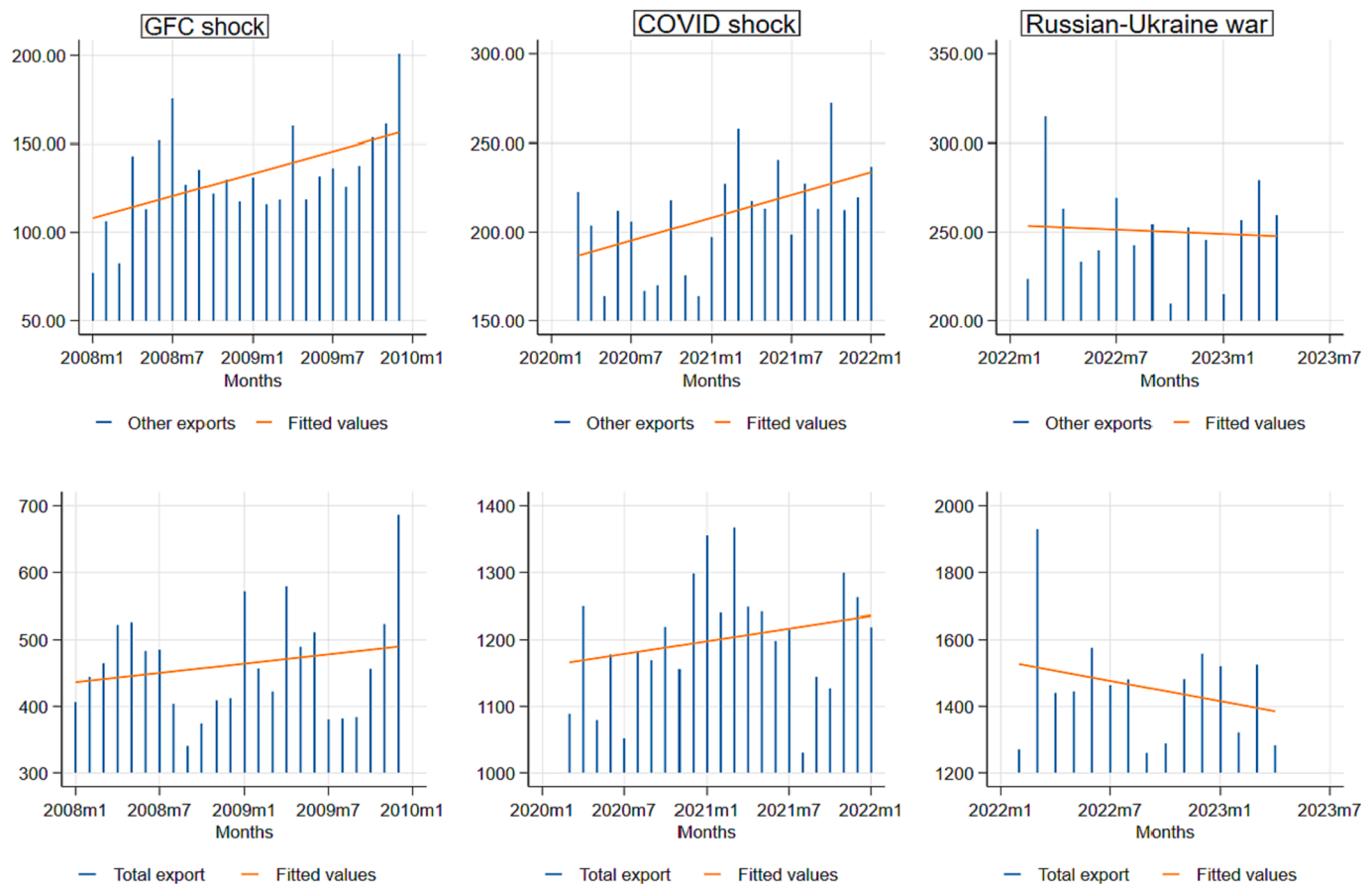


Fig. 6. Performance of other exports and total export Source: Authors' construction with data from BoG.

the COVID-19 era, on the other hand, the export of gold saw a consistent decline. Despite the emergence of the war by early 2022, gold exports remained relatively high. Regarding the export of timber and timber products, little improvement was realized in the early part of the GFC in 2008 but exports declined significantly after 2008Q4. Also, after a short initial decline in timber export due to the COVID-19 shock, a positive trend is observed throughout the COVID-19 era but a generally steady decrease in export from the break of the war.

The fitted averages in Fig. 5 inform that cocoa export recorded an upward trend during the COVID-19 and the war periods but a relatively stable trend during the GFC. On the other hand, gold export recorded was positively average only under the GFC and the war crisis and downward for COVID-19. However, the export of timber and timber products had much steeper downward average trends during the GFC than during the COVID-19 and the war periods. Ajakaiye et al. (2009) found similar results as Ghana's exports increased by 22 % during the GFC. This is because the GFC limited global financial flows which affected the timber-importing countries.

Fig. 6 depicts graphical trends of other exports (manganese, diamonds, residual fuel oil, electricity, bauxites, etc.) and total exports. It is observed that the export of other products was generally upward trending during the GFC and COVID-19 era but mildly negative during the war. Total exports of goods and services initially increased at the beginning of the GFC with a decline after 2008Q2. A positive trend was realized post-2008Q3 and during COVID-19, with an average decrease in total exports since 2022 M3. The average trend was positive in general during the GFC and the pandemic episodes, which could be driven by the high exports of gold and cocoa beans due to the high demand. This is justified by the fact that though Russia and Ukraine have been importers of cocoa beans from Ghana (Ackah et al., 2009), the occurrence of the war has caused a general drift of exports from these countries to other

European countries, where demand is high. Also, Ghana is taking advantage of the relative increase in the prices of these products in recent times compared to the period under the previous shocks. The case is different for timber because of the structural shift of the economy from agrarian coupled with the gradual depletion of the forest resources in the country. Studies such as Nkama (2009) found a contrary outcome for Cameroon where exports of most commodities disproportionately reduced.

Performances of food and non-food inflation

Inflation in the Ghanaian economy can have several negative effects, including eroding the purchasing power of consumers and reducing their standard of living. It can also create uncertainty for consumer spending and business investment, leading to decreased investment and economic instability. Fig. 7 analyzes the trends of food, non-food, and overall inflation under each shock. From Fig. 7, there were persistent fluctuations in food inflation during the GFC with positive trends from 2008Q1-Q2 and 2008Q4 but dipped moderately in 2008Q3 with a consistent decline throughout 2009, as the country emerged from the crises. A similar trend is observed for non-food inflation – reaching a maximum of 24 % in the last two months of 2008. Meanwhile, during the COVID-19 era, there was a gentle decline in food inflation which reached the lowest value of 5 % in May 2021 after which a steady increase was observed. In the same period, non-food inflation fluctuated significantly between 2021 M1 to 2021 M12, which reflects the significant fluctuation in the overall inflation. During the war periods, food and non-food inflation escalated from 2022 M2 to 2023 M1 but showed a favourable decline from the beginning of 2023.

The fitted monthly averages in Fig. 7 inform that both food and non-food inflation were upward trending under all three shocks, but it has

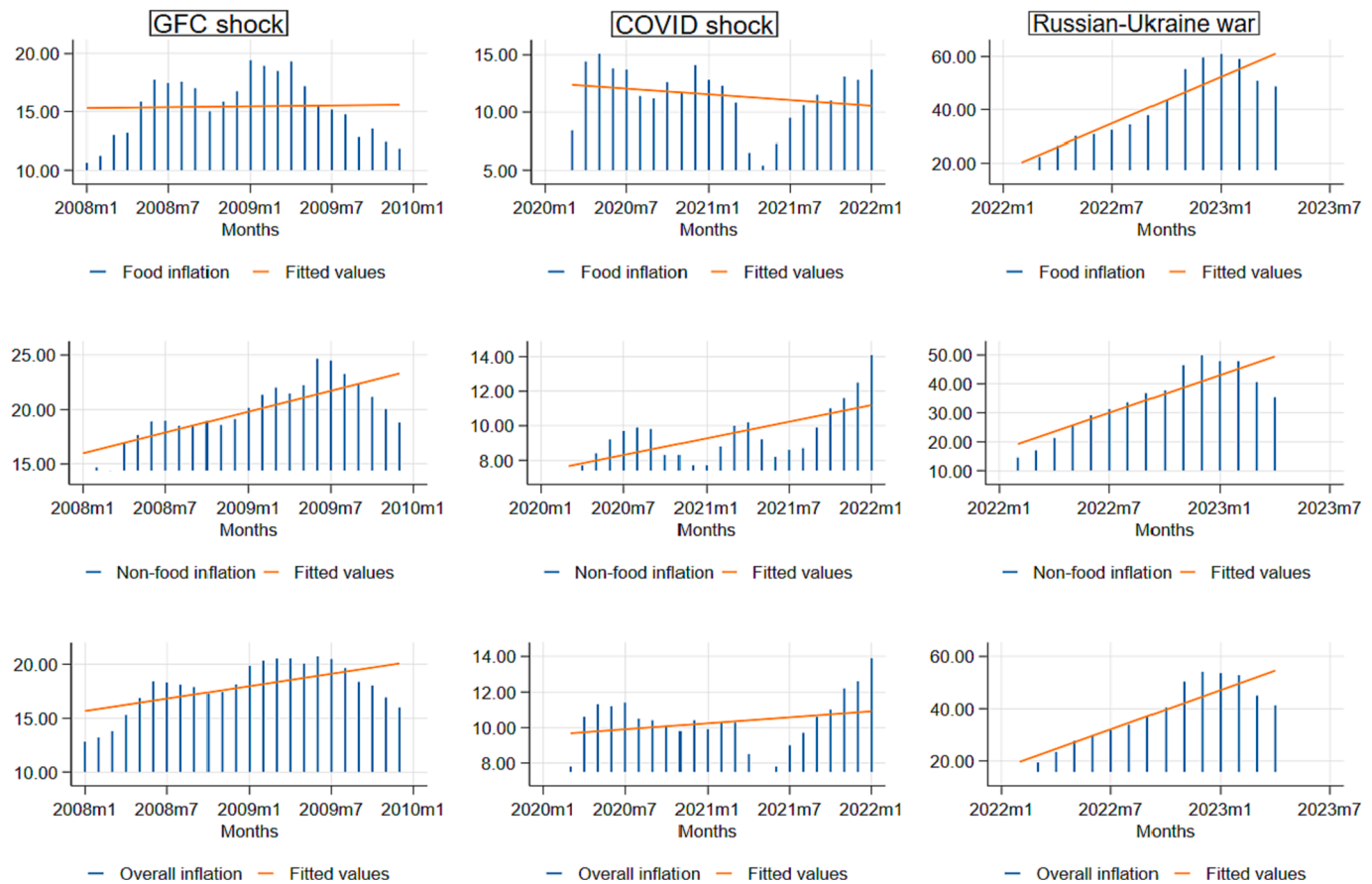


Fig. 7. Performance of inflation Source: Authors' construction with data from BoG.

been persistently high through the Russian-Ukraine war compared to the other shocks. This is reasonable as wheat, crude oil, and fertilizer prices increased by 113 %, 68 %, and 101 %, respectively during the war (Arndt et al., 2023). The dependence on Ukraine and Russia for cereals, fertilizers, live animals, and many other meat and fish products is reflected by the escalating food and non-food inflation since the war because of the significant reduction in the supply to importing countries like Ghana. It is also observed that during the COVID-19 shock food inflation was on the rise in the short run, but it gradually stabilized in the long run as a result of the appropriate lifting of various bans by the government and other government policies such as the provision of free and subsidized electricity and water consumption to reduce the burden of the people during the lockdown. Table 3 confirms that average food and non-food inflation has been highest since the break of the war relative to all other shocks. This narrowly highlights the country's overdependence on other countries for inputs and finished goods. These observations are supported by Arndt et al. (2023) on developing countries, Asante and Mills (2020) on Ghana, Ataguba (2020) on Nigeria, and Nkama (2009) on Cameroon.

Performances of trade balance and economic growth

Given the changes in imports and exports throughout each shock, the trade balance and growth of the country have exhibited divergent patterns under each shock as shown in Fig. 8. Trade balance was generally negative during the GFC but positive during the COVID-19 and war era. According to Dominguez et al. (2012), financial flows for many developing economies dried up during the GFC, which caused reserves depletion and deterioration of exchange rates in import-oriented countries which affected their trade balance. Hence, Ghana experienced a trade deficit throughout the GFC. Though the early part of 2022 showed

a promising favourable trade balance, there was a temporary disturbance from the emergence of the war till 2022Q4.

Economic growth, on the other hand, was high at the beginning of the GFC. This is in line with Gockel (2010) and Aryeetey and Ackah (2011) who argued that at the time of the GFC, the Ghanaian economy was relatively less globalized which reduced the impact of the shock on economic growth. However, the country went into a short-term recession in 2009 M7 and 2009 M8 but quickly emerged in the subsequent months (long run). During the short run (in the first 3 months) of COVID-19, the economy registered negative growth as the country went into a temporary recession. However, there was a restoration from 2020Q2 till the beginning of 2021Q2 due to the reduction of the restrictions on mobility and production. At the start of the war, the economy was performing relatively better until 2022 M8 when it went into a severe recession as inflation and oil prices skyrocketed.

The fitted averages in Fig. 8 inform that it was only during the COVID-19 shock that the average performance of trade balance was trending downward while economic growth was trending upwards. This underscores the favourable measures and investments made by the government to shield the country from the influence of the COVID-19 crisis. During the GFC and the Russian-Ukraine war, trade balance exhibited an upward trend in average performance, but economic growth was trending downwards on average. In terms of economic growth, negative trends are observed in the long run but not in the short run. Rena and Msoni (2014) reported a similar outcome for South Africa. Again, Table 3 confirms that, relative to the other shocks, the most favourable average growth and trade balance were recorded under the GFC.

The results imply that Ghana took advantage of the GFC and the Russian-Ukraine war to improve its trade balances by increasing exports over imports. The average decline in trade during the COVID-19 era is

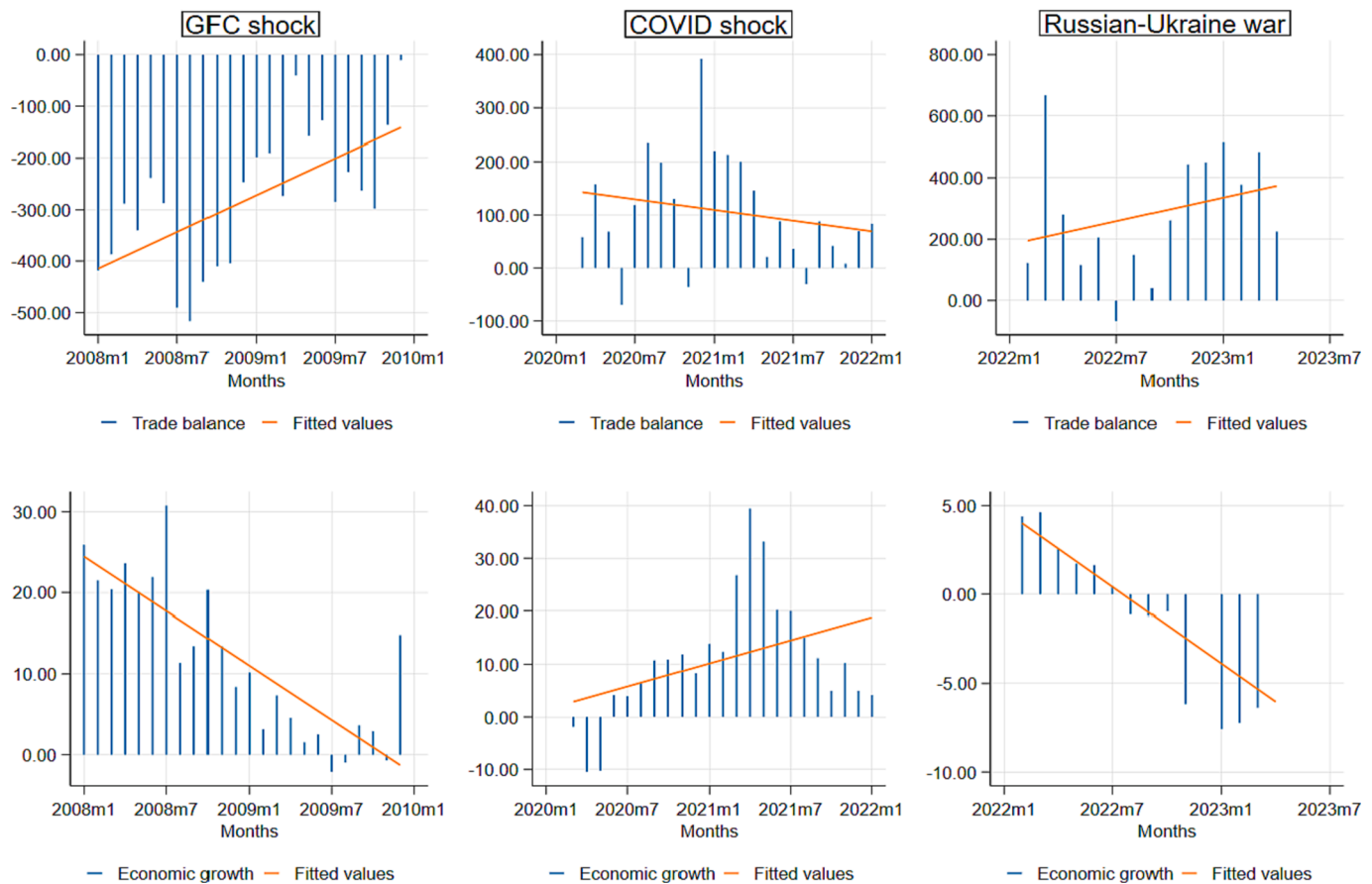


Fig. 8. Performance of trade balance and economic growth Source: Authors' construction with data from BoG.

justified by the partial lockdown that led to the closure of productive economic activities. Thus, in the short run, the country had to rely more on surplus imports after the lifting of COVID-19 bans. Despite the lockdown, growth was generally favourable relative to the situations under the GFC, and it is observed that, on average, the war has impaired growth than all other shocks. This is a motivation that the growth of the Ghanaian economy is more fragile to the war and financial crisis than COVID-19. Again, Table 3 shows that economic growth performed relatively well as it recorded a positive weighted mean during the GFC and COVID-19 than during the war.

Conclusion and policy implications

This study performed a comparative analysis of the dynamics and performance across various macroeconomic variables in Ghana during the global financial crisis, the COVID-19 pandemic, and the Russia-Ukraine war, using a descriptive approach and monthly data from the Bank of Ghana and International Financial Statistics. The study analyzed the performance of each variable by plotting the trend and calculating the average value under each shock. The results were shown with tables and figures.

The analysis showed that cocoa and gold prices increased most on average under the GFC while exchange rate and oil prices performed worse, on average, during the Russia-Ukraine war. Concerning imports, oil and gas imports were persistently trending downwards during the GFC and the war crisis while there was a positive average trend during the COVID-19 crisis. However, the trend in oil and gas imports during the war was averagely positive only in the short run. On the other hand, cocoa and gold exports performed well under the GFC and the war but the latter adversely declined during the COVID-19 shock than under any other shock. Exports of timber and timber products were on the rise

during the COVID-19 shock, but they experienced a sharp decline from the break of the war. Overall, trade balance was favourably higher on average during the GFC than during the war while it was trending downwards during the COVID-19 era. Inflation also has been unprecedentedly higher since the war than it has been under any of the shocks, and this has been reflected in growth records that are poorer than the average records registered during the GFC, and the COVID-19 shock. It is acknowledged that the poor trade balance, inflationary pressure, and exchange rate deterioration during the GFC and the war adversely influenced economic growth in those periods, as the country went into a significant recession in July 2009 and 2022.

Based on these observations, it is recommended that the government and policymakers strengthen the agriculture sector strategically to increase domestic production, both for subsistence and commercial purposes to insulate the country from external shocks. This could be done through investing in the planting of food and jobs programs. This would help reduce the dependence on foreign markets for food, reduce domestic inflation, increase exports to improve the trade balance position, and generate more domestic and foreign revenue to boost growth. Also, with gold, cocoa, and timber being the primary export commodities for the country, the government could add value to these raw products by refining them before exports to take advantage of price booms during short-run shocks. Finally, since the exchange rate consistently performed worse during all three shocks, policymakers should negotiate currency swap lines or trade agreements with major partners to stabilize forex flows and at the same time reduce black market forex trading and illegal capital flight.

One limitation of this study is that no econometric technique is employed to capture the impact of the shocks and the responses of the variables to such impulses. Given the interdependence of the macroeconomic variables discussed in this paper, it is recommended for future

studies to employ impulse response techniques to ascertain such interdependence. Nonetheless, this current study provides a snapshot of the dynamics and performance of diverse macroeconomic variables under each shock, which could be instrumental for policy purposes.

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CRediT authorship contribution statement

Bright Tetteh: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – review & editing. **Enoch Ntsiful:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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