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## Journal of International Money and Finance

journal homepage: [www.elsevier.com/locate/jimf](http://www.elsevier.com/locate/jimf)Media-based climate risks and international corporate bond market<sup>☆, ☆ ☆</sup>Ramzi Benkraiem<sup>a</sup>, Nebojsa Dimic<sup>b</sup>, Vanja Piljak<sup>b, \*</sup>, Laurens Swinkels<sup>c, d</sup>, Milos Vulcanovic<sup>e</sup><sup>a</sup> Audencia Business School, France<sup>b</sup> University of Vaasa, School of Accounting and Finance, Vaasa, Finland<sup>c</sup> Erasmus University, the Netherlands<sup>d</sup> Robeco Institutional Asset Management, the Netherlands<sup>e</sup> EDHEC Business School, France

## ARTICLE INFO

## JEL classification:

G10

G15

## Keywords:

Climate risk

Corporate bonds

Debt

Emerging markets

Physical risk

Transition risk

## ABSTRACT

We examine the impact of the media-based climate risks, grouped into physical and transition risk categories, on the international corporate bond market in the period from 2012 to 2022. We analyze the following aspects: (i) market development (developed versus emerging markets); (ii) credit quality (investment grade versus high yield bonds), (iii) industry (climate-sensitive versus non-sensitive industries), and (iv) maturity (short versus long term bonds). We find that transition risk is reflected in the global corporate bond market, but not in the emerging corporate bond market segment. Furthermore, transition risk has a material impact only on the investment grade bonds in the global corporate bond market. The industry analysis reveals that there are no consistent significant differences between climate-sensitive and climate-insensitive industries. Maturity analysis indicates that transition risk is reflected in global corporate bond market returns for both short and long terms, but this effect is less pronounced in emerging markets. Physical risk is not systematically reflected in international corporate bond returns. The subsample analysis shows higher importance of transition climate risk following the Paris Agreement in December 2015.

## 1. Introduction

Our study provides new evidence on the impact of the climate risks on the international corporate bond market. Motivation comes from the fact that climate change and climate risk are recognized as significant and complex challenges for economies, financial stability, and global financial markets (Dietz et al., 2016; Battiston et al., 2017; Giglio et al., 2021; Reinders et al., 2023). The global importance of climate change agenda has recently generated extensive literature on climate finance examining the effects of climate

\* This article is part of a special issue entitled: 'Reading Debt' published in Journal of International Money and Finance. \*\* The views expressed in this paper are not necessarily shared by Robeco. The financial assistance of the Foundation for the Advancement of Finnish Securities Markets towards this research is hereby acknowledged.

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<https://doi.org/10.1016/j.jimonfin.2024.103260>

Available online 24 December 2024

0261-5606/© 2024 The Author(s).

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risk on investments (Krueger et al., 2020; Agoraki et al., 2024), firm performance (Pankratz et al., 2023), capital structure (Ginglinger and Moreau (2023), equity markets (Bolton and Kacperczyk, 2021; Giese et al., 2021; Bolton and Kacperczyk, 2023; Faccini et al., 2023), real estate markets (Baldauf et al., 2020; Murfin and Spiegel, 2020; Giglio et al., 2021), CDS markets (Kölbel et al., 2024), municipal bond markets (Painter, 2020; Goldsmith-Pinkham et al., 2023), and corporate bond markets (Huynh and Xia, 2021; Duan et al., 2023; Boermans et al., 2024).<sup>1</sup> The literature also provides evidence of a higher importance of climate risks following the Paris Agreement in December 2015 (e.g. Bolton and Kacperczyk 2023; Bua et al., 2024). In particular, Bolton and Kacperczyk (2023) find significant and large premium in equity markets only after the Paris agreement, which is consistent with the perception that the Paris agreement represents shift in investors' awareness about the urgency of climate change.<sup>2</sup> Bua et al. (2024) observe the emergence of significant transition and physical risks premiums after Paris Agreement in European equity markets.

Our study builds upon this literature and examines relationship between media-based climate change risks and the international corporate bond markets in the contexts of market development (developed versus emerging markets), credit quality (investment grade versus high yield bonds), industry (climate-sensitive versus non-sensitive industries), and maturity (short versus long term bonds), while paying a special attention to the effects of the Paris Agreement.<sup>3</sup>

The sustainability movement driven by environmental concerns that started in developed markets several decades ago is now profoundly affecting emerging markets. However, emerging markets encounter considerable challenges, consistently trailing behind their developed market counterparts in all sustainability metrics (Tansan et al., 2023). This disparity, especially in environmental performance is anticipated, as firms in developed markets benefited from an early start, having implemented sustainability initiatives several decades ago in response to escalating demands from regulators, investors, and the broader society.<sup>4</sup> Conversely, emerging markets have predominantly prioritized economic growth over environmental sustainability, resulting in less advanced regulatory frameworks and limited governmental support for environmental initiatives. Simultaneously, it is important to recognize that bonds from emerging markets present compelling investment opportunities. Despite representing an attractive investment opportunity, emerging market bonds are associated with higher levels of risk, and they are usually labeled as "equity-like" assets (Panchenko and Wu, 2009; Piljak, 2013; Dimic et al., 2021). Considering this distinctive feature of emerging market bonds, analyzing the connection between emerging markets corporate bonds and climate change risks holds considerable significance for investment strategies. Bond investors generally demonstrate responsiveness to potential extreme climate risks, prompting potential adjustments in their portfolio strategies. As investor sentiment increases, their heightened awareness of extreme climate risks leads to an increased demand for higher yields as means to hedge against these risks (Ye et al., 2023).

The literature provides evidence that environmental performance and climate resilience could be also influenced by industry type. For instance, the petroleum and natural gas industry ranks low in environmental performance, whereas the computer software industry is among the top performers in this domain (Di Giuli and Kostovetsky, 2014). Furthermore, the effect of climate risks on financial markets might be different across different industries (Graff Zivin and Neidell, 2014; Faccini et al., 2023; Ye et al., 2023). Ye et al. (2023) use a sample of Chinese corporate bonds and find that extreme climate risks are positively associated with firms' offering yield spreads, with the effect more emphasized for companies in climate-sensitive industries. Hence, it is important to determine whether the effect of climate risks on corporate bond returns depends on the magnitude of the industry-sensitivity to climate change.

In addition to industry-based differences, the literature indicates that the effect of climate risks on bond markets might differ across different time horizons. In particular, Ye et al. (2023) find that extreme climate risks are positively associated with firms' offering yield spreads, with the effect being more pronounced for long-maturity corporate bonds. Bats et al. (2024) analyze euro area European corporate bond markets and find that for bonds with long maturities there is a significant pricing effect of physical risk.

Early studies on the effects of climate risks on financial markets use physical risk such as the sea-level rise (Allman 2022; Goldsmith-Pinkham et al., 2023) and carbon emission (Duan et al., 2023) to proxy for climate change risk. Given the multifaceted nature of climate risk, more recent studies make distinction between physical and transition risks and examine their effects separately.<sup>5</sup> For instance, Stroebel and Wurgler (2021) emphasize importance of distinguishing between physical and transition risks, as they have different relative importance in short and long run. In particular, the transition (regulatory) risk is the top climate risk for investors and businesses over the time horizon of the next five years, while physical risk will be the top risk over the next 30 years. Seltzer et al. (2022) focus on regulatory risks and examine its effects on corporate bond credit ratings and yield spreads.

The need to distinguish between physical and transition risks has led to developments of new measures of climate risk. One stream of the literature has focused on firm-level climate risk measures based on a textual analysis of earnings conference call transcripts

<sup>1</sup> For a comprehensive review of the literature on climate finance, see Giglio et al. (2021) and Hong et al. (2020), and for a broader discussion on the economic consequences of the climate change, see Barnett et al. (2019).

<sup>2</sup> Ginglinger and Moreau (2023) examine the effects of climate risk on capital structure and point out that the Paris Agreement represents historical breakthrough step regarding climate risk, given the level of the commitment of countries and financial institutions to the climate change agenda.

<sup>3</sup> A theoretical foundation of the relationship between climate-related risks and bond pricing is still open question as indicated by Agliardi and Agliardi (2021) who develop a structural model for defaultable bonds incorporating uncertainty about corporate earnings and uncertainty originating from climate-related risks. For further theoretical considerations about the cost of climate change and bond markets, see Bauer and Rudebusch (2023).

<sup>4</sup> During United Nations Framework Convention on Climate Change 2023 (COP27), developed-market governments recognized this imbalance by creating a "loss and damage fund" to help emerging market nations become more resilient in the face of climate change. For more information see: <https://www.un.org/en/climatechange/cop27>.

<sup>5</sup> Giglio et al. (2021) provide a comprehensive discussion of multifaceted nature of climate risk and its implications for asset pricing.

(Sautner et al., 2023; Li et al., 2024). Sautner et al. (2023) utilize machine learning method to measure firm's climate change exposures to physical and regulatory shocks related to climate change. Similarly, Li et al. (2024) use textual analysis to quantify the presence and materiality of firm's exposure to both physical and transition climate risks. The other stream of literature evolves around media-based climate risk measurement (Engle et al., 2020; Kapfhammer et al., 2020; Faccini et al., 2023; Ardia et al., 2023; Bessec and Fouquau, 2024; Liu and Lin, 2023; Bua et al., 2024).

Engle et al. (2020) made a pioneering contribution by proposing two monthly indices to measure climate change risk using news articles. The first index relates to attention about climate change news from the Wall Street Journal (WSJ) and employs a lexicon known as the Climate Change Vocabulary (CCV), which is derived from authoritative texts on climate change (Engle et al., 2020). The second index focuses on Hexagon sentiment-based measure to capture the negative attention to climate change in several newspapers. Faccini et al. (2023) utilize textual and narrative analysis of Reuters climate change news to develop risk factors associated with physical (natural disasters and global warming) and transition (international summits, and U.S. climate policy) risks. They find that only the U.S. climate policy factor is priced in US stocks, particularly after year 2012. Furthermore, Kapfhammer et al. (2020) employ country-specific climate change transition risk measures to show that commodity currencies undergo depreciation during periods of elevated climate change transition risk.

Ardia et al. (2023) introduce daily time series designed to capture media concerns regarding climate change. To measure climate change risks, Ardia et al. (2023) utilize a daily Media Climate Change Concerns Index (MCCC) based on climate change news from leading U.S. newspapers and newswires. In times of sudden surge in climate change concerns, the stock prices of green companies typically rise, while those of brown companies tend to decline with this effect being evident for both transition and physical climate change risks (Ardia et al., 2023). Bua et al. (2024) create two new daily indicators to measure physical and transition risks from 2005 to 2021, alongside two global climate risk vocabularies. Bessec and Fouquau (2024) develop several measures of attention, tonality and uncertainty about environmental news in major US newspapers. Liu and Lin (2023) construct climate change news index for Chinese market by using textual analysis of newspapers in China.

In our study, climate change risks are proxied by the Media Climate Change Concern (MCCC) Index developed by Ardia et al. (2023).<sup>6</sup> The MCCC Index is based on the news about climate change published by ten major highly circulated US newspapers and two major newswires, and further divided into four clusters capturing transition and physical risk themes. In particular, there are four clusters: (i) Business Impact; (ii) Environmental Impact; (iii) Societal Debate; and (iv) Research. The Business Impact and Societal Debate are proxies for the transition risks, Environmental Impact is proxy for physical risk, while Research cluster is formed by topics related to both transition and physical risks.

Our paper contributes to the growing strand of the literature which focuses on understanding the impact of climate risks on financial markets. First, we extend the literature on the corporate bond markets<sup>7</sup> by examining how media-based climate change risks affect international corporate bond markets. Previous literature on the effects of climate change on bond markets concentrates on US corporate bond market (Huynh and Xia, 2021; Allman, 2022; Duan et al., 2023) and US municipal bonds (Goldsmith-Pinkham et al., 2023; Painter, 2020) primarily focusing on physical climate risk. Duan et al. (2023) use carbon emissions data to proxy for climate risk, Allman (2022) uses sea-level rise, while Huynh and Xia (2021) examine transition risk by utilizing monthly climate change news index by Engle et al. (2020). We provide new insights into this stream of the literature by offering a comprehensive analysis of media-based physical and transition risks in several different contexts: (i) market development (developed and emerging corporate bond markets), (ii) credit quality (investment grade versus high yield bonds), (iii) industry (climate-sensitive versus non-sensitive industries), and (iv) maturity (short versus long term bonds). Our comprehensive evidence from emerging corporate bond markets represents a valuable addition to this stream of the literature that is almost solely focused on developed bond markets.

Second, we extend the studies examining industry, maturity and credit quality aspects of the climate change impact on corporate bond markets (Mastouri et al., 2022; Ye et al., 2023). Mastouri et al. (2022) focus on credit spreads and utilize corporate bond portfolios from developed markets including investment grade and high yield credit segments and different corporate sectors. They use greenhouse gas emission intensity and global temperature-rise scenario as proxies for the physical climate risk. Ye et al. (2023) examine the relationship between extreme climate risks (measured by extreme weather events) and offering yield spreads of Chinese corporate bonds and for the subsamples of climate-sensitive and climate-insensitive industries. Our paper differs from Mastouri et al. (2022) and Ye et al. (2023) by analyzing corporate bond returns in both developed and emerging markets with comprehensive analysis of credit quality, industry and maturity aspects, and by focusing on media-based climate change risks as proxies for physical and transition climate risks.

Third, we contribute to the strand of the climate finance literature that focuses on the effects of the Paris Agreement. The studies on equity markets document the emergence of significant transition and physical risks premiums after the Paris Agreement (Bolton and Kacperczyk 2023; Bua et al., 2024), indicating that the Paris Agreement represents a paradigm shift about the urgency of climate change. We complement this line of research by providing evidence from the global and emerging corporate bond markets.

The remainder of the paper is organized as follows. Section 2 describes our data and methodological framework. In Section 3, we discuss our empirical results. Finally, Section 4 concludes.

<sup>6</sup> The MCCC Index has been used by Pástor et al. (2022), Alekseev et al. (2022), Campos-Martins and Hendry (2021), among others.

<sup>7</sup> The literature on the factors influencing the corporate bond market returns is extensive. The most prominent studies include Fama and French (1993), Bao et al. (2011), Dick-Nielsen et al. (2012), Lin et al. (2018), Bekaert and De Santis (2021), Huang and Shi (2021), among others.

## 2. Data and methodology

### 2.1. Data on climate change

To proxy the climate change risks we utilize the Media Climate Change Concern (MCCC) Index developed by Ardia et al. (2023). The MCCC Index is based on the news about climate change published by ten major highly circulated US newspapers and two major newswires.<sup>8</sup> Ardia et al. (2023) retrieve climate change-related news articles and for these articles they create “concerns score” that is capturing the levels of negativity and risk discussed in each article. The article-level concern scores are aggregated across newspapers to form the MCCC Index, which is considered as proxy for changes in climate change concerns. Based on the machine-learning algorithm the news are organized into 30 topics which are further grouped into four clusters. Consequently, the MCCC Index is divided into four clusters capturing transition and physical risk themes. In particular, there are four clusters: (i) Business Impact, (ii) Environmental Impact, (iii) Societal Debate, and (iv) Research.<sup>9</sup> The Business Impact and Societal Debate are proxies for the transition risks, Environmental Impact is proxy for physical risk, while Research cluster is formed by topics related to both transition and physical risks.

The Business Impact cluster is built up from the following topics: climate summits, agreements/actions, climate legislation/regulations, legal actions, renewable energy, carbon reduction technologies, carbon credits market, carbon tax, government programs, corporations/investments, car industry, and airline industry. The Environmental Impact cluster consists of the following topics: extreme temperatures, food shortage/poverty, hurricanes/floods, glaciers/ice sheets, ecosystems, forests, water/drought, tourism, arctic wildlife, marine wildlife, and agriculture shifts. The Societal Debate consists of four topics: political campaign, social events, controversies, and cities. Finally, the Research cluster is built up from three topics: global warming, UN/IPCC reports, and scientific studies.

### 2.2. Data on corporate bond markets

The dataset includes a comprehensive universe of corporate bonds worldwide (including developed and emerging markets), represented by the suite of the J.P. Morgan corporate bond indices. The J.P. Morgan Global Corporate Index (GCI) suite of indices tracks corporate bonds across developed and emerging markets.<sup>10</sup> The J.P. Morgan Global Corporate Index (GCI) is a composite benchmark that integrates the Investment Grade and High Yield corporate debt markets, in both the developed and emerging markets. We use the GCI Aggregate Index that includes corporate debt denominated in USD. The GCI Aggregate Index is divided into the GCI Investment Grade and the GCI High Yield segments, and further divided into different maturity buckets. We use 1–3 years bucket to represent short term, 7–10 years bucket to represent medium term, and 20–30 years bucket to represent long term maturities.

We also use the GCI industry sub-indices derived by adopting a harmonized industry classification methodology. There are 14 different industries sub-indices: Automotive, Banks, Basic Industries, Cable/Media, Capital Goods, Consumer, Energy, Non-Bank Financials, Pharma/Healthcare, Real Estate, Technology, Telecom, Transportation, and Utilities. We divide industries into climate-sensitive and climate-insensitive by relying on the methodology applied by Morgan Stanley to identify industries that are most likely to be affected by shifting policies surrounding climate change.<sup>11</sup> In particular, climate-sensitive industries in our sample are: Automotive, Banks, Non-Banks Financials, Energy, Transportation, and Utilities.

<sup>8</sup> Ten newspapers are: New York Times, Washington Post, Los Angeles Times, Wall Street Journal, Houston Chronicle, Chicago Tribune, Arizona Republic, USA Today, New York Daily News, New York Post, while two newswires are Associated Press Newswires and Reuters News. For detailed description of the index methodology, please refer to Ardia et al. (2023). We acknowledge that since the MCCC Index is based on US media, it might not be completely representative of climate risks in emerging markets. However, we would like to point out that most of aforementioned newspapers provide also global climate news which are believed to have significant impact worldwide. In particular, news coverage has an international dimension related to climate summits, UN climate change conferences, climate agreements, global warming, natural catastrophes, UN reports, and scientific studies. For instance, the values of MCCC Index increase radically during the events of global importance such as the Paris Agreement, US President Donald Trump’s announcement of the US withdrawal from the Paris Agreement, the United Nations Climate Change Conference – COP26, and the United Nations Climate Change Conference COP 27. The timeline of all important global climate events reflected in the MCCC Index is available on <https://sentometrics-research.com/post/2024-climate-change/>.

<sup>9</sup> To provide further insights into how media attention to these clusters changes over time, Ardia et al. (2023) calculate a monthly time series of “article-equivalents” measuring the total of all article weights per topic. They document significant time variations in the coverage devoted to each cluster, whereas for instance Business Impact cluster is observed to have a larger number of article-equivalents during months when important conferences on climate change are held.

<sup>10</sup> The GCI Index includes instrument types: fixed rate, floating rate, step-up, PIK, toggle, amortizers, perpetuals, Sukuk, Tier 2, non-contingent convertible T1 capital, non-registered securities, and all subordinated financial bonds except AT1 or RT1. Only issues with a current face amount outstanding of US\$250 million or more are considered for inclusion.

<sup>11</sup> Morgan Stanley is using tools such as the Sustainability Accounting Standard Board’s materiality matrix and the PRI-backed Inevitable in identifying industries that are most likely to be affected by shifting policies surrounding climate change. They identify five industries that have higher sensitivity to climate change: Financial Services, Metals and Mining, Oil and Gas, Utilities, and Autos. The names of some industries in our sample slightly differ from the exact names in the industry classification of Morgan Stanley, but the essence of the covered industries is the same despite slightly different names. [https://www.morganstanley.com/im/publication/insights/articles/articles\\_fivesectorsthatcannotscapeclimatechange\\_us.pdf](https://www.morganstanley.com/im/publication/insights/articles/articles_fivesectorsthatcannotscapeclimatechange_us.pdf).

Emerging markets corporate bonds are represented by the Corporate Emerging Market Bond Index (CEMBI) Broad Diversified Index, which is a global, liquid corporate emerging markets benchmark that tracks USD denominated corporate bonds issued by emerging markets entities.<sup>12</sup> In a similar manner like for the GCI, we use the CEMBI Investment Grade and the CEMBI High Yield segments, further divided into maturity buckets representing short (1–3 years), medium (7–10 years), and long (10 + years) maturities. The CEMBI industry sub-indices represent the same 14 industries like for the GCI.

We use daily data on total return indices, meaning that they incorporate both bond price changes and coupon payments. The bond returns are calculated as the logarithmic first difference of the bond price indices.<sup>13</sup> The sample period spans from 31 December 2012 to 31 August 2022 and includes 2416 daily observations. The starting date of the sample period is determined by the date when JP Morgan launched the GCI Index, while the ending date of the sample is determined by the availability of climate change news data provided by Ardia et al. (2023).

Our empirical estimations include a set of the following control variables:

i) Term spread: We control for interest rate risk proxied with the term spread, computed as the difference between the long-term government bond return and the three-months Treasury bill return (see, e.g. [Huynh and Xia, 2021](#)).

ii) Default spread: The default spread is the difference between Moody's seasoned Baa corporate bond yield relative to the 10-year Treasury bond yield, capturing shifts in economic conditions that change the likelihood of default (see, e.g. [Bhanot, 2005](#); [Huynh and Xia, 2021](#)).

iii) Global liquidity conditions: Our proxy for the global liquidity conditions is the U.S. federal funds rate. Data are from the Federal Reserve System database. We use the daily data of the U.S. federal funds rate as an indicator of the tightening (loosening) of global liquidity conditions (see, e.g., [Schularick and Taylor, 2012](#); [Boubaker et al., 2019](#)).

iv) Global bond market volatility: The literature provides evidence that uncertainty of the global bond market, as measured by implied volatility, might influence bond markets returns ([Piljak, 2013](#)). As a proxy for the bond market volatility, we utilize the daily rate of change in the Merrill Lynch Option Volatility Estimate (MOVE) Index (see, e.g. [Zhou, 2014](#); [Dimic et al., 2016](#)). The MOVE index is calculated as the yield curve weighted index of the normalized implied volatility on 1-month Treasury options weighted on two-, five-, ten-, and thirty-year contracts.

v) Global bond market returns: Our benchmark for the global bond market is the J.P. Morgan Global Aggregate Bond Index (GABI), constructed by combining 5,500 instruments issued in more than 60 countries, denominated in over 25 currencies, collectively representing a total market value about USD 58 trillion (see, e.g., [Dimic et al., 2021](#)).

### 2.3. Descriptive statistics

[Table 1](#) displays descriptive statistics. Panel A shows basic statistics (mean, standard deviation, minimum and maximum values) for daily bond index returns for J.P. Morgan Global Corporate Index (GCI) on aggregate level, further divided into high yield and investment grade segments. Panel B presents daily returns for 14 industry components of the GCI, while Panel C reports daily returns across various maturities. Panel D displays the basic statistics for daily returns of J.P. Morgan CEMBI Broad Diversified Index, representing aggregate emerging corporate bond market, and further divided into high yield and investment grade segments. Panel E and F show daily returns for industry and maturity components of J.P. Morgan CEMBI Broad Diversified Index, respectively. Panel G shows summary statistics of media-based climate change risks developed by [Ardia et al. \(2022\)](#) and divided into four clusters: Business Impact, Environmental Impact, Societal Debate, and Research. Finally, Panel H displays descriptive statistics for control variables.

The statistics indicate that emerging corporate bond markets (CEMBI) have slightly higher average returns (when expressed annually it is 2.86 % per year) than the aggregate corporate bond market (GCI) consisting of developed and emerging markets together (when expressed annually it is 2.60 % per year). The returns slightly differ across industries, with the highest returns recorded for Non-bank Financial industry for GCI universe, and Cable/Media industry for emerging markets universe. The correlation matrix of the main variables included in the empirical analysis is provided in the [Table A1](#) in the Appendix. The GCI and CEMBI Index composition is displayed in [Tables A2 and A3](#) in the Appendix, respectively. The graphical representation of the time series of GCI and CEMBI bond indices is provided in the [Figs. A1 and A2](#) in the Appendix, while the time series of the MCCC Index and its four clusters are given in [Fig. A3](#) in the Appendix.

### 2.4. Methodology

Methodological framework is similar to [Baur and Smales \(2020\)](#). More specifically, we apply regression analysis with different specifications to investigate the impact of the climate change risks on the corporate bond returns, while paying attention to the aspects of market development, credit quality, climate-sensitive industries, and maturity. We run separate sets of regression specifications for two market segments: (1) the global corporate bond market, and (2) the emerging corporate bond market. For the global corporate bond market, we first run baseline regression for the aggregate market level (Eq. (1)), followed by the further segmentations by credit

<sup>12</sup> CEMBI Broad Diversified Index includes both fixed and floating rate securities along with capitalizing/amortizing bonds or loans (excludes convertibles, inflation-linked instruments, and defaulted bonds). Only issues with a current face amount outstanding of US\$300 million or more are considered for inclusion. The index includes a specific set of emerging markets countries in Asia ex-Japan/Australia/New Zealand, Eastern Europe, the Middle East, Africa and Latin America.

<sup>13</sup> This measurement has also been used by [Kim et al. \(2006\)](#), [Christiansen \(2007\)](#), [Piljak and Swinkels \(2017\)](#), [Dimic et al. \(2021\)](#).

**Table 1**

**Descriptive statistics.** This table reports descriptive statistics of our variables (mean, standard deviation, minimum, and maximum) for the sample period from December 31, 2012, to August 31, 2022 (total of 2416 daily observations). Panel A shows daily index returns for the global corporate bond market (including developed and emerging markets together) on the aggregate level (GCI Aggregate), tracking performance of USD-denominated corporate bonds, further divided into investment grade (GCI IG) and high yield (GCI HY) segments. Panel B contains daily index returns for GCI industry sub-indices. Panel C shows daily index returns for GCI IG and GCI HY further divided into different maturities (short: 1–3 years; medium: 7–10 years, and long: 20–30 years). Panel D contains daily index returns for the emerging corporate bond market on the aggregate level (CEMBI Aggregate), tracking performance of USD-denominated corporate bonds from emerging markets, further divided into investment grade (CEMBI IG) and high yield (CEMBI HY) segments. Panel E reports daily index returns for CEMBI industry sub-indices. Panel F shows daily index returns for CEMBI IG and CEMBI HY further divided into different maturities (short: 1–3 years; medium: 7–10 years, and long: 10+ years). Panel G displays climate change risks clusters by Ardia et al. (2023): Business Impact, Environmental Impact, Societal Debate, and Research. Panel H reports control variables: default spread, global liquidity conditions (US Federal Funds Rate), global bond market volatility (MOVE Index), term spread, and global bond market returns (GABI). All returns reported in Panels A, B, C, D, E, and F are calculated as the first logarithmic difference of the bond price indices.

	Mean	Std. dev.	Min	Max
<b>Panel A. Global corporate bond market</b>				
GCI Aggregate	0.00010	0.00248	-0.03436	0.01607
GCI IG	0.00009	0.00273	-0.03445	0.01516
GCI HY	0.00015	0.00295	-0.03403	0.02906
<b>Panel B. Global corporate bond market – Industries</b>				
GCI Automotive	0.00011	0.00183	-0.02554	0.01833
GCI Banks	0.00010	0.00182	-0.02579	0.01361
GCI Basic Industries	0.00011	0.00251	-0.03219	0.01835
GCI Cable/Media	0.00011	0.00307	-0.04195	0.03082
GCI Capital Goods	0.00011	0.00246	-0.03573	0.01779
GCI Consumer	0.00010	0.00273	-0.03745	0.01870
GCI Energy	0.00007	0.00350	-0.07113	0.02330
GCI Non-Bank Financials	0.00013	0.00239	-0.02955	0.01399
GCI Pharma/Healthcare	0.00010	0.00303	-0.03831	0.02016
GCI Real Estate	0.00005	0.00237	-0.02598	0.02168
GCI Technology	0.00010	0.00274	-0.03426	0.01876
GCI Transport	0.00012	0.00289	-0.03781	0.01568
GCI Telecom	0.00011	0.00319	-0.04313	0.02881
GCI Utilities	0.00010	0.00342	-0.03829	0.02140
<b>Panel C. Global corporate bond market – Maturities</b>				
GCI IG 1–3	0.00006	0.00065	-0.00945	0.00527
GCI IG 7–10	0.00009	0.00295	-0.03719	0.01370
GCI IG 20–30	0.00010	0.00598	-0.06862	0.03296
GCI HY 1–3	0.00012	0.00204	-0.02504	0.01982
GCI HY 7–10	0.00015	0.00360	-0.03795	0.03345
GCI HY 20–30	0.00030	0.00436	-0.05355	0.03517
<b>Panel D. Emerging corporate bond market</b>				
CEMBI Aggregate	0.00011	0.00194	-0.02941	0.01270
CEMBI IG	0.00009	0.00192	-0.02757	0.00874
CEMBI HY	0.00011	0.00276	-0.03968	0.02106
<b>Panel E. Emerging corporate bond market – Industries</b>				
CEMBI Automotive	0.00010	0.00169	-0.03051	0.01331
CEMBI Banks	0.00014	0.00143	-0.01832	0.00696
CEMBI Basic Industries	0.00010	0.00308	-0.04276	0.02033
CEMBI Cable/Media	0.00015	0.00349	-0.05666	0.04429
CEMBI Capital Goods	0.00013	0.00165	-0.02849	0.00943
CEMBI Consumer	0.00010	0.00242	-0.03274	0.01571
CEMBI Energy	0.00007	0.00366	-0.05589	0.02089
CEMBI Non-Bank Financials	0.00014	0.00156	-0.02260	0.00638
CEMBI Pharma/Healthcare	0.00008	0.00485	-0.06041	0.05677
CEMBI Real Estate	0.00007	0.00258	-0.02388	0.02533
CEMBI Technology	0.00011	0.00210	-0.02212	0.01101
CEMBI Telecom	0.00010	0.00231	-0.02863	0.01625
CEMBI Transportation	0.00012	0.00260	-0.04041	0.01058
CEMBI Utilities	0.00000	0.00284	-0.01752	0.01112
<b>Panel F. Emerging corporate bond market – Maturities</b>				
CEMBI IG 1–3	0.00005	0.00137	-0.03765	0.00504
CEMBI IG 7–10	0.00010	0.00242	-0.03462	0.01046
CEMBI IG 10+	0.00012	0.00352	-0.05548	0.02189
CEMBI HY 1–3	0.00011	0.00229	-0.03022	0.01274
CEMBI HY 7–10	0.00013	0.00354	-0.05375	0.02688
CEMBI HY 10+	0.00016	0.00245	-0.03118	0.01535
<b>Panel G. Climate change risk clusters</b>				
Cluster Business Impact	0.73250	0.41843	0	3.29872
Cluster Environmental Impact	0.69557	0.44799	0	3.08638

(continued on next page)

Table 1 (continued)

	Mean	Std. dev.	Min	Max
Cluster Societal Debate	0.78434	0.47913	0	3.39322
Cluster Research	0.58778	0.39883	0	4.25705
<b>Panel H. Control variables</b>				
Default Spread	2.39032	0.44323	1.56	4.31
Federal Fund Rate	0.69578	0.79829	0.04	2.45
MOVE	0.00014	0.01932	-0.13037	0.16204
Term Spread	1.40791	0.80069	-0.52	2.97
GABI	0.00000	0.00285	-0.02275	0.01532

Table 2

**Global corporate bond market.** This table reports the estimation results for global corporate bond market from Equations (1) and (1a). The Column (1) shows the results where the dependent variable is the daily return on GCI Aggregate, Column (2) reports the results for GCI IG, and Column (3) shows the results for GCI HY. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Aggregate	(2) GCI IG	(3) GCI HY
Cluster Business Impact	0.0003* (1.834)	0.0004* (1.749)	0.0002 (1.090)
Cluster Environmental Impact	0.0002 (0.995)	0.0002 (1.075)	0.0000 (0.165)
Cluster Societal Debate	-0.0004** (-2.006)	-0.0004* (-1.820)	-0.0003 (-1.636)
Cluster Research	-0.0003 (-1.424)	-0.0003 (-1.413)	-0.0002 (-0.666)
Default Spread	0.0002 (1.479)	0.0002 (1.542)	0.0001 (0.304)
Federal Funds Rate	-0.0001 (-0.643)	-0.0000 (-0.339)	-0.0002 (-1.609)
MOVE	-0.0292*** (-11.552)	-0.0256*** (-9.086)	-0.0464*** (-15.690)
Term Spread	-0.0003*** (-3.267)	-0.0003*** (-2.893)	-0.0003*** (-2.978)
N	2416	2416	2416
r2	0.062	0.041	0.097

quality (Eq. (1a)), industry (Eq. (1b)), and maturity (Eq. (1c)). Similarly, for the emerging corporate bond market, we run baseline regression for the aggregate market level (Eq. (2)), followed by the further segmentations by credit quality (Eq. (2a)), industry (Eq. (2b)), and maturity (Eq. (2c)).

The baseline regression specification for the aggregate corporate bond returns in global market is expressed as follows:

$$RET_{global,aggregate,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5 C_t + \varepsilon_t \quad (1)$$

where  $RET_{global,aggregate,t}$  denotes the daily log return of the corporate bond index for the global market on the aggregate level (GCI Aggregate). The key explanatory variables are four clusters of the Media Climate Change Concerns (MCCC) Index: Business Impact ( $BI$ ), Environmental Impact ( $EI$ ), Societal Debate ( $SD$ ), and Research ( $R$ ).  $C_t$  represents a set of control variables (term spread, default spread, global liquidity conditions, and global bond market volatility).

The credit quality-related analysis in global market is estimated by the following specification:

$$RET_{global,IG,HY,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5 C_t + \varepsilon_t \quad (1a)$$

where  $RET_{global,IG,t}$  denotes daily log return for investment grade (GCI IG) and  $RET_{global,HY,t}$  daily log return for high yield (GCI HY) categories, respectively.

The industry-related specification in global market is expressed as follows:

$$RET_{global,industry,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5 C_t + \varepsilon_t \quad (1b)$$

where  $RET_{global,industry,t}$  denotes the daily log returns of the 14 different industry-specific corporate bond indices.

The maturity-related analysis in global market is estimated by the following specification:

**Table 3**

**Global corporate bond market – Industry analysis.** This table reports the estimation results for global corporate bond market from Equation (1b) where the dependent variable is industry-specific daily return on GCI industry sub-indices. There are 14 different industry sub-indices represented in Columns (1–14). T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Automotive	(2) GCI Banks	(3) GCI Basic Industries	(4) GCI Cable/ Media	(5) GCI Capital Goods	(6) GCI Consumer	(7) GCI Energy
Cluster Business Impact	0.0002* (1.745)	0.0003* (1.863)	0.0003 (1.513)	0.0004* (1.920)	0.0003* (1.823)	0.0004* (1.769)	0.0003 (1.283)
Cluster Environmental Impact	0.0002 (1.144)	0.0001 (0.752)	0.0002 (1.051)	0.0002 (0.879)	0.0003 (1.390)	0.0002 (1.115)	0.0002 (0.943)
Cluster Societal Debate	-0.0003** (-2.165)	-0.0002* (-1.771)	-0.0005*** (-2.579)	-0.0004* (-1.810)	-0.0004** (-1.996)	-0.0004* (-1.787)	-0.0005** (-2.138)
Cluster Research	-0.0002 (-1.392)	-0.0002 (-1.181)	-0.0003 (-1.433)	-0.0004 (-1.562)	-0.0003 (-1.538)	-0.0004* (-1.648)	-0.0002 (-0.819)
Default Spread	0.0000 (0.123)	0.0002** (2.497)	0.0001 (0.888)	0.0003* (1.707)	0.0002 (1.196)	0.0002* (1.718)	-0.0002 (-0.859)
Federal Funds Rate	-0.0002** (-2.097)	0.0000 (0.079)	-0.0002* (-1.660)	0.0000 (0.007)	-0.0001 (-0.898)	-0.0001 (-0.588)	-0.0003** (-2.313)
MOVE	-0.0195*** (-10.367)	-0.0210*** (-11.242)	-0.0332*** (-13.060)	-0.0441*** (-14.257)	-0.0239*** (-9.385)	-0.0275*** (-9.778)	-0.0499*** (-14.092)
Term Spread	-0.0003*** (-3.944)	-0.0002*** (-2.717)	-0.0005*** (-4.696)	-0.0003** (-2.524)	-0.0003*** (-3.337)	-0.0003*** (-3.174)	-0.0005*** (-3.661)
N	2416	2416	2416	2416	2416	2416	2416
r2	0.052	0.059	0.080	0.085	0.045	0.048	0.082

	(8) GCI Non-Bank Financials	(9) GCI Pharma/ Healthcare	(10) GCI Real Estate	(11) GCI Technology	(12) GCI Transportation	(13) GCI Telecom	(14) GCI Utilities
Cluster Business Impact	0.0003* (1.713)	0.0004* (1.819)	0.0002 (1.176)	0.0004** (1.998)	0.0003 (1.294)	0.0005** (2.006)	0.0005* (1.898)
Cluster Environmental Impact	0.0002 (0.952)	0.0002 (0.796)	-0.0000 (-0.025)	0.0002 (1.075)	0.0003 (1.178)	0.0002 (0.702)	0.0003 (1.020)
Cluster Societal Debate	-0.0003** (-1.971)	-0.0004* (-1.650)	-0.0002 (-0.871)	-0.0003* (-1.662)	-0.0003 (-1.372)	-0.0005** (-2.014)	-0.0005** (-2.047)
Cluster Research	-0.0003 (-1.230)	-0.0004 (-1.513)	-0.0004* (-1.821)	-0.0004* (-1.697)	-0.0004 (-1.552)	-0.0003 (-0.979)	-0.0004 (-1.210)
Default Spread	0.0002 (1.264)	0.0003* (1.888)	0.0002* (1.925)	0.0004** (2.500)	0.0001 (0.537)	0.0003** (2.049)	0.0003 (1.350)
Federal Funds Rate	-0.0001 (-0.620)	-0.0000 (-0.237)	0.0001 (0.965)	0.0000 (0.174)	-0.0001 (-0.998)	-0.0000 (-0.017)	-0.0001 (-0.395)
MOVE	-0.0228*** (-9.249)	-0.0313*** (-10.024)	-0.0188*** (-7.654)	-0.0260*** (-9.212)	-0.0227*** (-7.577)	-0.0414*** (-12.791)	-0.0298*** (-8.415)
Term Spread	-0.0003*** (-3.125)	-0.0003*** (-2.849)	-0.0002* (-1.847)	-0.0003** (-2.446)	-0.0003*** (-2.913)	-0.0003*** (-2.840)	-0.0004*** (-2.754)
N	2416	2416	2416	2416	2416	2416	2416
r2	0.042	0.049	0.033	0.044	0.030	0.072	0.036

$$RET_{global,maturity,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5C_t + \varepsilon_t \tag{1c}$$

where  $RET_{global,maturity,t}$  denotes the daily log returns of the maturity-specific corporate bond indices.

The corresponding regression specifications for the emerging corporate bond market are given in Eq. (2) (aggregate level), Eq. (2a) (credit quality), Eq. (2b) (industry), and Eq. (2c) (maturity). The key explanatory and control variables are the same as in Equation (1).<sup>14</sup>

$$RET_{emerging,aggregate,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5C_t + \varepsilon_t \tag{2}$$

$$RET_{emerging,IG:HY,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5C_t + \varepsilon_t \tag{2a}$$

$$RET_{emerging,industry,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5C_t + \varepsilon_t \tag{2b}$$

$$RET_{emerging,maturity,t} = \beta_0 + \beta_1(BI_t) + \beta_2(EI_t) + \beta_3(SD_t) + \beta_4(R_t) + \beta_5C_t + \varepsilon_t \tag{2c}$$

<sup>14</sup> In the specification for emerging markets given in Equation (2), we use an additional control variable of global bond markets returns in order to control for the global bond market factor.

**Table 4**

**Global corporate bond market – Maturity analysis.** This table reports the estimation results for global corporate bond market from Equation (1c) where the dependent variable is maturity-specific daily return on GCI maturity buckets sub-indices. Columns (1–3) show the results for GCI IG in short, medium, and long term, respectively. Columns (4–6) report the results for GCI HY in short, medium, and long term, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI IG 1–3	(2) GCI IG 7–10	(3) GCI IG 20–30	(4) GCI HY 1–3	(5) GCI HY 7–10	(6) GCI HY 20–30
Cluster Business Impact	0.0001 (1.240)	0.0004* (1.850)	0.0008* (1.831)	0.0001 (0.731)	0.0004 (1.568)	0.0004 (1.281)
Cluster Environmental Impact	0.0000 (0.355)	0.0003 (1.385)	0.0005 (1.066)	–0.0000 (–0.287)	0.0001 (0.280)	–0.0001 (–0.197)
Cluster Societal Debate	–0.0001* (–1.807)	–0.0004** (–2.081)	–0.0007 (–1.555)	–0.0001 (–0.514)	–0.0005* (–1.909)	–0.0008** (–2.538)
Cluster Research	–0.0000 (–0.443)	–0.0004* (–1.707)	–0.0008 (–1.589)	–0.0002 (–1.398)	–0.0001 (–0.490)	0.0001 (0.257)
Default Spread	0.0001** (2.485)	0.0003* (1.695)	0.0003 (1.058)	0.0001 (1.223)	0.0002 (1.102)	0.0000 (0.042)
Federal Funds Rate	0.0000 (0.665)	–0.0000 (–0.275)	–0.0001 (–0.486)	–0.0000 (–0.131)	–0.0002 (–1.133)	–0.0004*** (–2.672)
MOVE	–0.0038*** (–5.671)	–0.0287*** (–9.442)	–0.0545*** (–8.815)	–0.0253*** (–12.096)	–0.0596*** (–16.600)	–0.0649*** (–14.786)
Term Spread	–0.0001*** (–3.140)	–0.0003*** (–3.011)	–0.0006** (–2.473)	–0.0001 (–1.644)	–0.0004*** (–2.882)	–0.0007*** (–4.183)
N	2416	2416	2416	2416	2416	2416
r2	0.026	0.046	0.037	0.062	0.108	0.091

**Table 5**

**Emerging corporate bond market.** This table reports the estimation results for emerging corporate bond market from Equations (2) and (2a), where the Column (1) shows the results where the dependent variable is the daily return on CEMBI Aggregate, Column (2) reports the results for CEMBI IG, and Column (3) shows the results for CEMBI HY. T-statistics are reported in parentheses \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI Aggregate	(2) CEMBI IG	(3) CEMBI HY
Cluster Business Impact	–0.0000 (–0.171)	0.0001 (0.524)	–0.0002 (–0.886)
Cluster Environmental Impact	–0.0000 (–0.328)	0.0001 (0.430)	–0.0001 (–0.608)
Cluster Societal Debate	–0.0000 (–0.310)	–0.0001 (–0.729)	0.0000 (0.110)
Cluster Research	–0.0001 (–0.412)	–0.0001 (–0.996)	–0.0000 (–0.075)
Default Spread	–0.0001 (–0.758)	0.0000 (0.102)	–0.0002 (–1.377)
Federal Funds Rate	–0.0001 (–1.004)	0.0000 (0.228)	–0.0002* (–1.700)
MOVE	–0.0189*** (–10.524)	–0.0137*** (–8.135)	–0.0298*** (–10.782)
Term Spread	–0.0002** (–2.442)	–0.0001* (–1.947)	–0.0002** (–2.326)
GABI	0.2974*** (24.377)	0.3552*** (30.922)	0.2304*** (12.245)
N	2416	2416	2416
r2	0.252	0.322	0.117

The estimation results are reported for different model specifications as follows.<sup>15</sup> Table 2 reports estimation results for global corporate bond market from Equations (1) and (1a) where the GCI Aggregate, GCI Investment Grade, and GCI High Yield are dependent variables, respectively. Table 3 shows the results for the specifications in Equation (1b) where the GCI Aggregate is divided into 14 industries. Table 4 is based on the specification in Equation (1c) and displays the results of the maturity aspect, where the GCI Investment Grade and GCI High Yield are further divided into three subindices representing short (1–3 years), medium (7–10 years)

<sup>15</sup> We are aware that there might be potential endogeneity issue between climate risk measures and bond market performance, as firms with strong environmental profiles may also be better at managing risks unrelated to climate change, independently influencing bond performance. Given the nature of our data as time-series of aggregate corporate bond indices containing bonds from different countries, it is not possible to know constitution of the index at the firm level. Consequently, we are unable to isolate firms with strong environmental profiles and determine their exact index weight.

**Table 6**

**Emerging corporate bond market – Industry analysis.** This table reports the estimation results for emerging corporate bond market from Equation (2b), where the dependent variable is industry-specific daily return on CEMBI industry sub-indices. There are 14 different industry sub-indices represented in Columns (1–14). CEMBI Utilities has shorter time of data availability (564 observations). \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI Automotive	(2) CEMBI Banks	(3) CEMBI Basic Industries	(4) CEMBI Cable/ Media	(5) CEMBI Capital Goods	(6) CEMBI Consumer	(7) CEMBI Energy
Cluster Business Impact	0.0001 (0.381)	-0.0001 (-0.461)	-0.0000 (-0.112)	0.0002 (0.866)	0.0000 (0.116)	-0.0000 (-0.220)	-0.0001 (-0.444)
Cluster Environmental Impact	0.0001 (0.998)	-0.0001 (-0.547)	0.0000 (0.204)	-0.0001 (-0.355)	-0.0001 (-0.886)	-0.0002 (-1.402)	0.0001 (0.516)
Cluster Societal Debate	-0.0003** (-2.562)	0.0001 (0.684)	-0.0002 (-0.706)	-0.0003 (-1.104)	-0.0002 (-1.542)	0.0000 (0.133)	0.0001 (0.413)
Cluster Research	0.0000 (0.325)	-0.0000 (-0.166)	-0.0002 (-0.808)	-0.0001 (-0.382)	0.0001 (0.918)	-0.0000 (-0.135)	-0.0003 (-1.152)
Default Spread	-0.0002* (-1.817)	-0.0000 (-0.304)	-0.0001 (-0.717)	0.0001 (0.451)	-0.0001 (-1.431)	-0.0000 (-0.104)	-0.0001 (-0.465)
Federal Funds Rate	-0.0001* (-1.669)	-0.0000 (-0.106)	-0.0002 (-1.447)	-0.0000 (-0.220)	-0.0001 (-1.245)	-0.0001 (-0.979)	-0.0001 (-0.476)
MOVE	0.0017 (1.047)	-0.0109*** (-7.925)	-0.0319*** (-10.522)	-0.0355*** (-10.768)	-0.0097*** (-6.363)	-0.0143*** (-6.174)	-0.0412*** (-11.667)
Term Spread	-0.0002*** (-3.288)	-0.0001 (-1.438)	-0.0003*** (-2.891)	-0.0002 (-1.498)	-0.0002*** (-2.628)	-0.0003*** (-2.862)	-0.0002 (-1.297)
GABI	0.2380*** (21.216)	0.1890*** (20.247)	0.3124*** (15.105)	0.4703*** (20.922)	0.2746*** (26.577)	0.3350*** (21.277)	0.4236*** (17.594)
N	2416	2416	2416	2416	2416	2416	2416
r2	0.168	0.183	0.145	0.211	0.257	0.190	0.178
	(8) CEMBI Non-Bank Financials	(9) CEMBI Pharma/ Healthcare	(10) CEMBI Real Estate	(11) CEMBI Technology	(12) CEMBI Telecom	(13) CEMBI Transportation	(14) CEMBI Utilities
Cluster Business Impact	0.0000 (0.248)	-0.0001 (-0.137)	-0.0000 (-0.060)	0.0001 (0.754)	-0.0001 (-0.624)	-0.0002 (-0.982)	0.0004 (0.910)
Cluster Environmental Impact	-0.0000 (-0.306)	-0.0001 (-0.167)	-0.0002 (-1.011)	-0.0002 (-1.251)	0.0000 (0.070)	-0.0002 (-0.943)	0.0004 (1.046)
Cluster Societal Debate	-0.0002** (-2.424)	-0.0002 (-0.441)	0.0002 (0.981)	-0.0001 (-0.448)	-0.0001 (-0.457)	-0.0001 (-0.414)	-0.0000 (-0.008)
Cluster Research	0.0001 (1.189)	-0.0000 (-0.076)	-0.0002 (-0.983)	0.0000 (0.012)	-0.0000 (-0.201)	0.0002 (1.136)	-0.0010** (-2.331)
Default Spread	-0.0001 (-1.450)	-0.0001 (-0.222)	0.0001 (0.832)	-0.0001 (-0.622)	-0.0001 (-1.131)	-0.0004*** (-3.325)	-0.0002 (-0.344)
Federal Funds Rate	-0.0000 (-0.580)	-0.0002 (-1.365)	0.0001 (0.814)	-0.0001 (-0.648)	-0.0002** (-2.088)	-0.0002* (-1.887)	-0.0006*** (-2.691)
MOVE	-0.0024* (-1.717)	-0.0412*** (-8.606)	-0.0088*** (-3.422)	-0.0076*** (-3.831)	-0.0211*** (-9.781)	-0.0126*** (-4.851)	-0.0043 (-0.788)
Term Spread	-0.0001* (-1.758)	-0.0003 (-1.400)	-0.0000 (-0.189)	-0.0002** (-2.028)	-0.0002*** (-2.906)	-0.0002** (-2.031)	-0.0011*** (-3.207)
GABI	0.2777*** (28.706)	0.5349*** (16.408)	0.2870*** (16.343)	0.3165*** (23.342)	0.3374*** (22.927)	0.2982*** (16.883)	0.1987*** (4.778)
N	2416	2416	2416	2416	2416	2416	564
r2	0.268	0.141	0.115	0.203	0.229	0.127	0.106

and long (20–30 years) maturity.

Table 5 reports the results for the emerging corporate bond markets segment from Equation (2) on the aggregate level (CEMBI Aggregate) and Equation (2a) showing investment grade (CEMBI Investment Grade) and high yield (CEMBI High Yield) categories. Table 6 shows the results from Equation (2b) for different industries of the emerging corporate bond markets. Finally, Table 7 displays the results on the maturity aspect presented in Equation (2c), where the CEMBI Investment Grade and CEMBI High Yield are further divided into three subindexes representing short (1–3 years), medium (7–10 years) and long (10 + years) maturity.

### 3. Empirical results

In this section, we report empirical results on the impact of climate change risks on international corporate bond markets. In order to facilitate the interpretation of results from the market development perspective, in the subsection 3.1 we present the results for the

Table 7

**Emerging corporate bond market – Maturity analysis.** This table reports the estimation results for emerging corporate bond market from Equation (2c), where the dependent variable is maturity-specific daily return on CEMBI maturity buckets sub-indices. Columns (1–3) show the results for CEMBI IG in short, medium, and long term, respectively. Columns (4–6) report the results for CEMBI HY in short, medium, and long term, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI IG 1–3	(2) CEMBI IG 7–10	(3) CEMBI IG 10+	(4) CEMBI HY 1–3	(5) CEMBI HY 7–10	(6) CEMBI HY 10+
Cluster Business Impact	−0.0001 (−0.709)	0.0002 (1.190)	0.0003 (1.367)	−0.0002 (−1.224)	−0.0001 (−0.559)	−0.0001 (−0.546)
Cluster Environmental Impact	0.0001 (0.988)	0.0001 (0.534)	−0.0000 (−0.113)	−0.0001 (−0.444)	−0.0002 (−0.745)	−0.0001 (−0.531)
Cluster Societal Debate	0.0001 (1.225)	−0.0002 (−1.259)	−0.0004* (−1.897)	0.0002 (1.147)	−0.0001 (−0.529)	−0.0002 (−0.950)
Cluster Research	−0.0003** (−2.157)	−0.0002 (−1.046)	−0.0000 (−0.168)	−0.0002 (−1.049)	0.0002 (0.663)	0.0001 (0.554)
Default Spread	0.0001* (1.697)	−0.0000 (−0.051)	−0.0002 (−1.389)	−0.0001 (−0.754)	−0.0001 (−0.836)	−0.0002 (−1.302)
Federal Funds Rate	0.0001** (1.999)	−0.0000 (−0.172)	−0.0001 (−0.935)	−0.0001 (−1.224)	−0.0002* (−1.716)	−0.0001 (−1.115)
MOVE	−0.0033** (−2.276)	−0.0165*** (−7.937)	−0.0319*** (−10.990)	−0.0180*** (−7.601)	−0.0416*** (−11.937)	−0.0266*** (−10.866)
Term Spread	0.0000 (0.352)	−0.0002** (−2.275)	−0.0003*** (−2.940)	−0.0002* (−1.756)	−0.0004*** (−2.774)	−0.0002** (−2.258)
GABI	0.0910*** (9.355)	0.4697*** (33.168)	0.7157*** (36.195)	0.1347*** (8.362)	0.3424*** (14.415)	0.2113*** (12.677)
N	2416	2416	2416	2416	2416	2416
r2	0.047	0.350	0.400	0.062	0.148	0.122

global corporate bond market (including both developed and emerging bond markets) and in the subsection 3.2 separately for emerging corporate bond market segment. Similarly, to provide further insights from the credit quality, industry, and maturity aspects, we further report the results for the investment grade and high yield categories, and across different industries and maturities (short, medium, and long). Section 3.3 presents the analysis of the effects of the Paris Agreement on the international corporate bond markets.

### 3.1. Global corporate bond market analysis

In Table 2 we report the impact of climate change risks on the global corporate bond market. The first column indicates the results on the aggregate index level (GCI Aggregate), while the second and third columns display the results for the investment grade (GCI IG) and high yield (GCI HY) categories, respectively. The results for the global market indicate that only transition risk (represented by Societal Debate and Business Impact clusters) shows statistically significant relationship, while physical risk is insignificant. In particular, the coefficient for the cluster Societal Debate is negative and statistically significant at 5 % level, indicating that increasing risks related to this cluster (composed of the following topics: political campaign, social events, controversies, and cities) have a negative effect on the corporate bond market returns. The Business Impact cluster shows positive coefficient with statistical significance at 10 % level, indicating that risks related to this cluster (including topics such as climate summits, agreements/actions, climate regulation, legal actions, and government programs, among others) have a positive effect on the corporate bond market returns. These estimates might reflect positive expectations for the future steaming from new regulations and international agreements that should support efforts to combat the climate change. Similar results in terms of statistical significance and the signs of coefficients are exhibited for the investment grade category of the global corporate bond market, while on contrary the high yield segment does not show statistical significance for any of four clusters of climate change risks (although the coefficient signs are the same). The estimates also indicate economic significance. For example, to understand the economic impact, the coefficient estimate of the Cluster Business Impact should be multiplied with the range of values that this explanatory variable can have. From Table 1, we see that this ranges between 0 and 3.30, with an average of 0.73 and standard deviation 0.42. If we use the common approximation for the interquartile range as 1.35 times the standard deviation, the economic effect ranges from 0.5 basis point per day to 3.9 basis points per day for the middle half of observations.

Physical risk, captured by Environmental Impact cluster (including topics such as extreme temperatures, hurricanes/floods, glaciers, water/draught, agriculture shifts, among others) is not systematically reflected in global corporate bond markets returns. The general finding of the importance of only transition risk (and not physical risk) is aligned with the literature on the impact of climate change on equity markets (Faccini et al. 2023).

#### 3.1.1. Industry analysis (climate-sensitive and non-sensitive industries)

Table 3 displays the analysis of the global corporate bond market divided further into 14 different industries. The aim of industry analysis is to reveal which industries are more affected by transition or physical risks and to identify whether climate-sensitive industries are more affected by the media-based climate change risks than climate-insensitive industries. Overall, the results across industries indicate the importance of transition risk relative to physical risk. The most prominent cluster is Societal Debate with a

significant impact in almost all industries, except for Real Estate and Transportation. The sign of the coefficient is negative and consistent across all industries, confirming the general finding of the negative effect of climate risks at the aggregate global corporate bond market level.

The other component of transition risk, represented by Business Impact cluster, shows significance in ten out of 14 industries. Two industries where Business Impact cluster is not relevant are the same as in the case of Societal Debate cluster (Real Estate and Transportation), while two other unaffected industries are Basic Industries and Energy. Overall, among six climate-sensitive industries, five of them show significance of at least one cluster of transition risk, where the only exception is Transportation.<sup>16</sup> Research cluster, which is related to both transition and physical risks, is significant only in 3 industries: Consumer, Real Estate, and Technology. Regarding the comparison between climate-sensitive (e.g. Automotive, Energy, Transportation, and Utilities) and climate-insensitive industries, the results show that they exhibit similar patterns in terms of the exposure of their bond returns to media-based climate change risks. This finding complements findings of Mastouri et al. (2022) who show that industries with higher climate-policy risk (utilities, energy, and materials) do not have significantly wider credit spreads than other industries with lower climate risk.

### 3.1.2. Maturity analysis

In Table 4 we display the results of the global corporate bond market divided further into segments based on the maturity aspect. Specifically, in the short term (maturities from 1-3 years) the only statistically significant cluster is Societal Debate (the coefficient is negative and significant on 10 % level) and only for the investment grade category. This result is in line with Stroebel and Wurgler (2021) who find that transition risk is the top climate risk in the short run (over the next five years). In the medium term (maturities from 7-10 years) the coefficient for Societal Debate is negative and statistically significant for both investment grade and high yield categories. In addition to Societal Impact, for the investment grade category there is also significance of Business Impact and Research clusters at 10 % level.

The results for the long term (maturities from 20-30 years) show again that only transition risk is relevant. In particular, Business Impact cluster exhibits a positive sign, and it is significant for the investment grade category, while for the high yield category the relevant cluster is Societal Debate (negative and significant at 5 % level). The insignificance of physical risk is in general in contrast to Bats et al. (2024) who analyze euro area European corporate bond markets and find that for bonds with long maturities there is a significant pricing effect of physical risk. However, Bats et al. (2024) argue that the pricing of climate risk premiums in Europe may differ from the rest of the world due to European Union's prominent role in climate regulations initiatives and their commitment to a net-zero emissions. Furthermore, they use different measure of physical risk news shocks based on Bua et al. (2024), and they focus on cross-sectional analysis of bonds only from the euro area. Our results might provide support for their argumentation that the pricing of climate risk premiums in Europe may differ from the rest of the world. Another potential explanation for the lack of physical climate risk impact in our sample might be that broad-based global bond market index could conflate positive and negative impacts of climate change on different geographic locations.

## 3.2. Emerging corporate bond market analysis

The previous section showed that only transition risk (and not physical risk) is reflected to the certain extent in the global corporate bond market. In this section, we focus further on the emerging corporate bond market and report the results in Table 5. In a similar fashion as in Table 2, the first column indicates the results on the aggregate index level (CEMBI Aggregate), while the second and third columns display the results for the investment grade (CEMBI IG) and high yield (CEMBI HY) categories, respectively.

The results across all specifications show that no cluster of climate change risks is statistically significant. This finding shows that climate change risks are not reflected in the corporate bond returns in emerging markets, indicating that emerging markets are still lagging behind developed markets in acknowledging importance of climate change agenda. This finding reflects the actions at COP27 where governments of developed markets created a "loss and damage fund" to support emerging market nations to become more resilient to challenges posed by climate change.<sup>17</sup>

### 3.2.1. Industry analysis (climate-sensitive and non-sensitive industries)

Table 6 displays the results for the emerging corporate bond market divided further into 14 different industries. The results reveal that in general, the industry returns of emerging corporate bond market are not affected by media-based climate risks, with the only exception of Automotive and Non-Bank Financial industries in the case of Societal Debate cluster (negative sign) and Utilities in the case of Research cluster (negative sign). This result is generally in contrast to Ye et al. (2023) who show that climate-sensitive industries exhibit more pronounced effect of extreme climate risk on firms' offering yield spread. Ye et al. (2023) use only Chinese corporate bonds and their results of significant difference between climate-sensitive and climate-insensitive industries might be driven

<sup>16</sup> The insignificant results for Transportation industry might seem somewhat counter-intuitive given that this industry is an important part of the green transition (<https://www.unepfi.org/wordpress/wp-content/uploads/2024/05/Climate-Risks-in-the-Transportation-Sector.pdf>). One potential explanation is that the composition of Transportation industry sub-index of the GCI might include larger weight of companies from emerging markets which are slower in implementing climate policies and generally trailing behind developed markets in the green transition. Consequently, the sub-index of Transportation does not show significant immediate reaction to media-based climate news.

<sup>17</sup> For more detailed discussion about the sustainability gap in emerging markets and its importance, see the World Economic Forum (<https://www.weforum.org/agenda/2023/03/how-to-fill-the-sustainability-gap-in-emerging-markets-and-why-it-matters/>).

**Table 8**

**Global corporate bond market (before and after the Paris Agreement).** This table reports the estimation results for global corporate bond market from Equations (1) and (1a) for two subsample periods: (i) before the Paris Agreement (31 December 2012 – 11 December 2015) and (ii) period after the Paris Agreement (12 December 2015 – 31 August 2022). The Columns (1–2) show the results where the dependent variable is the daily return on GCI Aggregate, Columns (3–4) report the results for GCI IG, and Columns (5–6) show the results for GCI HY. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Aggregate (Before Paris)	(2) GCI Aggregate (After Paris)	(3) GCI IG (Before Paris)	(4) GCI IG (After Paris)	(5) GCI HY (Before Paris)	(6) GCI HY (After Paris)
Cluster Business Impact	0.000 (0.074)	0.001** (2.234)	0.000 (0.329)	0.001** (2.059)	−0.000 (−1.119)	0.001* (1.751)
Cluster Environmental Impact	0.001** (2.071)	0.000 (0.757)	0.001** (1.966)	0.000 (0.873)	0.000 (0.720)	−0.000 (−0.031)
Cluster Societal Debate	0.000 (0.064)	−0.000* (−1.781)	0.000 (0.237)	−0.000* (−1.710)	−0.000 (−0.747)	−0.000 (−1.225)
Cluster Research	−0.000 (−1.645)	−0.000 (−1.489)	−0.001 (−1.531)	−0.000 (−1.509)	−0.000 (−0.703)	−0.000 (−0.680)
Default Spread	−0.001** (−2.092)	0.000 (1.305)	−0.001* (−1.753)	0.000 (1.181)	−0.001* (−1.795)	0.000 (1.044)
Federal Funds Rate	−0.010** (−2.328)	−0.000 (−0.939)	−0.011** (−2.146)	−0.000 (−0.775)	−0.005 (−1.082)	−0.000 (−1.221)
MOVE	−0.038*** (−10.534)	−0.027*** (−8.271)	−0.041*** (−9.239)	−0.021*** (−5.958)	−0.028*** (−7.068)	−0.053*** (−13.837)
Term Spread	−0.001*** (−3.262)	−0.001*** (−3.997)	−0.001*** (−2.987)	−0.001*** (−3.969)	−0.001 (−1.633)	−0.000** (−2.232)
N	738	1678	738	1678	738	1678
r2	0.149	0.057	0.119	0.039	0.085	0.109

by country-specific landscape and their focus on physical risk only.

Taken collectively, the insignificant results for emerging corporate bond market industries might indicate that emerging markets are lagging behind developed markets in the implementation of climate policies and the efforts for global decarbonization.<sup>18</sup>

### 3.2.2. Maturity analysis

Table 7 displays the results of the emerging corporate bond market divided further into segments based on the maturity aspect. In a similar manner to Table 4, we analyze short (1–3 years), medium (7–10 years) and long (10 + years) maturities.<sup>19</sup>

The results presented in Table 7 show that for investment grade category the only significant cluster in the short term is Research, with the negative coefficient significant at 5 % level, while Societal Debate is the only cluster relevant in the long term with the negative coefficient significant at 10 % level. However, for the high yield category, neither of clusters is statistically significant. Overall results for the emerging corporate bond markets indicate that the media-based climate risks are not reflected in this market segment at the aggregate level, with the only notable exceptions of Research cluster in short term and Societal Debate cluster in the long term in investment grade category.

### 3.3. The effects of the Paris Agreement

This section presents the results of the analysis in which we divide the full sample into two subsamples: (i) period before the Paris Agreement (31 December 2012 – 11 December 2015) and (ii) period after the Paris Agreement (12 December 2015 – 31 August 2022).<sup>20</sup>

Table 8 reports the results of the impact of climate risks on the global corporate bond market for two subsample periods (before and after the Paris Agreement). The reported results indicate that before the Paris Agreement the only statistically significant risk is physical risk (Environmental Impact cluster) shown in the aggregate market and investment grade segment. This result suggests that

<sup>18</sup> Further details on how emerging markets are lagging behind developed markets in the efforts for global decarbonisation, see <https://esgnews.com/fitch-warns-global-decarbonisation-efforts-lag-driven-by-emerging-markets/> and <https://www.climatepolicyinitiative.org/publication/accelerating-sustainable-finance-for-emerging-markets-and-developing-economies/>.

<sup>19</sup> The long maturity horizon definition differs slightly between the aggregate (GCI) and emerging (CEMBI) corporate bond market, where the long term for the GCI is represented with 20–30 years maturities, while for CEMBI it is represented with 10+ years maturities. In this respect, we follow maturity classification of the J.P. Morgan, as emerging markets bonds are usually not issued for a very long maturities as in the developed markets.

<sup>20</sup> We conducted the analysis with two subsamples for the same aspects as in the full sample analyses: (i) market development (developed versus emerging markets); (ii) credit quality (investment grade versus high yield bonds), (iii) industry (climate-sensitive versus non-sensitive industries), and (iv) maturity (short versus long term bonds). In order to save space, we report here only tables for the market development and credit quality aspects, while the results on industry and maturity aspects are available in the Appendix (Tables A4–A11). The industry analysis for two subsample periods is reported in Tables A4–A5 (global corporate bond market) and Tables A8–A9 (emerging corporate bond market). The maturity analysis for two subsample periods is reported in Tables A6–A7 (global corporate bond market) and Tables A10–A11 (emerging corporate bond market).

**Table 9**

**Emerging corporate bond market (before and after the Paris Agreement).** This table reports the estimation results for emerging corporate bond market from Equation (2) and (2a) for two subsample periods: (i) before the Paris Agreement (31 December 2012 – 11 December 2015) and (ii) period after the Paris Agreement (12 December 2015 – 31 August 2022). The Columns (1–2) show the results where the dependent variable is the daily return on CEMBI Aggregate, Columns (3–4) report the results for CEMBI IG, and Columns (5–6) show the results for CEMBI HY. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI Aggregate (Before Paris)	(2) CEMBI Aggregate (After Paris)	(3) CEMBI IG (Before Paris)	(4) CEMBI IG (After Paris)	(5) CEMBI HY (Before Paris)	(6) CEMBI HY (After Paris)
Cluster Business Impact	–0.000 (–1.160)	0.000 (0.161)	–0.000 (–0.338)	0.000 (1.082)	–0.001** (–2.246)	0.000 (0.205)
Cluster Environmental Impact	0.000 (0.354)	0.000 (0.124)	0.000 (0.478)	0.000 (1.136)	0.000 (0.189)	–0.000 (–0.314)
Cluster Societal Debate	0.000 (0.011)	–0.000 (–1.449)	–0.000 (–0.038)	–0.000 (–0.273)	0.000 (0.046)	0.000 (0.432)
Cluster Research	0.000 (0.471)	0.363*** (24.837)	0.000 (0.181)	–0.000** (–2.181)	0.000 (1.093)	–0.000 (–1.113)
Default Spread	–0.001*** (–2.789)	–0.000 (–0.293)	–0.001*** (–2.935)	0.000 (0.343)	–0.001** (–2.033)	–0.000 (–0.736)
Federal Funds Rate	0.001 (0.236)	–0.000 (–1.067)	0.001 (0.258)	–0.000 (–0.122)	0.002 (0.339)	–0.000 (–1.453)
MOVE	–0.024*** (–6.905)	–0.018*** (–8.838)	–0.023*** (–6.591)	–0.012*** (–6.122)	–0.034*** (–6.751)	–0.030*** (–9.189)
Term Spread	–0.000 (–0.905)	–0.000*** (–2.710)	–0.000 (–0.947)	–0.000*** (–3.259)	–0.000 (–0.539)	–0.000 (–1.637)
GABI	0.135*** (6.328)	0.363*** (24.837)	0.221*** (10.161)	0.406*** (30.503)	–0.019 (–0.622)	0.335*** (14.532)
N	738	1678	738	1678	738	1678
r2	0.148	0.321	0.214	0.396	0.077	0.169

investors focused extensively on physical climate risks such as extreme temperatures, hurricanes, floods, glacier melting, droughts, and shifts in agriculture. These climate-related issues affected returns in the global corporate bond markets in the period preceding the Paris Agreement. The general importance of physical climate-related risk is documented in the literature (Stroebel and Wurgler, 2021; Allman, 2022; Duan et al., 2023; Goldsmith-Pinkham et al., 2023). After the Paris Agreement the only significant risk is transition risk, shown in the aggregate market and both the investment and high yield segments. Our finding further suggests that in the post-Paris Agreement era, investors shift their attention more towards climate regulations and the transparency of climate-related policies. This shift is reflected in the Business Impact and Societal Debate clusters, which represent transition climate risk. Nasiritousi and Bäckstrand (2019) underscore the Paris Agreement's role in establishing transparent national climate plans and nationally determined contributions (NDCs) to combat climate change.

Table 9 displays the results of the impact of climate risks on the emerging corporate bond market for two subsample periods (before and after the Paris Agreement). The results demonstrate that physical risk is not significant in any period (neither before nor after the Paris agreement), while transition risk (reflected in Research cluster) has become significant in the aggregate market and investment grade market segment in the period after the Paris Agreement. These results indicate that during the post-Paris Agreement era, emerging markets are gradually beginning to exhibit similar patterns to developed markets with regard to the impact of climate risks on corporate bond markets.

Finally, we examine the impact of the Paris Agreement across various industries and maturities. The industry analysis for the global corporate bond market for two subsample periods (reported in Tables A2 and A3 in the Appendix) confirmed our previous finding of no consistent differences between climate-sensitive and climate-insensitive industries in terms of the exposure of their bond returns to media-based climate risks. However, it is worth noting that in the period before the Paris agreement several industries show significant coefficients for physical risk (cluster Environmental Impact), while in the period after the Paris Agreement significance is shifted towards transition risk. The corresponding industry analysis for the emerging corporate bond market (reported in Tables A6 and A7 in the Appendix) confirms the previously reported results that in general the industry returns of emerging corporate bond market are not significantly affected by media-based climate risks. The exceptions are Energy and Utilities sectors in post-Paris Agreement era, which supports perception that emerging markets have become gradually to follow the paths set by developed markets. Similar to the full sample analysis, the results show no consistent differences between climate-sensitive and climate-insensitive industries.

The maturity analysis for the global corporate bond market for two subsample periods (reported in Tables A4 and A5 in the Appendix) shows that physical risk exhibits importance for short, medium and long terms only for investment grade bonds during the period before the Paris Agreement, while in the post-Paris Agreement era the importance has shifted towards transition risk. The corresponding maturity analysis for the emerging corporate bond market (reported in Tables A8 and A9 in the Appendix) indicates that in the period after the Paris Agreement there is increasing importance of transition risk in the investment grade segment in all three maturity buckets.

Taken collectively, the results from subsample analysis support the evidence from the literature (Bolton and Kacperczyk 2023; Bua et al., 2024) that the Paris Agreement has been perceived as shifting moment for investors' attention towards urgency of climate

change. Furthermore, our findings on emerging corporate bond market provide further insights into importance of the Paris Agreement for increasing awareness of addressing climate change challenges.

### 3.4. Robustness

This section presents robustness checks. First, we conduct robustness check for maturity analysis for global and emerging corporate bond markets by examining additional maturity buckets of the GCI and CEMBI indices on the aggregate level, and further divided in the credit quality subgroups of IG and HY. In particular, for the global corporate bond market we examine maturity buckets of 3–5, 5–7, and 10–20 years, while for the emerging corporate bond market we examine maturity buckets of 3–5, and 5–7 years. The aim of this robustness check is to examine whether our results for short, medium, and long-term maturities stay unchanged if we use slightly different maturity buckets from those reported in [Tables 4 and 7](#). The results with these additional maturity buckets are very similar to those obtained by using 1–3, 7–10, and 20–30 years as proxies for short, medium, and long term. The results are reported in [Tables A12 and A13](#) in the Appendix.

Second, we perform robustness check by entering lagged values of independent variables into the regression analysis specifications. This robustness check should address concerns that media-based climate risks might affect daily bond returns with a lag (e.g. situations when the extent of a climate disaster only becomes fully known over several days or when the full extent of environmental legislation only becomes apparent gradually). In particular, we repeat our main regressions given in Equations (1) and (1a) (global corporate bond markets) and Equations (2) and (2a) (emerging corporate bond markets) by using the lag of 7 days for independent variables. The results are reported in [Tables A14 and A15](#) in the Appendix. The results for the global corporate bond market (aggregate level, as well as the investment grade and the high yield segments) confirm the main results that physical risk, captured by Environmental cluster, does not significantly affect bond returns. For the aggregate level and the investment grade segment, the only statistically significant cluster is Research. For the high yield segment, the results are the same as in the main analysis as this segment does not show statistical significance for any of four clusters of climate change risks. The results for the emerging corporate bond market show that Research cluster becomes significant for the aggregate level and the investment grade segment, while in the main analysis neither of climate change risk clusters was significant. The high yield segment exhibits the same results as in the main analysis, showing insignificance of all clusters. Overall, a slightly differing results regarding the significance of Research cluster might be explained by the possibility that news related to Research might affect daily bond returns with a delay of several days.

Third, we utilize the alternative methodological approach to test for the effects of the Paris Agreement. Similarly to [Ginglinger and Moreau \(2023\)](#), we perform a robustness check by first creating a dummy variable (*Post Paris*) that is equal to 0 for the period before the Paris Agreement and equal to 1 for the period after the Paris Agreement, and then interacting our climate risk clusters variables (Business Impact, Environmental Impact, Societal Debate, and Research) with the *Post Paris* dummy variable. In particular, we modify Equations (1) and (1a) (global corporate bond market) and Equations (2) and (2a) (emerging corporate bond market) by adding the interaction terms of each climate risk cluster variable with *Post Paris* dummy variable and run regressions for the aggregate level, the investment grade and the high yield segments. The results are reported in [Tables A16 and A17](#) (global corporate bond markets) and [Tables A18 and A19](#) (emerging corporate bond markets) in the Appendix. The results for global corporate bond market indicate that the climate risk effect on corporate bond returns (aggregate level and the investment grade segment) materializes after the Paris Agreement, as evident from significant interaction term with *Post Paris* dummy variable for all four clusters. The results for the high yield segment do not show any significance, which is aligned with our baseline results. The results for emerging corporate bond market confirm our finding that the Paris Agreement represented a shift towards the more significant impact of the climate risks on emerging corporate bond markets, especially investment grade segment. The results for the high yield segment did not exhibit any significance for either of four clusters.

## 4. Conclusions

This study examines the relationship between media-based climate risks and the international corporate bond markets in the contexts of market development (developed versus emerging markets), credit quality (investment grade versus high yield bonds), industry (climate-sensitive versus non-sensitive industries), and maturity (short versus long term bonds), with a special attention to the effects of the Paris Agreement. Specifically, we focus on four topic-based clusters of climate change risks (Business Impact, Environmental Impact, Societal Debate, and Research) grouped into physical and transition risk categories.

In summary, taken collectively our results indicate that transition risk, as measured by media-based climate risk, is reflected to some extent in the global corporate bond market (including developed and emerging markets together). However, given the insignificant results for emerging markets segment it might be concluded that significance of the results for the global corporate bond market is driven by developed markets segment. Furthermore, physical risk is not systematically reflected in corporate bond returns, regardless of whether market is developed or emerging. Industry-specific analysis reveals that there are no consistent significant differences between climate-sensitive and climate-insensitive industries in terms of the exposure of their bond returns to media-based climate risks. Finally, maturity-specific analysis indicates that transition risk is reflected in global corporate bond market returns for

both short and long terms, but however this effect is less pronounced in emerging markets. In particular, the effect in emerging markets is only observed for investment grade bonds, while in high yield category neither of climate change clusters is significant. The results from the subsample analysis (periods before and after the Paris Agreement), taken collectively, show that investors' attention shifted more towards transition risk in the post-Paris Agreement era, confirming common perception of the Paris Agreement as a turning point in increasing awareness of the need to address climate change challenges.

The overall results for emerging corporate bond market confirm that emerging markets in general are trailing behind their developed market counterparts in environmental sustainability and their efforts to address challenges posed by climate change. However, in the period after the Paris Agreement, there is evidence that emerging markets started gradually to follow the paths set by developed markets.

The study has important practical implications. Results of the paper provide insights for both investors looking to optimize returns and policymakers aiming to strengthen market resilience to climate risks. Investors targeting corporate bond markets should pay greater attention to transition climate risks when investing in developed markets, as these risks are more consistently priced into bond returns compared to physical climate risks. Emerging markets, by contrast, show limited reflection of media-based climate risks, suggesting potential mispricing or delayed reaction to climate risks. Furthermore, the heightened reflection of transition risks during the post-Paris Agreement era underscores the growing importance of international agreements and policy developments on climate-related investment decisions. Investors should closely monitor global policy shifts and assess their implications for bond markets.

The lack of consistency in pricing transition and physical climate risks across developed and emerging markets, across industries and across different time horizons, might be of interest of policymakers in designing regulations that should address challenges posed by the climate change. Furthermore, the results of this study might be of particular interest to policymakers in emerging markets as they need to accelerate their climate policy development in order to close the sustainability gap relative to developed markets. Policymakers in emerging economies should promote greater transparency and disclosure of climate risks. This could attract more international investors by reducing information asymmetry. The increased materiality of transition risks after the Paris Agreement shows that strong international agreements and policy commitments can influence market behaviour.

#### CRediT authorship contribution statement

**Ramzi Benkraiem:** Writing – review & editing, Writing – original draft, Visualization, Validation, Investigation, Conceptualization, Methodology. **Nebojsa Dimic:** Writing – original draft, Validation, Methodology, Investigation, Data curation. **Vanja Piljak:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Investigation, Formal analysis, Conceptualization, Validation. **Laurens Swinkels:** Writing – review & editing, Investigation, Data curation. **Milos Vulcanovic:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Software, Validation.

#### Declaration of competing interest

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

#### Appendix

**Table A1**

**Correlation.** This table reports the pairwise correlations of the main variables included in the analysis.<sup>a</sup>

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) GCI Aggregate	1.000										
(2) CEMBI Aggregate	0.683	1.000									
(3) Default Spread	0.035	0.016	1.000								
(4) Federal Funds Rate	0.028	0.032	-0.406	1.000							
(5) MOVE	-0.229	-0.246	-0.038	0.009	1.000						
(6) Term Spread	-0.068	-0.067	0.210	-0.712	-0.007	1.000					
(7) GABI	0.707	0.464	0.042	0.028	-0.135	-0.060	1.000				
(8) Business Impact	-0.000	-0.027	-0.205	0.105	0.025	-0.189	-0.022	1.000			
(9) Environmental Impact	0.006	-0.013	-0.274	0.163	-0.013	-0.288	-0.015	0.596	1.000		
(10) Societal Debate	-0.015	-0.021	-0.251	0.219	0.012	-0.344	-0.029	0.751	0.656	1.000	
(11) Research	-0.024	-0.034	-0.200	0.085	-0.002	-0.132	-0.034	0.653	0.751	0.650	1.000

<sup>a</sup>Due to space limitations we do not report here the correlations for the industry-specific and maturity-specific sub-indices.

**Table A2**

**Index composition of the Global Corporate Index (GCI).** This table reports the Global Corporate Index (GCI) composition by displaying index weights in percentages for each region in the time period from 2012 to 2022. Panel A shows the GCI Investment Grade (GCI IG), while Panel B shows GCI High Yield (GCI HY).

	Asia (weights)	Eastern Europe (weights)	Latin America (weights)	Middle East and Africa (weights)	North America (weights)	Western Europe (weights)
<b>Panel A. GCI IG</b>						
2012	7.26	1.50	4.02	1.52	70.09	15.60
2013	7.85	1.59	3.89	1.55	69.88	15.24
2014	8.67	1.24	3.70	1.66	70.00	14.73
2015	9.40	0.56	2.10	1.57	71.21	15.17
2016	9.41	0.38	1.98	1.67	70.94	15.62
2017	9.64	0.32	2.02	1.46	71.23	15.33
2018	10.13	0.39	1.79	1.36	70.25	16.08
2019	10.14	0.45	1.77	1.33	70.88	15.43
2020	9.79	0.47	1.72	1.49	72.45	14.07
2021	10.39	0.44	1.59	1.45	71.74	14.40
2022	10.17	0.01	1.51	1.50	72.36	14.45
<b>Panel B. GCI HY</b>						
2012	4.65	2.15	5.62	1.26	78.96	7.36
2013	5.63	2.40	6.10	1.67	75.81	8.39
2014	5.12	1.81	6.29	1.69	76.16	8.93
2015	4.90	1.97	9.68	1.56	72.41	9.49
2016	4.81	2.75	10.26	2.00	72.41	7.77
2017	6.62	3.27	10.08	2.24	70.99	6.80
2018	7.56	3.17	10.33	3.31	69.81	5.82
2019	9.99	3.28	10.03	3.17	67.77	5.76
2020	9.23	2.67	9.02	3.13	70.72	5.22
2021	7.45	2.50	8.73	3.56	72.84	4.93
2022	6.95	1.75	8.73	3.71	73.74	5.13

**Table A3**

**Index composition of the CEMBI Broad Diversified Index.** This table reports the CEMBI Broad Diversified Index composition by displaying index weights in percentages for each region in the time period from 2012 to 2022.

	Africa (weights)	Asia (weights)	Europe (weights)	Latin America (weights)	Middle East (weights)
2012	3.74	39.77	14.03	27.42	15.04
2013	4.48	38.93	13.86	27.12	15.62
2014	5.89	38.13	12.10	28.49	15.39
2015	4.92	39.92	12.48	27.68	15.00
2016	5.04	37.31	11.73	29.27	16.65
2017	6.62	35.82	11.51	30.10	15.93
2018	7.01	36.44	10.99	28.72	16.84
2019	6.69	37.05	11.05	27.75	17.46
2020	6.23	39.87	10.23	25.74	17.93
2021	7.18	40.76	9.85	24.29	17.93
2022	7.57	43.52	5.59	24.26	19.06

**Table A4**

**Global corporate bond market – Industry analysis (before the Paris Agreement).** This table reports the estimation results for global corporate bond market from Equation (1b) in the period before the Paris Agreement (31 December 2012 – 11 December 2015) where the dependent variable is industry-specific daily return on GCI industry sub-indices. There are 14 different industry sub-indices represented in Columns (1–14). T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Automotive	(2) GCI Banks	(3) GCI Basic Industries	(4) GCI Cable/ Media	(5) GCI Capital Goods	(6) GCI Consumer	(7) GCI Energy
Cluster Business Impact	0.000 (0.465)	0.000 (0.343)	−0.000 (−0.550)	0.000 (0.438)	0.000 (0.171)	−0.000 (−0.057)	−0.000 (−0.866)
Cluster Environmental Impact	0.000	0.000*	0.001*	0.001*	0.001**	0.001*	0.001**
Cluster Societal Debate	(1.318) −0.000 (−0.639)	(1.869) −0.000 (−0.313)	(1.864) −0.000 (−1.221)	(1.927) −0.000 (−0.183)	(2.147) −0.000 (−0.019)	(1.850) 0.000 (0.579)	(2.334) −0.000 (−0.255)
Cluster Research	−0.000 (−0.717) (−1.292)	−0.000 (−1.063) (−1.230)	−0.000 (−1.013) (−3.153)	−0.001** (−2.140) (−2.049)	−0.000* (−1.709) (−1.811)	−0.001* (−1.752) (−1.699)	−0.001 (−1.588) (−2.794)
Federal Funds Rate	−0.006** (−2.105)	−0.005* (−1.815)	−0.009** (−1.995)	−0.011** (−2.238)	−0.010** (−2.435)	−0.010** (−2.075)	−0.016*** (−3.004)
MOVE	−0.024*** (−10.348)	−0.026*** (−9.887)	−0.043*** (−10.494)	−0.045*** (−10.306)	−0.036*** (−9.927)	−0.040*** (−9.516)	−0.050*** (−11.214)
Term Spread	−0.001*** (−3.107)	−0.001*** (−2.655)	−0.001*** (−2.827)	−0.001*** (−2.726)	−0.001*** (−3.163)	−0.001*** (−3.108)	−0.001*** (−3.610)
N	738	738	738	738	738	738	738
r2	0.138 (8)	0.128 (9)	0.162 (10)	0.144 (11)	0.136 (12)	0.125 (13)	0.178 (14)
	GCI Non-Bank Financials	GCI Pharma/ Healthcare	GCI Real Estate	GCI Technology	GCI Transportation	GCI Telecom	GCI Utilities
Cluster Business Impact	0.000 (0.484)	0.000 (0.103)	0.000 (0.250)	0.000 (0.496)	0.000 (0.114)	0.000 (0.034)	0.000 (0.669)
Cluster Environmental Impact	0.000	0.001**	0.000	0.001**	0.001	0.001*	0.001*
Cluster Societal Debate	(1.591) −0.000 (−0.068)	(2.023) 0.000 (0.656)	(1.503) 0.000 (0.475)	(2.362) 0.000 (0.261)	(1.626) 0.000 (0.669)	(1.713) 0.000 (0.142)	(1.782) 0.000 (0.464)
Cluster Research	−0.000 (−1.170)	−0.001* (−1.852)	−0.000 (−1.242)	−0.001** (−2.131)	−0.001 (−1.570)	−0.001 (−1.438)	−0.001* (−1.690)
Default Spread	−0.001* (−1.889)	−0.001* (−1.678)	−0.000 (−1.449)	−0.000* (−1.720)	−0.001** (−2.083)	−0.001* (−1.955)	−0.001** (−2.256)
Federal Funds Rate	−0.009** (−1.966)	−0.010* (−1.894)	−0.009** (−2.302)	−0.008* (−1.939)	−0.011** (−1.972)	−0.011** (−2.205)	−0.014** (−2.102)
MOVE	−0.033*** (−8.486)	−0.042*** (−8.900)	−0.035*** (−10.397)	−0.036*** (−9.404)	−0.041*** (−8.590)	−0.046*** (−10.551)	−0.048*** (−8.523)
Term Spread	−0.001*** (−3.152)	−0.001*** (−2.836)	−0.001*** (−3.156)	−0.001*** (−2.870)	−0.001*** (−3.036)	−0.001*** (−2.984)	−0.002*** (−3.250)
N	738	738	738	738	738	738	738
r2	0.104	0.112	0.141	0.124	0.108	0.146	0.109

**Table A5**

**Global corporate bond market – Industry analysis (after the Paris Agreement).** This table reports the estimation results for global corporate bond market from Equation (1b) in the period after the Paris Agreement (12 December 2015 – 31 August 2022) where the dependent variable is industry-specific daily return on GCI industry sub-indices. There are 14 different industry sub-indices represented in Columns (1–14). T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Automotive	(2) GCI Banks	(3) GCI Basic Industries	(4) GCI Cable/ Media	(5) GCI Capital Goods	(6) GCI Consumer	(7) GCI Energy
Cluster Business Impact	0.000* (1.843)	0.000** (2.130)	0.001** (2.319)	0.001** (2.164)	0.001** (2.152)	0.001** (2.200)	0.001* (1.883)
Cluster Environmental Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cluster Societal Debate	(1.146) −0.000* (−1.724)	(0.575) −0.000 (−1.405)	(0.733) −0.000* (−1.841)	(0.611) −0.000 (−1.473)	(1.142) −0.000* (−1.726)	(0.954) −0.000* (−1.781)	(0.446) −0.001* (−1.876)
Cluster Research	−0.000* (−1.731)	−0.000 (−1.465)	−0.000* (−1.680)	−0.000 (−1.373)	−0.000 (−1.579)	−0.000* (−1.654)	−0.000 (−0.696)
Default Spread	−0.000	0.000*	0.000**	0.000*	0.000	0.000	0.000

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Table A5 (continued)

	(1) GCI Automotive	(2) GCI Banks	(3) GCI Basic Industries	(4) GCI Cable/ Media	(5) GCI Capital Goods	(6) GCI Consumer	(7) GCI Energy
Federal Funds Rate	(-0.553) -0.000**	(1.756) -0.000	(2.293) -0.000	(1.743) -0.000	(0.874) -0.000	(1.237) -0.000	(0.134) -0.000*
MOVE	(-2.530) -0.018***	(-0.490) -0.020***	(-1.269) -0.030***	(-0.248) -0.044***	(-1.315) -0.020***	(-1.001) -0.024***	(-1.834) -0.050***
Term Spread	(-7.450) -0.001***	(-8.234) -0.000***	(-9.555) -0.001***	(-11.176) -0.001***	(-6.254) -0.001***	(-6.724) -0.001***	(-10.873) -0.001***
N	(-4.932)	(-3.899)	(-3.868)	(-3.182)	(-4.364)	(-4.185)	(-2.809)
r2	1678	1678	1678	1678	1678	1678	1678
	0.050 (8)	0.058 (9)	0.073 (10)	0.084 (11)	0.042 (12)	0.046 (13)	0.073 (14)
	GCI Non-Bank Financials	GCI Pharma/ Healthcare	GCI Real Estate	GCI Technology	GCI Transportation	GCI Telecom	GCI Utilities
Cluster Business Impact	0.000* (1.935)	0.001** (2.218)	0.000 (1.450)	0.001** (2.216)	0.000 (1.629)	0.001** (2.389)	0.001** (2.078)
Cluster Environmental Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cluster Societal Debate	(0.919) -0.000*	(0.548) -0.000*	(0.076) -0.000	(0.774) -0.000	(1.113) -0.000	(0.538) -0.001*	(0.928) -0.001**
Cluster Research	(-1.710) -0.000	(-1.706) -0.000	(-0.723) -0.001**	(-1.501) -0.000	(-1.429) -0.000	(-1.814) -0.000	(-2.056) -0.000
Default Spread	(-1.493) 0.000	(-1.480) 0.000	(-2.207) 0.000	(-1.594) 0.000**	(-1.591) 0.000	(-1.050) 0.000*	(-1.217) 0.000
Federal Funds Rate	(0.711) -0.000	(1.366) -0.000	(0.831) 0.000	(1.968) -0.000	(0.279) -0.000	(1.927) -0.000	(1.095) -0.000
MOVE	(-1.134) -0.020***	(-0.691) -0.028***	(0.008) -0.014***	(-0.256) -0.023***	(-1.364) -0.017***	(-0.266) -0.040***	(-0.730) -0.024***
Term Spread	(-6.480) -0.001***	(-7.173) -0.001***	(-4.472) -0.001***	(-6.367) -0.001***	(-4.570) -0.001***	(-9.664) -0.001***	(-5.509) -0.001***
N	(-4.443)	(-3.906)	(-3.951)	(-3.402)	(-4.039)	(-3.356)	(-3.771)
r2	1678	1678	1678	1678	1678	1678	1678
	0.044	0.048	0.035	0.042	0.028	0.070	0.035

Table A6

**Global corporate bond market – Maturity analysis (before the Paris Agreement).** This table reports the estimation results for global corporate bond market from Equation (1c) in the period before the Paris Agreement (31 December 2012 – 11 December 2015) where the dependent variable is maturity-specific daily return on GCI maturity buckets sub-indices. Columns (1–3) show the results for GCI IG in short, medium, and long term, respectively. Columns (4–6) report the results for GCI HY in short, medium, and long term, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI IG 1–3	(2) GCI IG 7–10	(3) GCI IG 20–30	(4) GCI HY 1–3	(5) GCI HY 7–10	(6) GCI HY 20–30
Cluster Business Impact	-0.000 (-0.621)	0.000 (0.392)	0.000 (0.452)	-0.000 (-1.193)	-0.000 (-0.951)	0.000 (0.835)
Cluster Environmental Impact	0.000* (1.648)	0.001** (2.095)	0.001* (1.716)	0.000 (0.691)	0.000 (0.746)	0.001 (1.402)
Cluster Societal Debate	-0.000 (-0.313)	0.000 (0.115)	0.000 (0.444)	-0.000 (-1.117)	-0.000 (-0.232)	-0.001** (-2.288)
Cluster Research	0.000 (0.273)	-0.001 (-1.583)	-0.002* (-1.858)	0.000 (0.035)	-0.000 (-0.967)	-0.000 (-1.087)
Default Spread	-0.000 (-0.251)	-0.001* (-1.796)	-0.002* (-1.917)	-0.000 (-0.574)	-0.001 (-1.627)	-0.002*** (-4.786)
Federal Funds Rate	-0.002** (-2.430)	-0.014** (-2.348)	-0.020* (-1.660)	-0.002 (-0.678)	-0.008 (-1.374)	-0.011* (-1.846)
MOVE	-0.006*** (-7.462)	-0.052*** (-10.117)	-0.085*** (-7.965)	-0.016*** (-7.017)	-0.036*** (-7.022)	-0.032*** (-6.025)
Term Spread	-0.000*** (-2.915)	-0.001*** (-3.346)	-0.002** (-2.388)	-0.000 (-1.030)	-0.001* (-1.892)	-0.002*** (-3.757)
N	738	738	738	738	738	738
r2	0.086	0.139	0.093	0.076	0.080	0.105

**Table A7**

**Global corporate bond market – Maturity analysis (after the Paris Agreement).** This table reports the estimation results for global corporate bond market from Equation (1c) in the period after the Paris Agreement (12 December 2015 – 31 August 2022) where the dependent variable is maturity-specific daily return on GCI maturity buckets sub-indices. Columns (1–3) show the results for GCI IG in short, medium, and long term, respectively. Columns (4–6) report the results for GCI HY in short, medium, and long term, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI IG 1–3	(2) GCI IG 7–10	(3) GCI IG 20–30	(4) GCI HY 1–3	(5) GCI HY 7–10	(6) GCI HY 20–30
Cluster Business Impact	0.000* (1.736)	0.001** (2.195)	0.001** (2.102)	0.000 (1.270)	0.001** (2.256)	0.001 (1.394)
Cluster Environmental Impact	0.000 (0.277)	0.000 (1.185)	0.000 (0.862)	–0.000 (–0.419)	0.000 (0.115)	–0.000 (–0.376)
Cluster Societal Debate	–0.000 (–1.475)	–0.001* (–1.951)	–0.001 (–1.597)	–0.000 (–0.068)	–0.001* (–1.656)	–0.001 (–1.559)
Cluster Research	–0.000 (–1.144)	–0.001* (–1.845)	–0.001 (–1.416)	–0.000* (–1.680)	–0.000 (–0.445)	0.000 (0.204)
Default Spread	0.000 (1.461)	0.000 (1.339)	0.000 (1.048)	0.000 (1.272)	0.000 (1.592)	0.000 (1.524)
Federal Funds Rate	–0.000 (–0.125)	–0.000 (–0.721)	–0.000 (–0.765)	–0.000 (–0.123)	–0.000 (–0.908)	–0.000* (–1.759)
MOVE	–0.003*** (–3.621)	–0.021*** (–5.804)	–0.045*** (–5.979)	–0.028*** (–10.288)	–0.068*** (–14.832)	–0.076*** (–13.321)
Term Spread	–0.000*** (–4.171)	–0.001*** (–4.223)	–0.001*** (–3.394)	–0.000 (–1.404)	–0.001** (–2.549)	–0.001** (–2.559)
N	1678	1678	1678	1678	1678	1678
r2	0.030	0.042	0.035	0.066	0.126	0.106

**Table A8**

**Emerging corporate bond market – Industry analysis (before the Paris Agreement).** This table reports the estimation results for emerging corporate bond market from Equation (2b) in the period before the Paris Agreement (31 December 2012 – 11 December 2015), where the dependent variable is industry-specific daily return on CEMBI industry sub-indices. There are 13 different industry sub-indices represented in Columns (1–13). CEMBI Utilities has no observations before the Paris Agreement. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI Automotive	(2) CEMBI Banks	(3) CEMBI Basic Industries	(4) CEMBI Cable/ Media	(5) CEMBI Capital Goods	(6) CEMBI Consumer	(7) CEMBI Energy
Cluster Business Impact	0.000 (0.684)	–0.000 (–1.088)	–0.001* (–1.660)	–0.000 (–0.332)	–0.000 (–0.129)	–0.000 (–1.516)	–0.000 (–0.878)
Cluster Environmental Impact	–0.000 (–0.012)	0.000 (0.450)	0.000 (0.322)	–0.000 (–0.420)	0.000 (0.015)	0.000 (0.024)	0.000 (1.027)
Cluster Societal Debate	–0.000* (–1.911)	0.000 (0.531)	–0.000 (–0.171)	0.000 (0.159)	–0.000 (–1.442)	0.000 (0.865)	–0.000 (–0.297)
Cluster Research	0.000 (0.713)	0.000 (0.501)	0.000 (0.391)	–0.000 (–0.513)	0.000 (0.846)	–0.000 (–0.104)	0.000 (0.189)
Default Spread	–0.000 (–1.031)	–0.000** (–2.159)	–0.001*** (–2.815)	–0.001** (–2.547)	–0.001** (–2.292)	–0.001** (–2.290)	–0.001** (–2.110)
Federal Funds Rate	–0.009** (–2.352)	0.003 (0.777)	–0.000 (–0.062)	–0.007 (–1.231)	0.001 (0.193)	0.004 (1.005)	–0.004 (–0.589)
MOVE	–0.011*** (–3.208)	–0.017*** (–5.529)	–0.038*** (–7.175)	–0.029*** (–5.950)	–0.020*** (–6.225)	–0.018*** (–4.690)	–0.037*** (–6.551)
Term Spread	–0.001*** (–2.638)	–0.000 (–0.383)	–0.000 (–0.762)	–0.001** (–1.986)	–0.000 (–0.284)	–0.000 (–0.404)	–0.001 (–1.190)
GABI	0.084*** (4.021)	0.102*** (5.219)	0.161*** (4.848)	0.135*** (4.483)	0.119*** (5.995)	0.142*** (5.985)	0.104*** (2.920)
N	738	738	738	738	738	738	738
r2	0.064 (8)	0.101 (9)	0.136 (10)	0.107 (11)	0.130 (12)	0.104 (13)	0.092
Cluster Business Impact	–0.000 (–0.592)	–0.000 (–0.418)	–0.000 (–0.108)	0.000 (0.232)	–0.000* (–1.731)	–0.001* (–1.697)	

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Table A8 (continued)

	(1) CEMBI Automotive	(2) CEMBI Banks	(3) CEMBI Basic Industries	(4) CEMBI Cable/ Media	(5) CEMBI Capital Goods	(6) CEMBI Consumer	(7) CEMBI Energy
Cluster Environmental Impact	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	
	(-0.436)	(-1.138)	(-0.274)	(-0.344)	(0.583)	(-0.133)	
Cluster Societal Debate	-0.000	0.000	0.000	0.000	-0.000	0.000	
	(-1.483)	(0.061)	(0.659)	(1.117)	(-0.274)	(0.339)	
Cluster Research	0.000	0.000	-0.000	-0.000	0.000	0.001	
	(1.122)	(0.708)	(-0.259)	(-1.189)	(0.412)	(1.476)	
	(-2.548)	(-2.253)	(-0.988)	(-2.615)	(-3.154)	(-3.320)	
Federal Funds Rate	0.002	0.003	0.000	0.002	0.001	0.007	
	(0.660)	(0.459)	(0.020)	(0.477)	(0.210)	(1.051)	
MOVE	-0.006**	-0.016***	-0.020***	-0.000	-0.032***	-0.028***	
	(-2.019)	(-3.057)	(-4.221)	(-0.060)	(-7.796)	(-5.049)	
Term Spread	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	
	(-0.866)	(-1.143)	(-0.196)	(-1.109)	(-1.134)	(-0.732)	
GABI	0.096***	0.649***	0.165***	0.081***	0.135***	0.113***	
	(4.937)	(20.089)	(5.610)	(3.171)	(5.301)	(3.252)	
N	738	738	738	738	738	738	
r2	0.064	0.394	0.082	0.029	0.156	0.080	

Table A9

**Emerging corporate bond market – Industry analysis (after the Paris Agreement).** This table reports the estimation results for emerging corporate bond market from Equation (2b) in the period after the Paris Agreement (12 December 2015 – 31 August 2022) where the dependent variable is industry-specific daily return on CEMBI industry sub-indices. There are 14 different industry sub-indices represented in Columns (1–14). CEMBI Utilities has shorter time of data availability (564 observations) and there are no observations before the Paris Agreement. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI Automotive	(2) CEMBI Banks	(3) CEMBI Basic Industries	(4) CEMBI Cable/ Media	(5) CEMBI Capital Goods	(6) CEMBI Consumer	(7) CEMBI Energy
Cluster Business Impact	-0.000	0.000	0.000	0.000	0.000	0.000	-0.000
	(-0.076)	(0.432)	(0.909)	(1.078)	(0.301)	(0.538)	(-0.024)
Cluster Environmental Impact	0.000*	-0.000	0.000	0.000	-0.000	-0.000	0.000
	(1.806)	(-0.241)	(0.454)	(0.309)	(-0.300)	(-0.932)	(0.662)
Cluster Societal Debate	-0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000
	(-1.379)	(0.884)	(-0.354)	(-0.794)	(-0.383)	(0.142)	(0.961)
Cluster Research	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001*
	(-0.514)	(-1.327)	(-1.529)	(-0.632)	(-0.124)	(-0.682)	(-1.888)
Default Spread	-0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000
	(-1.338)	(-0.396)	(0.634)	(1.199)	(-0.892)	(-0.377)	(0.035)
Federal Funds Rate	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000
	(-1.607)	(-0.490)	(-1.049)	(0.214)	(-1.563)	(-1.306)	(-0.290)
MOVE	0.005***	-0.009***	-0.031***	-0.040***	-0.007***	-0.014***	-0.044***
	(2.686)	(-6.390)	(-8.366)	(-9.717)	(-4.274)	(-5.089)	(-10.343)
Term Spread	-0.000***	-0.000***	-0.000**	-0.000	-0.000***	-0.000***	-0.000
	(-2.771)	(-2.733)	(-2.076)	(-0.683)	(-3.214)	(-3.388)	(-0.867)
GABI	0.299***	0.223***	0.372***	0.615***	0.336***	0.414***	0.560***
	(22.916)	(21.507)	(14.364)	(21.353)	(28.605)	(20.832)	(18.410)
N	1678	1678	1678	1678	1678	1678	1678
r2	0.251	0.257	0.165	0.272	0.355	0.241	0.233
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Cluster Business Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.658)	(0.097)	(0.079)	(0.709)	(0.387)	(0.070)	(0.911)
Cluster Environmental Impact	0.000	0.000	-0.000	-0.000	0.000	-0.000	0.000
	(0.751)	(0.127)	(-0.442)	(-0.499)	(0.459)	(-0.371)	(1.046)

(continued on next page)

Table A9 (continued)

	(1) CEMBI Automotive	(2) CEMBI Banks	(3) CEMBI Basic Industries	(4) CEMBI Cable/ Media	(5) CEMBI Capital Goods	(6) CEMBI Consumer	(7) CEMBI Energy
Cluster Societal Debate	-0.000 (-1.341)	-0.000 (-0.422)	0.000 (1.090)	-0.000 (-0.737)	0.000 (0.156)	-0.000 (-0.397)	-0.000 (-0.009)
Cluster Research	0.000 (0.060)	-0.000 (-0.333)	-0.000 (-1.490)	0.000 (0.212)	-0.000 (-1.110)	-0.000 (-0.186)	-0.001** (-2.332)
Default Spread	-0.000 (-1.324)	0.000 (0.223)	0.000 (0.179)	-0.000 (-0.696)	-0.000 (-0.218)	-0.000*** (-2.741)	-0.000 (-0.345)
Federal Funds Rate	-0.000 (-0.683)	-0.000 (-0.939)	0.000 (0.117)	-0.000 (-0.599)	-0.000* (-1.905)	-0.000* (-1.800)	-0.001*** (-2.692)
MOVE	-0.002 (-1.463)	-0.049*** (-7.748)	-0.006** (-1.968)	-0.011*** (-5.260)	-0.019*** (-7.497)	-0.009*** (-3.000)	-0.004 (-0.789)
Term Spread	-0.000** (-2.476)	-0.000 (-0.879)	-0.000** (-2.004)	-0.000** (-2.036)	-0.000*** (-2.795)	-0.000** (-2.069)	-0.001*** (-3.208)
GABI	0.354*** (33.608)	0.493*** (11.034)	0.332*** (15.265)	0.420*** (27.317)	0.418*** (23.676)	0.370*** (18.345)	0.199*** (4.779)
N	1678	1678	1678	1678	1678	1678	564
r2	0.419	0.112	0.141	0.336	0.295	0.184	0.106

Table A10

**Emerging corporate bond market – Maturity analysis (before the Paris Agreement).** This table reports the estimation results for emerging corporate bond market from Equation (2c) in the period before the Paris Agreement (31 December 2012 – 11 December 2015), where the dependent variable is maturity-specific daily return on CEMBI maturity buckets sub-indices. Columns (1–3) show the results for CEMBI IG in short, medium, and long term, respectively. Columns (4–6) report the results for CEMBI HY in short, medium, and long term, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI IG 1–3	(2) CEMBI IG 7–10	(3) CEMBI IG 10+	(4) CEMBI HY 1–3	(5) CEMBI HY 7–10	(6) CEMBI HY 10+
Cluster Business Impact	-0.000* (-1.817)	0.000 (0.154)	0.000 (0.075)	-0.001** (-2.108)	-0.001** (-2.096)	-0.000 (-1.156)
Cluster Environmental Impact	0.000 (0.447)	0.000 (0.566)	0.000 (0.501)	0.000 (1.237)	0.000 (0.077)	0.000 (0.098)
Cluster Societal Debate	0.000 (0.437)	-0.000 (-0.191)	-0.000 (-0.076)	0.000 (0.231)	0.000 (0.208)	-0.000 (-1.168)
Cluster Research	0.000 (1.284)	-0.000 (-0.092)	-0.000 (-0.376)	0.000 (0.573)	0.000 (0.816)	0.001 (1.367)
Default Spread	-0.000 (-1.234)	-0.001*** (-2.948)	-0.002*** (-3.795)	-0.000 (-1.176)	-0.001** (-2.379)	-0.001* (-1.852)
Federal Funds Rate	0.001 (0.408)	0.002 (0.308)	0.000 (0.062)	0.007 (1.440)	0.000 (0.034)	0.005 (0.747)
MOVE	-0.005*** (-3.463)	-0.027*** (-5.839)	-0.050*** (-8.118)	-0.021*** (-4.854)	-0.043*** (-6.854)	-0.036*** (-6.495)
Term Spread	-0.000 (-0.202)	-0.000 (-1.103)	-0.001 (-1.099)	-0.000 (-0.021)	-0.000 (-0.951)	0.000 (0.039)
GABI	0.032*** (3.907)	0.280*** (9.597)	0.503*** (13.244)	-0.024 (-0.906)	0.008 (0.214)	0.024 (0.693)
N	738	738	738	738	738	738
r2	0.057	0.190	0.309	0.047	0.082	0.076

**Table A11**

**Emerging corporate bond market – Maturity analysis (after the Paris Agreement).** This table reports the estimation results for emerging corporate bond market from Equation (2c) in the period after the Paris Agreement (12 December 2015 – 31 August 2022), where the dependent variable is maturity-specific daily return on CEMBI maturity buckets sub-indices. Columns (1–3) show the results for CEMBI IG in short, medium, and long term, respectively. Columns (4–6) report the results for CEMBI HY in short, medium, and long term, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI IG 1–3	(2) CEMBI IG 7–10	(3) CEMBI IG 10+	(4) CEMBI HY 1–3	(5) CEMBI HY 7–10	(6) CEMBI HY 10+
Cluster Business Impact	–0.000 (–0.175)	0.000 (1.628)	0.000* (1.875)	–0.000 (–0.218)	0.000 (0.522)	0.000 (0.242)
Cluster Environmental Impact	0.000 (1.304)	0.000 (1.336)	0.000 (0.395)	–0.000 (–0.688)	–0.000 (–0.355)	–0.000 (–0.231)
Cluster Societal Debate	0.000 (1.411)	–0.000 (–0.806)	–0.000* (–1.697)	0.000 (1.314)	0.000 (–0.288)	0.000 (0.004)
Cluster Research	–0.000*** (–2.956)	–0.000** (–2.225)	–0.000 (–0.709)	–0.000* (–1.946)	–0.000 (–0.177)	–0.000 (–0.775)
Default Spread	0.000 (0.843)	0.000 (0.097)	–0.000 (–0.111)	–0.000 (–1.255)	–0.000 (–0.075)	–0.000 (–0.486)
Federal Funds Rate	0.000 (1.152)	–0.000 (–0.532)	–0.000 (–0.826)	–0.000 (–1.394)	–0.000 (–1.416)	–0.000 (–1.054)
MOVE	–0.003* (–1.737)	–0.014*** (–6.430)	–0.027*** (–8.449)	–0.018*** (–6.463)	–0.043*** (–10.492)	–0.024*** (–9.357)
Term Spread	–0.000 (–1.290)	–0.000*** (–3.721)	–0.000*** (–3.055)	–0.000* (–1.775)	–0.000** (–2.069)	–0.000* (–1.900)
GABI	0.114*** (8.477)	0.543*** (34.941)	0.795*** (34.829)	0.201*** (10.129)	0.483*** (16.655)	0.288*** (15.542)
N	1678	1678	1678	1678	1678	1678
r2	0.061	0.459	0.461	0.096	0.211	0.186

**Table A12**

**Global corporate bond market – Maturity analysis (additional maturity buckets).** This table reports the robustness analysis for global corporate bond market (estimation from Equation (1c) where the dependent variable is maturity-specific daily return on GCI maturity buckets sub-indices. Columns (1–3) show the results for GCI IG for the maturities 3–5, 5–7, and 10–20 years, respectively. Columns (4–6) report the results for GCI HY for the maturities 3–5, 5–7, and 10–20 years, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI IG 3–5	(2) GCI IG 5–7	(3) GCI IG 10–20	(4) GCI HY 3–5	(5) GCI HY 5–7	(6) GCI HY 10–20
Cluster Business Impact	0.000 (1.197)	0.000 (1.205)	0.001* (1.835)	0.000 (0.662)	0.000 (1.054)	0.000 (1.626)
Cluster Environmental Impact	0.000 (0.872)	0.000 (1.189)	0.000 (1.066)	0.000 (0.080)	0.000 (0.281)	0.000 (0.066)
Cluster Societal Debate	–0.000** (–2.087)	–0.000* (–1.821)	–0.001* (–1.700)	–0.000 (–1.336)	–0.000 (–1.629)	–0.001*** (–2.659)
Cluster Research	–0.000 (–0.695)	–0.000 (–1.225)	–0.001 (–1.604)	–0.000 (–0.661)	–0.000 (–0.634)	–0.000 (–0.224)
Default Spread	0.000** (2.195)	0.000** (2.119)	0.000 (0.971)	–0.000 (–0.674)	0.000 (0.290)	–0.000 (–0.065)
Federal Funds Rate	–0.000 (–0.133)	–0.000 (–0.120)	–0.000 (–0.528)	–0.000** (–2.001)	–0.000 (–1.638)	–0.000** (–2.342)
MOVE	–0.012*** (–7.969)	–0.020*** (–8.757)	–0.041*** (–8.992)	–0.041*** (–14.610)	–0.051*** (–15.599)	–0.054*** (–14.242)
Term Spread	–0.000*** (–3.226)	–0.000*** (–3.056)	–0.000*** (–2.640)	–0.000*** (–2.814)	–0.000*** (–2.882)	–0.001*** (–4.667)
N	2416	2416	2416	2416	2416	2416
r2	0.037	0.042	0.040	0.085	0.096	0.088

**Table A13**

**Emerging corporate bond market – Maturity analysis (additional maturity buckets).** This table reports the robustness analysis for emerging corporate bond market (estimation from Equation (2c), where the dependent variable is maturity-specific daily return on CEMBI maturity buckets sub-indices. Columns (1–2) show the results for CEMBI IG for the maturities 3–5, and 5–7 years respectively. Columns (3–4) report the results for CEMBI HY IG for the maturities 3–5, and 5–7 years, respectively. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI IG 3–5	(2) CEMBI IG 5–7	(3) CEMBI HY 3–5	(4) CEMBI HY 5–7
Cluster Business Impact	–0.000 (–0.263)	–0.000 (–0.093)	–0.000 (–0.659)	–0.000 (–0.800)
Cluster Environmental Impact	0.000 (0.967)	0.000 (0.861)	–0.000 (–0.468)	–0.000 (–0.399)
Cluster Societal Debate	–0.000 (–1.030)	0.000 (0.146)	0.000 (0.308)	0.000 (0.009)
Cluster Research	–0.000 (–1.085)	–0.000* (–1.659)	–0.000 (–0.281)	–0.000 (–0.014)
Default Spread	0.000 (1.548)	0.000 (0.819)	–0.000 (–1.436)	–0.000 (–1.172)
Federal Funds Rate	0.000 (0.717)	0.000 (0.908)	–0.000* (–1.666)	–0.000* (–1.944)
MOVE	–0.009*** (–6.620)	–0.013*** (–6.105)	–0.028*** (–9.099)	–0.039*** (–10.920)
Term Spread	–0.000 (–1.533)	–0.000 (–1.002)	–0.000* (–1.797)	–0.000** (–2.475)
GABI	0.111*** (11.479)	0.330*** (23.354)	0.239*** (11.374)	0.286*** (11.711)
N	2416	2416	2416	2416
r2	0.086	0.216	0.095	0.114

**Table A14**

**Global corporate bond market (analysis with lagged independent variables).** This table reports the estimation results for global corporate bond market from Equations (1) and (1a) where the independent variables enter the regression with a lag of 7 days. The Column (1) shows the results where the dependent variable is the daily return on GCI Aggregate, Column (2) reports the results for GCI IG, and Column (3) shows the results for GCI HY. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Aggregate	(2) GCI IG	(3) GCI HY
Cluster Business Impact (–7days)	0.000 (0.739)	0.000 (0.686)	0.000 (0.474)
Cluster Environmental Impact (–7days)	–0.000 (–1.484)	–0.000 (–1.433)	–0.000 (–0.930)
Cluster Societal Debate (–7days)	–0.000 (–0.705)	–0.000 (–0.561)	–0.000 (–0.788)
Cluster Research (–7days)	0.000* (1.722)	0.000* (1.926)	0.000 (0.026)
Default Spread (–7days)	0.001*** (4.312)	0.001*** (3.924)	0.001*** (3.615)
Federal Funds Rate (–7days)	0.000 (1.387)	0.000* (1.761)	–0.000 (–0.906)
MOVE (–7days)	–0.006** (–2.401)	–0.007** (–2.272)	–0.005* (–1.763)
Term Spread (–7days)	–0.000 (–0.532)	–0.000 (–0.001)	–0.000** (–2.374)
N	2416	2416	2416
r2	0.013	0.012	0.013

**Table A15**

**Emerging corporate bond market (analysis with lagged independent variables).** This table reports the estimation results for emerging corporate bond market from Equations (2) and (2a), where the independent variables enter the regression with a lag of 7 days. The Column (1) shows the results where the dependent variable is the daily return on CEMBI Aggregate, Column (2) reports the results for CEMBI IG, and Column (3) shows the results for CEMBI HY. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) CEMBI Aggregate	(2) CEMBI IG	(3) CEMBI HY
Cluster Business Impact (-7days)	-0.000 (-0.423)	-0.000 (-0.936)	-0.000 (-0.215)
Cluster Environmental Impact (-7days)	-0.000 (-1.411)	-0.000* (-1.792)	-0.000 (-1.118)
Cluster Societal Debate (-7days)	-0.000 (-1.128)	-0.000 (-0.644)	-0.000 (-0.973)
Cluster Research (-7days)	0.000* (1.718)	0.000** (2.070)	0.000 (1.095)
Default Spread (-7days)	0.000*** (3.808)	0.000*** (3.731)	0.000*** (3.378)
Federal Funds Rate (-7days)	0.000 (0.049)	0.000 (1.327)	-0.000 (-1.222)
MOVE (-7days)	-0.009*** (-4.205)	-0.007*** (-3.422)	-0.014*** (-4.754)
Term Spread (-7days)	-0.000** (-2.389)	-0.000 (-1.478)	-0.000*** (-2.974)
GABI (-7days)	-0.011 (-0.773)	-0.001 (-0.074)	-0.019 (-0.962)
N	2416	2416	2416
r2	0.021	0.018	0.022

**Table A16**

**Global corporate bond market – Aggregate (robustness test for the effects of the Paris Agreement).** This table reports the estimation results for global corporate bond market (aggregate) from modified Equation (1) with a dummy variable (Post Paris) that is equal to 0 for the period before, and to 1 for the period after the Paris Agreement. The Column (1) shows the results for the cluster Business Impact, Column (2) for Environmental Impact, Column (3) for Societal Debate, and Column (4) for Research. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1) GCI Aggregate	(2) GCI Aggregate	(3) GCI Aggregate	(4) GCI Aggregate
Cluster Business Impact	0.000 (1.254)			
Cluster Business Impact *PostParis	-0.000* (-1.693)			
Cluster Environmental Impact		0.000* (1.829)		
Cluster Environmental Impact*PostParis		-0.001** (-2.570)		
Cluster Societal Debate			0.000 (0.715)	
Cluster Societal Debate*PostParis			-0.000** (-2.177)	
Cluster Research				0.000 (0.955)
Cluster Research*PostParis				-0.001** (-2.366)
Default Spread	0.000 (0.928)	0.000 (0.536)	0.000 (0.421)	0.000 (0.568)
Federal Funds Rate	-0.000 (-0.983)	-0.000 (-1.215)	-0.000 (-1.236)	-0.000 (-1.193)
MOVE	-0.029*** (-11.566)	-0.029*** (-11.627)	-0.029*** (-11.593)	-0.029*** (-11.621)
Term Spread	-0.000*** (-3.582)	-0.000*** (-4.116)	-0.000*** (-4.188)	-0.000*** (-4.124)
N	2416	2416	2416	2416
r2	0.060	0.062	0.062	0.062

**Table A17**

**Global corporate bond market – Investment Grade and High Yield (robustness test for the effects of the Paris Agreement).** This table reports the estimation results for global corporate bond market (Columns (1–4) for IG, and Columns (5–8) for HY) from modified Equation (1a) with a dummy variable (Post Paris) that is equal to 0 for the period before, and to 1 for the period after the Paris Agreement. The Columns (1 and 5) show the results for the cluster Business Impact, Columns (2 and 6) for Environmental Impact, Columns (3 and 7) for Societal Debate, and Columns (4 and 8) for Research. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GCI IG	GCI IG	GCI IG	GCI IG	GCI HY	GCI HY	GCI HY	GCI HY
Cluster Business Impact	0.000 (1.621)				–0.000 (–0.825)			
Cluster Business Impact*PostParis	–0.000** (–2.034)				0.000 (0.458)			
Cluster Environmental Impact		0.001** (2.193)				–0.000 (–0.516)		
Cluster Environm. Impact*PostParis		–0.001*** (–2.849)				–0.000 (–0.166)		
Cluster Societal Debate			0.000 (1.174)				–0.000 (–1.411)	
Cluster Societal Debate*PostParis			–0.001** (–2.540)				0.000 (0.331)	
Cluster Research				0.000 (1.285)				–0.000 (–0.809)
Cluster Research*PostParis				–0.001*** (–2.620)				–0.000 (–0.146)
Default Spread	0.000 (0.821)	0.000 (0.488)	0.000 (0.336)	0.000 (0.513)	0.000 (0.678)	0.000 (0.293)	0.000 (0.372)	0.000 (0.341)
Federal Funds Rate	–0.000 (–0.775)	–0.000 (–0.974)	–0.000 (–1.010)	–0.000 (–0.961)	–0.000 (–1.414)	–0.000 (–1.631)	–0.000 (–1.593)	–0.000 (–1.584)
MOVE	–0.026*** (–9.120)	–0.026*** (–9.172)	–0.026*** (–9.144)	–0.026*** (–9.166)	–0.046*** (–15.642)	–0.046*** (–15.697)	–0.046*** (–15.664)	–0.046*** (–15.689)
Term Spread	–0.000*** (–3.512)	–0.000*** (–3.973)	–0.000*** (–4.075)	–0.000*** (–3.995)	–0.000** (–2.001)	–0.000** (–2.503)	–0.000** (–2.438)	–0.000** (–2.443)
N	2416	2416	2416	2416	2416	2416	2416	2416
r2	0.041	0.043	0.043	0.043	0.096	0.096	0.097	0.097

**Table A18**

**Emerging corporate bond market – Aggregate (robustness test for the effects of the Paris Agreement).** This table reports the estimation results for emerging corporate bond market (aggregate) from modified Equation (2), with a dummy variable (Post Paris) that is equal to 0 for the period before, and to 1 for the period after the Paris Agreement. The Column (1) shows the results for the cluster Business Impact, Column (2) for Environmental Impact, Column (3) for Societal Debate, and Column (4) for Research. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

	(1)	(2)	(3)	(4)
	CEMBI Aggregate	CEMBI Aggregate	CEMBI Aggregate	CEMBI Aggregate
Cluster Business Impact	0.000 (0.183)			
Cluster Business Impact*PostParis	–0.000 (–1.301)			
Cluster Environmental Impact		0.000 (0.665)		
Cluster Environmental Impact*PostParis		–0.000* (–1.793)		
Cluster Societal Debate			0.000 (0.203)	
Cluster Societal Debate*PostParis			–0.000 (–1.340)	
Cluster Research				0.000 (0.981)
Cluster Research*PostParis				–0.000** (–2.484)

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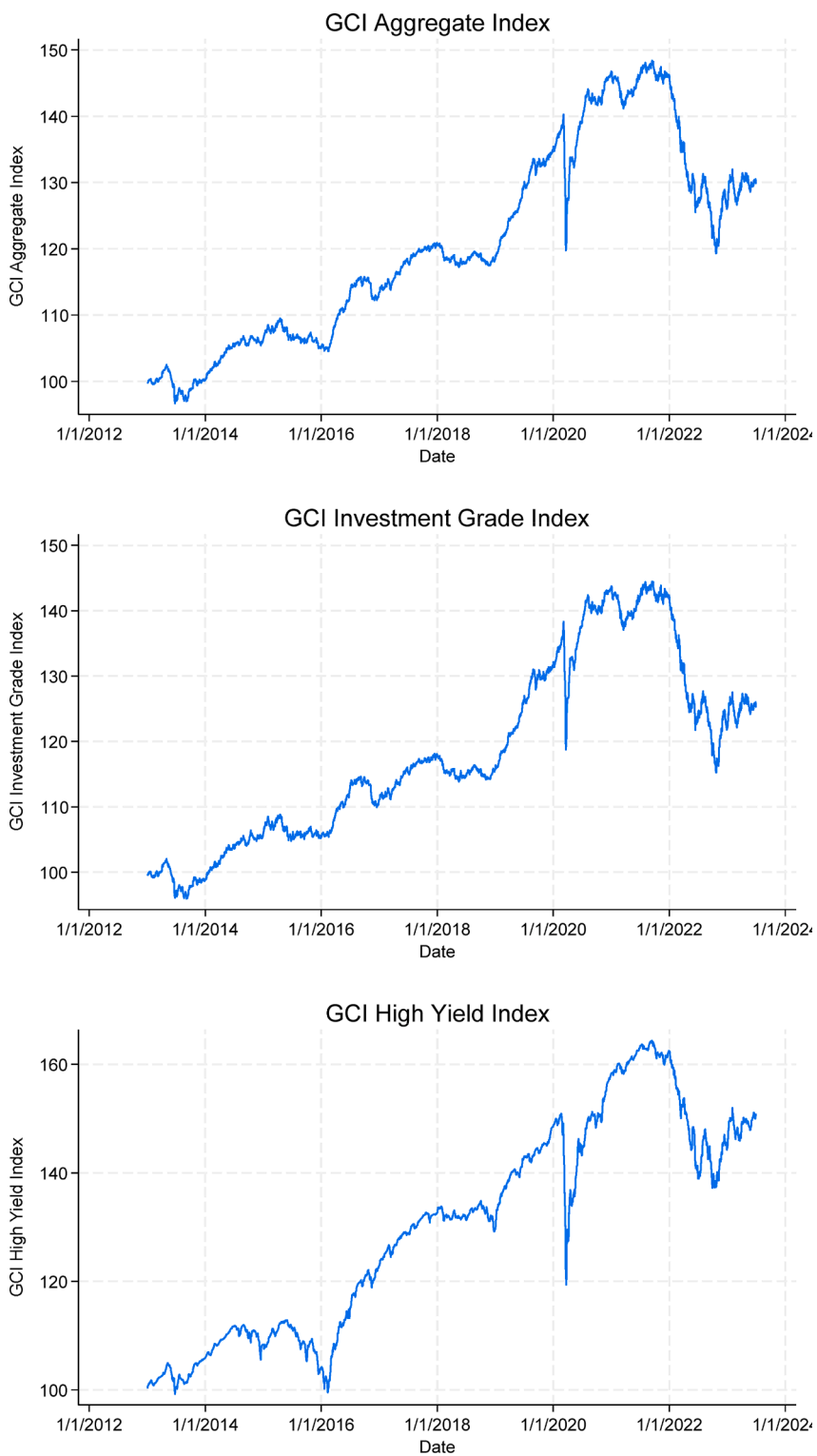
Table A18 (continued)

	(1) CEMBI Aggregate	(2) CEMBI Aggregate	(3) CEMBI Aggregate	(4) CEMBI Aggregate
Default Spread	-0.000 (-1.044)	-0.000 (-1.301)	-0.000 (-1.099)	-0.000 (-1.412)
Federal Funds Rate	-0.000 (-1.184)	-0.000 (-1.348)	-0.000 (-1.190)	-0.000 (-1.365)
MOVE	-0.019*** (-10.531)	-0.019*** (-10.623)	-0.019*** (-10.562)	-0.019*** (-10.629)
Term Spread	-0.000*** (-2.720)	-0.000*** (-3.088)	-0.000*** (-2.846)	-0.000*** (-3.348)
GABI	0.297*** (24.403)	0.297*** (24.316)	0.297*** (24.332)	0.296*** (24.334)
N	2416	2416	2416	2416
r2	0.253	0.253	0.253	0.254

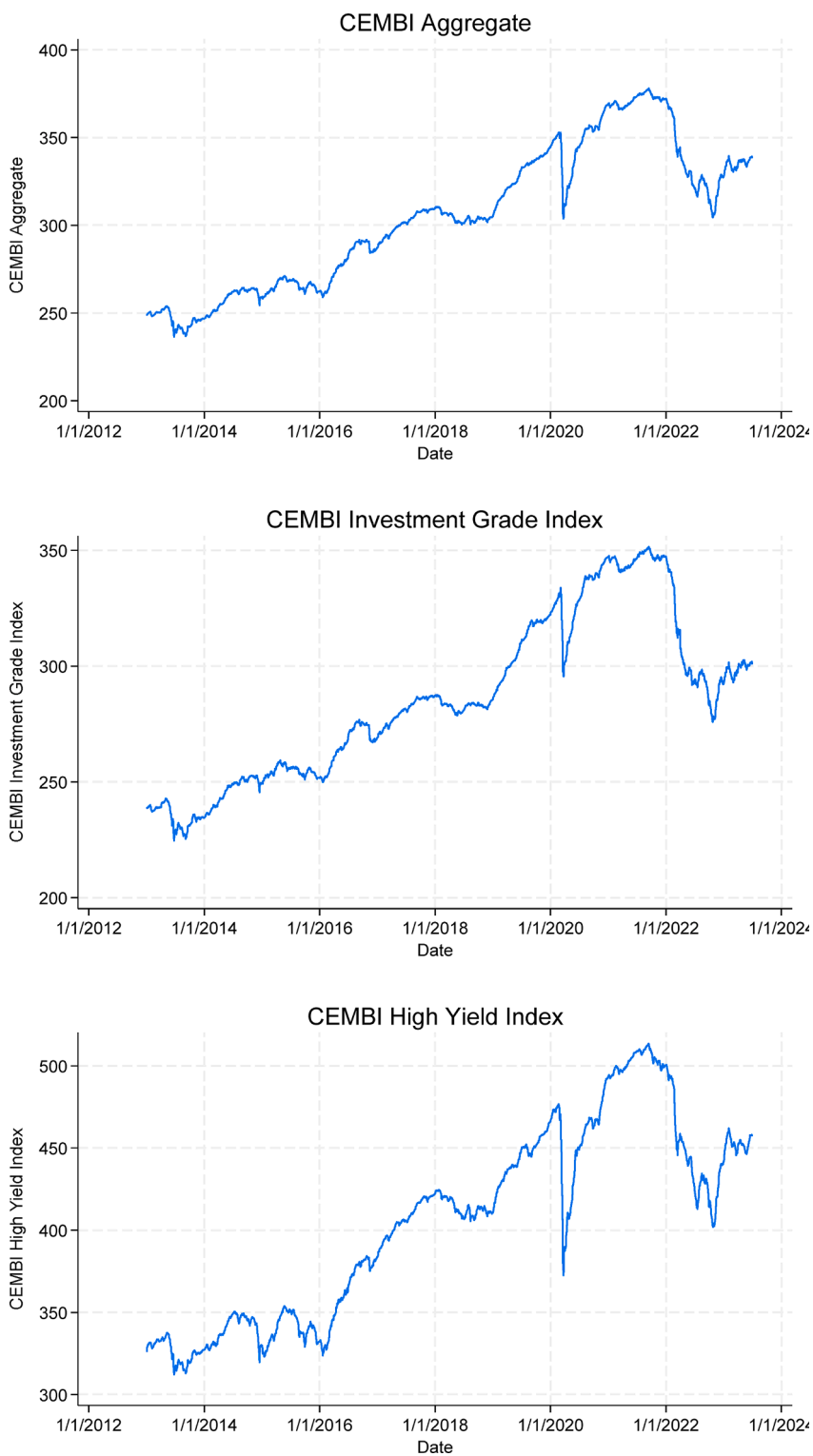
Table A19

**Emerging corporate bond market – Investment Grade and High Yield (robustness test for the effects of the Paris Agreement).** This table reports the estimation results for emerging corporate bond market (Columns 1–4) for IG, and Columns (5–8) for HY from modified Equation (2a) with a dummy variable (Post Paris) that is equal to 0 for the period before, and to 1 for the period after the Paris Agreement. The Columns (1 and 5) show the results for the cluster Business Impact, Columns (2 and 6) for Environmental Impact, Columns (3 and 7) for Societal Debate, and Columns (4 and 8) for Research. T-statistics are reported in parentheses. \*\*\*, \*\*, and \* indicate statistical significance at the 1 %, 5 %, and 10 % level respectively.

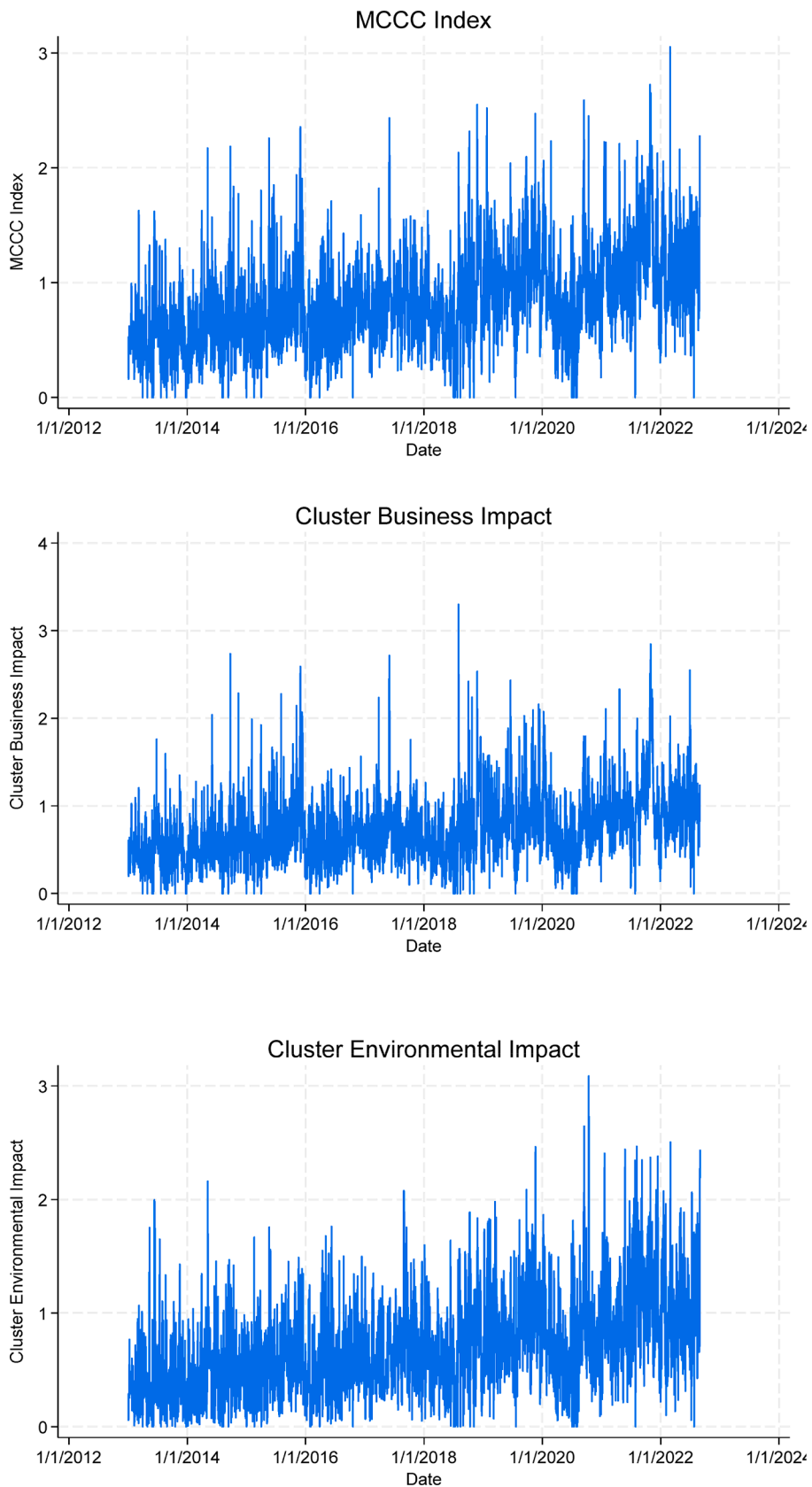
	(1) CEMBI IG	(2) CEMBI IG	(3) CEMBI IG	(4) CEMBI IG	(5) CEMBI HY	(6) CEMBI HY	(7) CEMBI HY	(8) CEMBI HY
Cluster Business Impact	0.000 (1.415)				-0.000 (-1.219)			
Cluster Business Impact *PostParis	-0.000** (-2.375)				0.000 (0.088)			
Cluster Environmental Impact		0.000 (1.642)				-0.000 (-0.228)		
Cluster Environmental Impact*PostParis		-0.000** (-2.529)				-0.000 (-0.874)		
Cluster Societal Debate			0.000 (1.085)				-0.000 (-0.737)	
Cluster Societal Debate*PostParis			-0.000** (-2.292)				-0.000 (-0.193)	
Cluster Research				0.000* (1.757)				0.000 (0.212)
Cluster Research*PostParis				-0.000*** (-3.351)				-0.000 (-1.532)
Default Spread	-0.000 (-0.691)	-0.000 (-0.763)	-0.000 (-0.775)	-0.000 (-1.020)	-0.000 (-1.139)	-0.000 (-1.549)	-0.000 (-1.199)	-0.000 (-1.630)
Federal Funds Rate	-0.000 (-0.259)	-0.000 (-0.324)	-0.000 (-0.268)	-0.000 (-0.433)	-0.000 (-1.579)	-0.000* (-1.819)	-0.000 (-1.602)	-0.000* (-1.814)
MOVE	-0.014*** (-8.184)	-0.014*** (-8.246)	-0.014*** (-8.207)	-0.014*** (-8.272)	-0.030*** (-10.755)	-0.030*** (-10.860)	-0.030*** (-10.792)	-0.030*** (-10.859)
Term Spread	-0.000*** (-2.979)	-0.000*** (-3.078)	-0.000*** (-3.054)	-0.000*** (-3.545)	-0.000* (-1.860)	-0.000** (-2.493)	-0.000** (-2.090)	-0.000*** (-2.676)
GABI	0.355*** (30.967)	0.354*** (30.860)	0.354*** (30.878)	0.354*** (30.901)	0.231*** (12.268)	0.230*** (12.204)	0.230*** (12.221)	0.229*** (12.193)
N	2416	2416	2416	2416	2416	2416	2416	2416
r2	0.324	0.324	0.324	0.326	0.117	0.117	0.117	0.118



**Fig. A1.** This figure shows time series of GCI Aggregate Index, GCI Investment Grade, and GCI High Yield for the sample period from 31 December 2012 to 31 August 2022.



**Fig. A2.** This figure shows time series of CEMBI Broad Diversified Index, CEMBI Investment Grade, and CEMBI High Yield for the sample period from 31 December 2012 to 31 August 2022.



**Fig. A3.** This figure shows time series of the MCCC Index and its four clusters (Business Impact, Environmental Impact, Societal Debate, and Research) for the sample period from 31 December 2012 to 31 August 2022.

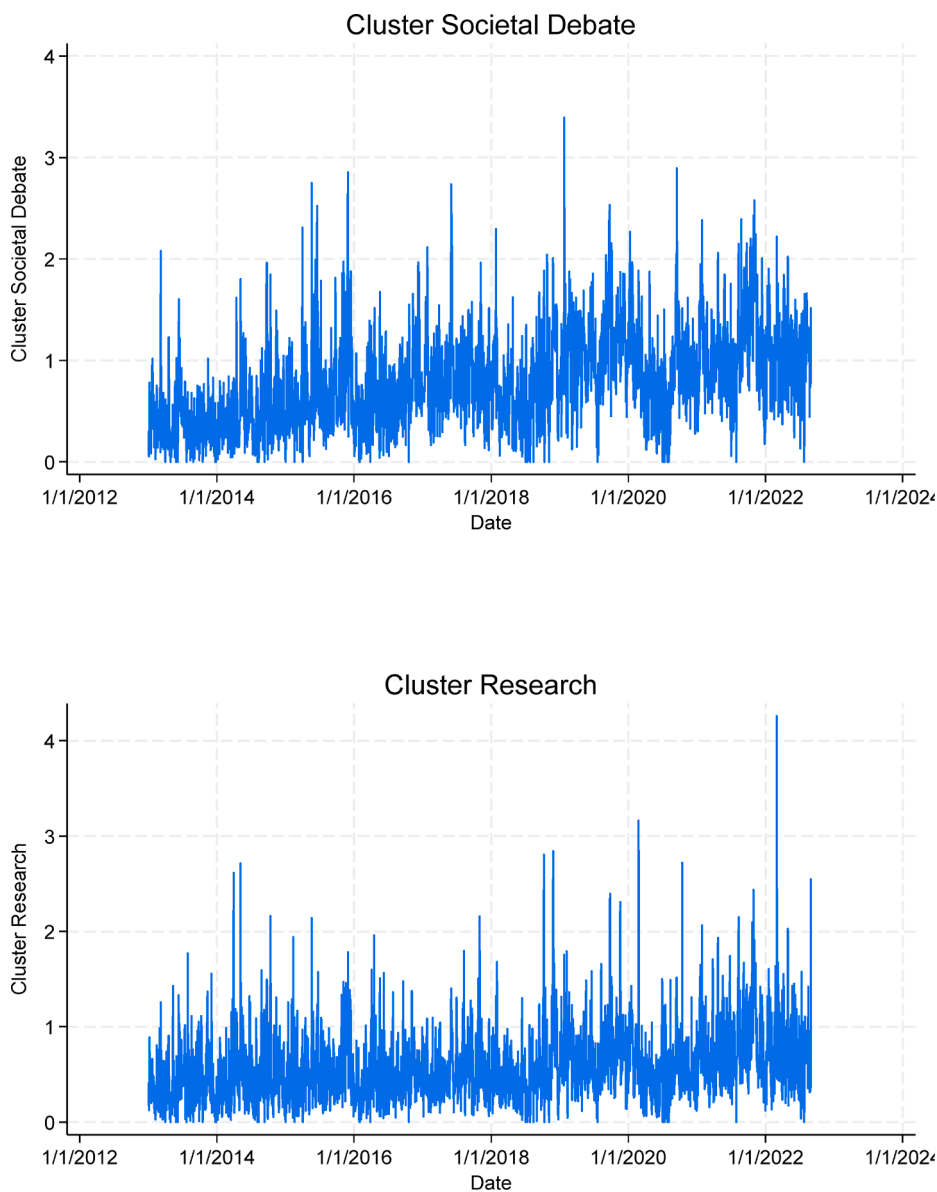


Fig. A3. (continued).

### Data availability

Data will be made available on request.

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