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Sustainable investment flows during crisis periods

Effects of Russian-Ukrainian war on SRI flows

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Abstract

The thesis focuses on political and military crises, specifically the Russian-Ukrainian war, to research the war's effect on monetary Net Flow in European mutual funds. We found that there are statistically significant positive mutual fund flows in Europe caused by the Russian-Ukraine war. The study uses different indicators, industries, and factors such as weapon investments, Oil & Gas Investments among other indicators such as performance, ESG, screening, risks, and retail investors.

We employ a difference-in-difference regression model to analyze mutual fund net flows before and after the Russian invasion of Ukraine in February 2022. Additionally, we have employed matched propensity score techniques to ensure a balance between the treatment and control groups.

The central insight from this study is the analysis of different factors that impact mutual fund flows. Where the thesis attempts to understand the effects of war in European markets. Considering only the statistically significant results obtained in our study, we found that risk factors and market conditions must be considered when examining the relationship between mutual fund flows and crisis events. Retail investors were more prone to invest in funds with an Above Average ESG rating while avoiding sectors associated with weapons investments.

Our study investigates retail investors preference for defensive industry investments, focusing on weapons and Oil & Gas industries, mutual fund exclusionary screening strategies, and the role of governance practices during the crisis. We expect that our findings can benefit mutual fund managers, investors, and regulators in their decision-making processes to give a more significant focus on sustainable mutual fund drivers.

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1. INTRODUCTION

Black swan events, such as terrorist attacks, health crises, and financial crises, were introduced by (Bossman et al., 2022) to describe random occurrences that disrupts the financial markets and impacts human lives, resulting in outliers, intense volatility, and uncertainty. Such unexpected events have a changing effect on financial markets and the economy as a whole ((Yousaf, et al., 2022; (Boungou & Yati'e, 2022))). In our study, we are focusing in one of the most recent black swan events, a political and military crisis, specifically the Russian-Ukrainian war with the goal to analyze its consequences on Socially Responsible Investments (SRI). Therefore, we examine various aspects such as market risk, retail investor behavior in defensive industry investments, mutual fund screening strategies, and the role of governance practices during a crisis period.

The significance and role of Socially Responsible Investment (SRI) funds in the financial market have grown over the last decade. The Morgan Stanley Institute for Sustainable Investment (2022) highlights the increasing number of funds with an Environmental, Social, and Governance (ESG) focus and their increasing assets under management (AUM). The AUM has risen from around US\$1.5 trillion in 2018 to nearly US\$3 trillion in 2022. Funds have also increased from 2,208 in 2018 to 6,959 in 2022. In compliance with new European regulations, the number of mutual funds classified as article 8 or 9 has also increased, representing a significant portion of assets (Eurosif, 2022). In the United States, sustainable mutual funds' domiciled assets account for around 11% of total invested assets, as reported in the US SIF Foundation (2022) Report on US Sustainable Investing Trends.

Several studies have shown a preference for sustainable investment among investors. Hartzmark & Sussman, (2019) and Ammann et al. (2018) observed that funds with high ESG scores attract more investment flows than those with low ESG scores. This preference for sustainability may reflect the changing sentiment around ESG. It could indicate the changing investor values that now seem to focus more on supporting personal morals and values rather than only focusing on the expected monetary gains. This new focus on values rather than gains is a common characteristic of an SRI prioritizing investors' values and beliefs (Statman, 2008; Riedl & Smeets, 2017). Some studies have found that SRI funds tend to achieve lower volatility and are less sensitive to negative returns (Bollen, 2007; Renneboog et al., 2011).

Given the growing inflows into SRI funds and investors' preference for sustainable alternatives, it is reasonable to believe that even during crisis periods, when systematic risk is high, investors would favor SRI mutual funds as a risk hedge and remain consistent with their sustainable commitments. This is particularly relevant for "green" investors, which is the focus of our study.

To analyze the impact of the Russia-Ukraine war on mutual fund flows, we use data from Morningstar Direct. Using the fund size variable, we have built the dependent variable, Net Flow. Our primary independent variable is the sustainability rating score from Morningstar. After collecting and cleaning the data, we employed propensity score matching to balance our treatment and control groups. Running a difference-in-differences regression after the PSM. Figure 1 shows the mean Net flow trend for all five Morningstar sustainability during our analyzed period from October 2021 to July 2022. We notice that the Low Sustainability rating is very volatile compared to the other ratings, and the High sustainability rating is the only category trending positively. The below average category is not parallel with the other ratings. We prefer Above Average and Average as two comparable categories in the pre-trend graph, which offers a more balanced view of the crisis's effect on sustainable mutual fund flows. Therefore, the Above Average and Average are our selected treatment and control groups, respectively.

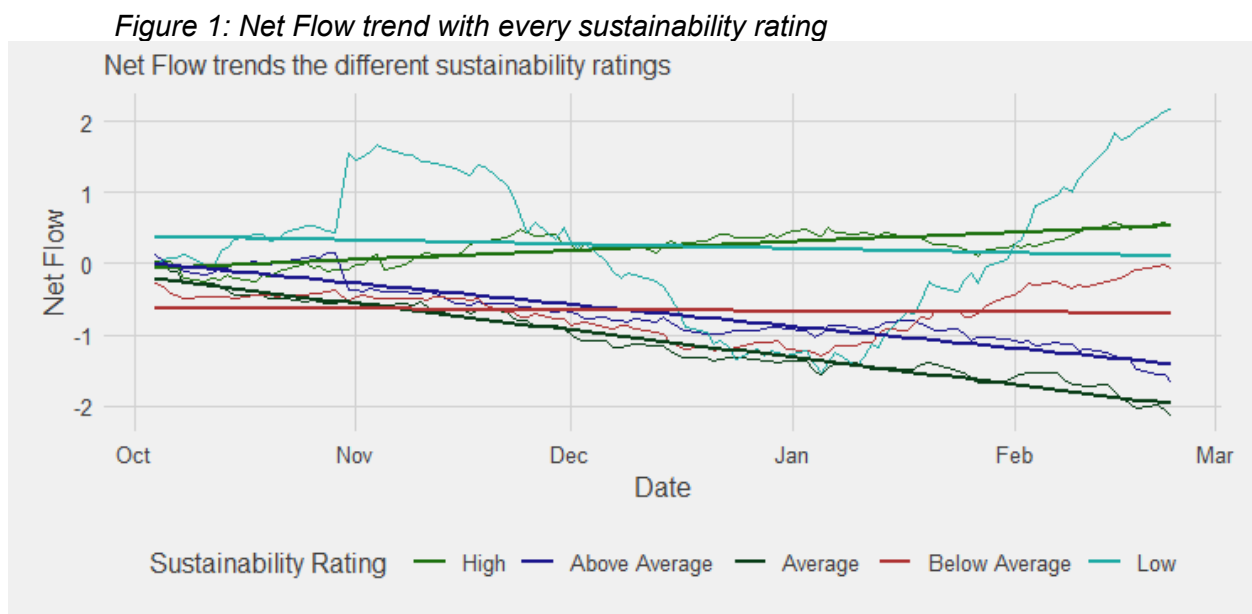


Figure 1: Shows the unmatched data comparing the mean trend of the five different sustainability Rating. This figure shows linear regression for each separate sustainability rating. Although the two that are closest and also most parallel are the Above Average and Average Sustainability ratings.

The result of our study shows that the crisis has a significant impact on mutual fund flows. Supporting the notion that sustainable investments hold substantial importance for investors during the Russian-Ukrainian war. We can observe that Above Average ESG mutual funds experienced higher inflows during the crisis than Average ESG funds, aligning with the assumption that sustainability is significant to investors. Our study contributes to the existing literature by shedding light on the interactions and importance of multiple drivers of mutual funds. Although we observed mixed relationships among sustainable ratings, Post variable, and the various drivers of mutual funds analyzed (screening selection criteria, governance practices, defensive equity investments), we believe that these results are helpful to fund managers and Policymakers in their decision-making and put particular emphasis on the drivers that are statistically significant to have an impact on sustainable mutual fund flows on the context of war.

2. LITERATURE REVIEW

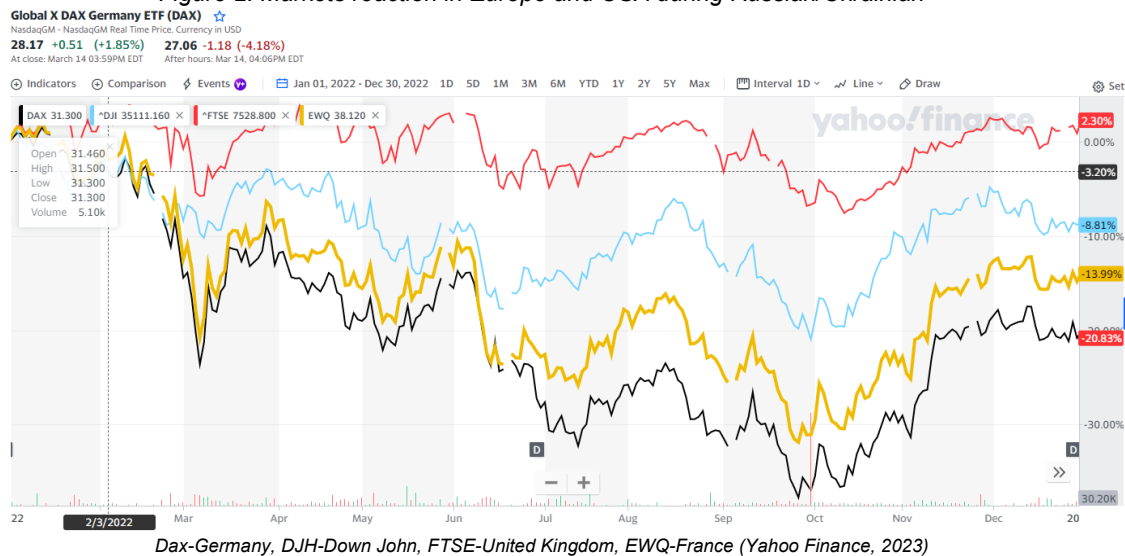
This chapter will first review the general notion of CSR and SRI in previous literature. Then we will go more thoroughly into different research aspects, such as retail investors, defensive industries, mutual fund screening strategies, and Governance during crises.

The existing literature on the relationship between crises, SRI mutual funds' performance, and flows present mixed results. Bansal, et al. (2022) found that high SRI stocks outperform low ones during good economic times, but the opposite is true during bad times. These findings can be partially explained by the research of Wright & Nyberg, (2017) who suggests that managers disassociate themselves from ESG commitments during business tensions or when environmental commitments are not yielding results. On the other hand, Pastor & Vorsatz, (2020) demonstrated that sustainable funds experienced relatively low flow fluctuations during the COVID-19 crisis. Regarding performance, Eccles, et al. (2012) documented that SRI can generate good financial returns in the long term. However, it is essential to note that the relationship between performance and flow in sustainable investments is weak. This assertion is backed by Benson & Humphrey, (2008) and El Ghouli & Karoui, (2017).

Before the crisis caused by the Russian-Ukrainian war, the most recent crisis was the Covid-19 pandemic, which resulted in several consequences for sustainable investments. Pastor & Vorsatz (2020) found that sustainable funds with active management underperformed compared to passive benchmarks during the Covid-19 crisis and that investors could perceive SRI as a luxury good rather than a necessity. These findings align with those of Bansal, et al. (2022), who identified a high correlation between alphas of high sustainable stocks and luxury consumption and luxury retail sales.

Numerous studies indicate that war has an impact on financial markets (Choudhry, (2010); Hudson & Urquhart, (2015); Rigobon & Sack,(2005), Schneider & Troeger, (2006), which is also evident in the Russia-Ukraine conflict. For a visual representation of the market situation in Europe, refer to Figure 2, which shows the reaction of European markets, including DAX-Germany, DJH-Down John, FTSE-United Kingdom, and EWQ-France, to the Russian-Ukrainian crisis.

Figure 2: Markets reaction in Europe and USA during Russian/Ukrainian



Additionally, this war has heterogeneous effects on the global stock market and specific sectors, resulting in negative cumulative abnormal returns (Boubaker et al., (2022) and (Sun et al., 2022)). These findings are supported by Boungou & Yatié (2022) and Yousaf et al. (2022), who found that the war has a negative effect on global stock markets. Additionally, the Russia-Ukraine war has increased volatility and decreased stock prices in the European market, as indicated by (Bougias et al., (2022)). The impact of the war on markets varies depending on the market conditions and type (Umar, Bossman et al. (2023) and (Umar, Riaz et al. (2022)) in their analysis of the connectedness of European, Global, and Russian markets.

2.1 Retail sustainable investors.

To understand how mutual fund flows have moved during the Russian-Ukrainian war, we investigate the investment behavior of sustainable retail investors since we believe it is a possible driver to see the causality of the war on mutual fund flows. Retail investors are generally relatively unsophisticated compared to institutional investors (James & Karceski, 2006). Retail investors have smaller investment amounts and lack specific sustainability mandates, differentiating them from sustainable institutional investors. These characteristics contribute to their active capacity to quickly reallocate their funds, potentially influencing their investment decisions during the relevant crisis (Guercio & Tkac,(2008) and Klinkowska & Zhao, (2023)). For example, during the peak of the Covid-19 crisis, retail investors reduced their fund flows into high ESG mutual funds, which contrasts with the flows invested by institutional mutual funds.

Regarding investor sophistication, Klinkowska & Zhao, (2023) distinguish between retail and institutional investors and explore the flow-performance and performance-flow perspectives. They find that retail mutual funds outperform institutional ones and that SRI funds generate positive abnormal returns before expenses. Additionally, they have found out that there is a "dumb money" effect observed for institutional SRI mutual funds, which might showcase that retail investors and institutional investors have different priorities and therefore are more swayed during crises. Finally, it is essential to acknowledge that financial motives do not necessarily drive ESG investors and are willing to forego financial returns in exchange for high ESG returns (Riedl & Smeets (2017), Bauer et al. (2021)).

2.2 Investments into defensive industries.

In this part, we will focus on retail investors' behavior, as a driver for determining mutual fund flows, in the context of conflicts and war. This study considers retail investors' investments in specific industries or sectors such as weapons and Oil & Gas. This idea is mainly based on the strong cash flows in these industries that could potentially be valuable during the Ukraine War. The potential for these industries to reduce downside risk and maintain portfolio stability is attractive. We want to investigate this aspect since it might be helpful for investment managers to determine what role these industries played in determining mutual fund flows during the Ukraine War.

The concept of defensive equity investment and value investing was introduced by Graham et al. (1962), In the context of this thesis, defensive investments will be used to describe investment strategies that invest into equity portfolios with companies that maintain strong financials, reliable earnings, and consistent dividends. Generally, a strategy to maintain long-term wealth preservation, as Balik & Mehran (2008) pointed out on the revised work of Graham and Dodd. Sustainability and defensive investment strategies are not necessarily equal; both have a long-term focus and offer low volatility to investors. However, Singh (2020) discovered that during the Covid-19 crisis, sustainable investment strategies outperformed defensives ones, implying that investors found refuge through ESG investments into mutual funds focusing on long-term sustainability.

Financial information services such as Morningstar and MSCI have also shifted focus on investments into defensive industries during market crises based on historical performance (Morningstar (2020), MSCI (2020)). For instance, State Street Global Advisors (2020) has

emphasized the upside for a long-term investment horizon and the potential benefits of defensive investments for passive investors, which aligns with the fundamental characteristic of SRI investments.

Overall, the shock resistance ability of defensive industries investment is crucial during periods of crises, considering they offer market downside performance protection (Novy-Marx (2014), French & Gärtner (2023)), are useful for risk mitigation Frazzini et al. (2012), but also, as point out by Collie & Osborn (2011), they can be a valuable investment considering the mispricing a portfolio base on defensive equity investment may have.

2.3 Mutual funds screening strategy.

Research and empirical studies indicate that screening strategies can enhance mutual funds' performance. Potentially influencing mutual fund flows during a crisis. Positive screening involves selecting companies that meet high social and environmental standards. In contrast, negative screening avoids investing in companies associated with controversial industries such as weapons, nuclear, gambling, tobacco, Oil & Gas. Increasing screening intensity during a selection process has been found to decrease financial performance slightly (Capelle-Blancard & Monjon (2014), Pena & Cortez (2017)), Where mainly the strategy of avoiding 'sin' investments reduces financial performance.

The research done on sustainable screening highlights the differences between positive and negative screening approaches and their impact on investors (Charles et al. (2016)). The screening selection method also plays a vital role in investment, mitigating risks and enhancing returns for investors, especially in the historical long term (Pena & Cortez (2017)). Furthermore, SRI receives significant payoff for their positive screening investments, as mentioned in Khan et al. (2015).

From a diversification point of view, negative screening affects portfolio performance, considering the potential loss of diversification due to exclusionary criteria (Trinks & Scholtens (2017), Kempf & Osthoff (2007)). Consequently, it can have an impact on mutual fund flows.

These screening practices, both positive and negative, have implications for mutual fund flows. Investor preferences for ESG funds and the influence of screening on investor behavior are essential factors affecting fund flows (Carlsson Hauff & Nilsson (2023); (Arribas et al.

(2019)). Understanding the relationship between screening practices and mutual fund flows can provide insights into investor behavior during a geopolitical crisis. Coming to a general trend where investors may achieve higher risk-returns by using these investment perspectives, and the screening process can help avoid bad outcomes without significant sacrifices in portfolio returns. (Schilling et al. (2019)).

2.4 Governance practice during crisis periods.

According to the current literature, Governance can be a driver to understand mutual fund flows in the context of geopolitical crises. Corporate Governance has gained importance due to past crises. Sun et al. (2011) found that inadequate corporate governance practices, such as poor board oversight and excessive risk-taking, played an essential role in the 2008 Global financial crisis. They suggested that improving transparency and accountability to increase governance quality could help prevent future crises. In this sense, mutual funds with well-structured boards may demonstrate effective decision-making and risk-management strategies during times of crisis, potentially attracting more flows (Adams et al.(2010).

High-quality governance practices have been found to positively impact mutual fund performance, with effects also extending to periods during crises. Adam et al. (2011) observed that higher-quality governance structures are associated with better mutual fund performance, as indicated by lower fund outflows. This suggests that good Governance can facilitate better investment decisions, higher investor trust, and contributes to improved performance and lower risk.

Investors who value stability will be attracted to funds with solid governance structures, increasing public confidence and trust, ultimately resulting in higher investment flows (Sandberg et al. 2023). Additionally, during a crisis, mutual funds with strong governance practices, particularly concerning ESG factors, may be perceived as more resilient and sustainable by investors (Boffo & Patalano, 2020).

These studies highlight the significance of good Governance in driving mutual fund performance and flow. Understanding the impact of Governance in the Ukraine war can help shed light on potential inflows or outflows in SRI funds.

3. HYPOTHESES

In this session, we present our hypotheses based on earlier literature and the analysis of market reactions during the crisis period.

3.1 Hypothesis 1: General model

Our first hypothesis is that above-average ESG mutual funds receive more flows than Average ESG funds during crises.

The current literature review supports this hypothesis. In this sense, Pastor & Vorsatz (2020) found that High ESG funds continued to attract fund flows after the COVID-19 crisis, mostly due to the resilience to face the downturn during crises. This also aligns with findings from the Morgan Stanley Institute for Sustainable Investment, 2022.

3.1.1 Market and mutual fund risk and volatility.

Consistent with findings that suggest sustainable funds have lower sensitivity to past negative returns and lower volatility (Bollen, 2007; Renneboog et al., 2011). We believe that market volatility will increase in the presence of a crisis, such as the war between Russia and Ukraine. However, Above Average ESG mutual funds will experience lower risk levels and, consequently, higher fund flow increases than Average ESG mutual funds. This will be measured using Profile Volatility and Risk-Adjusted Return Overall.

3.2 Hypothesis 2: focus on retail investors and Defensive industries investments.

For the second hypothesis, we consider the characteristics of sustainable retail investors mentioned earlier and consider two theories. The first is the efficient market theory (Fama, 1970), which suggests that markets adjust prices based on new information, and individuals make rational decisions based on all available information. However, we must also consider behavioral theories, which propose that individuals may overreact to unexpected events, such as geopolitical risks and conflicts (Zaremba et al., 2022). Therefore, we want to focus on one

relevant perspective related to retail investors in the context of a crisis; therefore, our hypothesis is that:

During a crisis, we believe that retail investors prefer to invest in mutual funds with an above average ESG rating that does not invest in sectors such as weapons or fossil fuels. This preference is expected to increase fund flows for these types of funds. The hypothesis converges with the notion that retail investors, during a crisis, may prefer mutual funds with above average ESG ratings. This reflects a long-term focus on sustainability and value investing strategies and may involve avoiding investments in sectors like weapons or fossil fuels. The hypothesis also suggests that retail investors are more likely to choose funds that align with their values and long-term objectives. This behavioral tendency is consistent with the observed trends in socially responsible investments, where investors prioritize environmental, social, and governance factors.

As an alternative hypothesis, retail investors are more inclined to invest in mutual funds with average ESG ratings that may include investments in sectors such as weapons or fossil fuels. This investment choice is expected to yield short-term returns, resulting in increased fund flows for these funds. This hypothesis is supported by the notion that humans tend to give more weight to recent events and information in their decision-making processes (Tversky & Kahneman, 1973).

In summary, the second hypothesis proposes that retail investors are more inclined to invest in mutual funds with an above average ESG rating during a crisis, avoiding sectors such as weapons or fossil fuels. This preference is expected to drive increased fund flows towards these funds as investors seek alignment with sustainability objectives and demonstrate a bias towards recent events and information in their decision-making.

3.3 Hypothesis 3: focus on mutual funds screening strategies.

During a crisis, mutual funds with negative screening strategies will have more outflows than positive screening strategies mutual funds. This is because investors may prioritize diversification and financial performance over strict ESG exclusion criteria, believing that mutual funds with poor or average ESG ratings may be more resilient in a crisis due to their focus on financial performance.

Conversely, the alternative hypothesis posits that mutual funds with negative screening strategies may attract higher inflows during a crisis. This hypothesis suggests that some investors may place greater importance on ESG factors, even during challenging periods, and see mutual funds with negative screening as more aligned with their sustainability and ethical preferences.

By examining the impact of screening strategies on mutual fund flows during a geopolitical crisis, our study aims to contribute to a better understanding of investor behavior and preferences in such contexts. The analysis will help elucidate the role of screening practices in shaping mutual fund flows, providing valuable insights for investors and fund managers.

3.4 Hypothesis 4: focus on company governance.

The fourth and final hypothesis we have elaborated in our study is the relationship between companies' governance and mutual fund flows. Based on the current literature, we believe mutual funds with above average sustainability rating, reflect strong governance practices. These funds will experience higher fund flows during a geopolitical crisis than mutual funds with Average ESG ratings. This is because investors perceive companies with robust governance structures to be more resilient and sustainable during times of crisis, leading to increased investment flows. Through this hypothesis, we aim to contribute to the understanding of the role of good Governance in driving mutual fund flows during periods of crisis.

4. DATA

Our primary source of information was the Morningstar Direct Data Base. Once we got the data for the relevant periods, we underwent the sorting and cleaning process, then we proceeded with a Propensity Score matching to have a balanced sample between our treatment groups and control group. Finally, for our main analysis, we used difference-in-difference regressions.

4.1 Crisis Periods

The periods will be categorized into two periods pre-crisis and post-crisis. We use the pre-crisis period to get an idea of the trends in the markets before the crisis to compare the changes that happen in the crisis and post-crisis periods. The crisis period will be the focus of the analysis to give information on the effects on our dependent variable.

From the analysis of the market evolution presented in Figure 2 and considering studies related to this crisis (Lo et al. (2022), Umar et al. (2023)), we have defined the following periods for our study.

- *Pre-crisis (October 2021 to February 24, 2022)*

The pre-crisis period is set from the beginning of October 2021 and ends just before Russia invaded Ukraine, and European Stock markets declined (see Figure 2)

- *Post- Crisis (February 24 to July 31, 2022)*

This period began when Russia invaded Ukraine on February 24 and continues until our analyzed periods end.

4.2 Source and collection.

Using the Morningstar Direct access provided by NHH, we selected European open-end funds, where we excluded money market funds and focused on funds mainly composed of equity. We have extracted daily information for our main dependent variable to capture more precise

changes in mutual fund flows; however, the extracted data is monthly for the main independent variable, Sustainable Morningstar rating. This process covers the duration of our defined study period:

- Total data period – From the start of October 2021 to the end of July 2022.

Following Hartzmark & Sussman (2018) and (Rawson, 2014), we are focusing our analysis on fund flows, mainly to avoid biased results from performance measurements. The flows represent the attractiveness of funds. Those can be affected by indirect measures, like prices, or some poor performance results that could potentially be hidden from fund managers. Finally, we have downloaded the information in CSV format.

4.3 Controlling For Survivorship Bias

In selecting our data, and to avoid bias, particularly survivorship bias issues, we have included funds that have been merged or terminated funds as well as active funds during the analyzed period.

4.4 Exclusion

We used Morningstar Direct to search for data, filtering it by Investment area (Europe) and Global broad category group (Equity). Following the Elton et al. (1996) approach, we dropped funds with less than \$15 million in assets to avoid extreme fluctuations from small funds. We also excluded young funds with less than 1 year of operation to mitigate incubation bias, as Evans (2010) highlighted.

The downloaded data contained multiple versions of the same fund for different share classes. We removed these duplicates and kept only the largest fund. To focus on the effects of ESG, we excluded funds without the Morningstar sustainability rating.

During the data collection process, we selected a set of variables that will be used as independent variables, controls, or dummy variables in our study.

4.5 Matching, merging, and processing data.

The data is downloaded in a wide format which is incompatible with our current analysis programs. We have used RStudio to change the data into a long format. Thus, creating a time series of each fund with daily data. Monthly, weekly, or constant values have been expanded to account for each day in the relevant time period. Resulting in a flexible data frame to expand upon and analyze.

To create our main dependent variable, Net flow, we follow the standard formula in the literature for Net flow (Barber et al.(2016), Pastor & Vorsatz (2020)).

$$NetFlow_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1} * (1 + Return_{i,t})}{TNA_{i,t-1}}$$

Where TNA means total net asset for asset I in time t, in our study, we are using the criteria called “**Fund Size - comprehensive (Daily)**”. Therefore, we have dropped funds with daily missing values. Also, one of the control variables in our model is net return, which uses the data from the variable “Daily Return Index”. Additionally, since the focus of our thesis is sustainability funds, and to have consistency in our study and avoid fluctuation that arises from changes on reclassifications on the Morningstar sustainability rating, we considered the rating in 2022. Finally, we have winsorized variable at a 1% level to avoid extreme values on the data and remove the effect of outliers.

4.6 Summary Statistics.

Table 1 presents summary statistics of essential variables used in the thesis. The table consists of two different panels spanning the period 2021.09.01 to 2022.07.31. **Panel A** shows the difference in monetary flows between the different Sustainability ratings, including the differences in categories such as standard deviation, Net Return, Net Assets, Gov Risk and ROA. The analysis focuses on Above Average vs Average, where we include the Above Average - Average row showing the clear difference in the two groups. Not all observations have a value in the values presented in nominal form unless otherwise specified. **Panel B** Shows the distribution of key variables used in the analysis section. Total Net Assets (TNA) Allocation Equity shows the percentage of equity investments. The variables are presented in nominal form unless otherwise specified.

Table 1: Summary statistics

Morningstar Sustainability Rating	N	Monthly Net flow	Sd Net Flow	Monthly Net Return	Mean Net Assets	Gov Risk	ROA
High	18,209	-1.71%	21.72%	-1.15%	€601,902,691	5.87	7.73%
Above Average	24,040	-1.78%	20.69%	-1.11%	€485,860,378	6.18	7.39%
Average	38,195	-1.59%	20.41%	-0.81%	€411,850,624	6.41	7.30%
Below Average	21,075	-1.20%	19.75%	-0.72%	€316,736,841	6.23	6.61%
Low	5,554	-1.23%	21.15%	-0.71%	€313,481,823	5.64	4.54%
Above Average - Average	62,235	-0.19%	0.28%	-0.30%	€74,009,754	0.23	0.09%

Morningstar Rating Overall	N	Monthly Net flow	Sd Net Flow	Monthly Net Return	Mean Net Assets	Gov Risk	ROA
5	5,938	-1.04%	21.05%	-0.72%	€853,431,061	5.89	8.46%
4	15,403	-1.50%	20.36%	-0.76%	€577,938,239	6.35	7.78%
3	21,384	-1.65%	20.68%	-0.98%	€406,209,835	6.18	7.50%
2	11,127	-1.69%	21.18%	-0.94%	€328,870,282	6.3	6.57%
1	2,552	-3.21%	23.01%	-1.68%	€147,058,623	6.5	6.27%

Panel B. Variable Distribution

Variable	n	mean	Sd	min	q10	q25	median	q75	q90	max
Net Flow	107,073	-1.56%	20.61%	-4.46%	-1.66%	-0.74%	0.01%	0.67%	1.35%	3.96%
Net Return	107,073	-0.91%	19.83%	-12.8%	-1.59%	-0.72%	0.02%	0.67%	1.34%	9.49%
ROA	107,073	7.11%	35.02%	-2.88%	4.44%	5.82%	7.13%	8.38%	9.85%	16.48%
TNA (ln)	107,073	19.05	1.32	16.53	17.31	18.09	19.04	19.97	20.81	22.94
Allocation Equity %	107,073	96.63	15.82	12.14	92.18	95.73	97.96	99.29	99.88	214.76
k Management Fee	58,768	0.81%	0.4%	0%	0.15%	0.45%	1%	1.17%	1.17%	1.17%

5. METHODOLOGY

We base our analysis on a difference and difference methodologies to capture the effects of crisis periods on mutual fund flows with different sustainability scores. A difference in difference methodology seems to be the best option considering the sample is not random and we expect to make comparisons over time between two funds groups. For this study, we have chosen the ‘Above Average’ ESG mutual funds as the treatment group and ‘Average’ ESG mutual funds as the control group.

5.1 MODEL

5.1.1 Propensity score Matching

Propensity Score Matching (PSM) is essential to reduce selection bias and improving the validity of causal inferences ((Dehejia & Wahba, 2002), (Caliendo & Kopeinig, 2008), (Rosenbaum & Rubin, 1983)). In the context of this study, PSM allows for a more rigorous examination of the impact of Above Average ESG ratings on mutual fund flows and mitigates the self-selection bias that could arise from investors choosing Above Average ESG rating mutual funds based on unobservable factors. Therefore, any differences observed in mutual fund flows in the light of the crisis can be attributed to the treatment effect of Above Average ESG rated mutual funds. Additionally, PSM can add precision and increased internal validity to our results, as shown in studies, such as Abadie et al. (2017), that PSM improves precision and reduces bias in causal inference.

Table 2: Summary of balance for unmatched and matched data

Variable	All data before matching			Data after matching			P-value
	Means Treated	Means Control	StdMea n Diff	Means Treated	Means Control	StdMean Diff	
Age	14.53	14.68	-1.59%	14.60	14.48	1.38%	0.139
Rating Overall	3.23	3.14	9.04%	3.25	3.26	-0.74%	0.413
Net Return	-5.31%	-4.06%	-0.98%	-5.34%	-6.01%	0.52%	0.572
Alpha	-31.02	-30.77	-11.25%	-31.02	-31.06	1.86%	0.109
Log TNA	19.20	19.00	16.26%	19.22	19.26	-3.52%	1.49e-4***
ROA	7.39	7.03	15.88%	7.37	7.30	2.99%	1.11e-3***
Beta company	0.60	0.60	19.8%	0.60	0.60	-0.91%	0.359
Management fee	1.23	1.15	14.99%	1.22	1.24	1.58%	1.01e-3***
Weapons	0.29	0.26	2.20%	0.25	0.24	0.57%	0.484

Significance Levels:

*p<0.1; **p<0.05; ***p<0.01

In Table 2. We can see a summary of the effects of matching funds on the Mean Standard Deviation Difference (Std Mean Diff). This table shows us that Propensity Score Matching has reduced the differences in variables for the observations between the treatment and control groups. In the data after matching values in Std Mean Diff lower than 0.1 is generally considered good.

5.1.2 General model

$$Net_Flows_{it} = \beta_1 * Above_average_ESG_i * Post_t + \beta_2 * Post_t + \beta_3 * Above_average_ESG_i + c' * x_{i,t} + \gamma_i + \theta_t + \epsilon_{i,t}$$

Our depend variable is Net_Flows_{it} of fund i in day t , $Above_average_ESG_i$ is a dummy variable that indicates our treatment, $Post_t$ is a time dummy that is equal to 1 for the crisis period which goes from 24 February 2022 till July 2022 and 0 for the period before. With the intention to focus on the effects of the crises on fund flows and avoid any possible effects from funds' characteristics influencing inflows or outflows to funds, we have included several fund control variables, such as the log of total net assets, fund age; also following Ammann et al. (2018), we have also included a short-, medium- and long-term performance, all these controls are represented by $c' * x_{i,t}$. Additionally, we are controlling for individual and time-fixed effects, respectively, $\gamma_i + \theta_t$. This way, we account for induvial fund characteristics that are constant over time but may affect mutual fund flows, and at the same time, we capture unobserved time-fixed factors, such as macroeconomic conditions, and policy changes, so we focus on the sustainability rating and mutual fund flows.

5.1.3 Testing pre-trend assumptions

To assure the validity of the model, we have run three different types of tests to evaluate if the parallel trend assumption holds, which in this case means that the trend between Above Average ESG rating mutual funds and Average ESG rating mutual funds would have continued with their “normal” trend. We first tested the parallel trend assumption through a Waldtest, which evaluates the significance of the interaction’s terms. The result of the Waldtest can be seen below. When the Wald test is not significant, that means that the parallel assumption holds. Another method used in this study is to evaluate graphically, as seen in figure 4. The visual test consists of looking at the linear regression of the trends and finding the ones with parallel slopes. This is an intuitive way to analyze if the parallel trend assumption holds. Finally, we have also performed a T-test to prove the parallel trend assumption (

(Angrist & Pischke, 2009), (Bertrand, Duflo, & Mullainathan, 2004), (Imbens & Wooldridge, 2009)).

Russian -Ukrainian crisis – Waldtest to prove parallel trend assumption.

Model 1:

$$Net_Flows_{it} = \beta_1 * Post_t + \beta_2 * Above_average_ESG_i + c' * x_{i,t} + \gamma_i + \theta_t + \epsilon_{i,t}$$

Model 2:

$$Net_Flows_{it} = \beta_1 * Above_average_ESG_i * Post_t + \beta_2 * Above_average_ESG_i + c' * x_{i,t} + \gamma_i + \theta_t + \epsilon_{i,t}$$

	Res.Df	Df	F	Pr(>F)
1	47422			
2	47421	-1	0.4462	0.5042

The Waldtest checks to see if the Pr-value is smaller than 0.05, meaning it is significant. In our case, we can see that the test is not significant since the value is 0.5042. This means that the Waldtest fails to reject the null hypothesis, meaning the test recognizes that the trends in the models are the same. Therefore, the results from this Wald test for the Russian- Ukrainian datasets suggest that the parallel trend assumption holds.

Russian -Ukrainian crisis - Graphic testing parallel trend assumption.

Figure 3: Testing graphically the parallel trend assumption before PSM

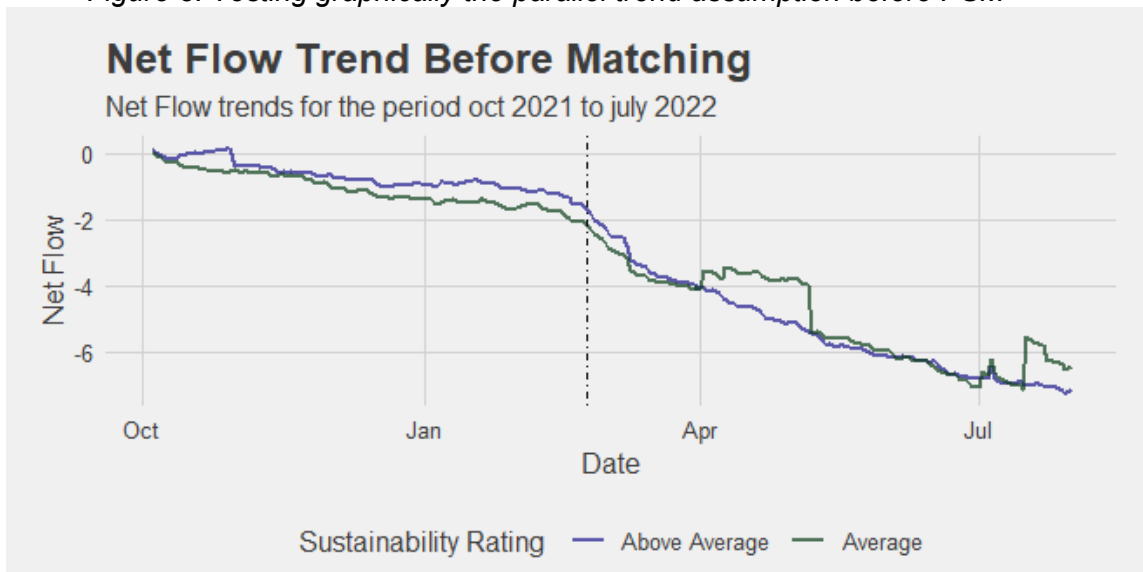


Figure 3: The Trend Analysis Shows the Net Flow trend of the categories Above Average and Average. Including a linear regression of the two data-series to showcase that the different ratings had similar trends in the period. The timeframe of the data spans 2021.10.01 to 2022.07.31.

We have made a pre-trend graph of Net flow for Above average categories and average to show that the pre-trend assumption holds visually.

Figure 4: Testing the parallel trend assumption after the PSM.

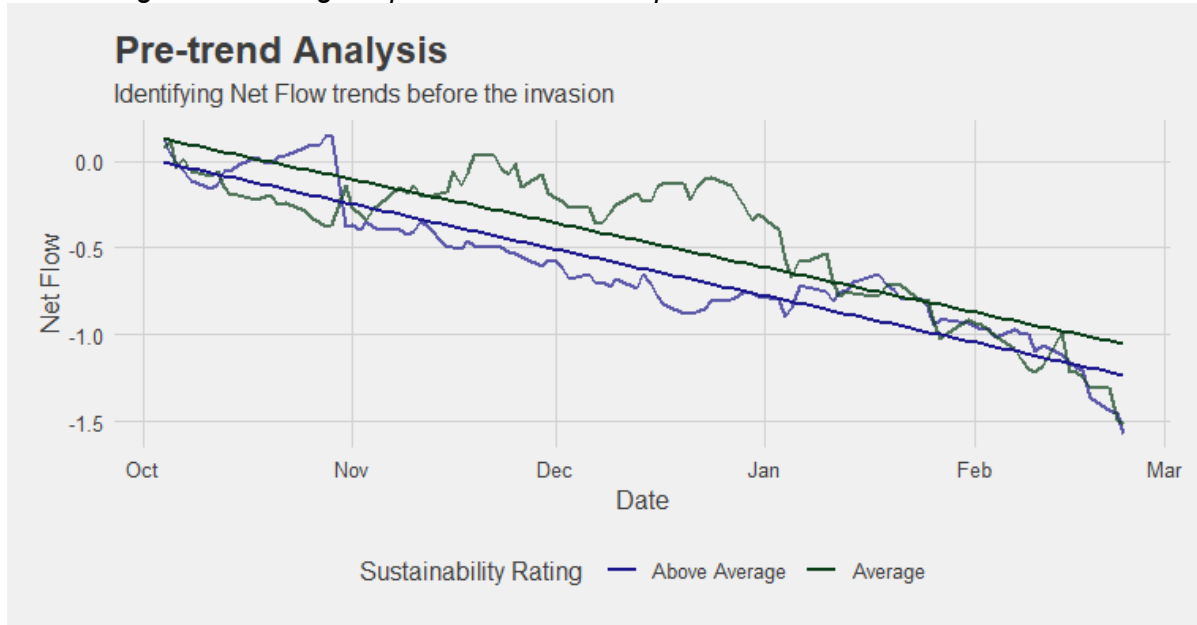


Figure 4: The Pre-Trend Analysis Shows the Net Flow trend of the categories Above Average and Average. Including a linear regression of the two data-series to showcase that the different ratings had similar trends in the period. The timeframe of the data spans between 2021.10.01 to 2022.02.23.

Figure 5: Fund flows after matching for the full duration oct 2021 to july 2022.

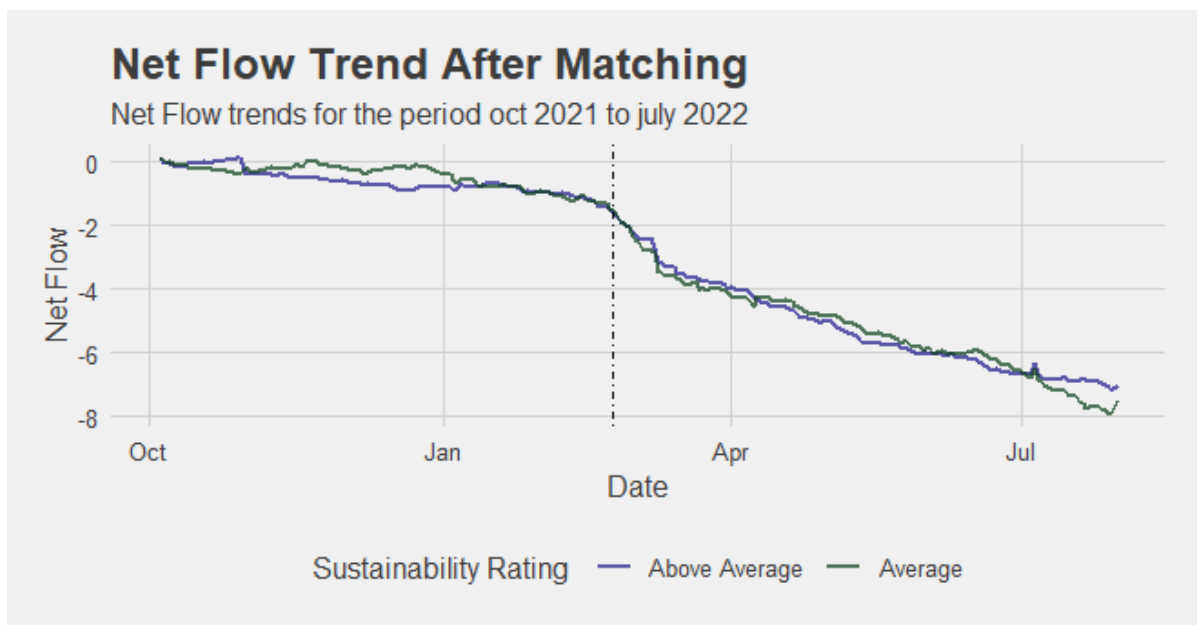


Figure 5: The Trend Analysis Shows the Net Flow trend of the categories Above Average and Average. Including a linear

regression of the two data-series to showcase that the different ratings had similar trends in the period. The timeframe of the data spans between 2021.10.01 to 2022.07.31.

Comparing Figures 3 and 4, we see that the trends become closer after processing the data with PSM. Visually showcasing the effects of the PSM process.

Finally, we also perform a T-test where we capture the p-value associated with the interaction term between dummy post (post-crisis period indicator) and treatment (sustainability rating group) which is approximately 0.077, the interpretation of this p-values is that considering it is greater than the conventional significance level of 0.05, we do not have strong evidence to reject the null hypothesis of no differential pre-treatment trends (parallel trends) between the treatment and control groups. Furthermore, based on this analysis, the results suggest that the parallel trend assumption holds in our study, implying that before the crisis period (represented by the time dummy Post), the treatment and control groups exhibited similar trends in mutual fund flows, as captured by the sustainability rating group.

6. RESULTS AND DISCUSSION FROM THE EMPIRICAL ANALYSIS

6.1 Results

In the results section, we will delve into the six separate regressions done for the thesis. Where we showcase the different results and their interpretation in the paper. And we are outlining the results from the difference-in-difference regressions based on PSM. The primary purpose of our study is to find if there is a significant difference between the two chosen sustainability ratings. Where we look for differences in fund characteristics such as weapons, Exclusion strategies, Governance scores, performance indicators, and Oil & Gas,

6.1.1 General Model

Table 3: General Model

	<i>Dependent variable:</i>				
	(1)	(2)	(3)	(4)	(5)
	Net Flow				
Above Average * Post	1.724	1.438	1.607	1.438	1.438
	t = 1.278	t = 0.999	t = 1.233	t = 0.999	t = 0.999
Above Average	-4.046***	-3.522**	-0.485	-3.522**	-3.522**
	t = -2.656	t = -2.398	t = -0.448	t = -2.398	t = -2.398
Post	-5.998***	-2.183*	-5.471***	-2.183*	-2.183*
	t = -6.583	t = -1.933	t = -6.061	t = -1.933	t = -1.933
Controls	No	Yes	Yes	Yes	Yes
Time-Fixed effects	No	No	Yes	No	Yes
Fund-Fixed effects	No	No	No	Yes	Yes
Observations	41,923	41,923	41,923	41,923	41,923

Note: Time-fixed effect is on daily observations.

Significance Levels:

*p<0.1; **p<0.05; ***p<0.01

Our analysis using the diff-in-diff regression model provides valuable insights into the relationship between the Russia-Ukraine war and mutual fund flows. We found that the interaction between the Above Average rating and the Post dummy has a positive coefficient.

This indicates that the crisis had a differential impact on the net flows of these funds compared to the control group. Therefore, Above Average ESG funds attracted more flows during the crisis than an average mutual fund group. This result supports our hypothesis and suggests that investors preferred sustainable investment options during high geopolitical tension.

The negative coefficient for the above average group suggests that overall funds with these ESG ratings experienced a decrease in net flows compared to the control group. These findings can be attributed to the market volatility and uncertainty associated with the Russia-Ukraine crisis. Investors might have opted for a more cautious approach, looking for investments that are perceived as resilient and focus more on financial performance rather than environmental and social considerations. This leads to investments in funds with lower ESG ratings, such as the Average rated funds.

The results shown in table 1 are related to sustainable investment market trends and recent studies on ESG considerations, as evidenced by the 2022 Sustainable report by the Morgan Stanley Institute for Sustainable Investment. The Morgan Stanley report points to a growing awareness and more extensive interest in environmental and social considerations during investment decision-making. Additionally, the study by Pastor & Vorsatz (2020) showcases the continued inflows into High ESG funds post-COVID-19 crisis, further supporting our hypothesis. Our study contributes to this body of literature by revealing a notable response in the mutual fund industry, with Above Average ESG funds receiving increased flows during the crisis period.

Our main model has been evaluated for heteroskedasticity and autocorrelation. On the former, we have performed a Breusch-Pagan test. The test considers a null hypothesis that there is homoskedasticity in the model in case the value is lower than a 5% threshold. In this case, it is considered statistically significant and rejects the null hypothesis. This implies there is heteroskedasticity in the model. In addition to the Breusch-Pagan test have also run a Durbin-Watson test to evaluate if there is autocorrelation. The Durbin-Watson test can check if the results are biased, and the bias affects the overall model. In this case, the null hypothesis is that the model has no autocorrelation.

data: diff_in_diff_original

BP = 418.8 df = 18 p-value < 2.2e-16

The results from the Breusch-Pagan test give us a p-value of 2.2e-16, showing that the model is affected by heteroskedasticity. We use a Robust Standard Error in our difference-in-difference model to adjust for heteroskedasticity.

data: diff_in_diff_original

DW = 1.9396 p-value = 1.447e-11

alternative hypothesis: true autocorrelation is greater than 0.

Our Durbin-Watson test gave us a value of 1.94. Since the result is below 2, the model has a slightly positive autocorrelation. The test value is within the accepted range of 2 ± 0.5 , which indicates that the regression residuals do not suffer from significant autocorrelation for the crisis.

6.1.2 Robustness check

To ensure the robustness of our general model, we employed categorical variables and a matched propensity score approach, followed by a difference-in-differences (diff-in-diff) regression analysis. In Table 4, we added performance measurements and their respective interactions to the general model.

Table 4: Effects of performance Covariates on treatment

	<i>Dependent variable:</i>				
	(1)	(2)	(3)	(4)	(5)
			Net Flow		
Post * ROA		0.216 t = 0.493			
Post * Net Return			-2.294*** t = -5.823		
Post * Rating Overall				-1.539* t = -1.930	
Above Average * Post	1.384 t = 0.975	1.405 t = 0.980	1.453 t = 1.017	1.482 t = 1.051	1.384 t = 0.975
Above Average	-3.511** t = -2.383	-3.536** t = -2.387	-3.507** t = -2.403	-3.387** t = -2.316	-3.511** t = -2.383
Post	-2.179** t = -2.089	-3.855 t = -1.076	-1.968* t = -1.884	2.891 t = 1.049	-2.179** t = -2.089
Observations	41,923	41,923	41,923	41,923	41,923

Note: The table includes controls in all five regressions. Controls include the covariates Age, Rating Overall, Net Return, Alpha, retail, TNA, ROA and Style Box. Effects used is "two-way" in all five regressions. "two-way" means that the regression uses both time- and fund-fixed effects. Time-fixed effect is on daily observations.

Significance Levels:

*p<0.1; **p<0.05; ***p<0.01

These results shed light on the dynamics between the crisis and mutual fund flows. We observed several significant interaction effects between the post-crisis period and performance measures.

The results suggest mutual funds with more substantial asset returns might have attracted more investor interest, as seen from the positive coefficient between the time dummy and Return on Assets (ROA). However, this is not statistically significant. We find that investors may look for more stable investment options rather than higher returns during times of crisis. The significant negative interaction effect between the post-crisis period and Net Return suggests that mutual funds with higher net returns experienced a decrease in net flows. The Morningstar rating overall is associated with long-term performance, where the results suggest mutual funds with higher overall ratings experienced a reduction in net flows during the crisis. We draw the same assumption as in the results from Net Return, where the negative interaction might indicate investors preferring to allocate funds to mutual funds with lower sustainability ratings, potentially driven by perceived risk aversion and a desire for more conservative investments during turbulent times.

The coefficients in the interactions between the Above Average group and the post-crisis period were not significant, which implies the Above Average group did not make any differences in net flows during the crisis period compared to the average group.

Overall, this robustness test, which adds to our general model some performance measurements, helps to understand the interplay between this measurement, sustainability rating, and mutual fund flows in the context of the Russia-Ukraine war.

6.1.3 Effects of Market risk

Table 5: Effects of Risk Covariates on treatment

	<i>Dependent variable:</i>				
	Net Flow				
	(1)	(2)	(3)	(4)	(5)
Above Average * Post * Profile Volatility	-0.103 t = -1.371	-0.101 t = -1.274	-0.047 t = -0.635	-0.101 t = -1.274	-0.101 t = -1.274
Above Average * Post * Risk Adj Ret	-0.055 t = -0.081	0.213 t = 0.289	0.076 t = 0.115	0.213 t = 0.289	0.213 t = 0.289
Above Average * Profile Volatility	0.126* t = 1.698	0.089 t = 1.170	0.031 t = 0.493	0.089 t = 1.170	0.089 t = 1.170
Above Average * Risk Adj Ret	0.122 t = 0.216	-0.084 t = -0.139	-0.138 t = -0.259	-0.084 t = -0.139	-0.084 t = -0.139

Post * Profile Volatility	0.103**	0.044	0.109**	0.044	0.044
	t = 2.547	t = 1.086	t = 2.438	t = 1.086	t = 1.086
Post * Risk Adj Ret	0.065	-0.025	-0.201	-0.025	-0.025
	t = 0.181	t = -0.070	t = -0.546	t = -0.070	t = -0.070
Post * Above Average	5.788**	4.563	2.832	4.563	4.563
	t = 2.107	t = 1.621	t = 1.067	t = 1.621	t = 1.621
Above Average	-10.287***	-7.764**	-0.748	-7.764**	-7.764**
	t = -3.076	t = -2.518	t = -0.335	t = -2.518	t = -2.518
Post	-9.887***	-2.378	-8.830***	-2.378	-2.378
	t = -4.490	t = -0.932	t = -4.227	t = -0.932	t = -0.932
Controls	No	Yes	Yes	Yes	Yes
Time-Fixed effects	No	No	Yes	No	Yes
Fund-Fixed effects	No	No	No	Yes	Yes
Observations	41,394	41,394	41,394	41,394	41,394

Note: Time-fixed effect is on daily observations.

Significance Levels: *p<0.1; **p<0.05; ***p<0.01

Table 5 provides insights into the relationship between risk, mutual fund flows, and the Russia-Ukraine war. The coefficient from the triple interaction between Above Average, Post, and Profile Volatility is negative, but is not significant. This interaction contradicts our hypothesis, which states that risk associated with Above Average ESG funds may have influenced investor behavior and led to increased flows. We can see that Above Average ESG funds experienced lower flows during the crisis period when volatility levels were high. The coefficients for the triple interaction with Risk-Adjusted Return suggest that investors may have been attracted to Above Average ESG funds that offered relatively better risk-adjusted performance during the crisis.

The double interactions using Post are statistically significant and allow us to understand the importance of considering risk factors and market conditions when examining the relationship between mutual fund flows and crisis events. Overall, the interaction effects indicate that the joint influence of Above Average rating, the post-crisis period, and risk variables had varying impacts on Net Flow and helped to comprehend its importance during crisis periods.

6.1.4 Effects of Defensive investments

Table 6: Effects of defensive Covariates on treatment

	Dependent variable:				
	Net Flow				
	(1)	(2)	(3)	(4)	(5)
Above Average * Post * Weapons	1.891*	2.471**	1.182	2.471**	2.471**

	t = 1.753	t = 2.313	t = 1.272	t = 2.313	t = 2.313
Above Average * Post * Oil&Gas	-0.400	0.023	-0.129	0.023	0.023
	t = -0.968	t = 0.054	t = -0.391	t = 0.054	t = 0.054
Post * Weapons	-1.883*	-2.393**	-1.485	-2.393**	-2.393**
	t = -1.805	t = -2.491	t = -1.527	t = -2.491	t = -2.491
Post * Oil&Gas	0.343	-0.232	0.080	-0.232	-0.232
	t = 0.828	t = -0.526	t = 0.237	t = -0.526	t = -0.526
Above Average * Weapons	-0.197	-0.760	0.387	-0.760	-0.760
	t = -0.222	t = -0.839	t = 0.375	t = -0.839	t = -0.839
Above Average * Oil&Gas	0.111	0.042	0.053	0.042	0.042
	t = 0.900	t = 0.368	t = 0.299	t = 0.368	t = 0.368
Above Average * Post	0.481	-0.532	0.349	-0.532	-0.532
	t = 0.283	t = -0.298	t = 0.217	t = -0.298	t = -0.298
Above Average	-3.835**	-2.838*	-0.754	-2.838*	-2.838*
	t = -2.515	t = -1.894	t = -0.600	t = -1.894	t = -1.894
Post	-4.733***	0.727	-3.720***	0.727	0.727
	t = -4.026	t = 0.468	t = -3.335	t = 0.468	t = 0.468
Controls	No	Yes	Yes	Yes	Yes
Time-Fixed effects	No	No	Yes	No	Yes
Fund-Fixed effects	No	No	No	Yes	Yes
Observations	46,159	46,159	46,159	46,159	46,159

Note: The data for this regression has been filtered to only include observations where the dummy retail is "Yes".
Time-fixed effect is on daily observations.

Significance Levels:

*p<0.1; **p<0.05; ***p<0.01

The results from table 6 provide insights into the investment decisions of retail investors and the impact that the Russia-Ukraine war has on sustainable mutual fund flows. The regression finds that there are mixed results from the triple interactions. The triple interaction with weapons has a positive and significant coefficient. In contrast, the coefficient estimates for the triple interaction with Oil & Gas are not significant. These results indicate that during this crisis, retail investors were more prone to invest in funds with an Above Average ESG rating while avoiding sectors associated with weapons. The investors did not show a clear preference for or against Oil & Gas investments based on sustainability considerations. This finding partially supports our hypothesis that investors demonstrate a bias towards sustainability objectives and seek alignment with their values during times of crisis.

Additionally, from the interaction between the time dummy and the two industries being analyzed, we have found similar results, meaning that "Post * Weapons" coefficients are statistically significant but negative; at the same time, the coefficient estimates from the interaction with "Post * Oil&Gas" are again not statistically significant. These results show a

decrease in fund flows towards mutual funds invested in the weapons industry during the crisis period aligning with the hypothesis that investors would prefer to avoid sectors associated with controversy and ethical concerns during a geopolitical conflict. Also, during the crisis, the perceived stability and potential value of investments in the Oil&Gas industry outweighed any ethical or sustainability considerations for retail investors.

Neither of the double interactions between the Above Average and the defensive industries is significant in any of the specifications. This indicates that sustainability rating alone does not significantly influence flows for funds invested in weapons or oil & gas.

6.1.5 Effects of Governance

Table 7: Effects of Governance Covariates on treatment

	<i>Dependent variable:</i>				
	Net Flow				
	(1)	(2)	(3)	(4)	(5)
Above Average * Post * Governance Score	-0.569*	-0.526	-0.370	-0.526	-0.526
	t = -1.792	t = -1.545	t = -1.312	t = -1.545	t = -1.545
Above Average * Governance Score	0.578	0.448	0.452*	0.448	0.448
	t = 1.429	t = 1.179	t = 1.842	t = 1.179	t = 1.179
Post * Governance Score	0.356**	0.177	0.352***	0.177	0.177
	t = 2.385	t = 1.106	t = 2.662	t = 1.106	t = 1.106
Above Average * Post	18.608*	17.131	12.978	17.131	17.131
	t = 1.831	t = 1.583	t = 1.451	t = 1.583	t = 1.583
Above Average	-22.820*	-18.043	-14.106*	-18.043	-18.043
	t = -1.666	t = -1.421	t = -1.807	t = -1.421	t = -1.421
Post	-16.084***	-6.562	-15.823***	-6.562	-6.562
	t = -3.135	t = -1.163	t = -3.545	t = -1.163	t = -1.163
Controls	No	Yes	Yes	Yes	Yes
Time-Fixed effects	No	No	Yes	No	Yes
Fund-Fixed effects	No	No	No	Yes	Yes
Observations	41,752	41,752	41,752	41,752	41,752

Note: Time-fixed effect is on daily observations.

Significance Levels:

*p<0.1; **p<0.05; ***p<0.01

Our results challenge the hypothesis that Governance is significant in driving mutual fund flows during a crisis. The finding indicates that investors may have emphasized governance practices during the crisis, although it did not significantly differentiate between Above Average and average ESG-rated funds. This can be observed from the coefficient estimates for the interaction term "Post * Governance Score" which was positively significant. This

indicates that the crisis period positively impacted fund flows based on governance scores, regardless of the treatment group.

It is worth noting that the coefficient estimates for the interaction term "Above Average * Post * Governance Score" were negative but not statistically significant, as well as the coefficient estimates for the interaction term "Above Average * Governance Score". These results suggest that investors did not clearly prefer mutual funds with Above Average governance scores during the crisis period but that other factors may have influenced investors' decisions during the crisis, and governance practices alone may not have been the primary driver of fund flows.

Our analysis did not support a significant relationship between governance and mutual fund flows. The results also indicated a mixed relationship between governance practices and investor behavior. Governance results suggest that investors may have considered Governance as one of several factors influencing their investment decisions.

6.1.6 Effects of Screening and Exclusion

Table 8: Effects of exclusion on treatment

	<i>Dependent variable:</i>				
	(1)	(2)	(3)	(4)	(5)
	Net Flow				
Above Average * Post * Exclusions	-1.238 t = -0.377	-2.581 t = -0.855	-1.114 t = -0.389	-2.581 t = -0.855	-2.581 t = -0.855
Above Average * Exclusions	0.920 t = 0.273	1.651 t = 0.474	-0.223 t = -0.118	1.651 t = 0.474	1.651 t = 0.474
Post * Exclusions	-1.207 t = -0.451	-0.133 t = -0.053	-0.786 t = -0.338	-0.133 t = -0.053	-0.133 t = -0.053
Above Average * Post	1.762 t = 0.606	2.709 t = 1.070	2.182 t = 0.889	2.709 t = 1.070	2.709 t = 1.070
Above Average	-4.786 t = -1.637	-4.942 t = -1.597	-0.217 t = -0.147	-4.942 t = -1.597	-4.942 t = -1.597
Post	-3.971 t = -1.584	-1.136 t = -0.469	-4.345** t = -2.037	-1.136 t = -0.469	-1.136 t = -0.469
Controls	No	Yes	Yes	Yes	Yes
Time-Fixed effects	No	No	Yes	No	Yes
Fund-Fixed effects	No	No	No	Yes	Yes
Observations	38,746	38,746	38,746	38,746	38,746

Note: Time-fixed effect is on daily observations.

Significance Levels:

*p<0.1; **p<0.05; ***p<0.01

We found that neither the triple interactions nor the double interactions between Exclusion are significant, indicating that the crisis did not significantly impact mutual fund flows based on negative screening strategies. Suggesting that investors did not clearly prefer mutual funds with negative screening criteria. Other factors, such as diversification and financial performance, may have influenced their investment decisions over strict ESG exclusion criteria during the crisis period. The results do not support a significant relationship between negative screening strategies and mutual fund flows during the crisis.

The different regressions showcase the complexity of investor behavior, which can be inferred by these varying results. Indicating that factors such as diversification and financial performance may take precedence during turbulent times. Suggesting a more balanced approach from investors, weighing various factors and not solely relying on negative screening strategies during the crises. Our study contributes to understanding investor behavior and screening strategies' role in shaping mutual fund flows during crisis situations.

6.2 Further Research

Further research could explore other factors that may influence investor behavior during crises and dig into additional variables and factors to provide a more comprehensive understanding of the dynamics between sustainability ratings and fund flows during crises periods, such market conditions, and investor sentiment.

Analyzing each possible driver of mutual fund flows, creating a more comprehensive analysis considering a broader range of governance practices, screening strategies, and crisis scenarios, would provide a deeper understanding of the relationship between Governance, mutual fund flows, and investor preferences during crisis periods.

The continued exploration of additional dimensions of sustainability, other crises, market shocks, and analyzing the long-term implications of sustainable investing in the face of global challenges can also be interesting topics for further research.

6.3 Limitations of our study

From our different views and perspectives, it is essential to understand that the thesis has been done in the particular context of the Russia-Ukraine war. The results may not be generalized

to other crises, with different aspects, factors, and geopolitical situations. We used the Morningstar Direct database; therefore, using different data sources and measurements could yield other results for each of the possible drivers of mutual fund flows in the context of the crisis. From an econometric point of view, the use of matched propensity score and difference-in-differences analysis implies no unobserved confounding variables, however, there could still be potential endogeneity or omitted variable biases that could influence the findings.

From the analysis of specific defensive industry variables, it can be considered for further investigation the inclusion of additional data sources or alternative industry classifications. Furthermore, this part of the study is focused on retail investors, which implies the results cannot be generalized to institutional investors or other market participants.

Finally, the study focused on a specific set of screening criteria, and the results may vary when considering different combinations of screening strategies. In the same way, the study focused on a specific set of governance criteria, and the results may differ with the inclusion of additional governance indicators.

7. CONCLUSION

The findings in our study show that the Russia-Ukraine war had a significant impact on mutual fund flows. The Above Average ESG mutual funds get more inflows during the crisis period than Average ESG funds. This confirms the importance that sustainable investments represent to investors. As SRI attracts more flows, asset managers and policymakers require more consideration, particularly in the context of crisis and geopolitical conflict.

Our study contributes to the current literature shedding light on the interactions and importance of multiple drivers of mutual funds. We have found several nuanced relationships among the different sustainable ratings, including our time dummy and the several drivers of mutual analyzed. We can emphasize the importance of considering risk factors in understanding investors' behavior during crises. In this sense, our findings from the weapons and Oil&Gas industries suggest that investors placed importance on sustainability objectives and sought alignment with their values through a preference for mutual funds with an Above Average ESG rating. Where investors mainly avoided the weapons industry.

Furthermore, from a screening selection method employed by sustainable mutual, our findings support the recognition of the growing importance of sustainable investing as a long-term investment approach that considers both financial performance and ESG considerations. Additionally, we find that the impact of Governance on fund flow is not significant. The findings suggest that there are multiple factors not covered in this thesis regarding investors' decision-making. On the complex relationship between governance practices, mutual fund flows, and investor behavior during a war, it is true that the results do not support a significant impact of Governance on fund flows. However, our findings highlight the importance of considering multiple factors in investment decision-making.

The study employs categorical variables, matched propensity scores, and difference-in-differences regression to mitigate potential biases and confounding factors. These methodological choices strengthen the robustness of the findings and enhance the validity of the conclusions drawn from the analysis.

Investment managers can benefit from the findings in this study by understanding the nuanced relationship between sustainability ratings, investor preferences, and mutual fund factors during geopolitical crises. Fund managers can leverage these findings to enhance their

offerings and attract capital from investors who value sustainability and social responsibility in their investment decisions. Policymakers can also benefit from our findings by recognizing the multifaceted nature of investor preferences during crises and designing strategies that align with investor demands and sustainability objectives.

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Appendix

Appendix 1: Definitions

Portfolio Sustainability Score Contribution % - Governance: The percent of the Portfolio Corporate Sustainability Score attributable to the Portfolio Governance Risk Score.

PAI Controversial Weapons % of Portfolio Involved: This represents the percentage of the fund's portfolio invested in companies involved in the manufacturing or sale of controversial weapons, such as cluster bombs, landmines, and nuclear weapons.

Equity Industry Oil & Gas Integrated % (Net): This represents the net percentage of the fund's portfolio invested in companies involved in the integrated oil and gas industry, which includes companies engaged in exploration, production, refining, and marketing of oil and gas products.

Employ Exclusions Overall: An indication whether the fund explicitly excludes certain sectors, companies, or practices. This indicator is marked if any exclusions are employed by the strategy, even if it is not a "Sustainable Investment". Morningstar identifies exclusions in 17 areas including: Abortion/Stem Cells, Adult Entertainment, Alcohol, Animal Testing, Controversial Weapons, Fur & Specialty Leather, Gambling, GMOs, Military Contracting, Nuclear, Palm Oil, Pesticides, Small Arms, Thermal Coal, Tobacco. "Other" indicates funds that use fewer common exclusions of controversial industries or regions not included in the previously listed areas.

Morningstar Risk-Adj Ret Overall: The Morningstar Risk-Adjusted Return (MRAR) is the guaranteed return that provides the same level of utility to the investor as the specific combination of returns exhibited by the fund. In other words, to risk adjust the returns of two funds means to equalize their risk levels through leverage or de-leverage before comparing them. The end result is an accurate representation of an investment's return that accounts for its level of risk. In a simplified manner, MRAR equals the investment's Morningstar Return minus its Morningstar Risk. Morningstar's level of risk is calculated differently than many other methods. The Overall Risk-Adj Return is a weighted average of the available three-, five-, and 10-year ratings.

Factor Profile Volatility: The volatility factor describes the maximum-observed spread in long-term returns, based on the trailing 12-month standard deviation of daily returns. A higher exposure to the volatility factor indicates larger variation in long-run outcomes.