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Do Defense Stocks Show Safe-Haven Characteristics during Geopolitical Tensions?

Insights from the Russo-Ukrainian War

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ABSTRACT:
This study examines the behavior of defense stocks as safe-haven assets during periods of geopolitical tensions, with a particular focus on Russia's invasion of Ukraine in 2022. The underlying motivation is to understand how investors can protect their investment portfolios in times of uncertainty. The research problem is to determine whether defense stocks function as reliable safe-havens during crises by analyzing their characteristics and performance under such conditions. The primary focus is on European stock markets and European defense companies, although other markets are also touched upon.

The theoretical framework is based on the concepts of safe-havens and risk management, as well as existing literature on stock behavior during crises and asset pricing models such as the CAPM and Fama & French three-factor-model. Key concepts include safe-haven, abnormal return, and geopolitical risk. The study draws on prior literature and research to analyze the reactions of defense stocks, typical safe-haven assets, and broader market indices to geopolitical events. As the research topic is relatively new, the limited availability of prior studies and literature presents some challenges in analyzing the results.

The findings suggest that defense stocks have provided significantly above-average returns during and after the onset of the war, supporting their potential role as safe-havens during geopolitically challenging times. The study also observes that defense industry companies have benefited from substantial increases in defense spending and rising security threats. The results offer valuable insights for both individual and institutional investors on how defense stocks can serve as part of a risk management strategy in times of geopolitical uncertainty.

KEYWORDS: Geopolitical tensions, Defense stocks, Hedging, Safe-Haven, War, Risk management, Ukraine, Russia

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TIIVISTELMÄ:

Tässä tutkimuksessa tarkastellaan puolustusosakkeiden käyttäytymistä turvasatamina geopoliittisten jännitteiden aikana, keskittyen etenkin Venäjän hyökkäykseen Ukrainaan vuonna 2022. Lähtökohtana on tarve ymmärtää, kuinka sijoittajat voivat suojata sijoitussalkkuaan epävakaissa olosuhteissa. Tutkimusongelmana on selvittää, toimivatko puolustusosakkeet luotettavina turvasatamina kriisiaikoina eli tutkia niiden ominaisuuksia sekä suorituskykyä kriisien aikana. Tarkastelun kohteena on etenkin Euroopan osakemarkkinat sekä eurooppalaiset puolustusosakkeet, mutta muitakin markkinoita sivutaan tutkimuksessa.

Tutkimuksen teoreettinen viitekehys perustuu turvasatamien ja riskienhallinnan käsitteisiin sekä aiempaan kirjallisuuteen osakkeiden käyttäytymisestä kriisiaikoina sekä osakkeiden hinnoittelumallien kuten CAPM sekä Fama & French kolmen faktorin mallin tuntemiseen. Keskeisiä käsitteitä ovat turvasatama, epänormaali tuotto ja geopoliittinen riski. Tutkimuksessa hyödynnetään aikaisempaa kirjallisuutta sekä tutkimuksia, joiden avulla analysoidaan puolustusosakkeiden, tyypillisten turvasatamien sekä laajempien markkinaindeksien reaktioita geopoliittisiin tapahtumiin. Tutkimusaiheen ollessa hyvin uusi, on todettavissa, että aikaisempien tutkimuksien sekä kirjallisuuden puute tuo osittain haasteita tutkimustulosten analyysiin.

Tutkimuksessa havaitaan, että puolustusosakkeet ovat tarjonneet huomattavasti keskimääräistä parempia tuottoja sodan alkamisen aikana sekä sen jälkeen, mikä tukee väitettä niiden mahdollisesta turvasatamaluonteesta geopoliittisesti haastavina aikoina. Tutkimuksessa havaitaan myös, että puolustusteollisuuden yritykset ovat hyötyneet huomattavasta lisääntyneestä puolustusbudjetoinnista sekä turvallisuusuhkien kasvusta. Tutkimustulokset antavat hyödyllistä tietoa sekä yksityisille sijoittajille että instituutionaalisille toimijoille siitä, kuinka puolustusosakkeet voivat toimia osana riskienhallintastrategiaa geopoliittisesti epävarmoina aikoina.

AVAINSANAT: Geopolitical tensions, Defense stocks, Hedging, Safe-Haven, War, Risk management, Ukraine, Russia

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1 Introduction

Geopolitical tensions in Europe have led to increased global uncertainty in the financial markets and to increased negative abnormal returns in the European stock market (Ahmed et al., 2024, p. 2–3). Considering the geopolitical risks, investors are seeking to preserve capital by often turning to assets perceived as safe-havens during periods of instability (Belhassine & Riahi, 2024, p. 353). While the interest in safe-havens increases during periods of uncertainty, Rigobon & Sack (2005, p. 1780) find that increases in the risk of war have not caused all of investors' capital to flow into safer assets. While traditional safe-haven assets such as gold, US Treasury bonds, and the Swiss franc have been widely studied, the role of defense sector stocks as potential safe-havens, hedges or as diversification remains an underexplored area in financial literature. Given that geopolitical conflicts, in this case Russia's invasion in Ukraine often result in heightened defense spending as found by Tian et al. (2023, p. 557), it is plausible that defense stocks could exhibit some safe-haven characteristics during such periods because of their significant role in this specific sector. This study examines if defense sector stocks act or could act as safe-havens during the Russo-Ukrainian War, analyzing their overall performance, returns and correlation with broader financial markets and the Geopolitical Risk Index (GPR), presented by Caldara & Iacoviello (2022).

The Russo-Ukrainian War, which escalated into full-scale conflict in February 2022, has had profound economic and financial repercussions. A war at this scale has significantly impacted the world's stock market indices negatively (Boungou & Yatie, 2022, p. 2–3). Although the whole world's financial markets have had a negative impact, those markets especially which are neighboring the conflict zone have experienced significant declines (Federle et al., 2024, p. 2–3). The impact was not only on the stock market as found by Belhassine & Riahi (2024, p. 363) who find that agricultural commodity prices also surged in result of the war. As previously mentioned by Tian et al. (2023) the military expenditures have seen a significant boost from previous years for example Europe's military spending grew 13% between the years 2021 to 2022 which sums up to approximately

$480 billion total expenditure. This development will drive higher earnings and support further investments to defense sector companies in the future (Gheorghe & Panazan, 2024, p. 3). These events and effects raise an important question: Do defense stocks systematically provide protection for investors during geopolitical crises, or is this a conflict-specific anomaly? Addressing this question has both theoretical and practical implications for asset pricing, portfolio diversification, and risk management strategies.

1.1 Backround

Financial markets are deeply influenced by various sources of uncertainty, including geopolitical tensions and economic fluctuations. Understanding different economic situations, risk factors and the cause-and-effect relationship is a valuable skill today. Previous research has extensively examined the relationships between asset classes, such as stocks, bonds and so-called safe-haven assets. This study tries to find whether defense sector companies could act as safe-haven assets during geopolitical tensions. This is a field that has not been researched enough to make reliable conclusions yet on whether they can provide a substantial hedge against geopolitical risk compared to traditional safe-haven assets.

According to Będowska-Sojka et al. (2022, p. 1) different asset classes had negative reactions to the war, but the intensity of the effects was different. They find that green bonds and precious metals such as gold, which are also traditionally seen as a safe-haven assets were the least affected negatively by the war. Gold is one of the assets this study is comparing defense stocks to because of its status as a hedging tool and as a safe-haven asset (Beckmann et al. 2015, p. 16).

Different types of conflicts, geopolitical tensions and disasters typically affect the financial markets positively or negatively. Because a large-scale war like todays Russo-Ukrainian war has not seen the light of day in Europe since the second World War, we can study the effects of different previous disasters and how they impacted defense companies stock returns. Capelle-Blancard & Couderc (2008, p. 27–28) find that after the September 11th terrorist attacks which not only shocked the world and the people but the defense sector companies by substantial abnormal returns. A disaster with that magnitude could be compared to today's war happening in Europe but the key difference is the length of the crisis. Interestingly they find that half of the companies which were studied had positive abnormal returns while the other half had negative.

Looking at the present time Martins et al. (2025) find in their study that defense firms based in Europe and the United States have gained positive and significant cumulative abnormal returns (CARs) and because of this, defense stocks could be used as a diversifier during the times of conflict. Different conflicts have different effects on the financial markets but as seen from previous studies, these violent conflicts have had substantial positive returns for defense stocks but negative for broader market indices. Guidolin & La Ferrara (2010, p. 676–677) find that during the second invasion of Iraq by the USA, financial markets saw the conflict as a positive thing by gaining positive market returns, but they also find that commodity indices such as agricultural commodities had negative effects which is the same reaction found in the previous chapter by Belhassine & Riahi (2024, p. 363) who find in their study that the Russo-Ukrainian war had the same effect regarding commodities. This study tries to find that if these abnormal returns and positive investor behavior towards defense sector stocks could be taken as a sign of defense stocks serving as a safe-havens, hedges or a diversification during geopolitical tensions.

1.2 Purpose of the Study & Hypotheses

This study assesses whether defense stocks have the same characteristics as safe-haven assets during geopolitical tensions. Using previous literature and studies, the research aims to find whether defense stocks offer excess returns and reduced market correlation during periods of heightened geopolitical risk and by presenting previous literature in the last chapter, the excess returns seem to be self-evident by seeing that defense firms gain substantial positive abnormal returns from the start of the war. This study also will research the correlation between different asset classes and the GPR to find how traditional safe-haven assets such as gold compares to defense stocks, which the latter has not previously been studied enough as a safe-haven during times of uncertainty. Additionally, the study analyzes market reactions to examine how investor sentiment and herding behavior may have contributed to the market response to defense stocks during the conflict.

The findings of this research will contribute to existing literature by bridging the gap between geopolitical risk, asset pricing, and safe-haven investment strategies. Understanding whether defense stocks provide a reliable hedge against geopolitical uncertainty is of particular importance to institutional investors, policymakers, and financial analysts engaged in risk management. By offering insights into the performance of defense stocks during the Russo-Ukrainian War, this study seeks to enhance our understanding of asset allocation strategies in times of geopolitical crises. This study's hypotheses are,

H1: Defense stocks exhibit safe-haven characteristics during geopolitical tensions.

H2: Defense stocks generate positive abnormal returns following geopolitical conflict-related events.

H3: Defense stocks have a negative or lower correlation with broader market indices during geopolitical crises.

H4: Defense stocks are positively correlated with geopolitical risk index (GPR).

The key purpose of this study is to find whether defense stocks could be identified as safe-havens during geopolitical tensions. To find answers to this question this study examines phenomena such as flight-to-arms mentioned by Zhang et al. (2022) where investors steer away from the negative impact on broader markets indices or stocks and start allocating their assets into the defense sector, which is positively impacted by violent conflicts and increased military spending as mentioned previously by Tian et al. (2023). This research question is important because it hasn't been studied enough before and previous literature has mostly studied only the effects of conflicts and geopolitical risk on the financial markets and assets, but hedging or safe-haven studies have not included defense stocks prior to now. Defense companies' positive returns during times of conflict are a bit self-evident but researching the characteristics of safe-haven assets and finding if defense stocks fill those criteria is important for investors, funds, policymakers and others who are engaged in risk management and asset allocation by knowing if there is a hedge to be utilized or is it that the abnormal returns of defense companies is only the sum of behavioral aspects of investors and temporary and conflict specific anomaly. These questions will be researched in this paper.

1.3 Scope & Limitations

As previously mentioned, this study examines the role of defense stocks as a safe-havens during geopolitical tensions, with a particular focus on the Russo-Ukrainian War and its impact on European financial markets. The research evaluates the performance of defense sector stocks relative to broader market indices and traditional safe-haven assets, such as gold and bonds, by utilizing previous studies and research on this topic.

Despite the comprehensive approach, the study has several limitations. Firstly, the analysis is constrained by data availability, particularly the lack of previous studies based around defense stocks' use as a hedge or a safe-haven. Second, while some event study analyses capture short-term market reactions, they may not fully reflect long-term investment trends or structural shifts in the defense sector in the future. Lastly, geopolitical crises are inherently complex, and isolating the precise impact of war-related events on stock performance remains challenging due to the influence of broader economic and policy factors. Despite these limitations, this study provides valuable insights into the relationship between defense stocks and geopolitical risk, contributing to the broader discussion on safe-haven assets and crisis-driven market behavior.

2 Theoretical Framework

Theoretical frameworks provide the foundation for analyzing the relationship between defense stocks and safe-haven investment behavior during geopolitical tensions. This study draws on established financial theories, including asset pricing models, safe-haven theory, and market reactions related to behavioral finance, to examine whether defense stocks exhibit safe-haven characteristics during the Russo-Ukrainian War. Ahmed et al. (2022) states that because the nature of this conflict being different from previous conflicts in its size and magnitude, its effect on the financial and commodity markets has been significantly negative and the final repercussions of this conflict remain to be unidentified. To understand the effects, risks, returns, hedging or diversification of assets, it's important to go over the framework which is used in a lot of existing literature.

2.1 The Capital Asset Pricing Model

One of the most well-known financial theories and asset pricing models is the capital asset pricing model (CAPM) which was created by William Sharpe (1964) and John Lintner (1965). According to Fama & French (2004) the CAPM is appealing because it provides clear and intuitive predictions about how to assess risk and the relationship between expected return and risk. Feder-Sempach (2024, p. 52) states that the traditional CAPM has an important role in the financial world as a measurement of an assets risk. However, Fama & French (2004) argue that its empirical performance has been weak and so weak in fact that it challenges the model’s practical validity. For instance, CAPM suggests that a stock’s risk should be measured relative to an all-encompassing market portfolio, which in theory includes not only traded financial assets but also consumer durables, real estate, and human capital. The CAPM’s unreliability of measuring expected returns has led to different implementations on asset pricing models one of which is the Fama & French three-factor model. Fama & French (2004, p. 37) critique the traditional

CAPM because it measures risk only by looking at the assets’ beta as a risk factor and different results on expected returns cannot be explained only by the assets beta, because only looking at an assets beta, outlooks other risk measurements which impact assets. They also confirm previous evidence that the security market line is much flatter than the original capital asset pricing model suggests, so the returns on low beta stocks are too high compared to high beta stocks’ returns being too low. This has resulted in investment strategies such as betting against beta (Frazzini & Pedersen 2014, p. 1–2). Although the problems stated by Fama & French that lie within the traditional CAPM model, this paper will use some studies that use it for measuring the expected returns of defense stocks, because of its simplicity and possibilities of data errors occurring are limited since the only measurement considered is the considered assets’ beta. This paper also uses studies that utilize the Fama & French three-factor-model and other multifactor models so we can get results from various models. The traditional CAPM formula is as follows:

$$E(R_i) = R_f + \beta_i * \left(E(R_m) - R_f\right), \tag{1}$$

Where:

$E(R_i)$ is the expected return of an asset i

R_f is the risk-free rate

β_i is the beta of an asset i

$E(R_m)$ is the expected return of a market portfolio

$E(R_m)$-R_f is the excess return of a market portfolio over the risk-free rate (market risk premium)

While the traditional CAPM has been criticized in various studies regarding its validity and poor performance mainly due to the weak performance of beta displaying all the risk an asset has, it still has some value today. Even if beta isn't the most accurate measurement of risk, it can be used to divide assets as risky, safe or neutral by its value as Feder-Sempach (2024, p. 53–54) mentions. She states that safe-haven assets beta should be negative because then the asset moves in the opposite direction than the market during market crashes or crises and a risky assets beta is typically positive. This statement is logical regarding financial theory, but finding assets, especially stocks with negative beta is unlikely. According to her, beta displays how assets move compared to other assets and she also mentions that beta could be in fact used as a replacement for correlation to find safe-havens or hedging assets. One interesting note about CAPM and its performance regarding this study is as found by Covachev & Fazakas (2025, p. 37–38) that when calculating cumulative average abnormal returns (CAARs) on defense stocks in the case of the Russo-Ukrainian war, they find that CAPM based calculations are not statistically significant and they suggest that other factors have more value when calculating expected returns, and the reason for this is that defense industry as a whole has a low market beta. This means that the traditional CAPM is not good enough to measure defense stocks' performance because CAPM assumes that low beta stocks produce low returns, but in this case low beta stocks generate returns bigger than the European stock market (Covachev & Fazakas, 2025).

To sum up, the traditional CAPM model has its flaws and errors, but it still has some use today because of its simplicity and by beta having other properties than simply displaying the risk that an asset has.

2.2 Fama & French Three-Factor-Model

The Fama & French three-factor model (FF3F) takes different factors into account by including variables such as small minus big (SMB) and high minus low (HML). The SMB factor measures small market cap firms minus big market cap firms, and the HML measures high market value firms minus low market value firms which the latter can be seen as growth firms. Fama & French (1996, p. 55) assess that previous studies find that companies' different characteristics are related to the stocks' average returns. These different financial indicators such as price to earnings (P/E), cashflow to price (CF/P) and companies' size cannot be explained by the traditional CAPM according to Fama & French (1996), who also find that the anomalies, so the models not explained by CAPM, largely vanish when using the three-factor model.

As mentioned in the previous chapter, Fama & French (1996, p. 74) find that the traditional CAPM which measures only asset's beta, fails to measure average returns accurately because beta doesn't take factors such as book equity to market equity (BE/ME) and earnings to price (E/P) into account which are related to the asset's average returns. The key finding of the three-factor model is that the model captures the anomalies of CAPM and thus it displays the average returns more accurately. This paper will use studies that utilize multifactor models as well as the traditional CAPM to get results from different models. The Fama & French three-factor model is as follows:

$$E(R_i) = R_f + \beta_i * \left(E(R_m) - R_f\right) + s_i * SMB + h_i * HML + \varepsilon_i, \qquad (2)$$

Where:

$E(R_i)$ is the expected return of an asset i

$E(R_m)$ is the expected return of a market portfolio

R_f is the risk-free rate

$E(R_m)$-R_f is the excess return of a market portfolio over the risk-free rate (market risk premium)

SMB is the return of a portfolio with small market capitalization stocks minus the return of a portfolio with big market capitalization stocks

HML is the return of a portfolio with high book-to-market value stocks minus the return of a portfolio with low book-to-market value stocks

ε_i is the error term

β_i, s_i, h_i are the sensitive variables for the factors $E(R_m)$-R_f, SMB and HML

Understanding how both the original CAPM and the three-factor-model are constructed, how they work and what are their strengths and weaknesses is valuable for understanding the results that some of the studies have that have utilized these models or other multifactor models. These aren't the only models that are being used in finance, but they are widely used and common to face when researching literature. For example, a study by Covachev & Fazakas (2025) use the traditional CAPM as stated in previous chapter, but also a four-factor model and a six-factor-model, all of which led to different results. Giving some background information about asset pricing models helps to understand the different variables used, strengths and the problems that asset pricing models have or may have.

2.3 Hedging & Safe-Haven Theories

Understanding safe-haven and hedging theories is an important cornerstone of this study. According to Feder-Sempach (2024, p. 42) a safe-haven refers to an investment that holds or generates value in volatile or uncertain times. Flight-to-safety phenomena is a term often used in financial literature to describe the situation where investors fear that their currently held investments may have higher risks than before and that triggers the flight-to-safety action where investors reallocate their capital towards lower-risk or safer investments (Mohamad, 2022, p. 1). Feder-Sempach (2024, p. 42) says that flight-to-safety is a way for investors to hedge their portfolios to avoid possible losses caused by heightened risk. Recent financial literature suggests a phenomenon called flight-to-arms regarding investors capital allocation towards defense sector firms during times of geopolitical tensions and that will be discussed further in this study.

Feder-Sempach (2024, p. 43) describes that safe-haven assets are usually measured by their financial statistics such as stability, liquidity and the ability to hedge investments in volatile and difficult times in the market. She points out that even though safe-havens carry protection against market risk, they cannot be categorized as risk-free assets. According to Baur et al. (2021, p. 1) safe-haven assets usually perform the best during broader market downturns and the trade-off for that is usually the fact that they provide lower or in worse case negative returns during stable financial times. Feder-Sempach (2024, p. 44–52) points out an important characteristic of safe-haven assets which is that they should be negatively correlated with the asset affected by downturns such as the stock market. She also mentions that a safe-haven assets should have a negative beta parameter or zero beta during financially unstable times such as crises. The correlation is one of the things this study will research regarding defense stocks' performance during the war, so if they are negatively correlated with the broader market indices. The definitions and differences between hedges and safe havens are as follows:

Table 1: Definitions of Hedges and Safe Havens, (Baur & McDermott, 2010, p. 1889)

Terms	Definition
Weak Hedge	An asset that is positively correlated with comparable asset or a portfolio on average
Strong Hedge	An asset that is negatively correlated with comparable asset or a portfolio on average
Weak Safe Haven	An asset that is positively correlated with comparable asset or a portfolio during specific periods only

Strong Safe Haven	An asset that is negatively correlated with comparable asset or a portfolio during specific periods only

The key difference between a hedge and a safe-haven according to Baur & McDermott (2010) is that a safe-haven is required to hedge investments only on certain periods of time so in this study the period is the Russo-Ukrainian war. They also point out one important fact regarding this study, which is that it is possible that an asset is negatively correlated with the broader market only at times of uncertainty and during stable times the correlation between the assets is more positive. This means that investors buy these types of assets that hold value or grow in value during uncertain periods or downturns, which leads to these types of assets serving as safe-havens. Going over this literature shows positive signs for defense stocks possibly serving as safe-havens during times of geopolitical tensions and by studying the correlations between defense stocks and broader markets further in this study we’re able to see results if these propositions hold.

When reading financial literature about safe havens the usual assets that come to light are gold, US government bonds and different currencies such as the Swiss franc. Especially gold is one of the most talked about safe-haven asset and there are multiple studies debating whether or not it is a reliable safe-haven. Beckmann et al. (2015) provides information on gold’s effective performance as a hedging tool in the global financial crisis (GFC) in 2007. They conclude that gold does in fact serve as both a hedge and a safe-haven asset, but which one of these depends solely on the economic environment. Defense stocks on the other hand have not been studied enough as a way to hedge investments or studied if they serve as safe-havens during turbulent market times. The lack of studies in this field is one of the motivations for this study.

2.4 Market Reactions to Conflicts

Market reactions to significant news and events around the world usually display in stock returns following the events. Ahmed et al. (2022) find that before the day when Russia invaded Ukraine, there were rising negative average abnormal returns on stocks included in STOXX Europe 600 index which may be explained by news articles written about possible invasion to Ukraine by Russia. According to Fama (1970) markets are efficient when prices of assets reflect all the information available correctly and in time, so in this case, investors' fear towards the war possibly reflected to stock prices before Russian troops even crossed the Ukrainian border. Alshammari et al. (2024, p. 8) state that understanding different variables and connections during unstable times is a key skill to manage risk and possibly take advantage of different opportunities in the financial markets provided by uncertainty. This statement aligns with this study's motivation.

Berkman et al. (2011, p. 330) conclude that the findings of their study indicate that crisis onsets significantly reduced stock returns and increased market volatility, with more severe crises and those involving major powers having a stronger effect. Additionally, they find that, while crisis risk does not predict future returns, it is positively correlated with valuation metrics such as the earnings-price ratio and dividend yield. The field of behavioral finance studies effects such as herding, which according to Blasco et al. (2024) is a phenomenon where investors' emotions take over and feelings such as fear, panic or overwhelming positivity may lead to irrational decision making. They find that emerging countries which share borders with the conflict zone are more prone to herding compared to developed markets, but overall geopolitical risks and war tend to have negative effects on investors' behavior and decision making. The lack of literature studying herding in the time of the Russo-Ukrainian war, closes the part of herding behavior leading to defense stocks' abnormal positive returns regarding this study.

Boubaker et al. (2022) find that being geographically close to the warzone leads to greater reactions in the financial markets, but countries bordering Russia solely differ in reactions. They find that after the initial invasion, Finland's reaction was negative while other countries' such as Norway's and Poland's were positive, so the geographical location doesn’t alone explain results in the financial markets. Boungou & Yatié (2022) find that countries near the conflict zone have had the biggest impact, supporting the idea of Boubaker et al. (2022) that being geographically close to the conflict leads to negative returns. This statement is also backed by Federle et al. (2024) who find that volatility of stock returns is higher in neighboring countries compared to those countries not directly bordering the warzone and they also assess that trade linkages explain the reason for countries closer to the conflict zone gaining more spillover effects.

The next chapter goes over previous literature regarding the war in Ukraine, finding key connections and reactions with financial markets and the geopolitical risk index as well as how defense stocks reacted to the conflict.

3 Review of Previous Findings on Defense Stocks, Financial Markets and GPR

This chapter's goal is to research previous literature regarding the war in Ukraine, and how it has affected the financial markets as well as how the geopolitical risk index presented by Caldara & Iacoviello (2022) has affected defense sector firms and the overall market. The previous chapter went over the financial theories presented in financial literature and gave a brief overview of how markets reacted to the war and how markets have previously reacted to conflicts. Going over previous literature, the goal is to find supporting findings about defense stocks serving as safe-havens, hedges or diversifications in times of uncertainty such as war. As previously mentioned in this study, defense stocks have not been studied enough as a safe-haven assets, so the conclusions and supporting findings regarding this studies hypothesis might be a little concise.

The first subchapter is going over how the geopolitical risk index (GPR) has affected the financial markets and defense stocks, as well as how the markets and defense firms are correlated with GPR to help this study to find how the geopolitical risk index affects different asset classes and to help find if movements in GPR drive defense firms stock returns. The second main subchapter is studying the flight-to-safety phenomenon and an iteration of it called flight-to-arms which has been brought up in previous literature scarcely. The chapters' objective is to find if flight-to-safety or flight-to-quality phenomena are connected to defense firms' stock returns and to find some support to them serving as safe-havens. The last chapter is concluding all the findings of the above subchapters findings to gather a summary of the results.

3.1 GPR, Financial Markets and Defense Stocks

The geopolitical risk index created by Caldara & Iacoviello (2022) is a rather new way of measuring geopolitical risk and it's interesting to see how it drives different assets movements. The index measures real time geopolitical risk by a news-based measurement, and it defines geopolitical risk as the threats, or events leading to wars and conflicts, terrorism or other events that affect the world's peaceful relations (Caldara &Iacoviello, 2022). According to them, the index measures geopolitical risks by different search terms that cite to geopolitical threats and war such as invasion and terror, but the searches must have multiple words to count because if the index counted all one-word searches there would possibly be errors on the results.

They find that the index has previously had major spikes during incidents such as the Gulf War, September 11th terrorist attacks and the Paris terrorist attack. Additionally, they provide information on how the GPR is correlated with other data, and they find that GPR is positively correlated with the military spending in the United States and positively correlated with deaths from wars and other armed conflicts. These aspects provide understanding on how the GPR measures geopolitical tensions and how it is correlated with this study's field of research.

3.1.1 The Valuation of Defense Stocks

Going over the valuation of defense stocks gives an understanding of their fundamentals and information on what impacts them. Past research by Capelle-Blancard & Couderc (2007) study the valuation of defense firms and they find that the valuation of firms in the defense sector is driven by mainly the same factors as other industries such as earnings announcements, but they point out that geopolitical tensions such as terrorist attacks and concerns about war have a clear effect on defense stocks' returns. Their findings on the September 11th terrorist attacks were discussed in the first chapter of this study and the results were significant abnormal returns both negative and positive.

Klein (2024 p. 312) states that defense firms based in Europe and U.S. have benefitted from the war between Russia and Ukraine due to the increased military spending. Martins et al. (2025) also find that a rise in demand of military equipment increases the market value of defense firms in the short run and that defense firms gained positive abnormal returns in result of the war. These findings give good information on how defense firms are valuated, and which factors affect their price movements.

3.1.2 Financial markets and GPR

Financial markets are a large sum of different assets, indices, financial instruments and much more, so to get an understanding on how the geopolitical risk index affects them, it's important to go over some previous studies on this topic. Studies covering the impact of GPR on market indices find interesting features, for example Shaik et al. (2023, p. 10) find that Dow Jones Global Index (DJGI) reacted to the war before the GPR, and they also find that both indices are positively correlated. There could be many reasons why markets reacted to the war before the GPR. Looking at the description of effective markets provided by Fama (1970), markets are efficient when they react to information correctly and on time, and GPR measures geopolitical risk by news-based sentiment, but it doesn't consider all newspapers around the world (Caldara & Iacoviello, 2022). The explanation here could be that investors reacted to news about Russia gathering troops near the Ukrainian border or other news about rising tensions between the countries, which may have not led to significant increase in GPR before the actual invasion happened.

Interestingly Będowska-Sójka et al. (2022) find that shortly before the war there was an increase in the coherence between GPR and developed, emerging and Islamic stock markets. They also find that developed markets were first negatively correlated with GPR before the invasion, but the correlation changed to positive, and the coherence also increased when Russia started the war. Another interesting finding by them is that GPR tended to lead emerging and Islamic stock markets. Other studies such as Alshammari et al. (2024 p. 6) find that GPR tends to receive shocks instead of transmitting them to the corporate bond market which does differs from the stock market. Previously mentioned Shaik et al. (2023, p. 10) also find that gold seems to be less correlated with GPR than the Dow Jones Global Index displaying gold's ability to work as a safe-haven. Before the war in Ukraine Smales (2021, p. 361) find that there is a negative correlation between the S&P500 index and the GPR which indicates the negative effect that heightened geopolitical risk has on stock markets.

It seems that GPR and financial markets do not have a clear connection and cause-effect relationships when looking at the studies. The results vary by market, period, location and by asset type. One interesting aspect is the changing correlation between GPR and developed markets around the time when war started in Ukraine, and the explanation for this could be as Zaremba et al. (2022, p. 2) argue that investors tend to overreact or underreact to shocks such as geopolitical events like the war in Ukraine and thus leading to short term mispricing in the financial markets. The mispricing could be in this case linked to the negative correlation around the time of the invasion that changed to positive shortly after as Będowska-Sójka et al. (2022) present. The explanation for this could be that investors' fear made them sell a lot of assets when GPR spiked up, which measures risk by news-based sentiment as stated before, but after the initial shock and fear, investors may have calmed down and started acting rationally again which could have lifted the stock prices again.

The connection between GPR and financial markets is complicated, and it seems to be a mix of behavioral aspects and the properties that an asset or a market has, is its location, risk or any other variable, thus it's difficult to make conclusions about the correlation between GPR and markets as a whole and it should be studied separately by market or an index. However, it's clear by the evidence previously presented in this study and in this chapter that the start of the Russian invasion impacted most of the financial markets negatively at the start, but some indices and markets rebounded faster than others. The next review topic is going to be more specific on the connection of GPR and defense stocks.

3.1.3 Defense Stocks and GPR

To get more information on how defense stocks react to changes in GPR, it's crucial to go over previous literature and research on this topic. This study supposes that changes in GPR, especially the rise of GPR, lead to positive changes in defense stocks' returns. The idea behind this is that heightened geopolitical risk means increases military spending and investments into the defense industry as presented earlier in this study, and thus leading to more capital flow to defense companies which logically should be displayed in their stock returns. Trying to find safe-haven aspects from defense stocks, one of the key definitions presented in literature is that an asset should be negatively correlated with a comparable asset or the broader market in turbulent times. Looking at the last chapter, it seems that the correlation between GPR and financial markets depends on the properties of the asset such as location and market type. However, Feder-Sempach (2024, p. 42) mentions that a safe-haven asset is an asset that holds it value or grows in value in unstable market conditions, so even if this study doesn't find strong negative correlation between defense stocks and broader market indices, it doesn't completely mean that defense stocks couldn't be seen as safe-haven assets if they generate pre-eminent returns compared to broader markets and thus provide partial safe-haven characteristics during geopolitical tensions.

Firstly, regarding the connection between GPR and defense stocks Apergis et al. (2017 p. 693) find that GPR does not have good capability of predicting stock returns of defense sector stocks, but it does in fact have the capability to predict defense stocks' volatility. At the start of the Russian invasion Covachev & Fazakas (2025, p. 37) find that on the first day of the attack defense stocks had negative average abnormal returns (AARs) the same way as the European stock market did. This displays a positive correlation between the assets but could be thus explained by the large negative shock to the financial markets. The research about the correlation between GPR and defense stocks is understudied thus making this part of this study a bit difficult. Panazan & Gheorghe (2025, p. 5–12) point this problem out in their study, but they find interesting and valuable information on this topic. They find that GPR tends to predict the profitability of the defense sector, and some defense stocks seen perform as diversification, but not all defense stocks have the same properties as diversification. This finding argues against the findings of Apergis et al. (2017 p. 693). Despite the scarce literature about this topic other studies such as a study by Zhang et al. (2022, p. 5) find that defense stock returns and volatility were not connected to GPR before the invasion started, but after the attack stock returns and volatility in the defense sector became strongly connected with the GPR which indicates a positive correlation.

Because the correlation between GPR and defense companies varies by time, the hedging and safe-haven properties of these firms vary across different periods (Panazan & Gheorghe, 2025, p. 12–16). In an earlier study by Gheorghe & Panazan (2024, p. 8–9) they also find a strong correlation between defense stocks and the GPR especially during the war in Ukraine and they conclude that GPR events such as the war produce stock returns for many defense companies. One interesting thing they note is that investors and policy makers should start to consider defense stocks as a way to hedge and diversify against the geopolitical risks which support the motivation of this study. The most important notes that they point out regarding this study are that investing in multiple defense stocks globally has provided clear benefits in terms of diversification and risk protection, especially over the medium to long term, however the benefits differ from company to company as stated earlier (Panazan & Gheorghe, 2025, p. 12–16). Also, they mention that from 2018 to 2022, European defense companies proved to be a strong hedge against geopolitical risk, meaning that they performed well during geopolitically challenging times. Finally, to conclude their remarks, they state that while defense stocks benefit from conflicts, the positive impact is compensated negatively in the upcoming periods, thus they could serve as short-term safe-havens or hedges.

These findings logically suggest that heightened geopolitical risk and armed conflicts display to defense stocks' returns describing a positive correlation and some safe-haven and hedging properties such as that they increase in value during market uncertainty like the war and thus support this study's hypotheses H1 and H4. The literature shows that the correlation between GPR and defense stocks seems to be positive especially during times of uncertainty and conflicts, but studies on the correlation outside the periods of uncertainty remain scarce. Next subchapter goes over phenomena such as flight-to-safety and flight-to-arms to see if behavioral aspects can partly explain the performance of defense stocks during times of geopolitical tensions and conflicts.

3.2 Flight-to-Safety or Flight-to-Arms?

When studying financial markets and phenomena that occurs within them, it is crucial to understand the practicalities of varying financial instruments and markets, but it's also important to understand investor behaviour. Researching financial literature, it's common to encounter terms such as flight-to-safety and flight-to-quality, but also regarding more recent literature about the Russo-Ukrainian war, a term flight-to-arms occurs time to time in the studies. The purpose of this chapter is to find, how this phenomenon appears during times of geopolitical uncertainty and if flight-to-arms could explain some of the positive impacts on defense stocks at the time of the Russo-Ukrainian war.

The definition for flight-to-safety is that investors tend to re-allocate their assets during market uncertainty by selling riskier assets they are currently holding and moving that freed capital to lower-risk or safer assets (Mohamad, 2022, p. 1). Typically flight-to-safety and flight-to-quality literature focus on investors re-allocating their capital to bonds and specifically government bonds as Baur et al. (2021, p. 4) mentions. Other safer assets that often appear on literature about flight-to-safety and flight-to-quality are precious metals such as gold, and sometimes fossil fuels and oil. The phenomenon called flight-to-arms as Zhang et al. (2022, p. 2) describes it, means that investors move their capital to the defense sector especially in the US and Europe to get positive gains from the increased military and defense spending which was mentioned before in this study by Tian et al. (2023) who find for example, that Europe's military spending grew 13 per cent between the years 2021 to 2022.

As Zhang et al. (2023, p. 2) find that when GPR spiked due to the invasion, investors fled towards defense stocks indicating a flight-to-arms phenomenon which basically mirrors the traditional flight-to-safety and flight-to-quality, but in a context of geopolitical tensions such as the war in Ukraine. The flight-to-arms phenomenon seems to be evident in the case of the Russian invasion to Ukraine as Gheorghe & Panazan (2024, p. 8) also confirm this in their study where they also find that there was a clear rise of interest towards aerospace and defense industry when the conflict started.

Studies based solely on the flight-to-arms phenomenon remain scarce, but the fact that's stated earlier in this study and as Klein (2024, p. 312) mentions that the increase of military spending and increase of defense budgets benefit the defense industry and stocks, it seems to be clear that a flight-to-arms behaviour is seen in the markets at the start and during the Russo-Ukrainian war. It's difficult to say if the rising interest and investments to defense stocks is a cause of investors seeking to allocate their capital to defense stocks as a safe-haven investment, or is it just that investors think that they could benefit from the rising geopolitical tensions by investing to the defense industry and gain better returns from there during the times of conflict as sort of a speculative investment. Either way, it's clear that a lot of capital flows into the defense industry at the time of conflicts, which clearly benefits defense stocks, which indicates a flight-to-arms phenomenon.

3.3 Key Findings and Reflection

To sum up the findings on existing literature on this topic, it's clear that this whole area of study is complex, and the results of the research vary periodically, by asset and across different markets. One of the key findings is that the spike in GPR at the start of the Russian invasion to Ukraine affected negatively to the financial markets and stock indices by them gaining short-time negative returns. One explanation to this presented by Zaremba et al. (2022, p. 2) could be that investors tend to overreact to negative news and cause mispricing in the stock markets. This seems logical as the large-scale conflict in Europe is something that hasn't been happening in ages and it causes an increase in investors fear levels and uncertainty levels, possibly leading to a flight-to-safety, flight-to-quality or even the flight-to-arms phenomenon as stated in the previous chapter. The main problem regarding this literature review, is the scarcity of studies based around this subject, but this chapter still managed to gather some interesting findings such as the connection and correlation between GPR and defense stocks as well as the flight-to-arms phenomenon.

This study's main objectives are to find safe-haven characteristics in defense stocks as well as to find confirmation for the other hypotheses such as the claim that defense stocks are positively correlated with the GPR and less correlated with the broader market indices. The latter did not gain a lot of support by the literature mainly because there isn't studies covering or researching that area, but based around the studies used in this chapter, the findings suggest that defense stocks and market indices are not negatively correlated at least constantly, but there's signs that during the initial spikes of GPR, the correlation between market indices and GPR is rather lower than usual, that being possibly caused by the higher interest in defense industry and the phenomenon of flight-to-arms. Looking back at the definition of safe-havens Baur & McDermott (2010, p. 1889) state that a safe-haven asset should be negatively correlated with comparable asset and Feder-Sempach (2024, p. 42–43) notes that safe-haven assets are not risk-free assets and the fact that safe-haven should hold or grow in value during uncertain times. The negative correlation between defense stocks and broader market indices has not been found yet in this study but the value growth has already gotten support.

Many studies as previously mentioned, find that defense stocks have gained clearly positive abnormal returns at the start and during the Russo-Ukrainian war which ties to the safe-haven theory in that part. The main argument against the possibility of defense stocks displaying as safe-haven assets during geopolitical tensions, is the correlation between comparable assets such as stock indices. Usually as shown before in this study, typical safe-haven assets are something else than stocks such as gold, bonds or precious metals, meaning that the correlation between these types of differently clear assets compared to stocks is logically lower than defense stocks, especially those which are also included in some of the stock indices such the S&P500 or STOXX Europe 600.

The idea that defense stocks could act as a temporary safe-havens during geopolitical tensions gets support by the studies of Gheorghe & Panazan (2024) and Panazan & Gheorghe (2025). All in all, this literature review finds interesting and useful information about the correlations between GPR, financial markets and defense stocks as well as the phenomenon called flight-to-arms that support this studies hypotheses H1 and H4. To make final conclusions about this study’s hypotheses, it’s necessary to study the performance of defense stocks compared to typical safe-haven assets to find how they compare and are there any similarities or differences at the time of the Russo-Ukrainian war. At this point of the study hypotheses H1, H2 and H4 have gotten some support but H3 hasn’t got enough support yet.

4 The Performance of Different Assets During the Russo-Ukrainian War

This chapter builds on the work of previous chapters of this study and focuses mainly on the performance of defense stocks and the most known safe-haven assets during the Russo-Ukrainian war to try to get support for this study's hypotheses and to find similarities and or differences between defense stocks and typical safe-haven assets. The motivation behind this is to find out, how known safe-haven assets such as gold and bonds behaved at the start and during the war and to compare that to the performance of defense stocks to try and find how each asset performed compared to the others and to discuss the possible similarities as well as differences to make conclusions on if defense stocks present safe-haven characteristics temporarily during geopolitical tensions.

The performance of these assets has been discussed slightly already in this study, but this chapter goes more in depth to the performance of each one to give better understanding on the performance of the assets and to make comparisons clearer. It is also important to note that different studies use different methods to measure returns for example, so the results may not be absolute, but still the results provide better understanding of the performance of the processed asset.

4.1 Performance of Gold

Historically, gold is perceived as one the most well known safe-haven and hedging tools against financial uncertainty and studies such as Beckmann et al. (2015, p. 1) note that during the global financial crisis, gold achieved significant increase in price compared to the plummeting stock market. The global financial crisis is important when studying historical performance of safe-haven assets, because at that time market uncertainty and fear reached extreme levels and investors moved towards safe-haven assets such as gold, which had a negative correlation with the stock market and thus served as a safe-haven (Baur & McDermott, 2010).

In recent years especially during the time of the Russo-Ukrainian war studies such as Będowska-Sójka et al. (2022, p. 6–7) find that gold is resilient to changes in geopolitical risk level measured by GPR and thus gold serves well to hedge investments during geopolitical tensions. Other studies suggest otherwise like Belhassine & Riahi (2024, p. 360–362) who find that gold seems to be a weak safe-haven when put against the STOXX Europe 600 for a medium-run portfolio during the war in Ukraine which's holding period is 8 to 64 days and also when put against the S&P500 index, gold seems to be a weak hedge in all investment periods during the war. Note here the difference between a hedge and a safe-haven as Baur & McDermott (2010, p. 1889) define that the main difference is that a hedge provides protection for a comparable asset on average and a safe-haven provides protection during certain periods of uncertainty only for example the war in Ukraine.

Studies on gold also find interesting features for example that gold is positively correlated with the geopolitical risk index with a value of 0.09 although the value fluctuates by time, but still it's stated that gold does serve as a safe-haven during crisis such as the war in Ukraine (Shaik et al. 2023, p. 7–8). After the initial invasion of Ukraine by Russia, Si Mohammed et al. (2023, p. 5) find that golds cumulative abnormal return (CAR) was slightly negative with the value of -0.22%, and compared to other assets they measure, gold's marginal negative reaction seems to be a sign of its safe-haven properties with other assets gaining bigger losses. Ustaoglu (2023, p. 1–8) points out gold's ability to hedge and diversify portfolios as a safe-haven asset which was displayed into its price by gold's price rising to over $2000 an ounce after a week from the initial invasion day. However, he also finds that gold has a role as a diversifier but not as a hedge, and it serves also only as a weak safe-haven during the Russo-Ukrainian war.

To conclude the findings on gold's performance, it's clear that the results on how gold performs and its safe-haven properties during the war in Ukraine vary by study, but still almost all studies suggest that it does act as a safe-haven during the war, but the strength of the safe-haven vary. Gold's properties as a hedge, diversifier and as a safe-haven seem to vary periodically quite a bit by its properties changing by the crisis or the strength of the same properties changing by time. The interesting finding is that gold seems to be positively correlated with the GPR as found by Shaik et al. (2023) same way as previous chapters found that defense stocks have a positive correlation with GPR, indicating that both assets benefit or at least do not suffer major negative returns from GPR events. However, gold being a precious metal, its properties as a financial asset differ from stocks, thus they differ from each other by how investors think about them as an investment. Most investors don't invest in gold thinking they are going to get the best return on their investment from it, but they do in fact invest into it to diversify or hedge their portfolios according to the literature presented in this study. Despite the critique and the partial weakness of gold as a safe-haven during the Russo-Ukrainian war, according to the literature, gold is still a safe-haven asset because it holds its value or grows in value during the times of uncertainty as well as the fact that investors move their capital into it during crises such as the war in Ukraine indicating a flight-to-safety behavior.

4.2 Performance of Bonds

Another financial asset typically perceived as a safe-haven is bonds. The previously mentioned flight-to-quality phenomenon is typically referred to when investors steer away from stocks to bonds as Baur & McDermott (2010, p. 1887) mention. Previous studies such as Rigobon & Sack (2005, p. 1771–1788) also find that increased war risk causes investors to invest more into safer assets rather than risky assets and they also find that war risk doesn't affect gold significantly or the liquidity premium on the on-the-run ten-year Treasury note. Newer studies considering the Russo-Ukrainian war such as Alshammari et al. (2024, p. 5) find that geopolitical difficulties like the war have affected the

Corporate Bond Market with investment-grade bonds suffering a loss of interest by investors. Bonds as financial assets are more complicated than gold for example because they are typically debt instruments that can offer regular interest payments and gold is typically just a value holder. Still, considering the difference between gold and bonds, they are both typically described as safe-haven assets.

Previously in this study, it was discovered that GPR doesn't have a big impact on US bond markets because it receives more shocks than transmits them into the corporate bond market (Alshammari et al. 2024, p. 8). Studies such as Będowska-Sójka et al. (2022, p. 6) find that green bonds seem to be resilient against GPR and thus serving to hedge investments in markets that aren't directly affected by the war. Complementing the findings by Będowska-Sójka et al. (2022), Dong et al. (2023, p. 3) find that, according to the definition of safe-havens by previously mentioned Baur & McDermott (2010), both conventional bonds and green bonds can be used as strong safe-havens against the S&P500 during increased GPR levels.

Although the studies presented find that bonds act as safe-havens during geopolitical tensions, some studies find negative impacts to assets like the two-year Treasury in the US (Rigobon & Sack, 2005). The explanation for the negative effects to Treasuries and corporate bonds caused by the possibility of war presented by Rigobon & Sack (2005, p. 1780) is that investors' uncertainty is more focused on the US economy falling than on their willingness to take risks. They also find that the two-year Treasury is significantly more volatile to war risk than the ten-year Treasury, which seems to be stable as mentioned previously. It's important to note that their study is based around the second Iraq war and the Treasuries are US based.

The studies around how bonds react to geopolitical tensions are broad and the findings differ by study with some studies finding negative reactions to some fixed income assets and some studies finding positive reactions. An explanation for this presented by Sulong et al. (2024, p. 4579) is that corporate bonds for example are issued by private companies and not governments like Treasuries are, thus they are seen as riskier investments. Also, the performance of the bonds is dependent on the performance of the company which issues the bonds and because it's a private company and not a government, the economic and market forces that affect them are different to those affecting Treasuries. They also mention that corporate bonds may suffer negative effects by the rise of CMDI which is an indicator of distress in the corporate bond market, thus signaling to investors that the risk levels are higher which can steer them towards even safer assets.

The findings on bonds during geopolitical tensions indicate that the strongest safe-haven and hedging properties are served by conventional bonds, green bonds and the ten-year US Treasury. The safe-haven and hedging properties seem to be weaker with corporate bonds and the reasonings are as presented before that the risks with private companies as issuers are higher than with governments and that corporate bonds are vulnerable to different economic and market reactions and indicators such as the CMDI. In conclusion, bonds are a good way to diversify or hedge investments during geopolitical tensions, but investors should have the knowledge about different types of fixed income assets and how they perform during different times for example geopolitical uncertainty. The next step in this study is to research the performance of defense stocks more in depth to find support on them serving as potential safe-haven, hedging or at least diversifying assets on investors' portfolio.

4.3 Performance of Defense Stocks

This chapter's main objective is to study the performance of defense stocks during the Russo-Ukrainian war and to find aspects that could indicate safe-haven or hedging properties within them. This study has already proposed the performance of defense stocks during the war and during historical events such as the September 11th attacks, and the preliminary result is that defense stocks produce abnormal returns during geopolitical tensions and there are many reasons behind this such as the previously mentioned flight-to-arms phenomenon, increased interest towards defense industry and military and defense expenditures and investments.

Martins (2024, p. 1022–1023) finds that around the start of the Russian invasion, portfolios with companies whose total revenue consists mainly of defense sales generate significantly larger CARs than those portfolios that have companies with weaker weight on defense sales. For example, the CAR for a portfolio weighted heavy with defense sales is 4.59% while the CAR for a portfolio weighted light with defense sales is -7.35%, with the event window being [-1, 10], so there's a difference of 11.94%. The reasons for defense stocks' short-term positive reactions according to Martins (2024) are the uncertainty that geopolitical tensions such as the war in Ukraine cause as well as the increase of military spending that brings cash-flows to defense companies like Gheorghe & Panazan (2023, p. 3) also mention. The findings of Martins fit this study's findings about defense stocks gaining positive returns at the start and during the war and that military and defense spending benefit defense companies.

Study by Wu et al. (2024, p. 15–16) proves that defense stocks' positive reaction and co-movement with each other is more powerful during major geopolitical events compared to more stable periods. They use leading defense companies in their study, which majority of them are based in the US and they find that at the start of the initial invasion most of the stocks had a strong upwards trend. This could be due to the combination of findings already presented in this study, for example the flight-to-arms phenomenon, increased interest in defense industry, military spending or just some investors speculating. Interestingly, after the initial Russian invasion to Ukraine, Wu et al. (2024) find that defense stocks' prices slowly declined over time but between the period of February 1st, 2023, to May 6th, 2023, in which no geopolitically significant conflicts occurred, they find that 5 stocks kept declining while 5 stocks had an upwards trend from the sample of 10 defense stocks. This indicates that there's not a clear trend on the movement of defense stocks during periods where there are no significant shocks. These findings indicate that defense stocks perform best during the initial phase of a conflict and by the time that the initial shock factor fades off, their performance varies by company. This could be explained by the previous findings in this study about the correlation between GPR and defense stocks. As Gheorghe & Panazan (2024, p. 8–9) mention GPR events tend to display positively to defense stocks' returns, but it must be noted that the previous findings show that not all defense stocks perform the same way as Panazan & Gheorghe (2025, p. 5–12) mention.

Martins et al. (2025, p. 317) also note that defense industry is part of a tiny group of industries that provide positive returns in the times of geopolitical uncertainty which is a key reason for investors increasing the weight of defense stocks in their portfolio as a way to minimize risk by industry diversification. This gives more support to the flight-to-arms phenomenon and it's logical to think that rational investors allocate their assets towards an industry which proven in the literature directly benefits from armed conflicts. Around the start of the Russo-Ukrainian war, it's shown in the literature that the European stock market reacted negatively to the war as Ahmed et al. (2022, p. 1082–1087) point out significant negative CARs before and after the actual invasion with their research including 587 companies from the STOXX Europe 600 index. They find that even after a month from the start of the invasion, the European stock market hadn't recovered from the initial negative shock with the negative CAR being -1.59% 25 days after the invasion and the highest single day drop being -0.41% on the day of the event.

Now comparing these results with the European stock market against defense stocks based in Europe, the difference is significant regarding the performance. Recent study by Covachev & Fazakas (2025, p. 35–37) present valuable information on how European defense companies performed around the invasion. As mentioned in the theoretical framework portion of this study, they use the traditional CAPM as well as multifactor models such as a four-factor and a six-factor model to measure cumulative average abnormal returns (CAARs). They find that with the event window being [0, 20], the CAARs for the different models are as follows: 7.09% CAPM, 12.39% four-factor model and 11.21% with six-factor model. It's important to note that all these results by Covachev &

Fazakas (2025) are of 1% level of significance. The results show that European defense stocks significantly outperformed the STOXX Europe 600 index during the start of the war, but it’s shown by Covachev & Fazakas (2025) that defense stocks also suffered negative excess returns on the initial event day when subtracting risk-free rate from the returns of defense stocks. According to them, this is caused by the initial negative shock to the European market.

The results by Martins (2024), Covachev & Fazakas (2025) and Wu et al. (2024) confirm this study’s hypothesis H2. Also, the fact that European markets continued to suffer negative CARs approximately a month after the invasion as presented by Ahmed et al. (2022) and European defense stocks continued to generate positive CAARs presented by Covachev & Zafakas (2025), indicate that there’s a lower or a negative correlation between the STOXX Europe 600 index and the 30 European defense stocks used by Covachev & Fazakas. This supports hypothesis H3, but since there’s not enough studies and proof on the correlation between defense stocks and broader market indices, the H3 cannot be totally confirmed, but the European market shows strong possibilities of a negative correlation. Also, it must be noted that the comparison between STOXX Europe 600 and the 30 defense stocks is problematic because they aren’t independent because the 30 defense companies are included in the index and the correlation should be studied with a different index such as the S&P500 or the STOXX Europe 600 with defense sector removed. In conclusion these findings about defense stocks’ performance give valuable information regarding this study’s objective.

4.4 Conclusions on the Performance of Presented Assets

Historically gold ands bonds are seen as the main safe-havens against different circumstances of uncertainty but during the Russo-Ukrainian war it’s clear that research on safe-haven assets has started to increase with studies finding different assets that could hedge or diversify portfolios during specifically geopolitical tensions. This chapter presented the performance of the well-known safe-haven assets gold and bonds as well as the performance of defense stocks to see how each asset performed and to find out their characteristics during the conflict in Ukraine. The pre-assumption on the performance of gold and bonds serving as safe-haven assets got support as expected, but it also showed some interesting contradictions between studies, which leads to the question that are these assets the best way to diversify or to hedge a portfolio during geopolitical tensions, or could it be that defense stocks offer a better result.

The mixed reviews are especially about gold's performance and its validity as a safe-haven and a hedge. Będowska-Sójka et al. (2022, p. 6–7) claim that gold is hedging tool against geopolitical tensions but a later study by Belhassine & Riahi (2024, p. 360–362) point out that gold seems to be a weak safe-haven against the STOXX Europe 600 index and S&P500. Financial literature differentiates the definitions of safe-havens and hedges mainly on the period which the asset provides safety on investments, with safe-havens being usually perceived as short-term hedges during temporary financial uncertainty and hedges being protective assets on average (Baur & McDermott (2010, p. 1889). The conclusion here could be that gold as stated before is typically seen as a great way to diversify a portfolio with risks that may or may not occur and thus it could help to weigh out the negative market reactions during the war, but its performance is not good enough to be a strong safe-haven at least when trying to hedge indices such as the STOXX Europe 600 and the S&P500 during the Russo-Ukrainian war. On the other hand, European defense stocks outperformed the European stock market as presented in the last chapter, thus it could possibly act as temporary safe-haven or at least as a way to take advantage of the rising interest in defense industry and the phenomenon of flight-to-arms.

The performance of bonds serving as a safe-haven investment during geopolitical tensions gets support from multiple studies, but some studies find negative reactions to some fixed income assets such as the US two-year Treasury. Studies like Będowska-Sójka et al. (2022, p. 6) find that green bonds serve a good hedge against the GPR and thus serving as safe-havens. This claim gets support by Dong et al. (2023, p. 3) who also mention that according to the safe-haven definition by Baur & McDermott (2010), both conventional and green bonds can be used as strong safe-havens against the S&P500 index during geopolitical tensions and increased level of GPR that comes with it. There are many types of fixed income assets and some of them seem to serve better as safe-haven assets than others like Alshammari et al. (2024, p. 5) mention that geopolitical tensions such as the war in Ukraine have caused a loss of interest towards investment-grade bonds by investors. One explanation for the loss of interest towards corporate bonds is that investors feel more uncertainty towards them because they solely rely on the performance of the company that issues the bonds compared to, for example US Treasuries which are government backed, and thus having a lower risk (Sulong et al. (2024, p. 4579). The findings on bonds show also support for the flight-to-quality phenomenon and thus bonds are still a great way to protect investments during geopolitical tensions.

The main difference between these assets is their properties as financial assets with gold being a precious metal that mainly holds its value during shocks, but it does not rise in value rapidly and it also serves generally as a good hedge over a long period, but it does not give superior performance during short periods of uncertainty such as the war in Ukraine. Bonds on the other hand are fixed income assets that are affected by the flight-to-quality phenomenon which leads investors to allocate their capital towards them during uncertain times. The bond market is broad as presented before and based around the studies used in this chapter, conventional and green bonds as well as the US ten-year Treasury seem to be the best ways to hedge investments during geopolitical uncertainty regarding bonds. Lastly defense stocks are companies that are directly benefitting from armed conflicts and going over the results found in this chapter, they show superior performance at the start and before the initial invasion to Ukraine by Russia by gaining CAARs of 12% 20 days after of the invasion. They outperformed the STOXX Europe 600 index with the index suffering losses even after 25 days of the initial invasion, which shows the positive impact of armed conflicts towards the defense industry.

5 Conclusion

This study's main objective was to find if defense stocks serve as safe-havens during geopolitical tensions. The study went over safe-haven and hedging theories to understand the features of those assets and then continued to research the effects of the Geopolitical Risk Index on financial markets and defense stocks to see how it affects them and to study the possible correlations between them. Also, it presented asset pricing models such as the CAPM and Fama & French Three-Factor-Model to give an understanding on the fundamentals on how some of the studies measure returns. Market reactions to conflicts were presented and studies covering for example the September 11th attacks gave good indication on how defense stocks react to geopolitical shocks, although every conflict is different. Defense stocks' valuation was covered to give understanding on what factors affect defense stocks' valuation and price movement and the effects of defense and military expenditure was also covered proving that increased defense expenditure positively affects on defense companies' cash flows. This chapter presents the key findings found in this study as well as concludes if defense stocks serve as safe-haven assets during geopolitical tensions and gives tips for the application for these results as well as suggestions for future research.

5.1 Summary of Key Findings & Their Interpretation

This study's main objective was to find if defense stocks serve as safe-havens during geopolitical tensions. Safe-haven and hedging theories were discussed to understand the features of within them and then continued to research the effects of the Geopolitical Risk Index on financial markets and defense stocks to see how it affects them and to study the possible correlations between them. It was found that different markets reacted differently to the changes in GPR with Shaik et al. (2023, p. 10) finding that Dow Jones Global Index (DJGI) reacted to the war before the GPR, and they also find that both indices are positively correlated. Other studies such as Ahmed et al. (2022, p. 1082–1087) find that 587 stocks from the STOXX Europe 600 index suffered negative CARs at the start and approximately one month after the invasion, which indicates a negative correlation with GPR and the European stock market. Defense stocks showed strong evidence of being positively correlated with GPR with studies by Zhang et al. (2022, p. 5) finding that stock returns and volatility were not connected to GPR before the invasion started, but after the initial attack stock returns and volatility in the defense sector became strongly connected with the GPR as well as a study by Gheorghe & Panazan (2024, p. 8–9) who also find a strong correlation between defense stocks and the GPR especially during the war in Ukraine. These findings confirm this study's hypothesis H4 and give confirmation on the fact that rising geopolitical tensions positively affect defense stocks' returns. This finding could be useful for investors, policy makers and others engaged in risk management to consider when planning investment allocation at the times of geopolitical tensions, uncertainty, challenges or shocks.

The lack of literature about the correlation between defense stocks and different market indices caused this study's hypothesis H3 to not be fully confirmed. Despite the lack of literature based on this subject, it was found that different indices and markets reacted differently and as mentioned earlier in this study, countries that are closer to the actual conflict zone suffered more than those that are farther away, which seems logical. The findings on European markets show evidence that defense stocks based in Europe showed a lower or negative correlation with the European stock market during the start of the invasion which could indicate a hedging opportunity or a safe-haven investment also with the fact that they provided substantial CAARs during the first month of the war as found by Covachev & Fazakas (2025). Their study with similar results by Martins (2024), and Wu et al. (2024) confirm this study's hypothesis H2 that defense stocks provide abnormal returns following geopolitical events. This finding with the confirmation on hypothesis H4 provides valuable information on how defense stocks perform during geopolitical tensions, with them gaining significant positive stock returns following geopolitically significant events such as the Russo-Ukrainian war. These findings provide valuable information for investors, portfolio managers and others closely working in risk management about asset allocation and the possibilities that defense stocks provide during crises such as increased returns and possible negative correlation with markets that are negatively affected by conflicts like in this case the European markets.

Regarding hypothesis H1, the positive stock returns that European defense stocks provide while the European stock market was taking losses at the start of the invasion, indicate a safe-haven characteristic proposed by Feder-Sempach (2024, p. 42) with defense stocks temporarily growing in value during uncertain market conditions. The findings also display the phenomenon of flight-to-arms which is caused by several reasons which were presented in this study such as increased interest towards defense industry, investor speculation and investors possibly seeking to diversify and hedge their investments in the defense industry which as shown is benefitting from armed conflicts. The biggest problem with fully confirming hypothesis H1 is the lack of literature on this field and in particular the lack of studies researching the correlation between defense stocks and market indices over a prolonged period, not just this conflict. The definition of safe-havens provided by Baur & McDermott (2010) suggest that defense stocks could act as safe-havens during geopolitical tensions but the correlation between them and market indices would be required to study to define if they serve as weak safe-havens or strong safe-havens or neither of these. The studies by Gheorghe & Panazan (2024) and Panazan & Gheorghe (2025) give support to the safe-haven, hedging and diversification properties of defense stocks by them mentioning defense stocks' ability to diversify and hedge against geopolitical risks. Some studies such as a study by Covachev & Fazakas (2025, p. 38) don't mention any of these properties regarding defense stocks but they mention that their performance could be exploited during short periods of geopolitical uncertainty such as the war.

To sum up the findings of this study, we fully confirm hypotheses H2 and H4 with strong support while hypotheses H1 and H3 cannot be fully confirmed because of the lack of literature and evidence across multiple markets on the correlation itself. Hypothesis H3 got support in the European markets but the performance of defense stocks should be put against different markets to see if, when and where they could in fact provide safe-haven properties against geopolitical risks. Hypothesis H1 got support by the performance of defense stocks being far more superior by their returns compared to broader market indices and typical safe-haven assets such as gold and bonds, but the correlation which is as important if not more important feature of a safe-haven assets between the defense companies and broader market indices left a spot to be filled in the financial literature, thus we cannot fully confirm the hypothesis. The closest this study got to finding a negative correlation was in European markets between the STOXX Europe 600 index and European defense stocks, but the correlation should be studied more in depth and between different indices in the future to prove the assumption of H1. It is still clear that during geopolitical tensions the defense industry provides stock returns which are difficult to find in other industries and even if they couldn't be declared as safe-havens, it is certain that it's an industry that could be used to generate significant short-term profits and to at least diversify a portfolio during geopolitical tensions.

5.2 Limitations & Areas for Future Research

The main problem regarding defense stocks serving as safe-havens during geopolitical tensions as mentioned is that their correlation with different stock markets has not been studied enough, thus we cannot say certainly if they do in fact serve as a safe-haven assets during the war in Ukraine for example. The negative correlation between assets in a portfolio is so important regarding the portfolio's risk that the available literature and research lacking in this field made it difficult to fully confirm this study's hypotheses H1 and H3, although they both got some support especially in European markets. It's also important to note that the correlation between defense stocks, especially European defense stocks, should be put against a market index which doesn't have any of these stocks included in it, so the performance of those defense stocks doesn't affect the performance of the index, thus making them independent and the results more robust.

For future research, it would be valuable to study the correlation of defense stocks against multiple market indices differing in their geographic location to see how the correlation develops over a prolonged period and to find if defense stocks prove safe-haven characteristics other than significant positive stock returns during geopolitical tensions and do the findings differ significantly based on the geographic location. Also, it would be interesting to see in the future, how defense stocks perform after the Russo-Ukrainian war and to see if they are able to hold their value and interest or is a significant downturn in their stock prices due to happen. But as for now, defense stocks remain to be assets that benefit from armed conflicts and by that provide significant abnormal returns around heightened geopolitical risk, and their performance also reflects some safe-haven, hedging and diversification properties around the Russo-Ukrainian War, but their classification as a temporary safe-haven remains yet to be confirmed.

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