Political Risk, Sustainability and Sovereign Credit Risk:

Pricing High-Frequency Political, Environmental, Social and Governance News

Abstract

Do environmental, social and governance (ESG) factors affect sovereign credit risk? We argue that E, S, and G components, including factors such as natural capital, human capital, short-term policy and regulatory shocks and corruption, are critical inputs for long-term growth and affect both sovereign ability and willingness to pay. Drawing on a global corpus of more than four billion news articles in sixty-five languages to identify the frequency and tone with which ESG factors are discussed daily, this paper shows that ESG factors affect creditors' assessment of sovereign creditworthiness, even after accounting for fiscal strength, political institutions and macroeconomic conditions. By revisiting previous work with a broader scope and more fine-grained data, we advance academic and practical conversations about how creditors formulate and update their expectations of sovereign creditworthiness. This project speaks to larger questions in the literature about the effects of globalization and the role of information.

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Introduction

With sustainable finance on the rise, environmental, social and governance (ESG) factors are increasingly being explicitly incorporated into investment frameworks. Recent survey evidence from J.P. Morgan finds that investors believe that improving ESG performance yields lower sovereign credit risk (Gratcheva et al., 2022, Chapter 2). A 2021 report from the Center for Sustainable Finance argues that "climate risk should be integrated in public sector funding and debt management strategies," and Standard and Poor's refers to climate change as a "global megatrend" for sovereign risk (Kraemer & Negrila, 2014). The COVID-19 pandemic brought to light the impact of social factors such as health and safety on sovereign creditworthiness. Governance factors, which have been historically included, are under a brighter spotlight than ever before. Recent events beg the question of whether this is simply rhetoric or if E, S and G factors are actually critical components of sovereign creditworthiness.

The existing international political economy literature starts from the premise that creditors assess risk-adjusted returns on both ability and willingness to repay. Willingness to pay is unobservable and thus difficult to quantify (Tomz, 2007), particularly in the face of information overload and short time horizons. Creditors, therefore, rely on shortcuts to make "good enough decisions" about the likelihood of repayment (Brooks et al., 2015a, 2022; Calvo & Mendoza, 2000; Hafner-Burton et al., 2017). The majority of the research on willingness to pay has focused on political institutions as a heuristic, including the level of democracy, executive constraints, veto players, strong rule of law, elections, government partisanship, and transparency (Beaulieu et al., 2012; Brooks et al., 2022; Copelovitch et al., 2018; Kohlscheen, 2010; North & Weingast, 1989; Schultz & Weingast, 2003; Staats & Biglaiser, 2012). However, the political science literature has not yet incorporated the most recent developments in the analysis of sovereign risk within International Finance.

This paper shows that environmental, social and governance factors affect creditors' assessment of sovereign credit risk, even after accounting for fiscal strength, political institutions and macroeconomic conditions. We argue that this is because E, S, and G components, including factors such as natural capital, human capital, short-term policy or regulatory shocks and corruption are critical inputs for long-term growth, and erosion of any component will generate long-term fiscal strain. Building on a branch of the literature that has explored real-time analysis of political factors using analysis of machine-coded media events, our results draw on a corpus of more than four billion news articles in sixty-five languages to identify the frequency and tone with which ESG factors are discussed daily. By revisiting previous work with a broader scope and more fine-grained data, we productively advance academic and practical conversations about how creditors formulate and update their expectations of sovereign creditworthiness. This project speaks to larger questions in the literature about the effects of globalization and the role of information.

Assessing a Country's Ability and Willingness to Pay its Creditors

Globalization has heightened governments' ability to fund current expenditures with debt issued in international capital markets. Governments borrow from a host of creditors, including commercial banks, mutual and hedge funds, and foreign central banks. Sovereigns' access to and terms of credit are a function of both global capital market conditions (Ballard-Rosa et al., 2021; Brooks et al., 2015a; Longstaff et al., 2011; Mosley et al., 2020) and country-specific characteristics that influence perceived sovereign credit risk.

Creditors are sensitive to the risk-adjusted returns on the credit that they extend. Their primary objective is to generate an expected return that exceeds the opportunity cost of capital (i.e., the yield on United States Treasury bonds which proxies for a "risk-free" rate of return). Given their higher perceived risk of sovereign default or restructuring of debt, other

governments must pay an interest rate premium to compensate creditors. Creditors calculate the required risk premium by estimating the probability that the debt contract (i.e., the payment terms of a bond) will be honored over various term length and the value they will recover if it is not.

Sovereign credit risk, however, is a hard concept to quantify, in part because the likelihood of default is contingent on both observable and unobservable characteristics (Tomz, 2007). Creditors must consider a government's "ability" to honor its debts, i.e. whether its macroeconomic fundamentals imply enough resources to make payments. They are therefore highly attuned to macroeconomic fundamentals such as public debt, fiscal balance, and inflation (Mosley, 2003). They must also consider a government's "willingness" to pay, i.e. the likelihood that the government is willing to divert resources away from domestic purposes and towards debt servicing. Pleas of poverty do not perfectly correlate with pennilessness and the government's political preferences also matter. As willingness to pay is private information, creditors must rely on indirect indicators to gauge governments' likelihood of repayment. Their beliefs about the government's likelihood of repayment affects the price at which they lend, i.e. the yield spread over US Treasury bonds that they charge sovereign borrowers. Compensation for uncertainty is particularly important when global liquidity is tight and borrowers are new or returning to international debt markets (Ballard-Rosa et al., 2021; Tomz, 2007).

Creditors hold a wide portfolio of debt instruments spanning countries and term lengths to manage these sovereign credit risks most effectively. However, they are limited by both their short time horizons and their ability to process information. They, therefore, rely on shortcuts to make "good enough decisions" about the likelihood of repayment (Brooks et al., 2015a, 2022; Calvo & Mendoza, 2000; Hafner-Burton et al., 2017). Several disparate literatures help to understand the cues on which creditors base their assessment of risk. The synthesis of these

works is threefold. First, creditors update their beliefs about sovereign risk as new information is revealed, especially when this information plays against type (Tomz, 2007). Second, creditors are sensitive to both long-term trends and short-term events. Third, creditors must economize the collection and evaluation of information (Mosley et al., 2020) and thus cannot respond uniformly to all cues.

In political science, much of this work has centered on political institutions as a heuristic. For example, whether because of executive constraints, veto players, or strong rule of law, democratic institutions serve as a credible signal and are rewarded with a lower cost of borrowing (Beaulieu et al., 2012, 2012; Kohlscheen, 2010; North & Weingast, 1989; Schultz & Weingast, 2003; Staats & Biglaiser, 2012). However, a subset of recent work finds that the "democratic advantage" is not foolproof; not all democratic leaders have incentives to repay (DiGiuseppe & Shea, 2015; Hansen, n.d.; Mamone, 2020). Financial institutions (Bodea & Hicks, 2015) and their transparency (Copelovitch et al., 2018) act as a similar heuristic. Elections (Block & Vaaler, 2004; Spanakos & Junior, 2009) , government partisanship (Barta & Johnston, 2018; Block & Vaaler, 2004; Brooks et al., 2022) and corruption (Ciocchini et al., 2003) also cause creditors to update their perception of political risk, particularly in developing countries.

Political institutions are not the only factor that may alter a country's ability or willingness to pay back creditors. While they focus on many of the same variables, the political science literature has not yet incorporated the most recent developments in the analysis of sovereign risk in International Finance. This literature has historically focused on real-time analysis of macroeconomic and financial data capturing a government's ability to pay. However, a growing body of research has recently explored the association between a wide range of Environmental, Social and Governance (ESG) factors, compiled into custom indexes or sub-indexes, and sovereign credit risk, particularly over longer-time horizons. Additionally,

another branch of the literature has explored real-time analysis of political factors using the analysis of media events. We integrate these two streams of research and introduce them to political science.

Underpinning the analysis of ESG factors on sovereign credit risk is the mechanism of long-term fiscal strain caused by erosion of natural or human capital or weak governance of the economic and political system which are critical inputs into long-term growth. The finance literature has largely focused on the ability to pay and the political science literature has largely focused on the willingness to pay as defined by political preferences for distribution. In reality, ability and willingness are based on much wider considerations and we believe one of the contributions of this paper is to put these two literatures into conversation with each other.

The first analysis of ESG and sovereign risk was undertaken by Crifo et al. (2017), who demonstrated that the country ESG rating, compiled by the company Vigeo (since acquired by Moody's), which incorporated information on a variety of environmental and social factors, was negatively associated with credit risk over 2007-12 in a model that already controlled for traditional economic, fiscal and governance factors. Capelle-Blancard et al. (2019) built on this initial finding by constructing their own transparent ESG index and extending the analysis to 1996-2014 for 20 OECD countries. Their measure relies on World Bank-reported data on environmental quality, social welfare and governance at the country level. In their disaggregated analysis, social (S) and governance (G) factors have independent associations with sovereign yield spreads but, surprisingly, environmental (E) factors do not. Rahman et. al. (2021) find a similar overall and disaggregated set of results using a proprietary index constructed by the investment management firm PIMCO covering more than 100 countries from 2006-18. Ten Bosch et al. (2022) use the Sachs et al. (2020) measure of national performance on the Sustainable Development Goals (SDG) and also find support for a negative correlation between sustainability performance and credit default swap spreads.

In an extension to the base correlations reported above, a number of analyses explore various contingencies to this overall effect as well as alternative dependent variables. For example, in an analysis of 33 emerging markets, Margaretic & Pouget (2018) find a negative association between ESG performance and credit yields as well as the likelihood of financial crisis. Hubel (2022) extends the analysis to 60 countries and shows more pronounced effects over longer time horizons. Pineau et al. (2022) show a stronger effect in advanced versus emerging economies and that this difference is growing over time. Martellini & Vallée (2021) use Verisk Maplecroft proprietary data to show that environmental factors have a greater impact on yield spreads for advanced economies whereas social factors are more important for emerging markets. Boehm (2022) shows that average temperatures are positively correlated with sovereign risk but that this effect is partially moderated by the strength of a nation's political institutions which may assist in mitigating the negative growth or higher conflict impacts of higher temperatures.

Another approach has been to focus more deeply on one of the three dimensions, with the environmental pillar being the most commonly explored. Chaudhry et al. (2020) link national carbon emissions both overall and, more strongly, from the electricity, industrial and transport sectors, to a measure of systemic financial risk in the G7 economies over 1996-2014. Work has also demonstrated a correlation between climate vulnerability and bond yields, with the largest implications for the most vulnerable nations and emerging markets (Beirne et al., 2021; Cevik & Jalles, 2022; Ford et al., 2020). Klusak et al. (2021) assess the credit risk rating implications of the predicted negative and higher variance growth caused by climate change (Burke et al., 2015; Kahn et al., 2021) and predict 63 countries suffering climate-induced downgrades by 2030 and 83 by 2100. The only study to similarly focus on the social (S) dimension finds evidence that inequality and its impact on long-term growth is already factored into sovereign bond ratings (Semet et al., 2021).

Both the political science and financial literatures studying sovereign credit risk reaffirm that sovereign credit risk is hard to quantify. The decision to default is ultimately one that rests in the unobservable "hearts and minds" of political leaders. Creditors expend significant effort in predicting sovereigns' repayment preferences but their ability to assess the riskiness of sovereign investments is complicated by the over-provision of information in a time-constrained environment. As the ESG literature interacts with political science, the information problem is exacerbated when we introduce factors (like energy imports and environmental agreements) that have not been previously considered. Information gathering is fundamentally important to sovereign creditors and this means "sustained attention to a wide array of government policies" (Brooks et al., 2015a, 598).

We argue that previous analyses of sovereign credit risk in political science have not captured the full process by which creditors assess risk. Economic, political, social, and environmental indicators are important but slow to change. Sovereign bond markets on the other hand are volatile. Even when political and institutional variables change, financial markets may adapt unevenly (Duyvesteyn et al., 2016). This implies that creditors are assimilating not just information on *de jure* factors like executive constraints or environmental agreements, but also their *de facto* application. They are also updating their perceptions of risk more quickly than the country-year or country-month observations that are standard in the political science literatures. Similar to Benton & Philips (2020) and Brooks et al. (2022), we argue that it isn't just about governments' economic, political, or environmental policies, but also about their revealed commitment to them. Policies may be slow to change, but their salience isn't. For example, while country constitutions may guarantee democratic elections, democratic practices are reaffirmed over time and continued democratic consolidation is rewarded by the bond market (Glaurdić et al., 2020). In other words, creditors' assessments of risk update continuously as they assimilate information that either confirms or contradicts their

prior judgments (Tomz, 2007). This is evident in the movement of international capital markets around political events and announcements (Bernhard & Leblang, 2006; Luechinger & Moser, 2014; Moser & Dreher, 2010).

While we seek to broaden the scope of variables that inform creditors' perceptions of sovereign risk, we are not the first to turn to policy events as a way of identifying "real-time" swings in risk premiums. A growing body of research in finance shows that the daily shifts in the sentiment of news coverage related to a country predict shifts in credit default swap spreads (Bedendo et al., 2011) or credit yield spreads (Beetsma et al., 2013; Hirsch et al., 2020; Liu, 2015, p. 201; Wolfinger et al., 2018) for sovereign bonds beyond only using macroeconomic data and measures of fiscal strength. Another line of inquiry explores the impact of announcements from the European Commission (Afonso et al., 2019) or a broader set of political actors (Gade et al., 2013), as well as the intensity of discussion on the Euro Area Asset Purchase Programme overall in the news (De Santis, 2020) on sovereign yields of Eurobonds. Moving beyond tone and the intensity of coverage, Consoli et al. (2021) use information on the frequency and sentiment, as well as the intensity thereof, associated with specific macroeconomic themes to predict both short- and long-term sovereign bond yields in Italy and Spain as well as variation therein in using neural forecasting networks. While much of this work focuses on various financial crises in the European Union, Tanyeri et al. (2022) extended that application to the Arab Spring. Blanqué et al. (2022) identify correlations among media-reported themes (e.g., recession or unemployment) identified using natural language parsing routines that they bundle into meta-themes or "narratives", which add predictive power to macroeconomic measures in predicting shifts in aggregate US stock price indexes.

Our primary contribution is the empirical fusing of these two streams of research which show the importance of ESG factors and real-time data respectively. We integrate broad, long-run, indicators with faster-moving information channels, measuring inputs at an empirical level

that mirrors the fluctuation of bond prices. How do creditors know what sovereigns are doing? As the policy events literature above suggests, the media is an important source. In what follows, we rely on the Global Database of Events and Language (GDELT) from the Global Knowledge Graph (GKG). We draw on a corpus of more than four billion news articles in sixty-five languages to identify the frequency and tone with which ESG factors are discussed on a daily level. Pairing daily data on the practice and application of ESG factors to sovereign borrowers with daily trade data on sovereign risk premiums is an important advancement. By revisiting previous work with a broader scope and more fine-grained data, we productively advance academic and practical conversations about how creditors formulate and update their expectations of sovereign creditworthiness.

Data and Empirical Strategy

Sample

Our unit of analysis is the country day. Our sample is every country that issues sovereign bonds with ten-year maturity (country list available in Appendix 1). The time period is 2013-2020. Though there is quite a bit of variation depending on exactly which variables are in the model, this yields an average of 60,000 observations.

Dependent variable

Following the economic literature, our dependent variable is the ten-year sovereign bond spread in percentage points, calculated by subtracting the yield of a ten-year US treasury bond from the yield of a ten-year bond issued by a given country. This data comes from Bloomberg. Following the literature, we winsorize the data at the first and 99^{th} percentiles to deal with outliers. We also log transform the data due to heteroskedastic residuals. Finally, we multiply by 100 to avoid statistical computing errors due to minuscule coefficients. We use

data from one source to avoid pooling non-comparable bond types. As expected, the data are non-stationary, which is not a problem for our error-correction model.

Independent variables

We utilize two daily measures of ESG factors and one daily measure of political risk and their subcomponents. The ESG measures are based on dictionary coding of the (open-source) global media, and the political risk measure is based on a proprietary source called GeoQuant. We discuss each in turn.

We generate two measures of ESG factors using open-source global media, which we obtain using the Global Knowledge Graph (GKG) data series of the Global Database of Events Language and Tone (GDELT) (Leetaru & Schodt, 2013). GDELT-GKG updates every 15 minutes with worldwide media and text in 65 languages. Each article is tagged for sentiment, themes, actors, and places. The data uses translated international and national news sources, coded using the automated Textual Analysis by Augmented Replacement Instructions (TABARI) system (Leetaru, 2015). Reliance on both domestic and international news reduces the likelihood of bias created by domestic press suppression because foreign correspondents present in the country increase the odds of reporting (Leetaru, 2015).

Drawing on a corpus of more than four billion media articles, we aggregated GDELT-GKG data on our themes of interest, ESG factors, as well as the average sentiment toward them in individual articles, to the country-day level. We did this using GDELT's pre-programmed 2300 themes, which include everything from 'water' to 'elementary school' to 'Rohinga'. For example, if there were 300 articles in Mexico on 3 March 2018 that talked about the theme of the environment, we recorded that number and calculated the average sentiment, or tone, across them (Leetaru, 2015). GDELT-GKG calculates tone by calculating the percentage of words in an article associated with a positive sentiment and the percentage of words associated with a negative sentiment and calculating the difference between them. As such, we can measure both

the frequency and intensity of discussion around broader topics, such as corruption, as well as more specific issues, such as air pollution.

An example of a GDELT-GKG record can help to further explain the information we are aggregating. A fictional record could contain the following information: 1) date, down to the 15-minute interval: July 1, 2020; 2:45pm, 2) News source: CNN, 3) Article title: 'Oil company blamed for oil spill off coast of Nigeria,' 4) Article URL: www.cnn.com/arfrica/07-01-20/index.html, 5) The average tone of the article (as above, GDELT-GKG does this by calculating the percentage of words in an article associated with a positive sentiment and the percentage of words associated with negative sentiment and calculating the difference between them), 6) a list of the themes (of the 2300 themes in the database) included in this article: oil, oil spill, pollution, human rights, non-violent conflict, and 7) The named entities included in this article, which could include people, businesses, civil society organizations, etc.: Royal Dutch Shell, Niger Delta, Eric Dooh.

Both for robustness and due to general disagreement about what exactly constitutes ESG, we aggregate GKG themes into E, S and G themes based on two existing typologies. The first typology is based on Baier et al. (2020), who published a dictionary of E, S and G-related words (referred to as ESG (B) in tables). The second typology is based on Vracheva et al. (2016), supplemented with hand coding (referred to as ESG (V) in tables). The two environmental measures are significantly correlated at 61.1%, the social measures are significantly correlated at 97.3%, and the government measures are significantly correlated at 97.1%. For this paper, our measures singular measures of E, S and G are interactions between the tone and the frequency of a theme on a given day in a given country. We also combine E, S, and G into a joint measure weighted by frequency.[1] As expected, the data are non-stationary,

[1] We do this using the following equation: (E frequency*Etone)*(E frequency/(E frequency+S frequency+G frequency) + (S frequency*Stone)*(S frequency/(E frequency+S frequency+G frequency) + (G frequency*Gtone)*(G frequency/(E frequency+S frequency+G frequency). Results are robust to other methods of aggregation.

which is not a problem for our error-correction model. Further, as expected, the data are cointegrated with the dependent variable.

Our measure of political risk and its subcomponents comes from GeoQuant, a company recently acquired by Fitch that develops specialized proprietary high-frequency political risk data. This data yields a particular advantage in that it is available daily and defined according to a taxonomy based on social science scholarship. GeoQuant data has two parts. The first part, the structural score, relies on 250 quantitative variables across the 22 indicators, including election outcomes, public opinion polls, economic and political data from NGOs, multilateral institutions, etc. This data tends not to move quickly, as most of these sources are updated annually or quarterly. The second part, or the high-frequency score, relies on traditional media that is processed with both natural language processing and machine learning, though with human oversight. The two parts (structural and high frequency) are then fused via a proprietary algorithm. GeoQuant data are structured in 22 dimensions of political risk that are further grouped into seven sub-indexes (government risk, institutional risk, policy risk, social polarization, human development, internal security and external security) which are then aggregated into three intermediate indexes (governance, social and security) as well as an aggregate political risk score. In this paper, we focus exclusively on the aggregate political risk score as well as the intermediate indices (governance, social, and security). As expected, the data are non-stationary, which is not a problem for our error-correction model. Further, as expected, the data are cointegrated with the dependent variable.

Control variables

Following the existing literature, we control for a range of fiscal, economic and political variables. Given the importance of domestic macroeconomic and fiscal indicators (Cantor and Packer 1996; Archer et al. 2007), we control for external debt levels, the deficit, the short-term debt-to-reserve ratio, the current account balance, GDP per capita, inflation, the exchange rate,

and exchange rate regime based on data from the World Development Indicators (World Bank, 2022). We also control for capital account openness using (Chinn & Ito, 2005). Next, we use Varieties of Democracy to control for levels of democracy, which have been extensively linked to market risk assessments (Biglaiser and DeRouen 2007, Santiso 2013). Relatedly, we control for geographic region, given research on peer effects (Brooks et al., 2015b). Finally, given demonstrated covariance with bond spreads (Pan and Singleton 2008), we control for the volatility of the S&P 500 using the Chicago Board Options Exchange Volatility Index (VIX). With the exception of VIX, which is daily, the rest of our control variables are at the quarterly or yearly level. In those cases, we carry forward the values to create daily observations. Descriptive statistics of all variables can be found in **Table 1**.

Table 1 – Descriptive Statistics of Variables

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Ln(Ten-Year Bond Spread)	126097	123.751	130.561	-1611.81	314.461
BBK (ESG(B)) Environmental	338306	-1168.537	5949.238	-1090589.8	36069.492
BBK (ESG(B)) Government	343798	-21030.756	71941.981	-3021091	64466.328
BBK (ESG(B)) Social	343843	-44220.609	153813.37	-7614419	177251.77
BBK (ESG(B)) Combined	338285	-38782.4	132716.5	-6349524.5	145693.09
Vracheva et. al (ESG(V)) Environmental	343622	-4353.883	20195.481	-1889936.5	66881.641
Vracheva et. al (ESG(V)) Government	343801	-26968.383	91361.948	-3415516.8	124847.88
Vracheva et. al (ESG(V)) Social	343845	-43436.522	146949.92	-10586376	211645.59
Vracheva et. al (ESG(V)) Combined	343603	-22546.033	82646.786	-7520797	1592464
GQ Political Risk	365822	48.561	11.873	24.954	77.997
GQ Governance	365822	48.217	12.086	24.528	78.881
GQ Social	365822	50.206	12.726	23.384	81.636
GQ Security	365822	47.506	12.688	22.769	80.007
External Debt	359406	2.100e+11	8.292e+11	0	1.040e+13
National Deficit	328726	7.448e+13	8.258e+14	0	1.397e+16
Short Term Debt	201248	83.11	532.193	0	11529.876
Current Account (% GDP)	379831	-2.16	7.41	-37.414	39.901
GDP per capita	406126	1982396.9	6836834.9	594.773	52673488
Exchange Rate Regime	350640	4.983	2.755	1	10
Real Exchange Rate	241412	99.873	30.159	53.783	741.778
Inflation	221326	6.584	28.722	-3.749	557.202
Financial Openness	347718	.585	.38	0	1
Electoral Democracy Index	417449	.56	.254	.015	.926
Volatility	316230	17.84	7.383	9.14	82.69
Region	456372	3.889	2.233	1	7

Analyses

Research design

Following the existing literature (Brooks et al., 2015b; Copelovitch et al., 2018), our primary modeling strategy is to employ error-correction models (ECMs). The idea behind an ECM model is that while two variables might be in equilibrium over a long time period, they might deviate from each other in the short term(Clarke et al., 1998).There are several reasons to employ ECMs to study sovereign bond spreads. First, ECMs are excellent at modeling dynamic behavior: they estimate the rate at which a variable returns to equilibrium after a change, which is useful for modeling short-term versus long-term fluctuations (Box-Steffensmeier et al., 2014). Second, ECMs are useful for dealing with both stationary and co-integrated data (De Boef & Keele, 2008), which are features we observe in our data. We specifically use the mean-group estimator of Pesaran and Smith (1995) with the dynamic fixed effects option, which allows for panel-specific intercepts. Finally, due to listwise deletion that dramatically decreases sample size when we include all control variables at once (Wang & Aronow, 2023), our main models feature a core group of controls but in the appendix, we add in each control variable discussed, one at a time.

Results

Consistent with our theoretical priors, our main result shows that both combined measures of ESG factors have a statistically significant and negative impact on ten-year bond spreads in the long term (see Table 2). We expect the coefficient to be negative because as media coverage of ESG issues becomes more positive, we expect risk premiums to fall. In other words, the more positively and frequently the media reports on ESG factors, the less expensive it becomes to borrow capital. In both of our typologies, the error-correction coefficient tells us that only 6% of the deviation from the long-term equilibrium is corrected for within the day. In terms of economic significance, the long-term coefficient of about -.0002 on each ESG measure indicates that over the long-term ESG will reduce the spread by .99 of a percentage point, which is nearly a fifth of the standard deviation of non log-transformed data (5.5).

Interestingly, evidenced by the positive and significant coefficient, ESG news appears to be mispriced by markets in the short-term (the day).

Table 2 – ESG combined (BBK (ESG (B)) & FCLT measure (ESG(V)))

VARIABLES	(1) ESG (V)	(2) ESG (B)
Error-correction coefficient	-0.0605***	-0.0605***
	(0.00174)	(0.00174)
ESG (V) Combined	-1.78e-05***	
	(4.2e-06)	
ESG (B) Combined		-1.16e-05***
		(2.52e-06)
Δ ESG (V) Combined	.000012***	
	(4.20e-05)	
Δ ESG (B) Combined		5.99e-06**
		(2.20e-06)
Electoral Democracy Index	37.41	36.16
	(29.82)	(30.04)
GDP per capita	4.48e-05***	4.49e-05***
	(5.93e-06)	(5.97e-06)
Current Account (% GDP)	2.152***	2.142***
	(0.644)	(0.649)
Constant	-1.728	-1.684
	(1.249)	(1.255)
Observations	39,660	39,481

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Next, we estimate the same models but include the topline measure of political risk from GeoQuant (referred to as GQ in tables). Here we again find that ESG factors have a statistically significant and negative impact on ten-year bond spreads in the long term yet are mispriced in the short term. We also find that as political risk increases, the ten-year spread also increases. This is in line with theoretical expectations because we would anticipate higher risk to lead to higher risk premiums. The coefficient of 5.7 on political risk indicates that over the long term, higher political risk will increase the spread by 1.06 of a percentage point, which is again around a fifth of the standard deviation of non-log-transformed data (5.5). We again see an adjustment speed of six percent.

Table 3 – ESG combined (BBK & FCLT measure + GQ topline)

VARIABLES	(1) ESG (V) & GQ	(2) ESG (B) & GQ
Error-correction coefficient	-0.0610***	-0.0607***
	(0.00175)	(0.00175)
ESG (V) Combined	-1.18e-05***	
	(4.19e-06)	
ESG (B) Combined		-1.18e-06***
		(2.29e-06)
GQ Political Risk	5.945	5.880
	(2.122)	(2.128)
Δ GQ Political Risk	2.820	2.934
	(21.01)	(21.10)
Δ Volatility	0.651***	0.654***
	(0.0460)	(0.0462)
Δ ESG (V) Combined	0.000115***	
	(2.85e-06)	
Δ ESG (B) Combined		6.13e-06***
		(2.21e-06)
Volatility	1.112***	1.145***
	(0.180)	(0.182)
Electoral Democracy Index	55.19*	53.46*
	(30.33)	(30.57)
GDP per capita	4.54e-05***	4.55e-05***
	(5.91e-06)	(5.95e-06)
Current Account (% GDP)	1.812***	1.813***
	(0.652)	(0.657)
Constant	-20.37***	-19.64***
	(6.768)	(6.787)
Observations	39,484	39,305

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We next consider the separate impacts of our environmental, social and government indicators while continuing to account for daily political risk. We find that the negative effect of ESG on risk premiums is predominantly driven by the "S" factor, though it is notably mispriced in the short term in both models. In terms of economic significance, the long-term coefficient of about -.0002 on each social measure indicates that over the long-term ESG will reduce the spread by .99 of a percentage point, which is nearly a fifth of the standard deviation

of non-log-transformed data (5.5). Political risk continues to be significant in the expected direction, and the rate of adjustment remains at about six percent.

Table 4 – ESG disaggregated (BBK & FCLT measure + GQ topline)

VARIABLES	(1) ESG (V) & ESG Components	(2) ESG (B) & ESG Components
Error-correction coefficient	-0.0611***	-0.0610***
	(0.00175)	(0.00175)
Δ ESG (V) Environment	1.40e-06	
	(7.32e-06)	
Δ ESG (V) Governance	-1.30e-05**	
	(5.97e-06)	
Δ ESG (V) Social	1.28e-05***	
	(3.85e-06)	
Δ GQ Political Risk	1.657	0.139
	(21.02)	(21.12)
Δ Volatility	0.651***	0.654***
	(0.0460)	(0.0462)
ESG (V) Environment	-0.000130	
	(0.000141)	
ESG (V) Governance	0.000239***	
	(8.35e-05)	
ESG (V) Social	-0.000225***	
	(5.72e-05)	
GQ Political Risk	5.768***	5.778***
	(2.120)	(2.136)
Volatility	1.099***	1.004***
	(0.180)	(0.189)
Electoral Democracy Index	55.33*	56.52*
	(30.25)	(30.43)
GDP per capita	4.54e-05***	4.47e-05***
	(5.89e-06)	(5.93e-06)
Current Account (% GDP)	1.843***	1.776***
	(0.650)	(0.654)
ESG (B) Environment		-0.000815
		(0.000580)
ESG (B) Governance		3.35e-05
		(6.33e-05)
ESG (B) Social		-0.000104***
		(2.73e-05)
Δ ESG (B) Environment		5.94e-05
		(3.74e-05)
Δ ESG (B) Governance		-7.31e-06
		(5.38e-06)
Δ ESG (B) Social		7.01e-06***
		(2.58e-06)
Constant	-19.85***	-19.79***
	(6.778)	(6.820)
Observations	39,484	39,305

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, we investigate the impact of the subcomponents of political risk (government, social and security) while continuing to account for the disaggregated components of E, S and G. We find that the political risk effect is being driven by government risk. In terms of economic significance, the coefficient size of approximately 11 in both models indicates that government risk increases the spread in the long term by 1.11 percentage points. The rate of adjustment remains at about six percent.

Table 5 – ESG disaggregated (BBK & FCLT measure) + GQ disaggregated

VARIABLES	(1) ESG (V) Components + GQ Components	(2) ESG (B) Components + GQ Components
Error-correction coefficient	-0.0625***	-0.0625***
	(0.00178)	(0.00178)
Δ ESG (V) Environment	1.27e-06	
	(7.32e-06)	
Δ ESG (V) Government	-1.28e-05**	
	(5.97e-06)	
Δ ESG (V) Social	1.25e-05***	
	(3.86e-06)	
Δ GQ Governance	24.09	22.85
	(17.33)	(17.44)
Δ GQ Social	-41.02**	-42.23**
	(16.36)	(16.44)
Δ GQ Security	9.562	9.600
	(10.13)	(10.17)
Δ Volatility	0.649***	0.653***
	(0.0460)	(0.0462)
ESG (V) Environment	-0.000122	
	(0.000138)	
ESG (V) Government	0.000232***	
	(8.21e-05)	
ESG (V) Social	-0.000216***	
	(5.64e-05)	
GQ Governance	10.24***	11.38***
	(2.224)	(2.245)
GQ Social	1.905	1.295
	(1.338)	(1.353)
GQ Security	-2.785*	-2.687*
	(1.488)	(1.494)
Volatility	1.149***	1.041***
	(0.181)	(0.188)
Electoral Democracy Index	99.81***	106.0***
	(31.06)	(31.24)
GDP per capita	4.36e-05***	4.33e-05***
	(5.98e-06)	(6.00e-06)
Current Account (% GDP)	1.113*	0.982
	(0.653)	(0.656)
ESG (B) Environment		-0.000633
		(0.000570)
ESG (B) Governance		7.09e-05
		(6.25e-05)
ESG (B) Social		-0.000116***
		(2.68e-05)
Δ ESG (B) Environment		5.37e-05
		(3.74e-05)
Δ ESG (B) Governance		-8.60e-06
		(5.39e-06)
Δ ESG (B) Social		7.51e-06***
		(2.58e-06)
Constant	-32.33***	-34.24***
	(7.812)	(7.836)
Observations	39,484	39,305

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Robustness

In the appendix, we first replicate the main model by introducing the additional control variables one at a time. We find the results are robust (Appendix 2). We also undertake the analysis on the subsamples of countries stratified by income as defined by the World Bank and region to see if the factors that assess ability and willingness to pay differ in the level of development or by geography (Appendix 3). This segmentation of our analysis may also better captures peer effects among similar countries. We find robust effects for political risk across income albeit with stronger economic significance in lower-income countries. Political risk is also significant in most regions with the exception of North

America, Middle East and North Africa as well as Sub-Saharan Africa[2] (Appendix 4). By contrast, these subsample results find that ESG issues matter primarily in higher-income countries and within Europe and East Asia. It makes theoretical sense that ESG issues are less important in lower-income countries where shorter-term economic policymaking decisions likely dominate credit risk assessments. We present these results in the appendix.

Discussion

Our analyses highlight that recent efforts to incorporate real-time indicators of shifts in a country's ability or willingness to pay creditors can offer important signals as to the long-term credit risk of a country. Notably, through the use of an error correction model, we see that much of this news has a long-term effect on credit yield spreads but less of a short-term effect. The lag in the incorporation of this information may offer substantial arbitrage trading opportunities to creditors and investors in sovereign bonds. Specifically, real-time information on shifts in social issues and in the policy environment in particular, can influence the trajectory of bond yields in the long-term but not be priced on release.

Turning from the market or financial implications to those for international political economy, our results add to the growing evidence of the informational content of media events and the rapidly accelerating capability to process media event information at scale. Using both a proprietary human-supervised approach to measuring political risk from media events developed by GeoQuant and two different automated unsupervised coding schemes applied to the open-sourced GDELT-GKG corpus, we find a signal for long-term sovereign bond risk. This signal adds predictive power above and beyond that offered within error correction models and the existing set of fiscal and political variables found to influence creditors' and investors' perceptions of a country's ability and willingness to pay.

[2] Our sample contains only 14 countries in these three regions combined so this difference may be driven by a lack of statistical power rather than a substantive difference in the effect of political risk.

Many questions in the field beyond the pricing of sovereign credit risk hinge both on an understanding of structural political factors as well as the (strategic) actions of actors within them. Media event data can offer powerful insight into the latter not only in the analysis of sovereign credit risk but inter-state relations including trade policy agreements, international investment and financial policy and security as well as relations between host country actors, intergovernmental organizations, multinational firms and civil society.

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Appendix 1: Country List (ISO 3 codes)

AFG	BHR	COL	GAB	IRQ	MDA	NIC	SEN	TUR
AGO	BIH	CPV	GBR	ISL	MDG	NLD	SGP	TWN
ALB	BLR	CRI	GEO	ITA	MEX	NOR	SLE	TZA
ARE	BOL	CYP	GHA	JOR	MLI	NZL	SLV	UGA
ARG	BRA	CZE	GMB	JPN	MLT	PAK	SVK	UKR
ARM	BWA	DEU	GNQ	KEN	MNE	PER	SVN	URY
AUS	CAF	DNK	GRC	KOR	MOZ	POL	SWE	USA
AUT	CAN	DOM	GTM	KWT	MRT	PRT	SYC	UZB
AZE	CHE	ECU	HND	LBN	MUS	PRY	TCD	VEN
BDI	CHL	EGY	HRV	LBR	MWI	QAT	TGO	VNM
BEL	CHN	ESP	HUN	LKA	MYS	ROU	THA	YEM
BEN	CIV	EST	IDN	LSO	NAM	RUS	TJK	ZAF
BGD	CMR	FIN	IND	LVA	NER	RWA	TKM	ZMB
BGR	COD	FRA	IRL	MAR	NGA	SAU	TUN	ZWE

Appendix 2: FCLT and BBK Results with Controls

VARIABLES	(1) ESG (B) short term deb	(2) ESG (B) exchange rate regime	(3) ESG (B) inflation	(4) ESG (B) capital openness	(5) ESG (B) region
Error-correction coefficient	-0.0517***	-0.0530***	-0.0618***	-0.0549***	-0.0605***
	(0.00212)	(0.00181)	(0.00215)	(0.00188)	(0.00174)
Δ ESG (B) Combined	1.93e-06	6.25e-06***	2.79e-06	6.98e-06***	5.99e-06***
	(1.75e-06)	(2.13e-06)	(2.39e-06)	(2.25e-06)	(2.20e-06)
Δ Volatility	0.306***	0.733***	0.505***	0.738***	0.652***
	(0.0406)	(0.0479)	(0.0512)	(0.0489)	(0.0460)
ESG (B) Combined	-1.73e-05	-0.000111***	-2.95e-05	-0.000124***	-0.000116***
	(2.15e-05)	(2.84e-05)	(2.50e-05)	(2.80e-05)	(2.52e-05)
Short-term debt (% total reserves)	0.00462				
	(0.151)				
Volatility	1.177***	1.082***	1.031***	1.090***	1.067***
	(0.183)	(0.209)	(0.200)	(0.204)	(0.184)
Electoral Democracy Index	16.06	79.89**	22.36	28.13	38.73
	(26.66)	(36.47)	(26.82)	(36.53)	(29.93)
GDP per capita	-1.41e-05	-1.47e-05	-9.43e-06	5.55e-05***	4.41e-05***
	(1.13e-05)	(1.40e-05)	(2.04e-05)	(9.35e-06)	(5.95e-06)
Current account (% GDP)	2.269***	3.116***	0.818	2.950***	2.103***
	(0.702)	(0.835)	(0.702)	(0.840)	(0.646)
Real Exchange Rate		-1.822			
		(1.276)			
Inflation (Annual Consumer Prices)			0.442		
			(0.406)		
Capital Openness				-125.9***	
				(32.37)	
Constant	8.754***	4.633***	6.356***	1.979	-1.646
	(1.214)	(1.657)	(1.401)	(1.705)	(1.254)
Observations	19,577	32,388	21,959	32,733	39,481

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) ESG (V) short term debt	(2) ESG (V) exchange rate regime	(3) ESG (V) inflation	(4) ESG (V) capital openness	(5) ESG (V) region
Error-correction coefficient	-0.0516***	-0.0530***	-0.0618***	-0.0548***	-0.0605***
	(0.00211)	(0.00181)	(0.00214)	(0.00188)	(0.00174)
Δ ESG (V) Combined	2.53e-06	7.82e-06***	3.71e-06	1.04e-05***	1.12e-05***
	(2.34e-06)	(2.73e-06)	(3.05e-06)	(2.87e-06)	(2.84e-06)
Δ Volatility	0.306***	0.728***	0.501***	0.733***	0.647***
	(0.0404)	(0.0477)	(0.0507)	(0.0486)	(0.0458)
ESG (V) Combined	-1.58e-05	-0.000150***	-4.91e-05	-0.000167***	-0.000178***
	(3.93e-05)	(4.69e-05)	(4.36e-05)	(4.73e-05)	(4.20e-05)
Short-term debt (% total reserves)	0.00762				
	(0.151)				
Volatility	1.201***	1.176***	1.053***	1.214***	1.169***
	(0.180)	(0.205)	(0.195)	(0.200)	(0.180)
Electoral Democracy Index	15.15	79.71**	23.43	26.18	37.41
	(26.64)	(36.34)	(26.68)	(36.48)	(29.82)
GDP per capita	-1.39e-05	-1.42e-05	-9.35e-06	5.76e-05***	4.48e-05***
	(1.13e-05)	(1.40e-05)	(2.04e-05)	(9.33e-06)	(5.93e-06)
Current account (% GDP)	2.250***	3.113***	0.821	2.967***	2.152***
	(0.701)	(0.831)	(0.697)	(0.837)	(0.644)
Real Exchange Rate		-2.177*			
		(1.266)			
Inflation (Annual Consumer Prices)			0.430		
			(0.404)		
Capital Openness				-128.7***	
				(32.34)	
Constant	8.733***	4.666***	6.326***	1.857	-1.728
	(1.210)	(1.649)	(1.390)	(1.698)	(1.249)
Observations	19,639	32,497	22,134	32,864	39,660

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 3: FCLT and BBK Results by Income Group

VARIABLES	(1) ESG (V) Combined High Income	(3) ESG (V) Combined Low Income	(5) ESG (B) Combined High Income	(7) ESG (B) Combined Low Income
Error-correction coefficient	-0.0694***	-0.0168***	-0.0685***	-0.0165***
	(0.00327)	(0.00481)	(0.00326)	(0.00480)
Δ ESG (V) Combined	2.61e-05***	1.76e-06		
	(6.83e-06)	(2.57e-06)		
Δ GQ Political Risk	109.0*	-2.397	109.5*	-2.147
	(60.26)	(12.09)	(60.33)	(12.09)
Δ Volatility	1.396***	0.0682***	1.397***	0.0679***
	(0.119)	(0.0171)	(0.119)	(0.0171)
ESG (V) Combined	-0.000386***	-0.000182	-0.000240***	-8.08e-05
	(9.33e-05)	(0.000168)	(8.19e-05)	(0.000147)
GQ Political Risk	17.24***	24.81**	17.68***	24.87**
	(5.615)	(10.25)	(5.692)	(10.43)
Volatility	1.175***	0.668**	1.302***	0.698**
	(0.420)	(0.303)	(0.425)	(0.311)
Electoral Democracy Index	384.4***	464.5	393.3***	456.1
	(113.3)	(295.8)	(114.6)	(300.5)
GDP per capita	4.91e-05***	1.58e-05	4.90e-05***	1.39e-05
	(9.47e-06)	(7.19e-05)	(9.60e-06)	(7.32e-05)
Current Account (% GDP)	1.194	-0.0379	1.120	0.155
	(1.513)	(1.905)	(1.534)	(1.927)
Δ ESG (B) Combined			1.33e-05**	-8.12e-07
			(5.89e-06)	(1.49e-06)
Constant	-79.23***	-25.49*	-79.74***	-24.94
	(16.94)	(15.24)	(16.95)	(15.25)
Observations	13,333	1,358	13,323	1,358

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) ESG (V) High Income	(2) ESG (V) Low Income	(3) ESG (B) High Income	(4) ESG (B) Low Income
Error-correction coefficient	-0.0677***	-0.0168***	-0.0668***	-0.0106***
	(0.00324)	(0.00481)	(0.00323)	(0.00330)
Δ ESG (V) Combined	2.66e-05***	1.75e-06		
	(6.84e-06)	(2.57e-06)		
Δ Volatility	1.401***	0.0681***	1.403***	0.0611***
	(0.119)	(0.0171)	(0.119)	(0.0153)
ESG (V) Combined	-0.000408***	-0.000180	-0.000255***	-0.000118
	(9.54e-05)	(0.000168)	(8.39e-05)	(0.000216)
Volatility	1.207***	0.669**	1.341***	0.940**
	(0.430)	(0.303)	(0.436)	(0.441)
Electoral Democracy Index	354.5***	446.3	363.6***	646.5
	(115.8)	(280.0)	(117.1)	(421.8)
GDP per capita	4.48e-05***	1.24e-05	4.46e-05***	-1.83e-05
	(9.58e-06)	(6.98e-05)	(9.72e-06)	(0.000103)
Current Account (% GDP)	1.955	-0.0780	1.897	0.215
	(1.532)	(1.897)	(1.554)	(2.815)
GQ Political Risk		24.60**		
		(10.22)		
Δ ESG (B) Combined			1.35e-05**	-7.38e-07
			(5.89e-06)	(1.38e-06)
Constant	-30.47***	-24.99*	-30.40***	0.812
	(5.696)	(15.03)	(5.692)	(3.818)
Observations	13,333	1,534	13,323	1,534

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4: FCLT and BBK Results by Region

VARIABLES[1] [2]	(1) ESG (B) & GQ East Asia & Pacific	(2) ESG (B) & GQ Europe & Central Asia	(3) ESG (B) & GQ Latin America & Caribbean	(4) ESG (B) & GQ Middle East & North Africa	(5) ESG (B) & GQ North America
Error-correction coefficient	-0.107***	-0.0579***	-0.00650***	-0.0107***	-0.322**
	(0.00615)	(0.00279)	(0.00144)	(0.00298)	(0.139)
Δ ESG (B) Combined	-9.51e-07	1.49e-05***	-6.91e-07	8.12e-06	7.42e-05
	(6.83e-06)	(3.99e-06)	(7.54e-07)	(5.59e-06)	(0.000196)
Δ GQ Political Risk	248.3**	-22.67	0.771	0.611	4,586
	(123.0)	(43.44)	(5.617)	(32.92)	(6,112)
Δ Volatility	1.422***	0.912***	0.228***	0.515***	-1.904
	(0.208)	(0.0897)	(0.0135)	(0.0683)	(4.234)
ESG (B) Combined	-6.29e-05*	-0.000199***	9.75e-05	-0.000479	0.00129
	(3.76e-05)	(5.45e-05)	(0.000104)	(0.000467)	(0.000982)
GQ Political Risk	21.77**	26.97***	10.54***	-45.60	-689.0
	(9.242)	(5.967)	(3.744)	(45.98)	(1,051)
Volatility	1.382***	1.309***	1.408**	-0.529	1.845
	(0.520)	(0.381)	(0.599)	(1.746)	(7.389)
Electoral Democracy Index	197.3	48.72	317.3**	-246.0	
	(132.1)	(48.01)	(126.0)	(408.5)	
GDP per capita	4.82e-05***	-2.67e-05	1.30e-05	-0.0321**	-0.173
	(7.86e-06)	(3.75e-05)	(1.60e-05)	(0.0153)	(0.208)
Current Account (% GDP)	-9.657***	2.872**	-5.035	10.40*	
	(2.796)	(1.284)	(3.532)	(5.859)	
Constant	-128.8***	-66.76***	-4.644***	37.85	10,261
	(44.35)	(16.45)	(1.728)	(27.05)	(16,638)
Observations	5,762	14,148	6,737	3,958	42

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1] Sub-Saharan Africa did not compute due to small sample size
[2] South Asia was excluded due to insufficient observations

VARIABLES[1]	(1) ESG (V) & GQ East Asia & Pacific	(2) ESG (V) & GQ Europe & Central Asia	(3) ESG (V) & GQ Latin America & Caribbean	(4) ESG (V) & GQ Middle East & North Africa	(5) ESG (V) & GQ North America	(6) ESG (V) & GQ Sub-Saharan Africa
Error-correction coefficient	-0.107***	-0.0578***	-0.00653***	-0.0107***	-0.362***	-0.00501***
	(0.00613)	(0.00278)	(0.00144)	(0.00298)	(0.140)	(0.00102)
Δ ESG (V) Combined	1.01e-05	1.52e-05***	-2.71e-07	7.69e-06	-1.78e-05	4.83e-07
	(9.14e-06)	(4.79e-06)	(1.23e-06)	(6.50e-06)	(0.000339)	(7.60e-07)
Δ GQ Political Risk	255.1**	-20.27	0.993	1.812	5,928	2.131
	(122.9)	(43.28)	(5.598)	(32.86)	(6,324)	(2.497)
Δ Volatility	1.430***	0.901***	0.228***	0.513***	-1.251	0.0802***
	(0.208)	(0.0893)	(0.0135)	(0.0683)	(4.375)	(0.00615)
ESG (V) Combined	-0.000111	-0.000217***	0.000256	-0.000430	0.00150	-7.77e-05
	(7.69e-05)	(7.50e-05)	(0.000190)	(0.000604)	(0.00135)	(0.000165)
GQ Political Risk	20.39**	26.62***	10.21***	-47.46	-957.0	0.356
	(9.344)	(5.967)	(3.722)	(45.98)	(893.8)	(5.018)
Volatility	1.515***	1.462***	1.397**	-0.314	-0.250	0.989***
	(0.502)	(0.377)	(0.589)	(1.725)	(6.226)	(0.320)
Electoral Democracy Index	185.2	48.21	329.2***	-251.9		77.91
	(132.4)	(48.02)	(124.3)	(407.4)		(89.19)
GDP per capita	4.87e-05***	-2.65e-05	1.25e-05	-0.0313**	-0.168	2.42e-05
	(7.90e-06)	(3.76e-05)	(1.59e-05)	(0.0152)	(0.189)	(8.27e-05)
Current Account (% GDP)	-9.263***	2.826**	-5.430	10.02*		1.617
	(2.905)	(1.284)	(3.553)	(5.825)		(1.013)
Constant	-122.3***	-65.68***	-4.592***	38.69	14,627	0.733
	(44.54)	(16.42)	(1.723)	(27.05)	(16,815)	(1.706)
Observations	5,761	14,202	6,737	3,964	42	8,778

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1]South Asia was excluded due to insufficient observations.

VARIABLES[1]	(1) ESG (B) East Asia & Pacific	(2) ESG (B) Europe & Central Asia	(3) ESG (B) Latin America & Caribbean	(4) ESG (B) Middle East & North Africa	(5) ESG (B) North America	(6) ESG (B) East Asia & Pacific
Error-correction coefficient	-0.103***	-0.0555***	-0.00529***	-0.0103***	-0.257**	-0.00512***
	(0.00604)	(0.00273)	(0.00135)	(0.00295)	(0.101)	(0.00103)
Δ ESG (B) Combined	-8.85e-07	1.40e-05***	-7.87e-07	8.61e-06	8.18e-05	-1.11e-07
	(6.84e-06)	(3.99e-06)	(7.53e-07)	(5.56e-06)	(0.000191)	(5.73e-07)
Δ Volatility	1.434***	0.916***	0.228***	0.516***	-1.492	0.0781***
	(0.208)	(0.0897)	(0.0135)	(0.0683)	(4.125)	(0.00612)
ESG (B) Combined	-7.23e-05*	-0.000181***	0.000156	-0.000562	0.00173	7.05e-07
	(3.87e-05)	(5.67e-05)	(0.000128)	(0.000479)	(0.00112)	(0.000103)
Volatiility	1.285**	1.274***	2.125***	-0.633	5.020	0.942***
	(0.536)	(0.397)	(0.756)	(1.799)	(7.299)	(0.317)
Electoral Democracy	98.88	50.62	113.1	-50.63		81.43
	(127.8)	(50.10)	(143.9)	(365.2)		(81.43)
GDP per capita	4.56e-05***	-5.93e-05	2.12e-05	-0.0321**	-0.118	1.91e-05
	(8.10e-06)	(3.84e-05)	(1.98e-05)	(0.0158)	(0.142)	(7.98e-05)
Current Account (% GDP)	-7.194***	3.729***	-5.960	10.26*		1.694**
	(2.750)	(1.322)	(4.404)	(6.051)		(0.838)
Constant	-26.60***	5.487**	-0.608	11.54*	1,643	0.887**
	(6.199)	(2.316)	(0.915)	(5.993)	(1,922)	(0.398)
Observations	5,762	14,148	6,737	3,958	42	8,834

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1] South Asia was excluded due to insufficient observations.

VARIABLES[1]	(1) ESG (V) East Asian & Pacific	(2) ESG (V) Europe & Central Asia	(3) ESG (V) Latin America & Caribbean	(4) ESG (V) Middle East & North Africa	(5) ESG (V) North America	(6) ESG (V) Sub-Saharan Africa
Error-correction coefficient	-0.103***	-0.0554***	-0.00537***	-0.0103***	-0.267**	-0.00504***
	(0.00604)	(0.00273)	(0.00135)	(0.00295)	(0.105)	(0.00101)
Δ ESG (V) Combined	1.15e-05	1.37e-05***	-4.79e-07	8.36e-06	-1.25e-05	5.00e-07
	(9.14e-06)	(4.78e-06)	(1.23e-06)	(6.46e-06)	(0.000334)	(7.50e-07)
Δ Volatility	1.443***	0.906***	0.228***	0.514***	-0.509	0.0789***
	(0.208)	(0.0894)	(0.0135)	(0.0682)	(4.286)	(0.00605)
ESG (V) Combined	-0.000149*	-0.000189**	0.000382	-0.000546	0.00197	-7.95e-05
	(7.85e-05)	(7.79e-05)	(0.000234)	(0.000620)	(0.00176)	(0.000160)
Volatility	1.395***	1.416***	2.065***	-0.386	3.572	0.982***
	(0.514)	(0.393)	(0.730)	(1.780)	(7.092)	(0.314)
Electoral Democracy Index	94.06	50.79	140.8	-49.31		75.90
	(127.9)	(50.09)	(139.3)	(364.9)		(82.01)
GDP per capita	4.65e-05***	-5.92e-05	2.02e-05	-0.0313**	-0.0481	2.30e-05
	(8.14e-06)	(3.84e-05)	(1.94e-05)	(0.0157)	(0.128)	(8.08e-05)
Current Account (% GDP)	-6.658**	3.680***	-6.506	9.822		1.673**
	(2.825)	(1.321)	(4.392)	(6.026)		(0.838)
Constant	-27.16***	5.461**	-0.685	11.25*	643.1	0.866**
	(6.241)	(2.307)	(0.914)	(5.979)	(1,911)	(0.392)
Observations	5,761	14,202	6,737	3,964	42	8,954

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[1] South Asia was excluded due to insufficient observations.