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Conflict in the Armament Industry

A study on the influence of war and investor attention towards ESG within the armament industry through the provision of bank loans

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Preface

I would like to thank my supervisor Dr. J.J.G Lemmen for his advice and support throughout the whole thesis process. His suggestions to include recently published articles and other insights added value to my research. Furthermore, I would like to thank all my friends and family members that supported me during the time of this research.

Abstract

The purpose of this research is to study the effect of war and investor attention towards ESG within the armament industry, through the provision of bank loans. Bank loan characteristics and loan announcement returns of the lender are analyzed against periods of war and heightened ESG concerns. First, an event study methodology provides evidence for a positive relationship between investor attention towards ESG and the loan announcement returns of a lender within the armament industry. Within a [0,2] event window, the CARs on the provision of bank loans towards the armament industry, are 0.17% higher for lenders in a period of heightened ESG investor attention, compared to lowered ESG concerns. An OLS regression with interaction effects further states that the effect of ESG attention on the CARs of the lender increases during wartime. Within the same event window, the effect of the ESG Index on the CARs of the lender is 0.06 higher during a period of war compared to peace. Second, increased ESG attention leads to banks enforcing less favorable loan characteristics towards companies active in the armament industry. As ESG investor attention increases, loan pricing becomes less favorable for defense contractors: an increase of 1 in the Ecological and Governance Index leads to a higher loan pricing of 0.03% and 0.04%, respectively. Third, loan characteristics become more favorable during wartime. For an increase in each index, the probability of a first lien debt status by the bank is decreased by at least 0.1 during wartime. Controlling for the ESG and Ecological Index, war increases the maturity date on a bank loan with at least 0.56 years.

Keywords: Armament Industry, ESG, Ecological, Social, Governance, War, Bank Loans

JEL Classification: G20, G21, G40, G41, Q01, Q54

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1. Introduction

This research tests the effect of war and investor attention towards ESG within the armament industry through the provision of bank loans. The armament industry is largely influenced by investor attention towards good Ecological, Social and Governance (ESG) standards. Products of the armament industry pollute the environment, contribute to the violation of human rights and are created around non-transparent and corrupt conditions (Causevic et al. 2022). Subsequently, the value system led to a reluctance on the part of financial institutions to work with industries that do not conform to ESG standards (Mitkow, 2022). The consequences are the exclusion of equity from funds, the termination of bank accounts and the refusal of export guarantees by banks (BDSV Mars, 2022; Mitkow et al. 2022). As a reaction, national defense industry associations across Europe officially expressed their concerns that increasing ESG standards may exclude their industries through widely-practiced but misleading applications (BDSV Mars, 2022).

However, hope oftentimes comes from an unexpected source: in the early morning of 24 February 2022, Russia officially declared war on Ukraine. As the Ukrainian government repeatedly asked the EU and US for weapons, Western governments decided to honor this request in order to counter a larger Russian evasion (Reed & Henry, 2022). With an increase of 13% in military expenditure, Europe saw its steepest yearly increase in at least 30 years. Inevitably, the realm of sustainable finance was not immune to this geopolitical event and increased military spending. The war changed the direction of the investor's attention towards undervalued defense stocks, widely labeled as sin stocks, causing stock prices to rise. The largest fifteen banks in Europe were suddenly blamed for investing in defense contractors, despite having a public defense policy indicating the risks within the armament industry (Pax for Peace, 2022). SEB Investment Management, one of the biggest banks in the Nordics, even decided to reverse its sustainability policy by permitting some of its funds to invest in defense companies (SEB Group, 2022).

The value system of war sheds new light on the question of where the armament industry is located on the ESG spectrum. Until today there seems to be no definite answer to this question within the financial literature. This study examines the following question in order to define the place of the armament industry on the ESG spectrum:

What is the effect of investor attention towards ESG in the armament industry, and which role plays the war in it?

The question will be answered from the perspective of banks since they form the essence of the above described conflict. On the one hand, do banks terminate bank accounts and provide less capital due to increased negative ESG attention (BDSV Mars 2022). On the other hand, do they reverse their investments policies due to increased geopolitical tension (SEB Group, 2022). Therefore, the lender loan announcement returns and the loan characteristics will be analyzed during periods of wartime and heightened ESG concerns.

Investor attention towards ESG is proxied by Google Search Trends (GST), of which four separate indexes are created based upon ESG, Ecological, Social and Governance search terms. Wartime is proxied through a dummy variable, stating 1 if the period falls within the boundaries of the United-States-Iraq war or the Russia-Ukraine war. To analyze the cumulative abnormal returns (CARs) of the lender, two event studies are performed. The first takes the median of the combined GST indexes and subsequently divides periods between heightened and lowered ESG concerns. The second event study is distinguished based upon the war dummy. Furthermore, a multivariate analysis tests the CARs on each of the separate investor attention indexes and the war dummy variable, controlling for lender, borrower, loan characteristics and geopolitical risk. To analyze the favorability of the loan characteristics, a multivariate OLS regression is performed on the loan amount, pricing, maturity and first lien debt status against the separate investor attention indexes and the war dummy variable. Finally, to analyze the effect of war on investor attention towards ESG, a multivariate regression with interaction effects is performed on both the CARs and separate loan characteristics.

Results in this study provide evidence for a positive relationship between investor attention towards ESG and the lender loan announcement returns within the armament industry. Within a [0,2] event window, the CARs on the provision of bank loans towards the armament industry, are 0.17% higher for lenders in a period of heightened ESG investor attention, compared to lowered ESG concerns. Furthermore, the effect of investor attention towards ESG on the CARs of the lender becomes greater during wartime. Within the same event window, the effect of the ESG Index on the CARs of the lender is 0.06 higher during a period of war compared to peace.

Moreover, increased ESG attention leads to banks enforcing less favorable loan characteristics towards companies active in the armament industry. First, as ESG investor attention increases, loan pricing becomes less favorable for defense contractors: an increase of 1 in the Ecological and Governance Index leads to a higher loan pricing of 0.03% and 0.04%, respectively. Second, for an increase of 1 in the ESG and Social Index, the probability of a first lien debt status of a bank increases with 0.012 and 0.007, respectively. Furthermore, loan characteristics become more favorable during wartime. For each index, the probability of a first lien debt status by the bank is decreased by at least 0.1 during wartime. Controlling for the ESG and Ecological Index, war increases the maturity date on a bank loan with at least 0.56 years. Unfortunately, the effect of investor attention towards ESG or wartime on the loan characteristics not mentioned yielded insignificant results.

This study aims to fill the lack of comparable and reliable research on the impact of ESG and its intertwining with war within the armament industry (Mitkow, 2022). Further contribution to the existing literature is made by examining the incorporation and valuation of war and investor attention towards ESG on the financial conditions of loans, within the armament industry (Nguyen & Thuy (2023; Kim et al. 2023). Finally, by examining the loan announcement returns on lenders' side, it adds to the short list of lender loan announcement effect studies (Waheed & Mathur, 1993).

This paper has the following structure: Chapter 2 reviews the literature to provide a comprehensive picture on the relation between on the one hand, ESG and war, and on the other hand, investor attention, the armament industry, the lender loan announcement effect and loan characteristics. It concludes with the hypotheses to address the main question. Chapter 3 elaborates on the data and methodology employed to test the hypotheses. Chapter 5 discusses the results of this research, whereas Chapter 6 concludes.

2. Literature Review

The first section of this chapter describes the concept of investor attention, whereas the second section discusses the armament industry. The third section elaborates on the loan announcement effect, and the final section explains the determination of loan characteristics. Each section elaborates on its relationship with ESG and war.

2.1. Investor Attention

Long time ago, the efficient market hypothesis (EMH) laid the foundation for the academic perspective on financial markets. Eugene Fama (1970) described that securities markets were extremely efficient by immediately reflecting new information in asset pricing. Fama (1970) distinguished the weak, semi-strong and strong form of the EMH. The weak version suggests that asset prices reflect all historical, security market information, such as past asset prices and rates of return. The semi-strong version adds the reflection of non-market information to the weak form, and therefore implies that an investor cannot use any published information to predict future prices. The strong version states that both public and private information are reflected in final asset prices. These forms are all based on the assumption that investors are rational, and therefore exploit profit opportunities created by mispricing through new information.

As the years passed, a various amount of studies casted substantial doubt on the unpredictability of stock market prices. Shiller (1981) found evidence against the efficient reflection of new information about future dividends in stock prices. Stock prices move too much to be fully justified by subsequent changes in dividends. Jegadeesh and Titman (1993) discovered an empirically robust stock price anomaly by buying past winners and selling past losers, also known as momentum investing. Nowadays, there are over 241 published anomalies, which raises the question on what causes these market inefficiencies (Jacobs & Müller, 2020).

Models of behavioral finance try to explain the phenomena described above by the concept of investor attention, which is known as a scarce cognitive resource (Kahneman 1973). Barber and Odean (2008) argue that limited attentional capacity greatly influences an investor's purchase decisions. Instead of performing a thorough research, investors frequently choose their stocks based on what catches their eye. Therefore, investors consequently invest in attention-grabbing stocks. Using variables including trading volume, performance from the previous day, and press coverage as attention indicators, Barber and Odean (2008) discovered that investors tend to purchase more of these attention-grabbing equities.

This research measures investor attention through the usage of Google Search Trends. As a result of the current fast advancement in computer technology and learning algorithms, measuring attention through

textual analysis and media sources became increasingly popular (Antweiler & Frank 2004; Tetlock 2007). The advantages are two-sided. First, the databases are large, free and frequently updated. Second, these measurements capture the behavior of the individual, less sophisticated investor. This is more in line with the concept of behavioral finance by including imperfect individuals with social, cognitive and emotional biases (Beer, Hervé & Zouauoui 2012). Furthermore, in 2023, Google accounted for approximately 92.5% of all search queries performed in the United States (Search Engine Market Share United States Of America | Statcounter Global Stats, n.d.).

Da et al. (2011a) were the first to proxy investor attention through search volume data presented by Google. Through internet search volume, they validated the hypothesis of Barber and Odean (2008) that investors are drawn towards attention-grabbing stocks and drive up their prices. Following Da et al. (2011a), Dzielinski (2011) stated a significant relationship between search-based uncertainty measures and aggregate stock returns and volatility. Finally, Bank et al. (2011) established an association between the increase in search queries and a rise in trading activity and stock liquidity on the German stock market.

2.1.1. Investor Attention towards ESG

Exploring investment strategies to integrate ESG factors has become of growing interest to investors and asset owners in recent years, however the exact reaction of investors to nonfinancial information such as Corporate ESG ratings is less well understood (Chen & Yang, 2020).

Regarding ESG ratings, Bams and Kroft (2022) find that these capture primarily firms promised sustainable performance, but are often negatively related to actual sustainable performance. Subsequently, social responsible investors subconsciously tilt their investments toward firms with high ESG ratings, but low sustainable performance. Furthermore, Serafeim and Yoon (2021) find, through the scanning of analyst reports, various media, advocacy groups and government regulators, a positive (negative) market reaction to positive (negative) ESG news. Interestingly, the market's reaction to positive news is smaller for firms with higher ESG ratings. Grewal et al. (2017) investigate the effect of the obligation to disclose nonfinancial information on the abnormal stock returns during the announcement date. The disclosure leads to positive returns for firms that have made investments to improve ESG-related performance. Finally, Chen & Yang (2020) find that investors systematically exaggerate the price impacts of good and bad news on all sorts of corporate ESG information. This results in a short-term momentum effect and long-term reversals for winner stocks with high ESG scores, and loser stocks with low ESG scores. In summary, these studies indicate that investors are drawn towards ESG stocks.

A direct link on ESG & investor attention proxied by Google Search Trends is measured by Kvam et al. (2022). The authors find that companies with high ESG scores deliver high short-term returns in periods of heightened ESG concerns, proxied by GST and Twitter. Moreover, El Ouadghiri et al. (2021) examine the effect of public attention to climate change and pollution on US sustainability

stock indices. The authors find that an increase in US Google Search Trends has a significantly positive effect on the returns of US sustainability stock indices.

The opposite of socially responsible investments are denoted as sin stocks. Sin stocks are shares in companies involved in activities considered to be unethical, e.g. alcohol, tobacco, gambling or weapons (Fabozzi et al. 2008). Various studies investigate the historical performance of sin stocks and find that they deliver significantly positive abnormal returns, outperforming common benchmarks (Hong & Kacperczyk. 2009; Fabozzi et al. 2008). One explanation is that investor attention to these stocks is limited due to investors' values constraining their investable universe. Subsequently, many investors shun these sin stocks causing them to be systematically underpriced. Investors who are willing to bear the reputational risk involved with investing in these sin stocks can earn a return premium. However, Blitz & Fabozzi (2017) later controlled for the Fama-French 5-factor model, by adding profitability and investments to the previously mentioned studies which only controlled for the Fama-French 3-Factor model. Blitz & Fabozzi (2017) find that the abnormal returns are completely explainable by the Fama-French 5-factor model, and therefore their results casts doubt on the existence of a sin stock anomaly nowadays.

2.1.2. War & Investor Attention

War, as a category of geopolitical risk, is considered to be one of the key drivers of investment decisions. War influences the financial markets through heavy government spending, disruption of exports and large spending on imports of war supplies (He, 2023). Given the magnitude of these massive economic interventions, surprisingly few studies have examined the effect of war on investor's decision making (Hudson & Urquhart 2015; He, 2023).

The existing literature on geopolitical risk (GPR) and investor attention focuses on oil price returns and volatility. This is due to the fact that GPR affects fundamentals and is often linked to major oil producing and consuming countries (Xiao et al. 2023). The intuition here is that as a result of war, investors, active in the financial and oil markets, optimize their portfolios due to enhanced geopolitical risk. Investors perceive oil as a good asset to hedge against heightened geopolitical uncertainty (Buoiyour et al. 2019).

War does have a negative direct and indirect effect on the concept of investor sentiment. Investor sentiment is defined as a belief about future cash flows and investment risks that cannot be justified by the facts at hand (Baker & Wurgler, 2007). On the one hand, geopolitical events such as war diminish the investor sentiment directly due to its uncertainty (Cerreia-Vioglio et al. 2011). On the other hand, there are three ways in which war influences investor sentiment indirectly. First, increased intensity in war leads to a decline in real economic activity and economic growth (Caldara & Iacoviello, 2022). Subsequently, real economic activity impacts consumer confidence and investor sentiment through lowering an investor's expectations and increasing their worries. Second, investments will decline due

to an increase in uncertainty. Gulen & Ion (2016) find a strong negative relationship between firm-level capital investment and the aggregate level of policy uncertainty. Lastly, the war exerts influence on investor sentiment through the stock market itself. As the performance of the stock market is a key determinant of an investor's decision making, an overall decline in the stock market leads to more pessimistic behavior (He, 2023). Overall, during a period of war investors decrease the investments made by sentiment, e.g. a belief about future cash flows and investment risks, not justified by the facts at hand

2.2. Armament Industry

The armament industry is known by many names, such as the defense industry, military industry or the arms trade. Following Auer (2013), stocks active within this industry are referred to as military related machinery, aerospace, robotics and support systems (MMARS) stocks. The M contains assault rifles, tanks, and aircraft carriers. A comprises manned aerial vehicles, ballistic missiles, as well as space technology such as spy satellites, GPS systems. R accounts for battle and exploration robots, unmanned aerial vehicles (UAVs), and physical augmentations like exoskeletons and prosthetics. Lastly, S covers an expansive range of products and services ranging from military information technology to cyberwarfare defense, critical suppliers for prime contractors to private contractors' services like translation, food supply, laundry services, reconstruction work or humanitarian aid.

Companies active within the previous domains could either be producing pure military goods, or so called dual-use goods. Alic et al. (1992) defined the technology behind the last category products as "the technology that has both military and commercial applications". Dual-use distinguishes two aspects: spin-off and spin-on. Spin-off contains the usage of defense technologies for the non-defense industry, such as jet engines which owe their successful commercial application to the R&D investments of governments. Spin-on is the usage of non-defense, commercial technologies in defense systems. An example is the implementation of commercialized computer chips for the US government through the operations of Intel (Brandt, 1994).

2.2.1 Armament Industry and ESG

Currently, there is a lack of academic research on the impact of ESG within the armament industry (Mitkow et al. 2022). The actual impact of the tendency towards ESG is however noticeable. Various European, national defense industry associations assembled towards the European Commission to plead that defense weapons should be included in the EU Taxonomy registry, more specifically in the list of 'accepted environmentally sustainable economic activities' (BDSV Mars, 2022). The document described that financial institutions limit their cooperation with defense companies under pressure of associations, NGOs and a few political currents. Defense contractors are being excluded from bank accounts, equity through funds and export guarantees by banks. The extent of these constraints is further

dependent upon the size, ownership structure and type of products/services provided (Mitkow et al. 2022). Concentrating on each of the three seperate ESG categories helps to understand why defense companies seem to suffer in their funding necessities, and why they are widely labeled as sin stocks (Fabozzi, 2017).

First, war efforts are a source to greenhouse gas emissions; from burning housing infrastructure and broken gas lines towards the diesel consumed by all of the airplanes, tanks and ships which are used (Simon, 2022). The carbon footprint of the global militaries and associated defense industries was 445 million tonnes of CO_2 in 2017, which was larger than the annual greenhouse gas emission of the entire country Italy (Transform Defence, 2020). Furthermore, sociological challenges come from a lack of transparency and control over the supply chain. One could think of the supply of military equipment to some of the world's most violent and unstable areas. Consequently, these goods could be used unlawfully, and contribute to a serious violation of international human rights. Potential irresponsible end-use of military equipment is a key issue of the industry (Matelly, 2023; Global Data, 2021). Finally, regarding governance, the arms industry is characterized by practices of corruption. A study of Transparency International (Linney, 2021) shows that of the 134 world's leading arms companies, a 100 companies showed limited to no commitment in tackling corruption. Furthermore, a little less than half of the companies assessed, showed no clear evidence of policies or processes to manage corruption risks in expanding to new markets. This is measured through the public disclosures of subsidiaries, beneficial ownership and major customers of defense sales (Linney, 2021).

2.2.2 Armament Industry and War

War leads to greater profits for the armament industry. It creates the necessity for countries to increase and spend their military budget. Over the years 2002 and 2003 in which the 9/11 attacks were in between, the Pentagon increased the U.S. military spending by more than the entire budget of any other country, including countries such as China and Russia (Hartug, 2021). By attracting the increase in military spending, the war economy is beneficial to corporate defense contractors in at least three ways: the logistics and reconstruction work in the war zones, the usage of private security contractors for the protection of critical infrastructure and the supply of weapons (Hartug, 2021). However, the chaos of war, the lack of adequate government oversight and the requirement of a speedy delivery causes companies to take advantage of wartime conditions. For example, KBR, an American construction company, charged the U.S. forces double the price of fuel, being merely half a year into the Iraq-United-States war (Hartug, 2021). Thus, in addition to enhanced demand, overcharging of the government or even outright fraud leads to bigger profits during war. Moreover, war puts extra emphasis on the bad governance performance of defense contractors.

Furthermore, past research on the armament industry and the financial markets focuses on the impact of conflict-related events, the impact of war risk on the equity market in general or the effect of budget

announcements on defense stocks (Gurdgiev et al. 2022). Capelle-Blancard & Couderc (2008) identified the abnormal stock returns of the world top 100 defense firms, and looked for information release likely to cause abnormal variations. They found that in essence changes in market values are driven by the same forces (earnings announcements, analysts' recommendations etc.) as other industries. Nevertheless, three specific defense industry drivers are to be distinguished: bid and take-over-related news, the relevance of geopolitical events and the importance of public military spending.

2.2.3. Armament Industry, War and ESG

As a result of the invasion of Ukraine, the necessity of western government to scale their armament industry impacts the realm of sustainable finance. The war shines new light on the question of how investors perceive ESG principles within the armament industry. Initially, defense stocks were widely classified as sin-stocks, however due to enhanced geopolitical risk the demand for them increased. Periods of war remove the undervaluation and create greater positive returns on these stocks (Billingsley et al. 1987; McDonald and Kendall 1994). Therefore, one of the biggest banks in the Nordics, Swedish SEB, decided to reverse its sustainability policy, by permitting some of its funds to invest in defense companies (SEB Group, 2022).

These trends are illustrative of what the Armament Industry European Research Group (ARES Group) describes as the result of unclear and divergent definitions of extra-nonfinancial criteria, such as ESG. These definitions suffer from an incomplete regulatory framework, and a lack of harmonization of concepts and definitions used by financial players. To classify sustainable activities, the European Commission responded by creating European taxonomy regulations. However, these regulations only focus on environmental activities. Enforcing the positive social aspect of the armament industry, the ARES Group argued that the taxonomy in its current version does no right towards the fact that defense companies aim to protect democracy, freedom, stability and human rights (Matelly, 2023).

In essence, there seems to be no consensus on whether the value system of war or ESG prevails. This research focuses on how investors dealt with this dilemma throughout the years 2004 until present. Therefore, the next two chapters elaborate on the lender loan announcement returns, the loan characteristics and their relationship with ESG and war within the armament industry.

2.3. Lender loan announcement effect

A loan announcement approach is used as the first method to analyze the balance between war and ESG within the armament industry. Banks play a special role in providing private debt and signaling privileged information. Mikkelson and Partch (1986) were the first to incorporate this unique status of banks into a study by discovering stock price movements linked to the announcements of bank lending agreements. However, Fama (1985) introduced the distinction between inside and outside debt, which sets the groundwork for the theory underlying the loan announcement effects. Bank loans are to be classified as inside debt, because of their accessibility to unique information within an organization's

decision process. Therefore, bank loans are different from publicly placed debt because banks know more about a company's prospects than other investors do (James, 1987). In addition, a bank loan represents a short-term inside debt agreement which usually holds a lower or near-last priority position when claims on promised fixed incomes are to be made (Fama, 1985). Fama (1985) then argued that the periodic evaluation, triggered by a bank loan renewal process, assesses the firm's capacity to fulfill its obligations. Positive loan renewals signal other parties, such as investors, that reassessment is unnecessary. This is beneficial to those parties, since reassessments are expensive, ultimately lowering an investor's service costs. Bank signals are credible by providing reliable information about the borrower's creditworthiness, operating with a large reach against reduced costs (Fama 1985; Petersen & Rajan 2002). Over the years, the literature agreed upon the concept of a loan announcement effect: the announcement of bank loan financing elicits a significantly positive announcement return for the borrower (Billett et al. 2006).

Whereas the literature widely examined a direct effect between the announcement of loans and the financial performance of borrowers, the effect of loan announcements on the returns of the lender remained rather unexposed (Waheed & Mathur, 1993; Megginson et al. 1995). Waheed & Mathur (1993) argued that the lender loan announcement effects are dependent upon the signaling of potential benefits and costs to market participants. Their research distinguished three specific benefits of foreign lending agreements: the exploitation of foreign market imperfections, a response to regulatory factors and the risk management through diversification. Furthermore, they classified too aggressive managerial behavior and country risk as major drawbacks of foreign lending agreements.

2.3.1. Costs and Benefits of the Armament Industry

Announcements of bank loans within the armament industry signal its potential benefits and costs. In an attempt to deepen the dialogue between the defense contractors and their financial players, the ARES Group described four drawbacks of financing defense markets.

At first, because the armament industry is far from being a perfect competition and free market, there are market imperfections which affect the costs of financing (Modigliani & Miller, 1958). The defense industry operates through a monopsony, with the state as its primary customer. Additionally, there are large firms which hold significant market power compared to the smaller ones (Day, 2012; Matelly, 2023). Furthermore, governments also regulate the sector through imposing strict rules on producers and overseeing export activities. It is perceived as ambiguous as state oversight is a form of security which mitigates risk, but limits operational flexibility and growth opportunities at the same time (Belin & Guille, 2008). Similarly, the acquisition or transfer of a company's ownership is typically subjected to state scrutiny. These regulations could be seen as potential challenges by introducing risk factors for investors who seek to divest their assets (Matelly, 2023).

Second, the production of defense equipment requires heavy and long-term investments, including a large amount of fixed-costs for highly qualified personnel and R&D (Capelle-Blancard, 2008). The industry is exposed to political and strategic uncertainties, with the technological complexity increasing the likelihood of failures and losses. Consequently, access to finance may be challenging, as returns do not materialize for years (Matelly, 2023).

Third, investing in the armament industry can raise ethical dilemmas. As is elaborated in 2.1., defense contractors contribute to the existence of war, in a non-transparent, polluting environment of which the end-usage of weapons is not always controlled. Subsequently, investors, such as banks, could suffer from reputational damage.

Finally, the armament industry is sensitive to geopolitical events and conflicts. The demand for military equipment is almost always directly accompanied by the existence of threats. Moreover, due to the insolvency, destabilization of states, social movements and economic or financial crisis, there exists a real 'country' risk (Matelly, 2023).

Through lending agreements towards defense contractors, banks may be seeking to signal market participants their efforts to gain benefits by diversification, profit potential, technological innovation.

First, as is also highlighted by Waheed & Mathur (1993), lending towards the armament industry might provide risk reduction benefits for banks. On the one hand, banks reduce the probability of default through expansion of credit lines to new sectors. They are less vulnerable to economic downturns and reduce financial intermediation costs due to information asymmetry. On the other hand, concentration towards a specific sector creates business expertise and results in less competition amongst banks (Tabak et al. 2011). Kemp et al. (2007) empirically verified that diversified credit portfolios achieve relatively lower levels of risk, however, concentrated portfolios generate higher returns.

Second, two of the earlier stated drawbacks could also be turned into benefits. First, the highly technological environment drives technological advancements which can have applications beyond the military sector. These spin-off dual-use technologies might find use in other industries, potentially generating additional revenue streams. Second, the anticipation of the armament industry to a necessary threat yields also great upward profit potential during times of war.

2.3.2. Lender loan announcement effect and war

Lender loan announcement returns in the armament industry are driven by signals to market participants on the benefits and drawbacks of the industry. However, war predominantly changes one signal and therefore its effect on the lender loan announcement returns. As is elaborated in 2.2., war generates more profit for the armament industry. Probably due to the realization of upward profit potential, investors within the armament industry react positively to the increase in geopolitical risk.

Bilingsley et al. (1987) and McDonald and Kendall (1994) were the first to conclude that war-related events have significant positive effects on the stock prices of defense contractors. Bilingsley et

al. (1987) even found that the same events which positively affect the armament industry, negatively affect the stock market as a whole. Shapiro et al. (2011) further underlined the impact of geopolitical events by examining the effect of war(-related) news on a portfolio of U.S. defense contractors. The portfolio responded positively to war-related announcements, and negatively to peace-related announcements. More surprisingly, very rarely did the market significantly respond on the exact day of the announcement, indicating that investors expected the news or suffered from a lag in response. Finally, Gurdgiev et al. (2022) underline a positive effect of (changes in) current (prior and lagged) budget announcements on stock returns. Furthermore, they found that direct conflict participation leads to a positive impact on stock performance, but it gets almost fully moderated by the subsequent period's negative reaction.

2.3.3. Lender loan announcement effect and ESG

Banks, similar to institutional equity investors, have a distinct and special ability to carefully monitor companies' progress when it comes to ESG considerations (Kim et al. 2023). Pressured by both shareholders and stakeholders, banks claim to take sustainability information into account in their lending (Hauptmann, 2017). Houston & Shan (2022) distinguish financial and reputational motivations of banks to focus on a borrower's ESG performance: poor ESG performance may ultimately translate into greater risk, and doing business with poor ESG-related borrowers would damage a bank's reputation.

Hartzmark & Sussman (2019) find that investors actually value sustainability through the examination of mutual fund flows. Over 11 months, the 10% lowest sustainable rated funds experienced outflows of over 11%, while the 10% highest sustainable rated funds experienced inflows of over 4% of fund size. Furthermore, bank loans are perceived by market participants to credibly signal a firm's ESG commitments. Kim et al. (2021) investigate the issuance of sustainability linked loans (SLL) and green loans. These loan spreads are dependent upon key performance indicators in order to meet certain ESG goals. The authors find that the borrowers' returns respond positively to the loan announcement as a result of a credible signal of the borrowers' ESG commitments to investors and stakeholders. Furthermore, Flammer (2021) examines corporate green bonds, which are bonds whose proceeds are committed to finance environmental and climate-friendly projects. The author finds a positive reaction of the stock market to the issuance, and explains this by the fact that green bonds let companies credibly signal their seriousness on global warming. Finally, Huang et al. (2022) even find a positive market reaction to the returns of the lender, around the announcement of loans from banks towards firms with worse ESG performance, compared to loans from banks towards firms with higher ESG performance.

2.4. Loan Characteristics

The second method evaluates financing conditions within the armament industry to analyze the balance between war and ESG through bank loans. This chapter elaborates on the creation of privately negotiated bank loans, and the role played by both war and ESG concerns.

Bank loan characteristics have been shown to be significantly associated with expected corporate risks and information asymmetry between lenders and borrowers (Qian et al. 2023; Du et al. 2017). The assessment of corporate risk and the degree to necessary information are assimilated with trust (Gambetta, 1988). Mayer et al. (1995) defines trust as "the willingness of a party to be vulnerable to the actions of another party, based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party". Hence, lenders' (i.e., the trustors) decisions for financial conditions on loans are not only dependent upon verifiable information on the borrower (i.e., the trustee) at hand. Trust compensates for the lack of information, and a lower perceived risk. Therefore, more trust leads to less concerns about a borrower's capacity to repay its debts, and thus less stringent financing conditions such as a longer maturity, less need for collateral and lower loan spreads.

Mayer et al. (1995) reviews a list of trust factors and classifies them into three components: ability, benevolence and integrity. Ability is the capacity of a borrower to meet its debt obligations through the borrower's influence within a specific domain. For example, the trustee may be highly competent in a technical area, affording that party trust on tasks related to that area. Benevolence is the degree to which a trustee is believed to want to do good to the trustor, aside from pursuing their own maximum profit. Finally, integrity sees on the lender's perception that the borrower values a set of principles that the lender finds acceptable. Both benevolence and integrity are the two ethics-based factors of trust, therefore closely intertwined with ESG concerns.

2.4.1. Loan Characteristics and War

Surprisingly, the effect of war on the cost of bank loans has yet only been examined by Nguyen & Thuy (2023). Let alone, the effect of war on loan pricing within the armament industry. The study finds that geopolitical risk increases the cost of bank loans, to the extent to whether banks consider it to be a significant risk for their borrowers. Three main perspectives on the relationship between war and the cost of bank loans could be distinguished.

First, there is growing evidence that geopolitical risks have harmful effects on the economy. Geopolitical risks worsen the business and investment environment due to capital destruction, increasing stock volatility and increasing the likelihood of economic recessions (Caldara and Iacoviello, 2022; Zhang et al. 2023). Furthermore, they could also trigger disruptions in energy supply, which negatively

impacts the economy (Nguyen & Thuy, 2023). These negative effects can translate into higher default risk for firms, pushing banks to charge more stringent financial conditions.

Second, geopolitical risk increases the costs of bank loans due to increased information asymmetry between lenders and borrowers. It can undermine analysts' sentiment and lead to inaccurate forecasts. This disrupts the effectiveness of information intermediaries, and the information stream towards financial markets (Cuculiza et al. 2020).

Third, according to the real options theory, geopolitical risk encourages managers to postpone their investment decisions and hold more cash as a buffer against economic shocks (Nguyen & Thuy, 2023). The saving of cash, however, exposes firms to higher agency problems, as insiders exploit a firm's free cash flows for private gains (Attig et al. 2021). Banks will price their loans higher on firms suffering more from agency problems (Lin et al. 2018).

2.4.2. Loan Characteristics and ESG

The integration of ESG features into loan pricing starts with ESG data directly from companies and sustainability rating agencies (Jonsdottir et al. 2022). However, little is known on the exact incorporation and valuation of ESG information by institutional investors and debt holders (Hauptmann, 2017; Zadeh and Serafeim, 2018; Chen & Yang, 2020; Henriksson et al. 2018; Kim et al. 2023). Nevertheless, banks ought to be cautious because recent studies show that ESG data includes a lack of relevance, materiality, accuracy, comparability and reliability in the (self) assessment of a company's actual sustainable performance (Jonsdottir et al. 2022).

The ESG performance of a borrower could affect its bank loan characteristics via at least two non-mutually exclusive mechanisms: the reduced risk channel, and the increased transparency channel (Qian et al. 2023).

The first channel translates into poor ESG performance leading to greater risk. Firms that exhibit weaker ESG performance may face more severe repercussions from diverse stakeholders, potentially resulting in increased costs (Houston and Shan, 2021; Chen and Yang, 2020). Furthermore, Friede et al. (2015) examined more than 2200 studies, and their results show that approximately 90% of the studies find a non-negative relation between ESG and corporate financial performance. The larger part of all the studies even report positive findings between ESG and a company's profitability, efficiency and overall financial health. As a result, the default risk of companies with better ESG performance is lower than their counterparts, subsequently they are offered less stringent loans (Qian et al. 2023).

The second channel translates into well performing ESG firms attracting more analyst following and higher institutional ownership, especially from long-term investors (Gillan et al. 2021). The devoted investors can act as effective monitors to discipline management, and ultimately decrease information asymmetry (Edmans & Holderness, 2017). The more analysts there are following, the more transparent

the information environment will be (Lang and Lundholm, 1996). As a result, firms with better ESG performance have lower information asymmetry, and are offered less stringent bank loans (Qian et al. 2023).

The literature demonstrates results in line with the above stated theories on the positive effects of ESG on the cost of capital. Firms with better ESG scores tend to borrow more cheaply, have higher credit ratings and lower cost of capital (Henriksson et al. 2018). First of all, good governance in terms of greater institutional ownership and stronger outside board control leads to lower bond yields and higher ratings due to a reduction in agency costs (Bhojraj and Sengupta, 2003). Second, environmental issues are associated with a significantly higher cost of debt financing and lower credit ratings (Bauer & Hann, 2008). Finally, Kim et al. (2014) discover that ethical behavior is related to better syndicated loan spreads. They also find that ethical similarity between the borrower and its lender results in more favorable loan conditions. In addition to the latter, Hauptmann (2007) finds that a borrower's overall ESG performance is only beneficial to the borrower when the lending bank' ESG performance is high as well.

As is elaborated in 2.1. the armament industry, theoretically, does not score well on the ESG scale. Especially, the lack of good governance performance diminishes the trust between the lender and borrower through components of benevolence and integrity. Moreover, the actual lack of ESG performance leads to an increase of default risk and information asymmetry. Therefore, the higher the ESG concerns, the more stringent bank loans will be for the armament industry.

2.5. Hypotheses

This research tests the effect of war and investor attention towards ESG within the armament industry through the provision of bank loans. The lender loan announcement returns and the loan characteristics within will help to indicate the position of the armament industry on the ESG spectrum. Regarding the investor attention towards ESG, the following hypothesis will be tested:

> *H1: Lender loan announcement returns within the armament industry will be lower*
> *during periods of heightened investor attention towards ESG.*

Lender loan announcement effects exist by signaling the potential benefits and costs of the armament industry to market participants (Waheed & Mathur, 1993). One of the drawbacks for the armament industry is its connection to ethical dilemmas: except for the subcategory social, there seems to be consensus on the armament industry to be non-ESG compliant. Nowadays, financial markets and its

investors value sustainability, while at the same time perceiving bank loans as credible signals to a company's ESG commitments (Kim et al. 2021; Huang et al. 2022; Flammer, 2021). Therefore, increased attention towards ESG leads to more negative lender loan announcement returns within the armament industry.

> *H2: Bank loan characteristics will be less favorable for the armament industry during periods of heightened investor attention towards ESG.*

Pressured by both shareholders and stakeholders, banks claim to take ESG requirements into account (Hauptmann, 2017). Although not much is known on the incorporation of ESG (scores) into bank loan pricing, there are several studies which demonstrate that firms with higher ESG scores tend to borrow against more favorable loan characteristics (Henriksson et al. 2018; Bhojraj and Sengupta, 2003; Kim et al. (2014). Theory explains these results by increased transparency, reduced default risk and strengthened trust as a result of strong benevolence and integrity. Therefore, an increase in ESG attention pressures banks to provide lower loan amounts, higher loan pricing, lower maturity and a higher probability of first lien debt towards a theoretically non-ESG compliant armament industry.

This research also tests the effect of war within the armament industry through lender loan announcement returns and the favorability of loan characteristics. Regarding war, the following hypotheses will be tested:

> *H3: Lender loan announcement returns within the armament industry will be higher during periods of war.*

A predominant effect of war on the armament industry is the realization of the upward profit potential (Hartug, 2021). It is no surprise that several studies demonstrated that the stock prices of defense contractors respond positively to war-related events (Bilingsley et al. 1987; Shapiro et al. 2011). A bank providing a loan towards a defense contractor during war time signals the benefit of the upward profit potential. Therefore it is expected to see more positive loan announcement returns, compared to a period of peace.

> *H4: Bank loan characteristics will be more favorable for the armament industry during periods of war.*

Without there being any research on the effect of war on loan characteristics within the armament industry, the expected favorability of them becomes a consideration. On the one hand, does the increase in profits lead to lower default risk and thus more favorable loan terms. On the other hand, does an

increase in geopolitical risk lead to an increase in the cost of bank loans, in general (Nguyen & Thuy, 2023). During periods of war, banks will provide higher loan amounts, lower loan pricing, higher maturity and a lower probability of first lien debt towards the armament industry.

The current tendency of investor attention towards ESG leads towards funding problems for the EU/US armament industry. The consequences are the exclusion of equity from funds, the termination of bank accounts and the refusal of export guarantees by banks (BDSV Mars, 2022; Mitkow et al. 2022). However, the geopolitical situation shines new light on the exact place of the gatekeepers of democracy, freedom, stability and human rights within the ESG spectrum (Matelly, 2023). The following hypothesis will help to address the interaction between war and investor attention towards ESG:

> *H5: Increased investor attention towards ESG will have a significantly weaker effect on the lender loan announcement returns and the favorability of loan characteristics within the armament industry during periods of war.*

War, as a result of enhanced geopolitical risk, diminishes investor sentiment both directly as indirectly (He, 2023). Therefore, during wartime investors are cautious to invest based upon ESG belief, supposingly justified by ambiguous ESG scores (Jonsdottir et al. 2022). Moreover, well scoring ESG stocks are not known to be a hedge against geopolitical risk. Comparable with oil, the armament industry proves to be a stable investment by realizing its upward profit potential during enhanced geopolitical risk. Therefore, within a theoretically poor ESG performing armament industry, the effect of an increase in investor attention towards ESG is expected to diminish during periods of war.

3. Data

This chapter elaborates on the data, which is collected through three main datasets: the loan, lender and borrower characteristics, the investor attention towards ESG and the stock returns of the lender. Each of the distinct variables presents descriptive statistics.

3.1. Bank Loans

All of the hypotheses are either tested upon the returns around the announcement of bank loans, or bank loan characteristics. The Refinitiv Bank Loan database provides historical information on the terms and conditions of deals in the global commercial loan market. This database provides information on syndicated and bilateral loans, of which both are used in this research. Furthermore, it contains various characteristics of the loan contracts such as lender and borrower identities, loan yield type and the borrower's public or private status (table 14 & 15, appendix). This research filters the data according to 4 criteria. First of all, this research focuses on the worldwide defense loan market, by retaining global loans within the TRBC classified 'Aerospace and Defense industry'. However, the majority of the loans emanate from the United States (see table 12, appendix). Second, since the investor attention data is not older than 2004, this research takes only loans with an announcement date after 2004. Third, in order to measure the cumulative abnormal returns, this research excludes private lenders such as government agencies. It includes delisted companies, only when the loan announcement date appears within the period the lender was publicly listed. Fourth, considering that the arranger does not always display the publicly listed parent company, this research substitutes them. For example 'Far Eastern Standard Chartered Bank' becomes 'Standard Chartered PLC'. These filters shrink the data to 1,875 distinct loans. The filter criteria steps are summarized in table 1:

Table 1: Sample selection procedure

Criteria	Description	Sample size
Aerospace and Defense	Only bank loans which were given towards companies active in the TRBC classified Aerospace and Defense industry.	2,932
Announcement Date	Bank loans of which the announcement dates were not between January 1, 2004 and May 31, 2023 were excluded.	1,886
Lender Public Status	Lenders which were not listed on a public exchange during the bank loan announcement period were excluded.	1,875
Separating Arrangers	On a given bank loan, multiple lead arrangers were separated into different observations to evaluate their returns.	3,993

To get to the basic sample used in this study, the criteria presented in the table were inserted in the Refinitiv Bank Loan Database in order to get two separate datasets. One contains 1,875 to evaluate the loan characteristics. The other contains 3,993 to evaluate the lender loan announcement returns.

3.2. Lender announcement returns

Hypotheses 1, 3 and 5 test the effect of war and ESG attention on the returns of the lender, prior and after the announcement of the bank loan. Therefore, for each syndicated loan the different lenders and the borrower were identified. A syndicated loan involves bookrunners, arrangers and participants, of which the arrangers play an important role due to the amount they contribute to the financing operation. In order to calculate the cumulative abnormal returns as a result of lending towards defense firms, this research focuses on the arrangers. The unique combination of the arrangers and the loan announcement date were then matched with the stock returns in the event window around the announcement date. These stock returns are obtained from the Refinitiv Datastream. The data sample contains the stock returns of 3,993 arrangers, all by name described in table 13, appendix. Furthermore, the lender and borrower characteristics were obtained from the Refinitiv Eikon database to control for. This paper analyzes the same yearly characteristics for both the arranger as the borrowing firm. First of all the size of both parties is proxied by the *Total Assets.* Second, the *Leverage Ratio* equals the debt over equity. Finally, the *ROA* represents the net income after taxes divided by total assets. The unadjusted descriptive statistics on the borrower and lender are presented in table 2.

Lender Characteristics	Definition	Unit	Obs	Mean	Median	Std.Dev.	Min	Max	Skewness	Kurtosis
Total Assets	Balance sheet assets, including current assets, long-term investments and funds, net fixed assets, intangible assets and deferred charges, before the offering. Equals total liabilities plus shareholders' equity plus minority interest.	trillion USD	3,722	16	1.32	56.93	0.00	374	-8.65	182.65
Debt to Equity	Total non-subordinated debt divided by total equity	%	3,721	0.5 bn.	226.16	0.01 tn.	0	0.7 tn.	35.19	1239.51
Return on Assets	Net income after taxes / Assets	%	3,712	0.68	0.74	2.76	-45.15	25.24	3.99	18.34
Borrower Characteristics										
Total Assets	Balance sheet assets, including current assets, long-term investments and funds, net fixed assets, intangible assets and deferred charges, before the offering. Equals total liabilities plus shareholders' equity plus minority interest.	trillion USD	723	0.18	0.38	0.03	0.00	1.6	2.38	8.75
Debt to Equity	Total non-subordinated debt divided by total equity	%	676	142.81	61.57	380.77	.01	3432	6.46	48.33
Return on Assets	Net income after taxes / Assets	%	612	5.98	5.54	3.91	.02	41.22	1.91	14.38

This table lists the variable names, definitions and summary statistics for both the lender and borrower characteristics. It includes the mean, standard deviation, minimum and maximum. The data contains 3,993 different observations for multiple arrangers, however the different characteristics for both the lender and borrower are not complete for each observation. For example, most of the borrowers are private and do not share their characteristics. Tn stands for Trillion, bn stands for billion.

3.3. Bank Loan Characteristics

Hypotheses 2, 4 and 5 test the effect of war and investor attention towards ESG on the favorability of the loan characteristics within the armament industry. Therefore, several loan characteristics were retrieved. The *Loan Amount* is the total amount a defense firm borrows in a deal. The *Loan Pricing* describes the total costs the firm needs to pay for the loan. *Maturity* equals the maturity date minus the announcement date. The *First Lien Debt* equals one if the lender has the first claim on the collateral. The *Number of Arranger* represents the number of different arrangers within a syndicated loan. The unadjusted descriptive statistics are presented in table 3:

Table 3: Descriptive statistics loan characteristics, raw

Loan characteristics	Definition	Unit	Obs.	Mean	Median	Std.Dev.	Min	Max	Skewness	Kurtosis

Loan Amount	Full loan package amount for both US and non-US target markets for all tranches	mln. USD	1867	764	249	1346	.25	16543	4.32	32.17
Loan Pricing	The spread that was used at the sign/close of the deal.	%	1163	3.44	3	2.67	0.05	21	2.5	12.81
Maturity	Maturity minus the announcement date	Years	1825	4.74	5	2.81	.08	28.64	2.74	20.52
First Lien Debt	Equal one if the loan is a first lien facility	0/1	1875	0.23	0	.39	0	1	1.62	3.63
Number of Arrangers	The number of lead arrangers in the deal	-	1717	2.54	2	2.34	1	20	2.66	12.88

This table lists the variable names, definitions and summary statistics of each of the different loan characteristics. It includes the mean, standard deviation, minimum and maximum. The data contains 1,875 loans, however the different loan characteristics are not complete for each loan, which explains the difference in observations.

On average, the loan amount provided to a defense contractor is 764 million with an interest of 3.44%, which has to be repaid within 5 years. Furthermore, in only 23% of all loans, the lender has the first claim on the collateral.

3.4. ESG Attention Indexes

Hypotheses 1, 2 and 5 analyze the effect of ESG attention on the loan characteristics and cumulative abnormal returns around the announcement date. Based upon Yu and Yuan (2011), this research measures public attention through search volumes on Google, the most used search engine in the world (Statista, 2021). In academic research, Google Search Trends (GST)-based indices focus either on the economy, a specific topic such as COVID-19 or specific stocks (Szczygielski et al. 2023). The GST-database provides insights back to January 2004. These frequencies are encompassed in the *Search Volume Index* ($SVI_{t,j}$), where index j denotes a specific search term. To measure the global tendency towards ESG, the search trends used in this paper were set worldwide.

The value of the SVI is measured from a scale of 0 to 100, where 0 refers to a period where the term does not comply with a certain threshold value and 100 refers to a period where the term was searched on its highest relative volume (Bank et al. 2011). Based upon the list of Kvam et al. (2022), monthly search volume indices were retrieved for ESG-related search terms, see table 11 in the appendix. This was done for the period of 01/01/2004 until 31/05/2023. Subsequently, the search intensity across all these words is aggregated by taking the average. Based upon the distinction made by Kvam et al. (2022), the ESG indexes were split up between high and low periods on the basis of the median, to analyze the effect of ESG attention on the lender loan announcement returns through an event study (hypothesis 1). To perform the multivariate analysis of ESG investor attention on the CARs, and to analyze its effect on the loan characteristics (hypothesis 2), the ESG indexes were used in their continuous form, from 0 to 100.

3.5. War

In order to test hypotheses 3, 4 and 5, this research uses a dummy variable to measure the effect of war on the cumulative abnormal returns of a lender and favorability of loan characteristics. This variable equals one during a period of war, and zero in a period of peace. More specifically, it distincts two separate periods of war: the United States-Iraq war, and the Russia-Ukraine war. This research choses these two periods, since the majority of the loans are classified as either European or American (see table 12, appendix), and both wars involve Europe and America as important players. The interdependence between the above wars and the financial markets of both continents are illustrated at the beginning of both wars. European equity markets were among the worst-hit by the Russia-Ukraine war, and the U.S. S&P 500 index fell more than 7% in the days following the invasion (Lodh et al. 2023; Bhachu 2023). In 2003, the U.S. S&P 500 fell by more than 5% following the start of the Iraq War (Chase de Vere, 2023).

Two turning points were taken to represent the boundaries of both wars. December 14, 2008 marks the end of the Iraq War, due to President George W. Bush signing the security pact with Iraq and holding a press conference where he famously dodged two shoes thrown at him from the audience. On February 22, 2022 Russia invaded Ukraine, which officially marks the beginning of the Russia-Ukraine war. Wars most of the time do not arise in one day, however this research picked both dates as boundaries on which the realization or termination of war is most likely to have reached the public. Figure 1 presents the two categories of explanatory variables of interest: the ESG attention indexes and war.
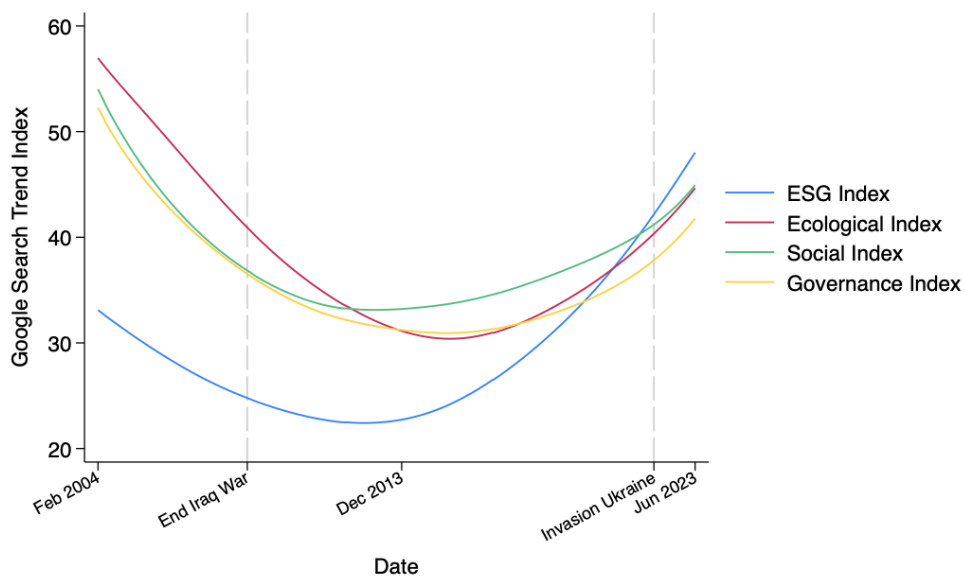
Figure 1. The figure displays the correlation between the two variables of interest: investor ESG attention, and war. The x-axis represents the date including the signing of the security pact and the invasion of Ukraine as boundaries on the beginning or ending of both wars. The y-axis represents the aggregated Google Search Trends per ESG, Ecological, Social or Governance index. The GST value is measured on a scale of 0 to 100.

3.6. Overview Adjusted Variables

As is shown in table 1 and 2, most of the variables violate the critical skewness and kurtosis level of |2.00| and |5.00|, respectively (Kim et al. 2014). These variables were transformed by either taking the logarithm or by winsorizing at a maximum 5% level. Still some of the variables, e.g. loan pricing, show extremely high values by impacting the kurtosis through its outliers. Table 4 shows the adjusted descriptive statistics of all variables used. The highest number of observations is 3933, but none of the loan, borrower or lender characteristics matches this number completely. None of the ESG attention indexes reach their maximum of 100. Based upon their skewness and kurtosis in the original state, they are relatively normally distributed, as can also be seen in figure 1. Out of the 1,875 bank loans, 625 were granted during a period of peace. Regarding the loan characteristics, the average percentage interest paid on a loan is 3.4, while the first lien debt status is 0.23 on average. Furthermore, the lender characteristics are higher compared to the borrower characteristics, except for the return on assets. Note that although the daily returns of the lender exceed the critical threshold value for kurtosis, they are not winsorized. Instead, the cumulative abnormal returns are winsorized which will be highlighted later on.

Table 4: Descriptive statistics of adjusted variables.

Variables	Mutation	Hypotheses	Unit	Obs	Mean	Median	Std.Dev.	Min	Max	Skewness	Kurtosis
Explanatory Variables											
ESG Index	None	1, 2 and 5	0 to 100`	3933	28.38	25.53	8.49	16.69	52.61	1.14	3.42
Ecological Index	None	1, 2 and 5	0 to 100	3933	36.57	34.64	9.85	20.21	73.42	0.85	3.36
Social Index	None	1, 2 and 5	0 to 100	3933	37.26	36.62	7.4	24.70	65.25	0.92	3.84
Governance Index	None	1, 2 and 5	0 to 100	3933	34.82	33.45	6.08	24.80	72.90	1.26	4.99
War	None	3, 4 and 5	0/1	3933	0.33	1	.47	0	1	-1.28	2.63
Lender Returns	None	1, 3 and 5	-	35649	-0.03	0	1.7	-30.77	24.77	-0.07	30.72
Loan Characteristics											
Loan Amount	Logarithm of loan amount	2, 4 and 5	Ln.	1867	6.38	6.64	1.47	0.42	9.73	-0.65	3.24
Loan Pricing	None	2, 4 and 5.	%	1163	3.44	3	2.67	0.05	21	2.5	12.81
Maturity	Logarithm of maturity	2, 4 and 5.	Ln.	1875	1.43	1.60	0.61	0	3.35	-1.12	5.27
First Lien Debt	None	2, 4 and 5.	0/1	1875	0.23	0.23	0	.39	0	1	1.62
Number of Arrangers	Logarithm of total arrangers	2, 4 and 5.	Ln.	1875	1.25	1.38	0.79	0	2.99	-0.05	2.14
Lender Characteristics											
Ln Total Assets	Logarithm of total assets, winsorized at 3%	All.	Ln.	3933	27.88	27.91	1.74	24.37	33.02	1.07	4.63
Debt to Equity	Winsorized at 3%	All.	%	3933	284	226.90	212.64	35.58	994.50	1.57	4.59
Return on Assets	Winsorized at 3%	All.	%	3933	0.72	0.75	0.49	-0.37	1.73	0.00	2.40
Borrower Characteristics											
Ln Total Assets	Logarithm of total assets	All.	Ln.	723	0.27	0.07	0.362	0.00	1.62	1.82	4.74
Debt to Equity	Winsorized at 5%	All.	%	676	104.06	68.81	107.03	0.01	461.89	2.25	7.49
Return on Assets	Winsorized at 3%	All.	%	612	5.67	5.05	3.33	0.78	13.43	0.52	2.48
GPR Index	None	All.	-	3933	101.82	92.59	36.64	60.60	325.52	2.45	3.83

This table lists the variable names and descriptive statistics for all the variables used. It includes the mean, median, standard deviation, minimum, maximum, skewness and kurtosis. Furthermore, the usage per variable in each hypothesis is highlighted. The data contains 3,933 different observations for multiple arrangers, however the different characteristics for both the lender and borrower are not complete for each observation. For example, most of the borrowers are private and do not share their characteristics. Note that the ESG indexes, war, lender returns, loan pricing and first lien debt are not winsorized. No variable is winsorized at a larger scale than 5%.

4. Methodology

This research distinguishes two different methodologies: an event study and the OLS regression. The hypotheses 1 and 3 which test the effect of war and investor attention towards ESG on lender loan announcement returns will be assessed through two distinct event studies, backed by one multivariate OLS regression. The hypotheses 2 and 4 which test the effect of war and ESG on loan characteristics will be assessed through one multivariate OLS regression. Hypothesis 5 which evaluates the effect of ESG attention on both cumulative abnormal returns and loan characteristics during periods war, will be tested with a multivariate OLS regression containing interaction effects.

4.1. Event Study - Lender Loan Announcement Returns

This research contains two event studies to investigate the cumulative abnormal returns of the lender around the announcement date of a bank loan within the armament industry during periods of war and high ESG attention (hypotheses 1 and 3). The design follows the standard event study methodology of MacKinlay (1997). MacKinlay (1997) shows that certain events, e.g. the provision of a bank loan, can cause deviation of the stock price from its value based upon the efficient market theory. These events do so by showing a statistically significant effect on the stock prices prior or after a specific event. In order to test this, this section identifies the event window for the abnormal returns, an estimation window for mean returns and the methodology behind the abnormal returns will be described.

4.1.1. Event and Estimation Window

The announcement date of the bank loan will be marked as the event day, i.e., day 0. The effect of the issuance on the lender's return on and around the event date will be examined. To recall, Shapiro et al. (2011) analyzed that not often the market responded on the exact day of the event. Following Waheed & Mathur (1993) & Li & Ongena (2015), four symmetric and four asymmetric event windows within one week are created to capture all of the announcement effects. The four symmetric windows are: seven-day [-3,3], five-day [-2,2], three-day [-1,1] and one-day [0,0]. The four asymmetric windows are three-day [-2,0] and [0,2], two-day [-1,0] and [0,1]. Furthermore, in line with MacKinlay (1997), the estimation period will be 120 trading days in advance of the start of the event window.

4.1.2. Cumulative Abnormal returns

The evaluation of the impact of the loan announcement requires a measure of the abnormal return. The abnormal return is the actual ex post return over the event window, minus the normal return of the firm (MacKinlay 1997). This research uses the market model to calculate the expected returns, due to the extensive usage in event studies. Moreover, Konchitchki and O'Leary (2011) recommend the market model when dealing with small samples. The sample is represented by the STOXX Global 1800 Banks, which proxies the normal market return through using the market standard Industry Classification Benchmark to categorize the index on worldwide banks.

Subsequent to the calculation of the normal stock returns, the normal market returns are calculated. The abnormal returns for the specific event window are then followed by:

$$AR_{i,t} = R_{i,t} - \left(a_i + \beta_i R_{m,t} \right) \tag{1}$$

The abnormal return of firm 'i' at day 't' within the event window represents the difference between the actual stock return ($R_{i,t}$) and the normal return. The normal return is predicted based upon the typical relationship between the firm's stock and its reference index, expressed by a_i and β_i, and the actual reference market's return ($R_{m,t}$). To further analyze the excess returns over the different event windows, the cumulative abnormal returns are calculated with the following formula:

$$CAR_{i,t} = \sum_{t2}^{t_1} AR_{i,t} \tag{2}$$

Where T_1 and T_2 form the beginning and the end of the different event windows. Finally, the CARs over the cross-section of events are aggregated to get the cumulative average abnormal returns (CAAR):

$$CAAR = \frac{1}{N} \sum_{i=1}^{N} CAR_i \tag{3}$$

4.1.3. Univariate Analysis

This research compares two times the means of two different groups. First to disentangle the effect of lender loan announcement returns in periods of high ESG attention, compared to periods of low ESG attention (hypothesis 1). Second, to investigate the lender loan announcement returns in periods of war compared to peace (hypothesis 3). For both the separate event studies, an independent two-sample t-test with unequal variances is used. Since the standard deviations between the two samples differ, unequal variances are used. Li & Ongena (2014) use this test to compare the loan announcement returns before and in the financial crisis.

Hypothesis 1 predicts that the lender's CAAR is lower in periods of heightened ESG attention within the armament industry. Therefore, the expected outcome for the independent two-sample t-test is $CAAR_{high} < CAAR_{low}$. The null hypothesis predicts that the CAAR is the same, or higher in periods of heightened ESG attention compared to lowered ESG attention. Therefore the null hypothesis is the following:

$$H_0: CAAR_{high} >= CAAR_{low} \qquad (4)$$

Hypothesis 3 predicts that the lender's CAAR in the armament industry is higher during wartime than during peace. Therefore, the expected outcome for the independent two-sample t-test is $CAAR_{war} > CAAR_{peace}$. The null hypothesis predicts that the CAAR is the same, or lower in periods of war compared to periods of peace. Therefore the null hypothesis is the following:

$$H_0: CAAR_{war} =< CAAR_{peace} \qquad (5)$$

The t-value obtained from the independent two-sample t-test with unequal variances, is calculated as follows:

$$t = \frac{CAAR_{high} - CAAR_{low}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \qquad (6)$$

The mean of the CARs for the high ESG attention group (war) is subtracted by the mean of the CARs for the low ESG attention group (peace). The sample variances are calculated per group and represented by S. Where S_1 represents the heightened ESG attention (war) sample, and S_2 represents the lowered ESG (peace) sample. N denotes the samples size for each group.

4.2. Regression Analysis

This research contains three different OLS regression. First, under the univariate analysis we considered the influence between the CARs and one variable only. Therefore, hypothesis 1 and 3 will be backed by a multivariate OLS regression controlling lender, borrower and loan characteristics. Second, in order to test hypothesis 2 and 4, four separate loan characteristics are being regressed against the different ESG indexes and the war dummy, controlling for lender, borrower and loan characteristics. Finally, an OLS regression with interaction effects will test the effect of war on the relationship between ESG attention on the lender loan announcement returns and loan characteristics, hypothesis 5.

4.2.1. Cumulative Abnormal Returns

To strengthen the testing of war and ESG attention on lender loan announcement returns, a multivariate OLS regression will be performed. This section first checks for heteroskedasticity, multicollinearity and performs a general specification test for the linear model.

To check for possible heteroskedasticity, the Breush-Pagan and White tests are performed. As can be seen in table 21, appendix, the null hypothesis of constant standard deviations (homoscedasticity) is rejected for all of the different indexes and event windows. Both tests show significant results at a 5% level, indicating that there is some heterogeneity in the data. Therefore, robust standard errors are to be taken. Furthermore, the Variable Inflation Factor (VIF) is retrieved to check for multicollinearity. O'Brien (2007) argues that a threshold of 10 should be considered when considering the VIF score. A score of higher than 10 indicates high multicollinearity between at least one of the variables in the regression. As can be seen in table 23, appendix, all of the VIF scores are below 4. Finally, to limit omitted variable bias, and possible endogeneity a Ramsey RESET test is performed. The aim of this test is to check whether the model has no omitted variables, H_0. Table 25, appendix shows the results. Except for the ESG Index regression on the CARs [0,2], the null hypothesis cannot be rejected at a 5% level.

The following formula is used for a multivariate analysis on hypotheses 1 and 3:

$$CAR_i = a + \beta * ASVI_{st} + \gamma * War + \delta * LenderControls + \delta 1 * BorrowerControls$$
$$+\delta 2 * LoanCharacteristics + \delta 3 * GeopoliticalRisk + \varepsilon_{it} \qquad (7)$$

CAR_i is the dependent variable and denotes the cumulative abnormal return for lender 'i'. a displays the constant. β is one of the two variables of interest, measuring the relation between ESG attention and a lender's return. $ASVI_{st}$ represents the aggregated search results for ESG-category 's' at time 't'. Note that in contrast to the earlier event studies, the data is not divided into two samples, but takes the google search trends in its continuous form from 0 to 100. γ is the second variable of interest, measuring the relation between war and a lender's return. War equals 1 if the loan has been announced during a period of war. δ stands for the set of controls, which include the loan, borrower and lender characteristics as displayed in table 4. In addition, the Geopolitical Risk Index (GPR) is added to control for geopolitical risk. The index scrapes newspapers, and is obtained through Caldara & Iacoviello (2022).
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4.2.2. Loan Characteristics

To test for the effect of ESG attention and war on the favorability of loan characteristics a multivariate OLS regression is performed (hypotheses 2 and 4). The same tests as before are performed to check for possible heteroskedasticity, multicollinearity and omitted variable bias. Again, the null hypothesis of both the White test and the Breush-Pagan test cannot be rejected at a significance level of 5% (Table 22,

appendix). Therefore, robust standard errors are taken. Furthermore, all of the Variable Inflation Test scores are all below 4, indicating little to none multicollinearity. Moreover, for all of the Ramsey RESET tests, the null hypothesis cannot be rejected, signaling the possibility of omitted variable bias in the data.

The effect of ESG attention and war on the several characteristics of a bank loan is tested through an OLS regression (Coleman et al. 2002):

$$LC_{it} = a + \beta * ASVI_{st} + \gamma * War + \delta * \delta LenderControls + \delta 1 * BorrowerControls$$
$$+\delta 2 * LoanCharacteristics + \delta 3 * GeopoliticalRisk + \text{Country FE}_i + \varepsilon_{it} \qquad (8)$$

LC_i is the dependent variable and denotes either the loan amount, loan pricing, maturity, first lien debt for a given loan 'i' issued at year and month 't'. β is one of the two variables of interest, measuring the relation between ESG attention and the loan characteristic. $ASVI_{st}$ represents the aggregated search results for ESG-category 's' at time 't'. γ is the second variable of interest, measuring the relation between war and a loan characteristic. War equals 1 if the loan has been announced during a period of war. δ stands for the set of controls, which include the loan, borrower and lender characteristics as displayed in table 4. In addition, the Geopolitical Risk Index (GPR) is added to control for geopolitical risk. The index scrapes newspapers, and is obtained through Caldara & Iacoviello (2022). Finally, note that this regression only adds country fixed effects. Yearly fixed effects would omit the effect of war on the loan characteristics. Industry fixed effects have no effect.

4.2.3. Interaction Effects

Finally, multiple multivariate regressions are performed with interaction effects to test whether war diminishes the effect of ESG attention on either the favorability of loan characteristics or lender loan announcement returns. For the heteroskedasticity, multicollinearity and omitted variable tests, see the previous sections. Robust standard errors are used, and the following regressions are used:

$$LC_{it} = a + \beta_1 * ASVI_{st} \ x \ War + \ \beta_2 * ASVI_{st} + \gamma * War + \delta * LenderControls +$$
$$\delta_1 * BorrowerControls + \delta_2 * LoanCharacteristics + \delta_3 * GeopoliticalRisk +$$
$$\text{Country FE}_i + \varepsilon_{it} \qquad (9)$$

LC_i is the dependent variable and denotes either the loan amount, loan pricing, maturity, first lien debt for a given loan 'i' issued at year and month 't'. The interaction effects are measured through variable β_1, indicating the difference in the effect of the ESG indexes on the loan characteristic during periods of war and peace.

$$CAR_i = a + \beta_1 * ASVI_{st} \; x \; War + \beta_2 * ASVI_{st} + \gamma * War + \delta * LenderControls$$
$$\delta_1 * BorrowerControls + \delta_2 * LoanCharacteristics + \delta_3 * GeopoliticalRisk + \varepsilon_{it} \quad (10)$$

CAR_i is the dependent variable and denotes the cumulative abnormal return for lender 'i'. Note that only event windows [-3,3] and [0,2] will be regressed, since they will appear to be the most significant ones during the event study (section 5.1). The interaction effects are measured through variable β_1, indicating the difference in the effect of the ESG indexes on the lender loan announcement returns during periods of war and peace.

5. Results

This chapter discusses the results of the study. The lender loan announcement study contains two univariate event study analyses and one multivariate analysis on the effect of war and ESG attention on lender loan announcement returns. The effect of war and ESG attention on loan characteristics are only analyzed through a multivariate regression. Finally, the last section elaborates on the interaction effects between ESG attention and war.

5.1. Lender Loan Announcement Returns

The results of this section focus on the evidence to accept or reject hypotheses 1 and 3, by evaluating the investors' reaction on lender returns around the announcement of a bank loan given towards a borrower active in the armament industry. Before the event studies are evaluated during periods of war and heightened ESG attention, the original descriptive statistics for the CARs of the full dataset are presented below in table 5:

Table 5: Descriptive statistics cumulative abnormal returns for all event windows, adjusted.

Event Windows	Obs.	Mean	SD	Min	Max	Median	Skewness	Kurtosis
[-3,3]	3993	-0.002	2.75	-8.25	9.05	0.04	0.03	4.39
[-2,2]	3993	-0.02	2.37	-7.44	7.11	0.05	-0.11	4.41
[-1,1]	3993	0.02	1.89	-5.63	5.60	0.01	0.006	4.13
[0,0]	3993	0.04	1.34	-3.79	5.52	0.00	0.59	6.08
[-2,0]	3993	0.02	2.00	-5.70	6.81	0.06	0.20	4.58
[0,2]	3993	-0.01	1.80	-6.10	5.68	0.02	-0.12	4.93
[-1,0]	3993	0.02	1.7	-5.12	5.80	0.03	0.25	4.79
[0,1]	3993	0.02	1.57	-5.02	4.78	0.00	-0.21	4.46

This table shows the adjusted descriptive statistics of the total sample for the CARs in different event windows. For each event window the mean, standard deviation, minimum, maximum and median were multiplied by 100%, The skewness and kurtosis were not adjusted

The descriptive statistics indicate that there was very little difference between the stock return and the market return, since all of the statistics were multiplied by 100. Furthermore, the CARs were winsorized at a 1% interval, since the kurtosis of the original CARs violated its threshold of |5|. The original descriptive statistics can be found in table 16, appendix. The results do not show consensus on whether the cumulative abnormal returns have a positive or negative mean around the announcement date.

However, the mean on the announcement date seems to be the strongest in absolute terms, indicating a lender loan announcement effect, which predominantly exists on the day of the announcement.

5.1.1. Univariate Analysis War

Table 6 lists the univariate analysis for the cumulative abnormal returns (CARs) during the period of peace and war. The war period is spread over 2004 until December 2008 and February 2022 until present. The period of peace runs from December 2008 until February 2022. The number of observations, e.g. the stock returns of the different bookrunners in different loans, equals 1,247 and 2,778 respectively. This table presents the mean, standard deviation, the minimum and the maximum. In the first two panels, the t-statistic tests the significance of the CARs to zero. In the third panel, the t-statistic represents an independent two-sample t-test in which both means are compared.

Table 6: Cumulative Abnormal Returns during the period of war and peace.

	Event Window	Mean	Std.Dev.	t-value	Min	Max
War-period:	CAR [-3,3]	-0.16	2.79	(-5.22)***	-8.26	9.05
	CAR [-2,2]	-0.04	2.34	(-1.63)	-7.45	7.12
	CAR [-1,1]	-0.02	1.82	(-0.52)	-5.63	5.56
	CAR [0,0]	0.09	1.42	(2.39)**	-3.38	5.55
	CAR [-2,0]	0.06	2.05	(1.81)*	-5.70	6.80
	CAR [0,2]	-0.05	1.72	(-1.93)*	-6.10	5.68
	CAR [-1,0]	0.07	1.72	(1.86)*	-5.13	5.85
	CAR [0,1]	-0.01	1.50	(-0.35)	-5.02	4.76
Peace-period:	CAR [-3,3]	0.06	2.73	(3.37)***	-8.26	9.05
	CAR [-2,2]	-0.0008	2.38	(-0.04)	-7.45	7.12
	CAR [-1,1]	0.04	.1.91	(1.97)**	-5.63	5.56
	CAR [0,0]	0.009	1.30	(0.39)	-3.38	5.55
	CAR [-2,0]	0.01	1.98	(0.51)	-5.70	6.80
	CAR [0,2]	-0.008	1.84	(0.42)	-6.10	5.68
	CAR [-1,0]	0.002	1.71	(0.08)	-5.13	5.85
	CAR [0,1]	0.04	1.60	(2.05)**	-5.02	4.76
Diff. War - Peace	CAR [-3,3]	-0.22		(-6.82)***		
	CAR [-2,2]	–0.03		(-0.82)		
	CAR [-1,1]	0.001		(0.03)		
	CAR [0,0]	0.25		(4.26)***		

CAR [-2,0]	0.08		(1.93)
CAR [0,2]	0.02		(0.49)*
CAR [-1,0]	0.12		(2.43)**
CAR [0,1]	0.05		(1.43)

*This table lists the statistics for the cumulative abnormal returns (CARs) during the period of war and peace. The number of observations (n) equals 1,247 and 2,778, respectively. The table lists the mean, standard deviation (Std.Dev.), the minimum and the maximum, which all have been multiplied by 100%. A t-static denotes the significance with ***p<0.01, **p<0.05, *p<0.1.*

As can be seen in table 6, the most significant results for each period are reported in the [-3,3] event window. This is in line with the lender loan announcement study of Waheed and Mathur (1993), who only reported significant coefficients for the [-3,3] event window. During wartime, the announcement of a loan towards defense firms leads to a -0.16% decrease in a lender's stock return in the seven days event window. Except for the [0,2] event window, all of the significant results are negative. Announcing a loan during a period of peace leads to a significantly smaller increase in a lender's stock return of 0.06%, during the seven days event window. Furthermore, all of the significant event windows report positive results around the announcement of a bank loan. Finally, the seven days event window reports a negative difference of -0.22% for announcing a loan towards a defense firm during wartime compared to peace. However, the announcement date reports a positive difference of 0.25%, which makes the results conflicting. However, if we focus on the requirement of significant results during periods of war and peace independently, solely the [-3,3] event window survives, and therefore hypothesis 3 is rejected.

The results indicate a rejection of hypothesis 3: periods of war do not lead to more positive lender loan announcement returns within the armament industry. A possible reason could be that during wartime, bank loans signal the potential drawbacks instead of the benefits of the armament industry. Investors value the costs of the armament industry over its benefits. These costs are market imperfections, corruption, heavy and long-term investments which are less likely to materialize, ethical concerns and the sensitivity to geopolitical events. The benefits of granting a loan towards the armament industry is a diversified loan portfolio, upward profit potential during war, and technological innovation of the industry itself.

Although lender loan announcement returns within armament industry have not yet been examined, the results roughly contradict the findings of Billingsley et al. (1987) and McDonald & Kendall (1994) by not finding a significant positive reaction of the market towards the stocks of defense contractors as a reaction on war-related events.

5.1.2. Univariate Analysis ESG Attention

Table 7 lists the univariate analysis for the cumulative abnormal returns during a period of heightened ESG concerns, compared to a period of lowered ESG concerns. The number of observations, e.g. the stock returns of the different bookrunners in different loans, equals 2,058 and 1,935 respectively. This table presents the mean, standard deviation, the minimum and the maximum. In the first two panels, the t-statistic tests the significance of the CARs to zero. In the third panel, the t-statistic represents an independent two-sample t-test in which both means are compared.

Table 7: Cumulative Abnormal Returns during periods of High and Low ESG Attention

	Event Window	Mean	Std.Dev.	t-value	Min	Max
High ESG Attention:	CAR [-3,3]	0.04	3.18	(1.41)	-14.04	17.45
	CAR [-2,2]	0.06	2.54	(2.40)**	-14.40	15.78
	CAR [-1,1]	0.06	2.22	(2.14)**	-12.41	17.24
	CAR [0,0]	0.15	1.96	(3.53)***	-8.34	15.09
	CAR [-2,0]	0.06	2.23	(2.22)**	-10.98	14.73
	CAR [0,2]	0.09	2.12	(3.17)***	-11.96	14.13
	CAR [-1,0]	0.07	2.07	(2.18)**	-10.22	14.74
	CAR [0,1]	0.10	2.02	(3.35)***	-11.98	17.59
Low ESG Attention:	CAR [-3,3]	0.009	3.04	(0.34)	18.22	20.97
	CAR [-2,2]	-0.06	2.71	(-2.31)**	-14.70	18.88
	CAR [-1,1]	0.04	2.27	(1.23)	-20.67	14.97
	CAR [0,0]	-0.004	1.44	(-0.15)	-10.88	8.28
	CAR [-2,0]	0.02	2.30	(0.52)	-12.55	18.88
	CAR [0,2]	-0.09	2.03	(-3.24)***	-14.71	11.23
	CAR [-1,0]	0.04	1.96	(1.21)	-10.88	14.91
	CAR [0,1]	-0.008	1.86	(-0.26)	-20.67	11.23
Diff. High - Low ESG Attention	CAR [-3,3]	0.03		(0.78)		
	CAR [-2,2]	0.12		(3.32)***		
	CAR [-1,1]	0.02		(0.59)		
	CAR [0,0]	0.16		(2.88)***		
	CAR [-2,0]	0.05		(1.16)		
	CAR [0,2]	0.17		(4.52)***		
	CAR [-1,0]	0.03		(0.72)		
	CAR [0,1]	0.11		(2.61)***		

This table lists the statistics for the cumulative abnormal returns (CARs) during periods of high- and low ESG sentiment. The number of observations (n) equals 2,058 and 1,935, respectively. The table lists the mean, standard deviation (Std.Dev.), the

The most consequent, significant results for all of the 3 panels are reported during the [0,2] event window. When the ESG concerns are above the median of the combined ESG indexes, granting a loan towards a defense firm leads to 0.06% increase in cumulative abnormal returns for the lender. During a period of low ESG attention, the percentage change is -0.09%. Therefore, the cumulative abnormal returns are 0.17% higher during a period of heightened ESG concerns. More importantly, is that for each period, all of the significant results report similar results. During a period of heightened ESG concerns, granting a loan towards a company active in the armament industry leads to positive lender loan announcement returns. During a period of lowered ESG concerns, providing a loan towards a defense firm even leads to negative abnormal returns. Therefore, a significant, positive difference between both periods exists.

Because the cumulative abnormal returns are higher in a period of heightened ESG concerns, hypothesis 1 is rejected. A possible explanation could be that investors value the signal of a diversified loan portfolio, upward profit potential and technological innovation over ethical concerns such as ESG. Another reason could be that the inconclusiveness on the social aspect of the armament industry prevails over the bad performance on the ecological and governance aspects. Subsequently, investors value the armament industry not as non-ESG compliant as it theoretically seems.

The results partly contradict the results of Flammer (2021), Kim et al. (2021) and Huang et al. (2022) through the observation of a positive market response to a non-ESG compliant armament industry. However, the above authors stated a positive market return to ESG loans, but did not exclude the possibility of a similar positive market response to loans provided to non-ESG compliant firms.

5.1.3. Multivariate Analysis

To further strengthen the rejection of hypotheses 1 and 3, this section performs a multivariate regression of which the coefficients of interest, the separate indexes and the war dummy variable, are presented in table 8. This regression focuses on the event windows [-3,3] and [0,2] since both yielded the most significant results in the univariate analysis of, respectively, war and ESG attention. Furthermore, this regression controls for geopolitical risk and loan, lender and borrower characteristics as described in 4. The entire regression can be found in table 17, appendix, as this regression only displays the coefficients for the separate ESG investor attention indexes and war.

Table 8: Cross-sectional regressions CARs

	CAR [-3,3]	CAR [-3,3]	CAR [-3,3]	CAR [-3,3]	CAR [0,2]	CAR [0,2]	CAR [0,2]	CAR [0,2]
ESG Index	0.02				0.05			

	CAR [0,2]				CAR [-3,3]			
t-value	(1,78)*				(3.21)***			
War	-0.70				-0.71			
t-value	(-5.09)**				(-5.09)***			
Ecological Index		0.01				0.00		
t-value		(1.92)*				(0.01)		
War		-0.07				-0.41		
t-value		(-4.98)***				(-2.70)**		
Social Index			0.00				0.000	
t-value			(0.72)				(0.90)	
War			-0.59				-0.47	
t-value			(-3.94)***				(-3.76)***	
Governance Index				0.00				0.00
t-value				(0.46)				(1.09)
War				-0.57				-0.50
t-value				(-4.46)***				(-3.81)**
Adj. R2	0.04	0.04	0.04	0.04	0.06	0.06	0.06	0.06
N	3993	3993	3993	3993	3993	3993	3993	3993

This table lists the statistics of the multivariate regression, with CAR [0,2] and CAR [-3,3] as dependent variables. War equals one if the announcement date is within the war period (2004 to December, 14, 2008 and February, 22, 2022 to present), and equals zero otherwise. Loan, lender and borrower characteristics are defined in Tables 3. All of the CARs were multiplied by 100 %. ***p<0.01, **p<0.05, *p<0.1.

Controlling for war, geopolitical risk, and lender, loan, borrower characteristics the coefficients for the ESG indexes are either zero or positive in both event windows. An increase in the ESG Index of 1 leads to a significant 0.05% increase for the three day event window. This positive relationship between the ESG indexes and the cumulative abnormal returns around the announcement of loan towards a defense firm, strengthens the rejection of hypothesis 1. Furthermore, controlling for geopolitical risk, lender, loan and borrower characteristics and each of the different ESG indexes, war leads to significant negative cumulative abnormal returns. In the [-3,3] event window, controlling for the general ESG Index, the cumulative abnormal returns are 0.70% lower compared to a period of peace. These results strengthen the rejection of hypothesis 3: war is not beneficial for a lender's returns in announcing loans towards the armament industry. Finally, for each ESG index, the coefficient of war exceeds the coefficient of the index, which points in the direction of acceptance of hypothesis 5: ESG attention has a significantly weaker effect on the loan announcement returns during periods of war.

5.2. Loan Characteristics

Table 9 lists the coefficients of interest, the separate indexes and the war dummy variable, for multiple multivariate regressions with the four different loan characteristics as the dependent variables. These results test hypotheses 2 and 4 on the loan characteristics becoming less (more) favorable during periods of heightened ESG concerns (war). This regression controls for geopolitical risk and loan, lender, and borrower characteristics as described in table 4. The entire regression can be found in the tables 18.1 & 18.2, in the appendix. Table 9 only displays the coefficients for the ESG investor attention indexes and war:

Table 9: Loan Characteristics

	A: Loan Amount				B: Loan Pricing			
ESG Index	-17.46				0.02			
t-value	(-1.13)				(0.73)			
Ecological Index		4.91				0.03		
t-value		(0.97)				(2.36)**		
Social Index			3.40				0.03	
t-value			(0.46)				(1.71)*	
Governance Index				1.60				0.04
t-value				(0.20)				(2.55)**
War	58.57	-151.90	-93.81	-73.30	0.45	0.38	0.32	0.18
t-value	(0.33)	(-0.89)	(-0.58)	(0.649)	(1.35)	(0.01)	(1.17)	(0.70)
Adj. R2.	0.39	0.40	0.39	0.39	0.07	0.08	0.08	0.08
N	1867	1867	1867	1867	1163	1163	1163	1163
	C: Maturity				D: 1st Lien Debt			
ESG Index	-0.02				0.012			
t-value	(-0.81)				(4.11)***			
Ecological Index		-0.01				-0.000		
t-value		(-1.37)				(-0.74)		
Social Index			0.02				0.007	
t-value			(1.75)*				(5.35)***	
Governance Index				0.02				0.001
t-value				(1.58)				(1.05)
War	0.56	0.63	0.25	0.27	-0.20	-0.11	-0.19	-0.13
t-value	(2.43)**	(2.81)***	(1.36)	(0.187)	(4.11)***	(-4.70)***	(-7.82)***	(-6.12)**
Adj. R2	0.20	0.22	0.21	0.20	0.16	0.15	0.16	0.14

N	1825	1825	1825	1825	1875	1875	1875	1875

*This table lists the statistics for each of the multivariate regression, with either Loan Amount, Loan Pricing, Maturity or First Loan Debt as dependent variable. War equals one if the announcement date is within the war period (2004 to December, 14, 2008 and February, 22, 2022 to present), and equals zero otherwise. See table 18.1 & 18.2 Appendix for the table including control variables. ***p<0.01, **p<0.05, *p<0.1.*

Unfortunately, the loan amount does not report any significant results for each of the different ESG indexes and the war coefficient. Regarding the price of a loan, the Ecological, Social and Governance Index demonstrate a significant positive coefficient. If the investor attention index increases by 1, the loan price increases by 0.03, 0.03 and 0.04 percentage point, respectively. Furthermore, the positive coefficients between war and maturity are however more significant for the ESG and Ecological Index. A period of war increases the maturity given on loans towards defense firms with 3.6 years (=$10^{0.56}$), controlling for the ESG Index. Finally, the ESG and Social Index report a strong significantly positive coefficient for first lien debt. An increase of 1 in the ESG Index, increases the probability of a bank having the first claim on the collateral by 0.012. Moreover, controlling for each index, war has a strongly significant, negative effect on the first lien debt status on loans given towards defense firms.

First, periods of war lead to a longer maturity and a smaller necessity for a bank to have a first lien debt status. These results suggest that war leads in general to more favorable loan characteristics within the armament industry. Therefore, these results provide evidence in favor of hypothesis 4. A possible explanation is that the realization of the upward profit potential leads to a lower default risk and therefore more favorable loan terms.

Second, an increase in ESG attention leads to increased loan pricing and a greater necessity for banks to have a first lien debt status. The results imply a negative relationship between ESG attention and the favorability of loan characteristics, and therefore provide evidence in favor of hypothesis 2. The findings are explainable by the theory that poor ESG performance leads to greater default risk, higher information asymmetry and lower trust between a lender and borrower. Just as higher ESG scores lead to more favorable loan characteristics (Henriksson et al. 2018; Kim et al. 2014; Bauer & Hann, 2008; Bhojraj & Sengupta, 2003), the findings contribute by showing that higher ESG attention leads to less favorable loan characteristics for a theoretically non-ESG compliant armament industry.

5.3. ESG Attention & War - Interaction Effects

In order to test whether increased investor attention towards ESG has a significantly weaker effect during periods of war (hypothesis 5), a multivariate regression including interaction effects is performed. Table 10 displays the results for both the cumulative abnormal returns and the loan characteristics, including interaction effects between the ESG attention indexes and war. The table only reports the coefficients of the interaction variables, tables 19 & 20 in the appendix report the full regressions including control variables, observations and adjusted R2.

Table 10: Interaction Effects for Cumulative Abnormal Returns and Loan Characteristics.

Variable	Cumulative Abnormal Returns		Loan Characteristics			
	[-3,3]	[0,2]	Loan Amount	Loan Pricing	Maturity	First Lien Debt
ESG Index x War	0.13	0.06	0.02	-2.09	-0.009	-4.07
T-value	(4.09)***	(1.93)*	(1.22)	(-0.28)	(-0.63)	(-6.99)***
Ecological Index x War	-0.02	-0.00	0.007	-0.47	0.005	0.05
T-value	(-1.38)	(-0.37)	(1.02)	(-0.16)	(0.09)	(0.29)
Social Index x War	0.04	0.02	-0.02	7.47	0.08	-2.25
T-value	(3.00)***	(1.70)*	(-1.88)**	(1.84)*	(1.13)	(-7.80)***
Governance Index x War	0.04	0.04	0.02	0.31	0.01	-1.24
T-value	(2.62)***	(2.32)**	(1.93)**	(0.08)	(1.68)*	(-3.87)***

This table lists the interaction effects for each regression with either the loan characteristics or the cumulative abnormal returns as dependent variables. See table 19 & 20 in the appendix for the table including control variables. ***p<0.01, **p<0.05, *p<0.1.

The coefficients denote the difference in the effect of the ESG indexes on the cumulative abnormal returns and the loan characteristics during wartime compared to peace. For both the event windows and all of the indexes, the interaction coefficient for the cumulative abnormal returns is positive. A positive coefficient indicates that the effect of ESG attention on the CARs is greater during a period of war compared to peace. For example, within the [-3,3] event window, the difference between the effect of the ESG index on the cumulative abnormal returns is 0.13 higher during a period of war compared to peace.

Regarding the loan characteristics, there are some conflicting results. The effect of the governance index on loan amount is greater during war than peace, whereas the effect of the Social Index is smaller during war than peace. Furthermore, the effect of the Social Index on loan pricing is greater during war, however not strongly significant. Unfortunately, the effect of the indexes on maturity does not have significant results. Finally, the effect of the ESG Index and Social Index on the first lien debt status is greater during peace than war.

Hence, the effect of ESG attention on lender loan announcement returns is significantly greater during wartime than peace. However, the interaction of war and ESG attention on loan characteristics do not provide any significant evidence. Therefore the results partly provide evidence against hypothesis 5.

The results are therefore not in line with the reality where banks ignore or change their ESG

investment policies due to the necessity of the armament industry to scale up as a result of the Russia-Ukraine war. This observation does however find support in academic literature, where it is argued that war diminishes the effect of investor attention. Either directly through uncertainty, or indirectly to a decline in real economic activity, growth, investments and trust into the stock market (He, 2023).

6. Conclusion

6.1. Answer to the research question

The call for ESG conformity has been dominating the financial markets for years. By influencing the attention of investors, ESG gave rise to at least two major trends in the realm of sustainable finance. First, well performing ESG companies provided positive abnormal returns, whereas sin stocks were mostly undervalued. Second, financial institutions such as banks got pressured by stakeholders and shareholders to account for sustainability information into their lending. As a result, the armament industry, notorious for poor ESG standards, struggled in their funding necessities. In 2021, several national defense industry associations across Europe united and officially expressed their concerns on the exclusion of equity from funds and termination of bank accounts. However, the increased geopolitical risk as of today, might provide a solution to the above stated ESG funding problem. The Russia-Ukraine war enforces countries to scale up their national armament industry, which realizes the industry's upward profit potential and increases its stock returns. The increased geopolitical risk shines new light on the attention of investors towards ESG within the armament industry.

Based on these tensions, this research sought to study the intertwining between investor attention towards ESG and war within the armament industry through the provision of bank loans. During periods of war and heightened ESG concerns, the bank loan characteristics and the loan announcement returns of the lender were analyzed. The study used a unique sample of 1,875 syndicated bank loans between 2004 and today. Investor attention was proxied through Google Search Volumes, and a dummy variable was created for periods of war. At first, event study methodology was used to evaluate the investors reaction on a bank's return, after giving a loan towards defense contractors in periods of heightened ESG concerns and war. Furthermore, these results were strengthened by a multivariate OLS regression, controlling for geopolitical risk and lender-, borrower,- and loan characteristics. Thereafter, four different bank loan characteristics were regressed upon ESG attention indexes and war. Finally, an interaction effects regression analyzed the effect of investor attention towards ESG on lender loan announcement returns and bank loan characteristics, during periods of war compared to peace. Together these five different tests contribute to the main research question:

What is the effect of investor attention towards ESG on bank loans in the armament industry, and which role plays the war in it?

The question will be answered through first analyzing the separate hypotheses.

Hypotheses 1 and 3 state that the lender loan announcement returns will be lower (higher) during periods of heightened ESG attention (wartime). The results of the event study indicate higher cumulative

abnormal returns during periods of heightened investor attention towards ESG. The rejection of hypothesis 1 has two possible explanations. First, it could be that investors value the armament industry as ESG confirmative. The inconclusiveness on the social aspect of the armament industry prevails over the bad performance on the ecological and governance aspects. Second, it could be that investors value the signal of a diversified loan portfolio, upward profit potential and technological innovation over ethical concerns such as ESG. The results partly contradict the results of Flammer (2021), Kim et al. (2021) and Huang et al. (2022), whereas the authors found positive market returns to ESG loans. Unfortunately, the results of event study on periods of war did not provide any conclusive evidence in favor or against hypothesis 3.

Hypotheses 2 and 4 state that bank loan characteristics will be less (more) favorable for the armament industry during heightened investor attention towards ESG (wartime). The results provide significant evidence for the acceptance of hypothesis 2; an increase in ESG attention leads to higher loan pricing and a higher chance of a first lien debt status. Theoretically, poor ESG performance leads to greater default risk, higher information asymmetry and lower trust between a lender and borrower. Just as higher ESG scores lead to more favorable loan characteristics (Henriksson et al. 2018; Kim et al. 2014; Bauer & Hann, 2008; Bhojraj & Sengupta, 2003), the findings contribute by showing that higher ESG attention leads to less favorable loan characteristics for a theoretically non-ESG compliant armament industry. Furthermore, more favorable loan characteristics are provided during periods of war, where the results show a longer maturity and a smaller necessity for a bank to have a first lien debt status. The acceptance of hypothesis 4 suggests that the realization of the upward profit potential leads to a lower default risk and therefore more favorable loan terms.

Hypothesis 5 states that the effect of investor attention towards ESG on the CARs and loan characteristics will decrease during a period of war. The results provide evidence for an increase in the effect of ESG attention on the cumulative abnormal returns of the lender during wartime. Unfortunately, the interaction effect on the loan characteristics is insignificant. Therefore, hypothesis 5 is partly rejected. These results are therefore not in line with the reality where banks ignore or change their ESG investment policies due to the necessity of the armament industry to scale as a result of the Russia-Ukraine war. A possible explanation could be that investors perceive the armament industry not as non-ESG confirmative as it theoretically seems.

In conclusion, this study finds that investor attention towards ESG raises the lender loan announcement returns within the armament industry. Periods of war only increase the positive effect of investor attention towards ESG on the CARs of a lender. However, increased ESG attention results in banks enforcing less favorable loan characteristics of companies active within the armament industry. Therefore, pressured by shareholders and stakeholders, bank loans reflect the increased ESG concerns in lending towards a theoretically non-confirmative ESG industry. However, bank returns do not suffer from lending towards the armament industry.

6.2. Limitations and Future Research

There are five limitations that should be taken into account when assessing the results and conclusions of this study. First, the data obtained through the Refinitiv Bank Loan database does not exactly specify how the loans were announced to investors. Concerning the event study it is crucial to identify the right event day. Furthermore, the data also substituted subsidiaries by the publicly listed parent company. For example 'Far Eastern Standard Chartered Bank' became 'Standard Chartered PLC'. Subsequently, the stock returns of the parent company Standard Chartered PLC were evaluated. It could be that the causality of providing a loan by the subsidiary is less sufficient to result in abnormal returns differences for the parent company.

Second, this research proxies investor attention towards ESG through Google Search Trends. GST cannot capture whether the attention towards ESG is from good or bad news. During well performing ESG times it could be that investors turn a blind eye towards the armament industry. Bad ESG news could exaggerate the negative value that investors give to funding of the armament industry. Furthermore, the GST that was used captures the investor attention towards ESG as a whole, but does not specifically focus on ESG investing. Hence, a suggestion for further research is to capture more specifically the attention towards ESG investing.

Third, to disentangle the effect of war on investor attention and returns of the lender, future research could focus on specific events during a war instead of using a dummy variable indicating time periods. War is a result of ongoing geopolitical tension, and proxying it through a war dummy indicates a clear beginning and end. In reality it does not come down to two specific days, which in this study are used as boundaries of war periods. Subsequently, picking the right day is also extremely difficult.

Fourth, in order to disentangle the effect of war on investor attention towards ESG within the armament industry, future research could also evaluate the ESG scores of defense contractors during wartime. Unfortunately, many of the Defense contractors in the data sample do not have reliable ESG scores, therefore this research made the theoretical assumption of a non-ESG confirmative armament industry. Comparing the effect of war on ESG scores with different industries could further evaluate and specify the intertwining between the value systems of ESG and war.

Fifth, this research only focuses on the loan announcement returns of the lender, of which literature and research is limited. The existence of a borrower loan announcement effect is more widely established in the financial literature. The loan announcement returns of the borrower within the armament industry is yet undiscovered. Subsequently, the subject could be linked towards ESG investor attention to help specify the effect on banks loans in the armament industry.

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Appendix

A: Search Terms GST

Table 11: Search terms for ESG, environmental (E), social (S) and governance (G)

ESG	Environmental	Social	Governance
CSR	Acid rain	Animal testing	Board composition
ESG	Biodiversity	Business disabilities	Board members
ESG investing	Carbon footprint	Business ethnicity	Board of directors
ESG screening	Climate change	Career development	Code of business conduct
Ethical investing	Conservation	Child labor	Company policies
Green investments	Deforestation	Customer complaints	Company transparency
Impact investing	Endangered species	Data privacy	Corporate compliance
Responsible investing	Environment	Equal rights	Corporate fraud
Responsible investments	Global warming	Equality	Corporate governance
Socially responsible investing	Globalization	Fair trade	CSR strategy
Sustainability	Greenhouse gas	Gender equality	Executive compensation
Sustainable	Ozone layer	Health and safety	Litigation risk
Sustainable investments	Pollution	Human rights	Management structure
	Renewable energy	Inequality	Public disclosure
		Labor practices	Risk management
		LGBT business	Shareholder rights
		Product quality	Shareholder interest
		Salary gap	Sustainable governance
		Social impact	Sustainable growth
		Social responsibility	Takeover defenses
		Social rights	Tax reporting
		Staff turnover	Whistleblower
		Work life balance	
		Working conditions	

B: Descriptive Statistics

Table 12: Loan Nation Classification & Year

A: Loans Nation Classification	Freq.	Percent.	B: Year	Freq.	Percent.
Australia	1	0.05	2004	83	4.43
Austria	11	0.59	2005	100	5.33
Belgium	7	0.37	2006	115	6.13
Brazil	17	0.91	2007	130	6.93
Canada	68	3.63	2008	58	3.09
Cayman Islands	8	0.43	2009	53	2.83
Chile	1	0.05	2010	75	4.00
China	41	2.19	2011	118	6.29
France	102	5.44	2012	88	4.69
Germany	39	2.08	2013	99	5.28
Greece	2	0.11	2014	122	6.51
Hong Kong	5	0.27	2015	125	6.67
Indonesia	2	0.11	2016	102	5.44
Ireland	4	0.21	2017	103	5.49
Italy	44	2.35	2018	104	5.55
Japan	113	6.03	2019	90	4.80
Kuwait	2	0.11	2020	93	4.96
Luxembourg	2	0.11	2021	81	4.32
Macau	2	0.11	2022	97	5.17
Malaysia	6	0.32	2023	39	2.08
Maldives	3	0.16			
Netherlands	11	0.59			
Norway	9	0.48			
Singapore	4	0.21			
South Korea	8	0.43			
Spain	44	2.35			
Sweden	9	0.48			
Switzerland	11	0.59			
Taiwan	7	0.37			
United Arab Emirates	4	0.21			
United Kingdom	164	8.75			
United States	1124	59.95			

Table 13: Different Lenders

Name	Freq.	Percent	Name.	Freq.	Percent.
ABN Amro Bank NV	17	0.42	Franklin BSP Lending Corp	1	0.02
ANZ Group Holdings Ltd	11	0.27	General Electric Co	3	0.07
African Export Import Bank	2	0.05	Goldman Sachs Group Inc	76	1.89
Ally Financial Inc	9	0.22	Golub Capital Bdc Inc	16	0.40
Ares Capital Corp	6	0.15	Great Elm Group Inc	32	0.80
Ashikaga Bank Ltd	1	0.02	HSBC Holdings PLC	116	2.88
BNP Paribas SA	157	3.90	Hirogin Holdings Inc	1	0.02
Bain Capital Specialty Finance Inc	14	0.35	Hua Nan Financial Holdings Co Ltd	3	0.07
Banco BPM SpA	4	0.10	Huntington Bancshares Inc	3	0.07
Banco Bilbao Vizcaya Argentaria SA	34	0.85	ICBC Credit Suisse	49	1.22
Banco Santander SA	47	1.17	ICICI Bank Ltd	1	0.02
Banco do Brasil SA	3	0.07	IKB Deutsche Industriebank AG	9	0.22
Bank of America Corp	372	9.25	ING Bank NV	20	0.50
Bank of China Ltd	21	0.52	Industrial and Commercial Bank of China	18	0.45

Name	Freq.	Percent
Bank of Ireland Group PLC	7	0.17
Bank of Montreal	24	0.60
Bank of New York Mellon Corp	2	0.05
Bank of Nova Scotia	21	0.52
Barclays PLC	112	2.79
Barings BDC Inc	2	0.05
Bayerische Landesbank	9	0.22
Bear Stearns Companies LLC	11	0.27
Blackstone Inc	3	0.07
Blue Owl Capital Corp	3	0.07
Bper Banca SpA	2	0.05
CTBC Financial Holding Co Ltd	2	0.05
Cadence Bank	1	0.02
Caixabank SA	4	0.10
Canadian Imperial Bank	41	1.02
Capital One Financial Corp	16	0.40
Cathay General Bancorp	2	0.05
Chang Hwa Commercial Bank Ltd	3	0.07
China Citic Bank Corp Ltd	1	0.02
Chugin Financial Group Inc	1	0.02
Churchill Capital Corp VII	2	0.05
Citigroup Inc	288	7.16
Citizens Financial Group Inc	59	1.47
Comerica Inc	9	0.22
Commerzbank AG	46	1.14
Credit Agricole SA	4	0.10
Credit Suisse Group AG	53	1.32
DBS Group Holdings Ltd	2	0.05
DNB Bank ASA	2	0.05
Daishi Hokuetsu Financial Group Inc	1	0.02
Danske Bank A/S	3	0.07
Deutsche Bank AG	93	2.31
Dresdner Bank AG	7	0.17
E.SUN Financial Holding Co Ltd	2	0.05
East West Bancorp Inc	7	0.17
EnTie Commercial Bank Ltd	1	0.02
Erste Group Bank AG	5	0.12
Fifth Third Bancorp	16	0.40
First Commerce Bank	3	0.07
First Eagle Private Credit LLC	4	0.10
Intesa Sanpaolo SpA	30	0.75
Investec PLC	2	0.05
JPMorgan Chase & Co	403	10.02
Jefferies Financial Group Inc	22	0.55
KEB Hana Bank	1	0.02
KKR & Co Inc	36	0.90
KeyCorp	24	0.60
Krungthai Thanakit Finance Pcl	2	0.05
Lehman Brothers Holdings Capital	53	1.32
Lloyds Banking Group PLC	33	0.82
M&T Bank Corp	4	0.10
Macquarie Group Ltd	8	0.20
Mediobanca Banca di Credito	7	0.17
Mitsubishi UFJ Financial Group Inc	116	2.88
Mizuho Financial Group Inc	64	1.59
Monroe Capital Corp	8	0.20
Morgan Stanley	79	1.96
National Australia Bank Ltd	1	0.02
National Bank of Canada	28	0.70
National Bank of Greece SA	1	0.02
Natixis SA	38	0.95
Natwest Group PLC	125	3.11
Nomura Holdings Inc	8	0.20
Nordea Bank Abp	3	0.07
Northern Trust Corp	2	0.05
ODDO BHF Algo Trend US CR-EUR	3	0.07
Oaktree Specialty Lending Corp	2	0.05
Oppenheimer Holdings Inc	2	0.05
PNC Financial Services Group Inc	83	2.06
People's United Financial Inc	8	0.20
Raiffeisen Bank International AG	10	0.25
Regions Financial Corp	44	1.09
Royal Bank of Canada	106	2.64
SVB Financial Group	1	0.02
Shanghai Pudong Development Bank	1	0.02
Sinopac Financial Holdings Co Ltd	1	0.02
Skandinaviska Enskilda Banken AB	7	0.17
Societe Generale SA	65	1.62
Standard Chartered PLC	11	0.27
Sumitomo Mitsui Financial Group Inc	72	1.79

Name	Freq.	Percent
Svenska Handelsbanken AB	4	0.10
Swedbank AB	4	0.10
Taichung Commercial Bank Co Ltd	2	0.05
Taiwan Cooperative Financial Holding Co Ltd	3	0.07
Texas Capital Bancshares Inc	2	0.05
Toronto-Dominion Bank	30	0.75
Truist Financial Corp	114	2.84
UBS Group AG	64	1.59
UMB Financial Corp	4	0.10
US Bancorp	80	1.99
UniCredit SpA	50	1.24
Union Bancorp	4	0.10
United Overseas Bank Ltd	2	0.05
Wachovia Corp	46	1.14
Wells Fargo & Co	171	4.25

West Bancorporation Inc	5	0.12	
Wilmington PLC	1	0.02	
Yuanta Financial Holding Co Ltd	1	0.02	

Table 14: Loan Yield Type

Loan Yield Type	Freq.	Percent	Cum.
Highly Leveraged	502	26.77	26.77
Investment Grade	432	23.04	49.81
Leveraged	504	26.88	76.69
Near Investment Grade	78	4.16	80.85
Undisclosed Yield Type	359	19.15	100.00

Table 15: Status Borrower

Status Borrower	Freq.	Percent	Cum.
Government	1	0.05	0.05
Joint Venture	24	1.28	1.33
Private	547	29.17	30.51
Public	797	42.51	73.01
Subsidiary	506	26.99	100.00
Total	1875	26.99	100.00

Table 16: Descriptive statistics cumulative abnormal returns for all event windows, raw.

Event Windows	Obs.	Mean	SD	Min	Max	Median	Skewness	Kurtosis
[-3,3]	3993	0.02	3.11	-18.22	51.93	0.03	1.50	27.28
[-2,2]	3993	-0.002	2.63	-14.70	18.88	0.05	0.35	9.66
[-1,1]	3993	0.04	2.22	-20.67	17.24	0.01	0.85	16.60
[0,0]	3993	0.07	1.74	-10.88	15.09	0.006	3.22	31.62
[-2,0]	3993	0.04	2.26	-12.54	17.97	0.06	0.85	11.93
[0,2]	3993	0.002	2.07	-14.71	17.13	0.02	0.67	15.97
[-1,0]	3993	0.05	2.02	-10.88	14.91	0.02	1.57	15.76
[0,1]	3993	0.05	1.95	-20.67	17.59	0.007	1.39	27.01

This table shows the adjusted descriptive statistics of the total sample for the CARs in different event windows. For each event window the mean, standard deviation, minimum, maximum and median were multiplied by 100%, The skewness and kurtosis were not adjusted

C: Multivariate Regression CAR [-3,3] & CAR [0,2]

Table 17: Multivariate Results for CAR [-3,3] & CAR [-2,2]

	CAR [-3,3]	CAR [-3,3]	CAR [-3,3]	CAR [-3,3]	CAR [0,2]	CAR [0,2]	CAR [0,2]	CAR [0,2]
ESG Index	0.02				0.05			
t-value	(1.78)*				(3.21)***			
War	-0.70				-0.71			
t-value	(-5.09)**				(-5.09)***			
Ecological Index		0.01				0.00		
t-value		(1.92)*				(0.01)		
War		-0.07				-0.41		
t-value		(-4.98)***				(-2.70)**		
Social Index			0.00				0.000	
t-value			(0.72)				(0.90)	
War			-0.59				-0.47	
t-value			(-3.94)***				(-3.76)***	
Governance Index				0.00				0.00
t-value				(0.46)				(1.09)
War				-0.57				-0.50
t-value				(-4.46)***				(-3.81)**
Return on Assets (L)	0.25	0.26	0.25	0.25	0.00	0.00	0.00	0.00
	(3.04)***	(3.18)***	(3.05)***	(3.21)***	(0.09)	(0.07)	(0.11)	(0.09)
Debt to Equity (L)	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.082)*	(-1.59)	(-1.48)*	(-1.23)	(-3.01)***	(-3.05)***	(-2.88)***	(-2.85)***
Total Assets (L)	-0.11	-0.11	-0.11	-0.11	-0.12	-0.11	-0.11	-0.11
	(-3.76)***	(-3.56)***	(-3.65)***	(-3.62)***	(-3.33)***	(-3.13)***	(-3.16)***	(-3.20)***
Total Assets (B)	0.18	0.18	0.18	0.18	0.09	0.09	0.08	0.08

	(5.85)***	(6.06)***	(5.87)***	(5.90)***	(2.76)***	(2.75)***	(2,79)***	(2.57)***
Return on Assets (B)	0.09	0.010	0.09	0.09	0.07	0.06	0.07	0.07
	(5.85)***	(7.37)***	(7.45)***	(7.12)***	(6.18)***	(5.42)***	(5.95)***	(5.32)***
Debt to Equity (B)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.082)***	(1.84)*	(1.85)*	(1.86)*	(0.59)	(1.03)*	(0.76)	(0.86)
1st Lien Debt	0.20	0.31	0.29	0.28	0.60	0.66	-0.65	-0.55
	(2.68)***	(3.06)***	(2.81)***	(2.84)	(4.99)***	(5.37)***	(5.19)***	(5.21)***
Number of Arrangers	-0.02	-0.02	-0.02	-0.025	-0.00	-0.00	-0.00	-0.00
	(-1.88)*	(-1.78)*	(-1.82)*	(-0.27)	(-0.37)	(-0.50)	(-0.60)	(-0.55)
Loan Amount	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(-6.56)***	(-6.71)***	(-6.61)***	(-6.37)***	(-1.32)	(-1.41)*	(-1.34)*	(-1.01)
Loan Pricing	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00
	(-4.62)***	(-4.67)****	(-4.85)***	(-4.95)***	(2.02)**	(2.05)*	(2.10)**	(2.15)**
Maturity	0.17	0.17	0.017	0.013	0.11	0.11	0.11	0.11
	(7.61)***	(7.57)***	(7,48)***	(7.18)***	(4.91)***	(4.72)***	(4.67)***	(4.60)***
GPR Index	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(1.37)	(1.71)*	(1.50)	(-1.47)	(1.60)	(1.86)*	(-1.56)	(-1.46)
Constant	-0.12	-0.01	0.37	-0.23	-0.56	1.3	1.12	1.10
	(0.11)	(0.01)*	(0.35)	(0.24)	(0.45)	(1.02)	(0.90)	(0.60)
Adj. R2	0.04	0.05	0.05	.0.05	0.06	0.06	0.06	0.06
N	3993	3993	3993	3993	3993	3993	3993	3993

This table lists the statistics of the multivariate regression, with CAR [0,2] and CAR [-3,3] as dependent variables. War equals one if the announcement date is within the war period (2004 to December, 14, 2008 and February, 22, 2022 to present), and equals zero otherwise. Loan, lender and borrower characteristics are defined in Tables 1 and 2. All of the CARS were multiplied by 100 %. ***p<0.01, **p<0.05, *p<0.1.

D: Multivariate Regression Loan Characteristics

Table 18.1: Loan Amount, Loan Pricing

	Loan Amount	Loan Amount	Loan Amount	Loan Amount	Loan Pricing	Loan Pricing	Loan Pricing	Loan Pricing
ESG Index	-17.46				0.02			
t-value	(-1.13)				(0.73)			
Ecological Index		4.91				0.03		
t-value		(0.97)				(2.36)**		
Social Index			3.40				0.03	
t-value			(0.46)				(1.71)*	
Governance Index				1.60				0.04
t-value				(0.20)				(2.55)**
War	58.57	-151.90	-93.81	-73.30	0.45	0.38	0.32	0.18
t-value	(0.33)	(-0.89)	(-0.58)	(0.649)	(1.35)	(0.01)	(1.17)	(0.70)
Total Assets (B)	522.23	523.49	526.59	525.13	0.09	0,10	0.09	0.11
t-value	(16.70)***	(16.72)***	(16.45)***	(16.50)***	(1.62)	(1.75)*	(1.56)	(1.84)*
Debt to Equity (B)	1.23	1.20	1.21	1.20	-0.00	-0.00	-0.00	-0.00
t-value	(6.07)**	(5.88)***	(5.48)***	(5.91)***	(-3.16)***	(-3.28)**	(-3.28)***	(-3.33)***
Return on Assets (B)	37.11	42.40	40.40	38.91	-0.27	-0.14	-0.18	-0.31
t-value	(2.80)***	(3.15)***	(2.95)***	(2.44)***	(-1.06)	(-0.55)	(-0.74)	(-0.52)
Return on Assets (L)	254.70	261.48	257.52	242.81	0.11	0.15	0.12	0.16
t-value	(2.77)***	(2.82)***	(2.93)***	(2.43)***	(0.61)	(0.83)	(0.68)	(0.86)
Debt to Equity (L)	-0.13	-0.13	-0.13	-0.13	-0.00	-0.00	0.00	0.00
t-value	(-0.92)	(-0.91)	(-0.90)	(-0.89)	(-0.16)	(-0.19)	(0.09)	(0.15)
Total Assets	16.52	14.48	15.58	14.32	-0.00	-0.00	0.01	-0,01

(L)								
t-value	(0.71)	(0.61	(0.56)	(0.49)	(-0.14)	(-0.03)	(-0.13)	(-0.08)
Loan Pricing	-0.30	-0.32	-0.30	-0.31	-	-	-	-
t-value	(-2.68)**	(2.45)**	(2.67)**	(2.49)**	-	-	-	-
Loan Amount	-	-	-	-	-0.00	-0.00	-0.00	-0.00
t-value	-	-	-	-	(-2.12)**	(-2.18)**	(-2.15)**	(-2.16)**
Number of Arrangers	68.36	64.42	65.72	63.72	-0.01	-0.00	-0.00	-0.00
t-value	(5.80)***	(5.42)***	(5.34)***	(5.76)***	(-0.59)	(-0.23)	(-0.10)	(-0.02)
1st Lien Debt	–145.51	–156.50	–146.810	–157.59	-1.62	-1.58	-1.66	-1.60
t-value	(-1.28)	(-1.50)	(-1.34)	(-1.44)	(-8.08)***	(-8.14)***	(-8.32)***	(-8.28)***
Maturity	-100.81	-99.98	-95.12	-96.32	0.96	0.10	0.08	0.08
t-value	(-2.83)***	(-2.48)***	(-2.63)***	(-2.41)***	(1.04)*	(1.16)**	(0.95)	(0.89)*
Constant	-3572.70	-4085.28	-3745.42	-3734.53	1.3	2.82	0.88	0.31
	(-4.42)***	(-5.22)***	(-5.07)***	(-4.63)***	(0.58)	(0.13)	(0.39)	(0.11)
Adj. R2	0.39	0.40	0.39	0.39	.07	.08	.08	.08
N	1867	1867	1867	1867	1163	1163	1163	1163

This table lists the statistics for each of the multivariate regression, with either Loan Amount or Loan Pricing as dependent variables. War equals one if the announcement date is within the war period (2004 to December, 14, 2008 and February, 22, 2022 to present), and equals zero otherwise. See table 13, 14 and 15 Appendix for the table including control variables. ***p<0.01, **p<0.05, *p<0.1.

Table 18.2: Maturity, 1st Lien Debt

	Maturity	Maturity	Maturity	Maturity	1st Loan Debt	1st Loan Debt	1st Loan Debt	1st Loan Debt
ESG Index	-0.02				0.012			
t-value	(-0.81)				(4.11)***			
Ecological Index		-0.01				-0.000		
t-value		(-1.37)				(-0.74)		
Social Index			0.02				0.007	
t-value			(1.75)*				(5.35)***	
Governance Index				0.02				0.001

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
t-value				(1.58)				(1.05)
War	0.56	0.63	0.25	0.27	-0.20	-0.11	-0.19	-0.13
t-value	(2.43)**	(2.81)***	(1.36)	(0.18)	(4.11)***	(-4.70)***	(-7.82)***	(-6.12)**
Return on Assets	-0.28	-0.28	-0.28	-0.28	0.00	0.00	-0.00	0.00
t-value	(-6.46)***	(-6.57)***	(-6.55)***	(-6.45)***	(0.02)	(0.06)	(-0.06)	(0.14)
Debt to Equity	0.00	0.07	0.00	0.06	0.00	0.00	0.00	0.00
t-value	(3.47)***	(3.52)***	(3.14)***	(3.21)***	(2.49)**	(3.02)***	(2.54)**	(2.95)***
Total Assets	0.01	0.01	0.02	0.02	-0.00	-0.00	-0.00	-0.01
t-value	(0.97)	(0.79)	(1.47)	(1.49)	(-1.62)	(-2.46)**	(-1.12)	(-2.08)***
Return on Assets (L)	-0.24	-0.26	-0.23	-0.22	0.07	0.08	0.08	0.08
t-value	(-2.32)**	(-2.44)**	(-2.24)**	(-2.12)**	(3.37)***	(3.35)***	(3.50)***	(3.46)***
Debt to Equity (L)	-0.00	-0.03	-0.00	-0.04	-0.00	-0.00	-0.00	-0.00***
t-value	(-2.03)**	(-2.01)**	(-1.79)*	(-1.82)*	(-2.98)***	(-3.12)***	(-2.27)**	(-2.90)**
Total Assets (L)	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
t-value	(0.65)	(0.54)	(0.51)	(0.57)	(0.30)	(0.51)	(0.44)	(0.52)
Loan Amount	-0.00	-0.02	-0.00	-0.02	-0.00	-0.00	-0.00	-0.00
t-value	(-3.58)***	(-3.53)***	(-3.56)***	(-3.57)***	(-1.23)	(-1.42)	(-1.45)	(-1.44)
Number of Arrangers	0.14	0.14	0.15	0.15	0.00	0.00	0.00	0.00
t-value	(10.54)***	(10.39)***	(10.65)***	(10.86)***	(0.81)	(0.43)	(1.62)	(0.68)
1st Loan Debt	1.14	1.11	1.071742	1.11	-	-	-	-
t-value	(7.66)***	(7.63)***	(7.33)***	(7.77)***	-	-	-	-
Maturity	-	-	-	-	0.03	0.03	0.03	0.03
t-value	-	-	-	-	(6.57)***	(6.39)***	(6.28)***	(6.50)***
Loan Pricing	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00
t-value	(1.85)*	(1.96)*	(1.72)*	(1.69)*	(-6.42)***	(-6.44)***	(-6.42)***	(-6.45)***
Constant	5.11	5.27	4.276066	4.20	-0.32	-0.09	-0.31	-0.16
t-value	(4.81)***	(5.15)***	(4.09)***	(4.03)***	(-1.38)	(-0.39)	(-1.33)	(-0.69)
Adj. R2	0.20	0.22	0.21	0.20	0.16	0.15	0.16	0.14
N	1825	1825	1825	1825	1875	1875	1875	1875

This table lists the statistics for each of the multivariate regression, with either Maturity or First Lien Debt as dependent variables. War equals one if the announcement date is within the war period (2004 to December, 14, 2008 and February, 22, 2022 to present), and equals zero otherwise. See table 13, 14 and 15 Appendix for the table including control variables. ***p<0.01, **p<0.05, *p<0.1.

E: Interaction Effects War and ESG

Table 19: Interaction effects CAR

	[0,2]	[0,2]	[0,2]	[0,2]	[-3,3]	[-3,3]	[-3,3]	[-3,3]
War	-2.05	-0.22	1.38	-1.88	-3.73	-4.10	-2.21	-2.10
	(-3.00)***	(-0.48)	(-2.63)***	(-3.23)***	(-5.04)***	(-0.09)	(-4.14)***	(-3.74)***
ESG Index	0.008				-0.06			
	(0.31)				(-2.31)**			
ESG Index x War	0.06				0.13			
	(1.93)*				(4.09)***			
Ecological Index		0.002				0.02		
		(0.21)				(1.78)*		
Ecological Index x War		-0.00				-0.02		
		(-0.37)				(-1.38)		
Social Index			-0.01				-0.03	
			(-0.78)				(-1.92)*	
Social Index x War			0.02				0.04	
			(1.70)*				(3.00)***	
Governance Index				-0.02				-0.02
				(-1.00)				(-1.58)
Governance Index x War				0.04				0.04
				(2.32)**				(2.62)***
Total Assets (B)	0.09	0.09	0.09	0.09	0.19	0.18	0.18	0.18
	(2.84)***	(2.73)***	(2.75)***	(2.78)***	(6.00)***	(6.12)***	(5.85)***	(5.97)***
Return on Assets (B)	0.07	0.06	0.07	0.06	0.10	0.01	0.10	0.094
	(6.06)***	(5.43)***	(5.64)***	(5.40)***	(7.67)***	(7.39)***	(7.34)***	(6.92)***
Debt to Equity (B)	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
	(0.53)	(1.04)	(0.96)	(0.88)	(1.65)*	(1.88)*	(1.99)**	(1.88)*
Return on Assets (L)	0.008	0.008	0.008	0.006	0.25	0.279	0.25	0.24
	(0.11)	(0.11)	(0.11)	(0.07)	(3.08)***	(3.28)***	(3.06)***	(2.90)***
Debt to Equity (L)	-0.0006	-0.0006	-0.0005	-0.0005	-0.0002	-0.0003	-0.0002	-0.0002
	(-3.00)***	(-3.23)***	(-2.77)***	(-2.63)***	(-1.49)	(-1.88)*	(-1.12)	(-1.13)
Total Assets (L)	-0.12	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11
	(-3.31)***	(-3.11)***	(-3.09)***	(-3.10)***	(-3.75)***	(-3.49)***	(-3.54)***	(-3.59)***
Loan Amount	-0.00	-0.00	-0.00	-0.00	-0.0002	-0.0002	-0.0002	-0.0002
	(-1.17)	(-1.42)	(-1.10)	(-1.24)	(-6.09)***	(-6.84)***	(-5.83)***	(-6.38)***
First lien debt	0.66	0.66	0.70	0.69	0.40	0.32	0.40	0.34

	(5.43)***	(5.38)***	(5.52)***	(5.58)***	(3.73)***	(3.07)***	(3.63)***	(3.27)***
No. Arrangers	-0.009	-0.007	-0.01	-0.01	-0.03	-0.02	-0.04	-0.03
	(-0.56)	(-0.44)	(-0.67)	(-0.69)	(-2.32)**	(-1.51)	(-2.39)**	(-2.21)**
Loan Pricing	0.0003	0.0003	0.0003	0.0003	-0.0007	-0.0007	-0.0008	-0.0007
	(2.00)**	(2.06)**	(1.82)*	(1.92)*	(-4.61)***	(-4.67)***	(-4.74)***	(-4.58)***
Maturity	0.10	0.11	0.11	0.11	0.17	0.17	0.17	0.17
	(4.91)***	(4.73)***	(4.77)***	(4.66)***	(7.68)***	(7.55)***	(7.50)***	(7.40)***
GPR Index	0.003	0.003	0.004	0.003	0.003	0.002	0.004	0.003
	(1.76)*	(1.78)*	(2.17)**	(1.78)*	(1.79)*	(1.37)	(2.16)**	(1.55)
Constant	1.3	1.01	1.55	1.78	1.85	-0.26	1.14	1.12
	(0.93)	(0.91)	(1.17)	(1.25)	(1.56)	(-0.23)	(1.02)	(1.03)
Adj. R2	.05	.05	.05	.05	0.06	0.06	0.06	0.06
N	3993	3993	3993	3993	3993	3993	3993	3993

This table lists the interaction effects for each regression with either the cumulative abnormal returns with event window [0,2] or [-3,3] as dependent variable.

Table 20: Interaction Effects Loan Characteristics.

	Loan Amount				Loan Pricing				Maturity				First Lien Debt			
War	2244.74	1183.24	3435.34	1702.63	94.55	19.53	-240.86	7.55	0.69	0.99	0.23	-0.60	0.77	-0.13	0.71	0.29
	(2.85)***	(2.72)***	(6.10)***	(3.02)***	(0.54)	(0.15)	(-1.66)*	(0.06)	(0.63)	(1.44)	(0.31)	(-0.70)	(5.98)***	(-1.93)*	(6.80)***	(2.89)***
ESG Index	43.62				3.74				-0.01				0.03			
	(1.59)				(0.60)				(-0.44)				(7.01)***			
ESG Index x War	-91.72				-2.09				-0.005				-0.04			
	(-2.89)***				(-0.28)				(-0.13)				(-6.99)***			
Ecological Index		21.26				3.37				-0.005				-0.04		
		(2.77)***				(1.68)*				(-0.49)				(-0.58)		
Ecological Index x War		-32.50				-0.46				-0.008				0.0004		
		(-3.29)***				(-0.16)				(-0.54)				(0.29)		
Social Index			68.70				-2.29				0.017				0.02	
			(4.89)***				(-0.68)				(1.10)				(7.58)***	
Social Index x War			-96.73				7.46				0.003				-0.02	
			(-6.40)***				(1.84)*				(0.02)				(-7.80)***	
Governance Index				34.49				4.28				0.02				0.002
				(2.82)***				(1.37)				(0.12)				(2.99)***
Governance Index x War				-50.77				0.31				0.02				-0.01
				(-3.48)***				(0.08)				(1.04)				(-3.87)***
Total Assets (B)	514.49	522.24	503.49	519.09	9.79	10.77	9.42	11.20	-0.28	-0.28	-0.28	-0.28	-0.001	0.004	-0.001	0.001
	(16.00)***	(16.61)***	(15.77)***	(16.37)***	(1.60)	(1.76)*	(1.58)	(1.85)*	(-6.46)***	(-6.56)***	(-6.54)***	(-6.42)***	(-0.24)	(0.06)	(-0.04)	(0.15)

Return on Assets (B)	39.09	41.91	43.30	44.11	-2.65	-1.44	-2.12	-1.31	0.01	0.01	0.02	0.02	-0.002	-0.005	-0.001	-0.004
	(2.97)***	(3.16)***	(3.18)***	(3.18)***	(-1.06)	(-0.55)	(-0.85)	(-0.55)	(0.98)	(0.79)	(1.47)	(1.37)	(-1.09)	(-2.46)**	(-0.67)	(-1.60)
Debt to Equity (B)	1.25	1.20	1.14	1.20	-0.10	-0.10	-0.11	-0.11	0.005	0.0007	0.0006	0.0006	0.0001	0.0001	0.0001	0.0001
	(6.12)***	(5.93)***	(5.87)***	(5.93)***	(-3.16)***	(-3.29)***	(-3.1)5***	(-3.33)***	(3.45)***	(3.52)***	(3.14)***	(3.21)***	(2.87)***	(3.01)***	(2.58)**	(3.10)**
Return on Assets (L)	251.63	285.62	243.77	267.88	11.46	16.01	13.01	16.29	-0.24	-0.25	-0.23	-0.23	0.07	0.07	0.07	0.08
	(2.76)***	(3.07)***	(2.72)***	(2.89)***	(0.61)	(0.85)	(0.69)	(0.84)	(-2.31)**	(-2.37)**	(-2.24)**	(-2.18)**	(3.26)***	(3.29)***	(3.37)***	(3.59)***
Debt to Equity (L)	-0.14	-0.20	-0.25	-0.20	-0.004	-0.006	0.01	0.004	-0.0004	-0.0004	-0.0003	-0.0003	-0.00007	-0.00007	-0.00008	-0.00008
	(-0.99)	(-1.38)	(-1.78)*	(-1.44)	(-0.17)	(-0.22)	(0.47)	(0.16)	(-2.03)**	(-2.05)**	(-1.76)*	(-1.57)	(-3.15)***	(-2.99)***	(-3.68)***	(-3.6)***
Total Assets (L)	15.31	18.52	4.63	12.11	-0.96	-0.15	-0.19	-0.50	0.02	0.02	0.02	0.02	0.001	0.004	0.001	0.003
	(0.66)	(0.79)	(0.21)	(0.52)	(-0.14)	(-0.02)	(-0.03)	(-0.08)	(0.65)	(0.57)	(0.51)	(0.60)	(0.23)	(0.50)	(0.16)	(0.46)
Loan Amount	-	-	-	-	-0.01	-0.01	-0.008	-0.01	-0.0001	-0.0001	-0.0001	-0.0001	0.03	0.03	0.03	0.03
					(-2.10)**	(-2.19)**	(-1.69)*	(-2.13)**	(-3.56)***	(-3.56)***	(-3.54)***	(-3.43)***	(6.71)***	(6.40)***	(6.46)***	(6.61)***
First lien debt	-233.21*	-161.24	-393.68	-209.36	-164.59	-157.79	-148.55	-160.36	1.13	1.11	1.07	1.13	-	-	-	-
	(-1.92)	(-1.47)	(-3.16)***	(-1.85)*	(-7.34)***	(-8.14)***	(-6.28)***	(-7.93)***	(7.58)***	(7.66)***	(7.09)***	(7.82)***				
No. Arrangers	73.04	76.41	89.47	76.58	-0.93	-0.32	-1.85	-0.08	0.14	0.14	0.15	0.14	0.003	0.0007	0.008	0.003
	(6.02)***	(6.45)***	(7.08)***	(6.23)***	(-0.52)	(-0.17)	(-0.87)	(-0.04)	(10.46)***	(10.33)***	(10.53)***	(10.25)***	(1.94)*	(0.37)	(3.80)***	(1.52)
Loan Pricing	-0.30	-0.31	-0.22	-0.30	-	-	-	-	0.0003	0.0003	0.0003	0.0003	-0.0001	-0.0001	-0.0001	-0.0001
	(-2.69)***	(-2.77)***	(-2.06)**	(-2.73)***					(1.84)*	(1.95)*	(1.72)*	(1.69)*	(-6.37)***	(-6.44)***	(-5.72)***	(-6.53)***
Maturity	-100.35	-99.67	-96.97	-96.71	9.66	10.04	8.84	8.77	-	-	-	-	-0.00001	-0.000007	-0.00002	-0.000009
	(-2.82)***	(-2.82)***	(-2.78)***	(-2.71)***	(1.94)*	(2.06)**	(1.80)*	(1.76)*					(-1.74)*	(-1.40)	(-2.61)***	(-1.72)*
GPR Index	0.97	0.22	-1.77	0.96	1.12	1.27	1.31	0.91	0.008	0.007	0.008	0.007	-0.0001	0.0002	-0.0006	0.0001
	(0.57)	(0.13)	(-0.99)	(0.56)	(2.29)**	(2.47)**	(2.58)**	(1.78)*	(3.84)***	(3.29)***	(3.37)***	(3.24)***	(-0.34)	(0.53)	(-1.39)	(0.27)
Constant	-4753.18	-4595.86	-5473.64	-4887.89	103.40	21.28	215.92	30.43	5.03	5.12	4.28	4.69	-0.84	-0.08	-0.71	-0.40
	(-5.32)***	(-5.87)***	(-6.86)***	(-5.98)***	(0.42)	(0.10)	(0.91)	(0.13)	(4.45)***	(4.84)***	(4.00)***	(4.27)***	(-3.43)***	(-0.35)	(-3.00)***	(-1.60)
Adj. R2	0.39	0.39	0.39	0.39	.07	.08	.08	.08	.20	.20	.20	.20	.19	.14	.20	.15
N	1867	1867	1867	1867	1163	1163	1163	1163	1825	1825	1825	1825	1875	1875	1875	1875

This table lists the interaction effects for the regressions with either Loan Amount, Loan Pricing, Maturity or First Lien Debt as the dependent variable. ***p<0.01, **p<0.05, *p<0.0

F: Breush-Pagan and White Tests

Table 21: White's and Breush-Pagan test *H*0: Homoscedasticity. Hypotheses 1, 3 and 5.

		ESG Index		Ecological Index		Social Index		Governance Index	
		[-3,3]	[0,2]	[-3,3]	[0,2]	[-3,3]	[0,2]	[-3,3]	[0,2]
White's Test	Chi^2	282.52	402.58	297.45	410.79	277.64	404.86	280.11	5.68
	Prob > Chi^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Breusch-Pagan Test	Chi^2	7.74	29.75	4.42	30.04	6.08	26.88	410.84	26.30
	Prob > Chi^2	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.00

Table 22: White's and Breush-Pagan test *H*0: Homoscedasticity for hypotheses 2, 4 and 5.

		ESG Index	Ecological Index	Social Index	Governance Index
Loan Amount					
White's Test	Chi^2	130	129.37	130.65	127.64
	Prob > Chi ^{2}	0.03	0.03	0.03	0.00
Breusch-Pagan Test	Chi^2	298.01	298.01	297.72	298.62
	Prob > Chi^2	0.00	0.00	0.00	0.00
Loan Pricing					
White's Test	Chi^2	102.72	116.12	111.09	103.85
	Prob > Chi^2	0.43	0.14	0.23	0.40
Breusch-Pagan Test	Chi^2	50.33	47.72	46.19	48.00
	Prob > Chi^2	0.00	0.00	0.00	0.00
Maturity					
White's Test	Chi^2	310.79	286.28	296.61	281.67
	Prob > Chi^2	0.00	0.00	0.00	0.00
Breusch-Pagan Test	Chi^2	69.00	71.84	59.86	62.14
	Prob > Chi^2	0.00	0.00	0.00	0.00
First Lien Debt					
White's Test	Chi^2	458.89	436.36	456.57	422.18
	Prob > Chi^2	0.00	0.00	0.00	0.00
Breusch-Pagan Test	Chi^2	424.72	408.94	423.08	402.61
	Prob > Chi^2	0.00	0.00	0.00	0.00

G: Variance Inflation Factor (VIF)

Table 23: Variance inflation factor for hypotheses 1 and 3 on CARs

Variable	ESG Index	Ecological Index	Social Index	Governance Index
War	2.97	3.50	2.40	2.54
ESG/E/S/G Index	2.43	2.92	1.94	2.23
Ln Total Assets (B)	1.73	1.73	1.73	1.74
Loan Amount	1.66	1.66	1.66	1.66
No. Bookrunners	1.47	1.48	1.52	1.50
Return on Assets (L)	1.31	1.32	1.31	1.33
Maturity	1.27	1.28	1.28	1.28
First Lien Loan Flag	1.21	1.19	1.21	1.19
Debt to Equity (L)	1.17	1.17	1.19	1.18
Debt to Equity (B)	1.16	1.14	1.16	1.15
GPR Index	1.14	1.15	1.14	1.20
Return on Assets (B)	1.12	1.16	1.16	1.17
Ln Total Assets (L)	1.11	1.10	1.10	1.10
Loan Pricing	1.10	1.11	1.10	1.11
Mean VIF	**1.49**	**1.56**	**1.42**	**1.46**

Table 24.1: Variance inflation factor for loan amount and loan pricing, hypotheses 2 and 4.

Variable	Loan Amount				Loan Pricing			
	ESG	Eco.	Soc.	Gov.	ESG	Eco.	Soc.	Gov.
War	2.97	3.49	2.40	2.53	2.97	3.50	2.39	2.54
ESG/E/S/G Index	2.43	2.92	1.94	2.23	2.43	2.90	1.94	2.22
Ln Total Assets (B)	1.30	1.30	1.30	1.31	1.71	1.73	1.72	1.73
Loan Amount	-	-	-	-	1.66	1.66	1.65	1.65
No. Bookrunners	1.43	1.44	1.48	1.47	1.47	1.48	1.52	1.50
Return on Assets (L)	1.30	1.31	1.30	1.32	1.31	1.32	1.31	1.33
Maturity	1.26	1.26	1.26	1.26	1.27	1.27	1.27	1.27
First Lien Loan Flag	1.21	1.19	1.21	1.19	1.17	1.16	1.17	1.15
Debt to Equity (L)	1.17	1.17	1.19	1.18	1.17	1.17	1.19	1.18
Debt to Equity (B)	1.12	1.10	1.12	1.11	1.15	1.13	1.15	1.14
GPR Index	1.14	1.15	1.14	1.20	1.13	1.14	1.13	1.19

Variable								
Return on Assets (B)	1.12	1.15	1.15	1.16	1.12	1.16	1.16	1.17
Ln Total Assets (L)	1.11	1.10	1.10	1.10	1.11	1.10	1.10	1.10
Loan Pricing	1.10	1.10	1.10	1.10	-	-	-	-
Mean VIF	**1.43**	**1.51**	**1.36**	**1.40**	**1.51**	**1.59**	**1.44**	**1.48**

Table 24.2: Variance inflation factor for maturity and first lien debt, hypotheses 2 and 4.

	Maturity				First Lien Debt.			
Variable	ESG	Eco.	Soc.	Gov.	ESG	Eco.	Soc.	Gov.
War	2.94	3.46	2.39	2.54	2.85	3.46	2.29	2.48
ESG/E/S/G Index	2.42	2.91	1.94	2.22	2.40	2.92	1.91	2.23
Ln Total Assets (B)	1.63	1.63	1.63	1.65	1.73	1.73	1.73	1.74
Loan Amount	1.64	1.64	1.65	1.64	1.66	1.66	1.66	1.66
No. Bookrunners	1.35	1.37	1.39	1.38	1.47	1.48	1.51	1.50
Return on Assets (L)	1.30	1.32	1.31	1.38	1.29	1.30	1.29	1.30
Maturity	-	-	-	-	1.22	1.23	1.23	1.23
First Lien Debt.	1.16	1.14	1.17	1.14	-	-	-	-
Debt to Equity (L)	1.17	1.17	1.18	1.18	1.17	1.17	1.18	1.18
Debt to Equity (B)	1.15	1.13	1.15	1.14	1.15	1.12	1.14	1.13
GPR Index	1.13	1.14	1.13	1.19	1.14	1.15	1.14	1.20
Return on Assets (B)	1.12	1.16	1.15	1.17	1.12	1.15	1.16	1.16
Ln Total Assets (L)	1.11	1.10	1.10	1.10	1.11	1.10	1.10	1.10
Loan Pricing	1.10	1.10	1.10	1.10	1.07	1.07	1.07	1.07
Mean VIF	**1.48**	**1.56**	**1.41**	**1.44**	**1.49**	**1.58**	**1.42**	**1.46**

G: Ramsey RESET test

Table 25:: Ramsey RESET test $H0$: model has no omitted variables. Hypotheses 1 and 3.

	ESG Index		Ecological Index		Social Index		Governance Index	
	[-3,3]	[0,2]	[-3,3]	[0,2]	[-3,3]	[0,2]	[-3,3]	[0,2]
F-value	6.40	2.43	6.60	2.99	6.50	3.06	6.51	3.00
Prob > F	0.00	0.06	0.00	0.03	0.00	0.03	0.00	0.03

Table 26: Ramsey RESET test $H0$: model has no omitted variables. Hypotheses 2 and 4.

	ESG Index	Ecological Index	Social Index	Governance Index
Loan Amount				
F-value	19.12	20.08	20.06	19.86
Prob > F	0.00	0.00	0.00	0.00
Loan Pricing				
F-value	2.91	2.71	3.56	2.90

Prob > F	0.03	0.04	0.01	0.03
Maturity				
F-value	8.52	9.99	8.46	8.65
Prob > F	0.00	0.00	0.00	0.00
First Lien Debt				
F-value	58.07	48.66	68.38	52.25
Prob > F	0.00	0.00	0.00	0.00