**ERASMUS UNIVERSITY ROTTERDAM**
*Erasmus School of Economics*

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# Evaluating Sovereign ESG-Performance as Determinant for Attracting Foreign Direct Investments in a COVID-19 Context

*H.J. (Hendrik Jan) van Norel (645283hn)*

This study examines the response of FDI inflows to Sovereign ESG performance, in a COVID-19 context. Data from 142 countries over the period of 2000 to 2022 is applied in a range of panel data models to investigate the various channels through which FDI inflows are affected. The findings show that; post-COVID growth of ESG performance has declined; during COVID-19, FDI inflows (as % of GDP) have not experienced a significant decrease; Sovereign ESG performance has a significant positive relationship with FDI inflows (as % of GDP); post-COVID importance of Sovereign ESG performance for FDI inflows is consistent with pre-COVID years. The findings hold implications for policymakers and (foreign) investors.

Supervisor: Dr. A. (Antti) Yang
Second assessor: Dr. R (Rex) Wang
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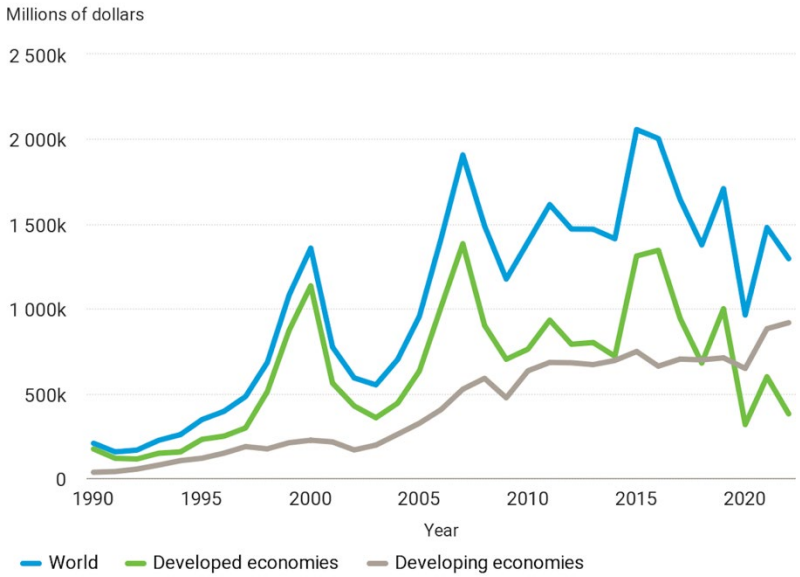
# 1. Introduction

The COVID-19 outbreak, which originated in Wuhan (China), was first identified in December 2019 and rapidly spread due to the world's high interconnectedness as a result of globalisation. On 30 January 2020 the World Health Organisation (WHO) officially declared COVID-19 as a global pandemic. To prevent the spreading of the virus, most governments responded with policies to primarily ensure public health. Globally observed measures were, amongst others, school/workplace closures, mandatory testing, face coverings and quarantine measures. These measures deeply affected social habits and human behavior of which long-term impact is still not defined. Once impending vaccinations became publicly available, restrictions evaporated and societies slowly recuperated. On the 5th of May 2023 the WHO formally ended the pandemic (WHO, 2023).

Pre-COVID, rising globalization has been increasing interconnectedness between countries and continents. As a result, cross-border investments have become more and more popular. FDI is defined by investors from one country, establishing a lasting interest in a foreign country, in the form of founding new businesses or acquiring a minority stake (>10%) in a foreign company and is a key element in international economic integration, creating stable and long-lasting links between economies. FDI is an important channel for the transfer of technology and wealth between economies, and can foster economic development, which in turn increases the importance for governments to employ FDI attracting policy. Pull-factors vary from market size, employment, and commodities to tax incentives and political stability. The latter is heavily affected due to the pandemic. Restrictions related to import and export of both people and goods/services resulted in a slowdown of economic activity. Global GDP growth dropped from 2.6% (2019) to -3.1% (2020), which is even lower than the GDP growth following the Great Financial Crisis (-1.3% in 2009) (World Bank, 2023). The uncertainty that derived from the fluctuating COVID-19 policy and uncertain outcomes imposed high risk for investors and lowered investor sentiment. This is reflected when investigating FDI. In 2019 global FDI transactions were worth $1.7trn and decreased to $0.96trn (-43%) in 2020 (Figure 1).

*Figure 1: FDI inflows. Source: UNCTAD World Investment Report 2022*



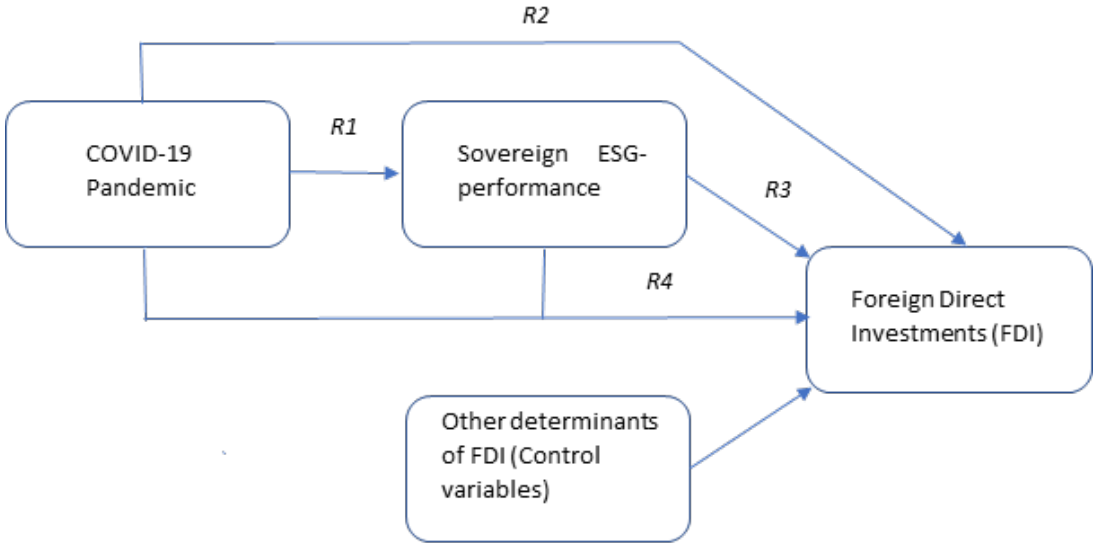

*The graph presents absolute FDI inflows ($USD) by World, Developed economies and Developing economies between 1990 and 2022.*

The pandemic specifically marks the decline of investments in developed countries, as the FDI inflows of developing countries appear stable, raising the suggestion that the COVID-19 impact on FDI for developed countries has been more severe compared to that of developing countries.

Where many studies concentrate on the negative effects of the pandemic, some focus on the positive side effects, namely regarding the environment. Due to lockdowns and the abrupt stoppage of (international) movements, aviation transport and work-home travel had decreased. The consumption of energy dropped as workspaces and offices were out of use. The combination of these two resulted in a reduction of CO2 emissions by 4.6% for 2020 globally (Mousazadeh, 2021). The COVID-19 outbreak has also minimized other polluting activities including overexploitation of natural resources and smog generation which in turn increased biodiversity. Moreover, the pandemic has forced societies to think out-of-the-box in solving various issues like providing distant education to students, maintaining business relationships without physical attendance and more attention to mental well-being. On a corporate level, study of Al Amosh et al. (2023) show that during the pandemic firms in emerging markets focused on enhancing environmental performance, where enterprises in developed markets improved social performance. These Environment, Social and Governance (ESG) matters are also of importance to countries. High ESG performing countries are beneficial as there exists a negative relationship between Sovereign (country-specific) ESG-ratings and the bond-yield spread which is used as a proxy for borrowing costs (Crifo, 2017). Furthermore Zhang et al. (2022) suggests that superior Sovereign ESG performance can solve the burden of debt overhang on investments. High ESG-performing countries are expected to be more resilient to crises due to their increased trustworthiness by means of signaling theory and their economies recover more quickly (Khodija, 2023). A well-functioning economy, with better ESG-performance can therefore better mitigate the crises associated risk. Similarly, FDI functions as a catalyst towards converging back to pre-crisis levels of GDP growth, as it helps fill the gap between domestic saving and spending, increases employment and generates knowledge spillovers (Ali, 2010 & Cicak, 2015). Both FDI and Sovereign ESG are drivers of post-crisis recovery, however thorough investigation of the interaction between these two, in the context of such a crisis, is absent.

In some sense, COVID-19 has provided the world with an opportunity to rethink certain fundamental subjects relating to ESG. The developments and its global impact have suggestively amplified ESG awareness among investors, governments and policy makers. It is therefore interesting to investigate whether governments exploited the opportunity to increase ESG-performance by adjusting and putting new regulations in place. This study examines this relationship between the COVID-19 pandemic and Sovereign ESG (R1). The study also considers the impact of the outbreak on FDI (R2). Furthermore, the importance of Sovereign ESG for FDI as a pull-factor is investigated (R3). Lastly these three relationships are combined to determine whether the importance Sovereign ESG for FDI has increased due to the COVID-19 events (R4). The aim is to obtain a comprehensive understanding of through which channels FDI is impacted and to shed light on the importance of ESG for FDI. The conceptual framework for this paper is given below.

*Figure 2: Conceptual framework*




Additionally, three extensions are proposed. First, to control for endogeneity between FDI and GDP growth, a Two-Stage-Least-Squares model is applied. The results hold however little statistical meaning due to complications of the instrumental variables. Secondly, the country sample is divided into developed and developing to explore the suggested difference in impact regarding COVID-19, as derived from Figure 1. The countries are additionally categorized as either stringent or non-stringent (lenient) countries to determine the impact of deviating pandemic policy strategies on FDI. Lastly, a study is conducted to examine the impact of COVID-19 on Foreign Portfolio Investments (FPI) and to report on the fundamental differences between FDI and FPI.

Despite the potential for the COVID-19 crisis to serve as an opportunity for enhancing ESG-related issues, this study contradicts this expectation. Opposing the assumption that economic slowdown and global exposure during the pandemic might lead to improvements in ESG performance, the results indicate a worsening trend in ESG growth during and after COVID-19. The results also refute the adverse effects of the COVID-19 pandemic on Foreign Direct Investment (FDI) inflows. Furthermore, the study suggests that countries with strong ESG performance can mitigate the decline in foreign capital during economic instability. Higher ESG performance is associated with increased FDI inflows, providing additional capital that can facilitate recovery and address the savings-investment gap in countries. Lastly, the study reveals that the significance of ESG considerations for FDI remained unchanged during/after the pandemic; neither increasing nor decreasing in importance.

The special circumstances of the global shutdown and consequent economic obstruction caused by COVID-19, create a unique opportunity to contribute to the literature by investigating how sentiment towards ESG has changed. Furthermore, this study adds to the growing field of ESG-related academics by focusing on recently developed and emerging Sovereign ESG data, which rates ESG performance on the country-level, rather than on corporate ESG. Current literature primarily focuses on corporate ESG and/or affiliated Corporate Social Responsibility (CSR) and its relationship with firm risk, performance and value. When focusing on the country-level, no consistent research has been conducted on the relationship between (Sovereign) ESG and FDI. Many drivers of FDI such as GDP growth, Trade openness, Inflation etc. have been well-researched, however a shift in research towards sustainability as

determinant of FDI is imminent as ESG is rising in popularity and becoming a more important driver of investment decisions. Lastly, this study uniquely applies the annually disclosed SDG ranking index of the Sustainable Development Solutions Network (SDSN) as proxy of Sovereign ESG performance. Their holistic approach and equal weighting method for capturing country-specific ESG performance contribute to the reduction of subjectivity concerns, for which the ESG framework is often blamed.

The study sheds light on the implications of COVID-19 for FDI inflows and ESG performance. It can assist policymakers in devising strategies to enhance a country's ESG performance to attract FDI and enhance economic resilience. These findings could inform policy adjustments to promote ESG issues as part of economic recovery plans post-crisis. Additionally, these inflows may then foster advances in a nation's progress toward the Sustainable Development Goals (SDGs) while also fostering economic growth and constructing more vital and resilient economies. For (foreign) investors, the outcome may support when assessing risk, by uncovering the relationship between a country's ESG performance and FDI during a crisis. Investors seek countries with robust ESG practices that demonstrate resilience during uncertain times, ensuring more stable and sustainable investments. Investors might favor countries showcasing strong ESG performances during challenging periods, anticipating better stability and growth potential post-crisis. The implication of this, is a change in the allocation of FDI inflows (FDI activity). The findings also contribute to the extending academic field of research on the ESG framework and its relation to economic stability.

The study is organized as follows. Section 2 is the literature review, where, per relationship, existing research is evaluated, and followed with a hypothesis. The applied data is stated in section 3. In section 4 the methodology will be described. Section 5 presents and discusses the empirical results. Section 6 consists of the extensions of the study. The limitations are identified in section 7. Lastly, section 8 concludes the study and proposes additional research suggestions.

# 2. Literature review

## 2.2. Relationship 1 (R1): COVID-19 on Sovereign ESG Performance

### 2.1.1 Literature review

A conceptual framework for understanding the process of change in complex social systems is punctuated equilibrium theory (PET). The model maps the evolution of policy change as a result of critical events. Those events vary from human-caused crises to disruptive natural phenomena such as COVID-19. According to theory, most social systems and policies go through a prolonged period of stagnation that can occasionally be broken up by abrupt changes that bring about profound change. The society's attention is directed towards containing the issue and offering remedies to resolve it when one arises, putting great pressure on governments, institutions, and firms. The magnitude of action provides incentives for reforms in policy, behaviour and objectives (Baumgartner, 2018).

Burns et al. (2018) apply the framework to analyze policy change in the EU during the Great Financial Crisis (GFC) of 2008. The financial crisis was fueled by unfit-for-purpose financial regulation, which resulted in the socialization of taxpayer losses and the privatization of financial industry gains. They find that financial regulation underwent incremental reform, and privatization underwent drastic change despite the EU's formal lack of institutional authority in this field. Study by Moschella (2011) adds that the GFC functioned as a catalyst in policy shift towards more financial supervision to ensure stability. The Dodd-Frank act and Basel III were implemented, and international cooperation intensified. The study highlights that the impact of previous crisis like the emerging markets crisis from the 1990s on present crises like the GFC can’t be underestimated, thus proposing a lagged response mechanism of PET to certain crises.

When moving towards the COVID-19 crisis, recent study from Golden et al. (2023) shows that healthcare policy in the US abruptly changed because of COVID-19. Long before the COVID-19 pandemic telehealth (remote provision of health by means of technology) was recognized as a potential to increase health accessibility, but policies for higher reimbursement were temporized. The outbreak imposed the necessity to provide telehealth and policy shifts were made to foster adaptation of telehealth. Primarily, the COVID-19 pandemic threatened public health, but gradually the policy perception changed as measures had a direct financial impact on the economy. COVID-19 policy changed from being primarily concerned with health and the healthcare system to including covering the economy. As a result, the economy was the focal point of governmental decisions. By reframing the policy issue, governments were able to conduct alterations in non-health policy as well, thus increasing the possibility of a broad scale punctuated equilibrium (Amri, 2021).

Moreover, Yukhno et al. (2021) conclude that the COVID-19 epidemic has pushed ESG agendas of economies and societies and amplified overall ESG awareness amongst regulators and investors. The rapid outbreak has exposed how countries and companies are threatened due to high interconnectedness and globalism. The necessity to act upon the Sustainable Development Goals (SDGs) of the United Nations was therefore fortified. During the pandemic and the sudden stop of workflow, firms took the opportunity to work on their ESG performance. Al Amosh et al. (2023) find that the epidemic has improved environmental and social awareness among businesses. Stakeholder preference for ESG during times of crisis and the risk-mitigation power of high-ESG-performing firms are the two main drivers of this. The authors observe that developing countries experienced a larger boost in the environmental performance, whereas developed countries accomplished higher social performance. Finally they also note that the pandemic decreased governance performance, as a result of travel restrictions and poor communication.

Recent post-COVID regulation by the United States Securities and Exchange Commission (SEC) aims to root out this ESG-related misconduct by providing disclosure requirement policy for businesses (SEC, 2023). Currently, scores are assigned to capture ESG performance, however due to differences in methodology and approach, these scores vary across rating providers and occasionally little correlation is found between providers (Dorfleitner, 2015). Therefore, cherry-picking of ratings is achievable, and firms can adjust external perceptions of ESG-performance through corresponding ESG-scores simply by selecting different rating providers. Due to lack of disclosure guidance, companies and funds can label their practices as 'sustainable' and 'green' without solid foundation. This recent development demonstrates the increasing awareness of governments and institutions toward the importance of ESG for society.

### 2.1.2 Hypothesis development

The hypothesis on the relationship between COVID-19 and Sovereign ESG performance is based on the high likelihood of punctuated equilibrium caused by COVID-19 and corresponding fundamental policy changes (which extend beyond health policy through image framing), the increased awareness of ESG-performance, and the momentum created by COVID-19 to work on ESG-related issues (performance, stakeholder preferences, and reporting). At company level, this phenomenon is already observed as corporations capitalized the opportunity to work on ESG performance. The hypothesis is stated as follows:

***Hypothesis 1 (H1): COVID-19 has a positive impact on Sovereign ESG performance.***

## 2.2. Relationship 2 (R2): COVID-19 on FDI

### 2.2.1. Literature review

Foreign Direct Investments (FDI) have been expanding around the world and plays an essential role in the economic development of countries. Since the rise of globalization, the world has experienced a boom in FDI (Iamsiraroj, 2016). Pull factors of FDI are cost of labour, abundance of resources, superior technology, attractive policy and entrance to new customer base. Host countries benefit from the inflow of FDI, which results in external capital, knowledge spillovers and employment, which help bridge a country's internal savings gap and foster economic growth (Ali, 2010 & Cicak, 2015).

Much research has been conducted on constructing frameworks to explain location decisions of multinational companies (MNCs) and investigating drivers of FDI. Yet, most research focusses on economic determinants of FDI and underexposes the significance of governments ability to actively attract FDI by adjusting their policy framework. Sabir et al. (2019) emphasize the importance of quality of institutions. Indicators of institutional quality used are political stability, control of corruption, rule of law, voice and accountability, regulatory quality and government effectiveness. The results show that institutional quality positively impacts FDI. Buchanan et al. (2012) applies governance as proxy for institutional quality and argues that poor governance increases FDI volatility and increases financing costs, thus reducing investor sentiment. In general, political stability lowers investor risk and therefore is beneficial in attracting FDI. Abdel-Latif (2019) investigates how foreign investors react to sudden political shocks by examining the impact of the Arab Spring (in MENA countries) on the FDI inflows. Key findings are that the institutional quality, proxied by the polity index, is a strong positive determinant of FDI. Furthermore, the political shock caused by the Arab Spring temporarily decreased FDI inflows for the MENA countries. Al Shammari et al. (2023) study the same subject only from a more quantitative approach and find similar results. They state that movements in FDI are adversely related to phases of political instability.

Extrapolating these findings to the COVID-19 epidemic provides valuable insights. Like the Arab Spring, the COVID-19 pandemic faced the world with a sudden shock and abrupt policy changes. The pandemic affects FDI through policy, but globally not all policy responses were equal. The fact that governments enact their own policies differently across place and time strongly affects the impact on societies and economies (McBryde, 2020). Fang et al. (2021) evaluate the impact of COVID-19 on FDI in OECD and BRICS countries but focus on China as this was the country where the virus originated from and therefore was first confronted with the disease. The impact of COVID-19 in China was however limited, due to swift policy response, resulting in a time advantage. In general, they observe a negative relationship between COVID-19 (measured with a combination of cases and deaths) and FDI. This impact worsened in countries in continental America and Europe. In 2020, China's GDP increased by 2.3% whereas the GDP decreased for the US and EU, 3.5% and 6.4% respectively. Chattopadhyay et al. (2022) add to the study of Fang et al. by examining BRICS countries more closely. According to their analysis, the pandemic adversely influences Brazil's FDI, while it is insensitive in the other BRICS nations.

#### 2.2.2. Hypothesis development

The rise of globalization has accelerated foreign investments. Factors driving FDI range from surplus of labour and resources to attractive regulations. Institutions and policies play an important role in providing investors with a positive business climate. Political instability has proven to be detrimental to FDI. Governments were forced to act upon societal health issues caused by the COVID-19 outbreak. The abrupt nature of the pandemic, the additional restrictions in international travel and the reduction of imports and exports caused a general negative impact on FDI. Therefore, the following can be hypothesized:

***Hypothesis 2 (H2): COVID-19 has a negative impact on Foreign Direct Investments.***

Figure 1 suggests that for developing countries experienced negligible impact of COVID-19 on FDI, whereas FDI inflows towards developed countries reduced significantly. Literature of R2 substantiates these observations. Therefore, in the Extension (Section 6), a test will be performed by dividing the country sample into developed and developing countries to account for the difference in COVID-19 response and study how this impacts the results. Moreover, its important to note that literature on R2 also implicates that the overall impact of COVID-19 on FDI fluctuates per country due to divergence in policy responses. As a results, to observe how different policy responses influenced FDI inflows, additional similar research will be performed using a policy stringency split.

### 2.3. Relationship 3 (R3): (Sovereign) ESG Performance on FDI

#### 2.3.1. Literature review

In recent years, climate change and humanitarian crises have increasingly contributed to the philosophy of sustainable investing. According to the literature, sustainable investing has gone mainstream, with an estimated $37.8 trillion in assets under management in 2022. Global ESG assets are on track to exceed $53 trillion by 2025 (Bloomberg, 2022). The three main approaches of sustainable investing are; socially responsible investing (SRI), impact investing or ESG-investing. Whereas SRI and impact investing are difficult to quantify due to complexity of measuring social returns of investments, ESG is most applied in practice due to its broad scope and scalability (Hornberger, 2023).

In academics the relationship between ESG and corporate financial performance is well-studied. Friede et al. (2015) observe a sharp increase in studies on the relationship since 2000, ending at an estimated 2200 unique studies in 2015. Their meta-study combines all these studies and conclude that over 90% of the studies find non-negative relationship between ESG and corporate financial performance of which the

majority observe a significantly positive relationship that holds over time. The financial performance is measured using accounting-based characteristics such as ROA and ROI.

Study by Whelan et al. (2021) confirm post-2015 findings from Friede et al. and prolong this meta-study by analyzing over 1000 research papers of the period between 2015 and 2020. The leading definition of financial performance of the authors, is the Sharpe-ratio, the key-metric for risk-adjusted financial return. Their findings are, amongst others, that the positive relationship still holds, and is amplified on the long term, meaning that ESG impacts financial performance more on the long run.

Since the beginning of ESG in the 1990's, more and more firms manage and disclose internal ESG data. By 2022, Perez et al. (2022) argue that over 90% of S&P500 firms already disclose ESG data. Main motive of why investors use ESG data is to gain insight in financial performance rather than for ethical reasons (Amel-Zadeh, 2018). Principal-agent theory is the main channel through which ESG performance influences financial performance. Firms with higher corporate social responsibility have better access to capital markets, and lower financial constraints due to reduced agency costs and higher transparency which lowers information asymmetry. The cost of debt for firms with transparent and high-level of disclosure therefore shrinks (Raimo, 2021 & Cheng, 2014). Moreover, Li et al. (2022) find that, for Chinese firms, higher ESG performance lowers default risk. Study of Fauser et al. (2021) investigates the relation between ESG performance and litigation risk and concludes that higher ESG performance reduces the probability of US class action lawsuits. When examining Foreign Investments in specific, Khodijah et al. (2023) apply signaling theory to explain that high ESG performance leads to more foreign investments due to better reputation of those firms. Abidance of an ESG mandate is perceived by investors as a positive signal and raise their sentiment, thus generating cash inflows.

The rise in popularity of ESG investing can be attributed to these many-sided benefits. ESG is therefore mainly used by investors for its risk-mitigation properties. Investors are even willing to pay a premium of 20 bp for funds with ESG mandate compared to equal funds without ESG mandate (Baker, 2022). These risk-mitigation qualities are put to the test during economic turmoil. Expected is that firms that deploy adequate ESG strategies are more resilient and less prone to externalities. During the GFC of 2008-2009 companies with high corporate social responsibility had on average 4 to 7 percentage points greater stock returns and were superior in terms of profitability, growth, sales per employee and debt incurred compared to low corporate social responsibility performing firms (Lins, 2017).

For the COVID-19 pandemic, much research has been conducted and findings are similar. Focusing on China, ESG stocks have been superior in mitigating financial risk due to reduced stock price volatility and stability throughout the pandemic. Prior- and post-epidemic volatility increased less for high-performing ESG firms, indicating more resilience (Zhou, 2021). Broadstock et al. (2021) conduct a similar study, but differ from Zhou et al. by observing investor portfolio's in the Chinese market. Their results are similar in terms of financial risk reduction, but their findings also emphasize that the relationship is mostly present during crisis. Lööf et al. (2022) reveal that the high performing ESG stocks have lower downside risk and lower upside potential, thus demonstrating the risk-return trade-off is still in place during crisis. For the European market findings are also comparable. Cardillo et al. (2023) show that sustainable companies have higher returns, experience lower levels of volatility and are more liquid. The authors explain their results by looking at liquidity within the firms. Sustainable-oriented enterprises retained more cash and other liquid assets, enabling those firms to cope with the externalities from the pandemic. The proposed mechanism is in line with previous literature on the ability of high-performing ESG to better attract finances and thus hold larger capital buffers.

### 2.3.2. Hypothesis development

Summarizing the literature on ESG and its benefits, it can be stated that academic consensus is reached that firms with effective ESG mandates and clear business disclosures reduce principal-agent complications, like information asymmetry and agency costs, through signaling theory. In general high-performing ESG firms experience superior financial performance and benefit from better access to capital markets, are more liquid, face and face lower default risk. These benefits of ESG stocks are intensified during crisis times and have proven their worth during COVID-19 and the GFC, hence positively impacting investor sentiment toward ESG. Most literature is conducted on corporate ESG and its linkage to investments.

When addressing corporate ESG performance, the emphasis on regulatory frameworks and policies established by governments and organizations is critical for the development and success of the company. The assumption is made that without suitable legislation and policies, firms may not be sufficiently motivated or rewarded to incorporate ESG concepts into their operations. Extending this line of thought to Sovereign ESG, similar concepts apply. Governments and institutions build frameworks, regulations, and standards to support and regulate a country's adherence to ESG practices. For example, governments can pass legislation mandating emission reduction targets, encouraging the use of renewable energy, or implementing measures to protect natural resources. They may introduce social programs focusing on education, healthcare, poverty reduction, and social equality. Establishing transparent and accountable institutions, anti-corruption measures, and regulatory agencies can all improve a country's governance standards. The literature on corporate ESG, which investigates the interaction of rules, business behavior, and sustainable practices, can be a useful resource for understanding and shaping Sovereign ESG and is used for the formulation of the hypothesis. Analyzing how regulatory environments influence corporate behavior and performance can lead to a better understanding of how governmental actions affect a country's overall ESG standing. The hypothesis on the relationship between Sovereign ESG and FDI is the following:

***Hypothesis 3 (H3): Sovereign ESG has a positive impact on Foreign Direct Investments.***

## 2.4. Relationship 4 (R4): COVID-19 and Sovereign ESG (interaction) on FDI

### 2.4.1. Literature review and Theoretical framework

The relationship between COVID-19, Sovereign ESG and FDI builds upon relationships 1, 2, and 3. By examining how COVID-19 has affected FDI through Sovereign ESG, the study aims to determine whether the epidemic has had an impact on investor sentiment/behavior toward sustainable investing. During COVID-19, FDI inflow levels declined in 2020 by about 43%, only to partly recover in 2021 (WHO, 2023). The implication is that countries, keen to restart their economies, will seek to encourage investment, including by attracting as much FDI as possible. Thus, the world FDI market will become even more competitive, and governments will use all the tools at their disposal to attract and facilitate inward investment and will likely pursue an FDI-embracing approach. The inflow of foreign capital fosters recovery and contributes to economic growth and sustainable development. The benefits of sustainable FDI are double-sided as they are financially attractive and contribute to the ESG development of host countries. Sustainable development is accelerated by sustainable investments (Sauvant, 2021). Two problems arise from this conclusion as (1) there exists an asymmetry in the motives of foreign investors and governments as foreign investors seek to maintain and increase their competitiveness in an international context, whereas governments formulate investment policies with their national objectives (financial and sustainable) in mind (Henisz, 2005) and (2) identifying sustainable investments has proven to be complex (Sauvant, 2019).

Applying ESG as proxy for sustainability can be practical, as Antoncic et al. (2020) empirically establish a positive connection between ESG performance and SDG footprint. This can help with screening firms and investments. Key sustainable characteristics of firms are derived from the SDG and corresponding ESG framework. Sauvant et al. (2019) state that the core characteristics are; low carbon footprint, labour rights, workplace safety, human rights, transparency, legal compliance and stakeholder engagement. Interest alignment provides a solution. Sauvant et al. (2021) conceptualize a framework for attracting sustainable FDI and conclude that the best solution is alignment of interest, demonstrating that the crux of sustainable development lies in sustainable governments attracting sustainable investments.

### 2.4.2. Hypothesis development

Observing the studies surrounding R1 show that the COVID-19 outbreak has potentially increased awareness of ESG and that the pandemic has provided governments with an opportunity to implement a wide range of policy alterations aimed at improving their ESG performance. The literature on R3 suggests that high-performing ESG is related to stability and better performance, thus providing a financial motive on why investors would want to invest in high-performing ESG companies and countries. Moreover, the theoretical framework of R4 highlights importance of sustainable investments for governments and countries, emphasizing the mutually beneficial nature of ESG investing. When combining the literature of R1, R2 and R4, one could argue that both governments and investors attitude towards ESG investing have improved due to the pandemic and its global consequences. The hypothesis applied is therefore:

***Hypothesis 4 (H4): The COVID-19 pandemic has increased investor sentiment towards ESG investing, resulting in more FDI going towards high-performing ESG countries.***

# 3. Data

## 3.1. Data sample

A large dataset was computed combining all data on the variables from the various sources. Then the intersection of the years and countries was taken, yielding a strongly balanced dataset comprising of 142 countries during a continuous period of 2000 up to 2022. The data used comes from publicly accessible databases of the World Bank, the Sustainable Development Solutions Network (SDSN), the United Nations Development Programme (UNDP) and Yale University. The US-dollar ($) is used as currency for all monetary-related variables, contributing to consistency and comparability of the data.

## 3.2. Sovereign ESG metric

In the absence of global standards and academic consensus for measuring Sovereign ESG performance, limited empirical analysis on country-specific/Sovereign ESG has been conducted. The lack of conformity towards indicator selection and index calculation methods complicates academic research (Jiang, 2022). These findings hold for both Sovereign and corporate ESG ratings (Dorfleitner, 2015). Large providers of ESG ratings, such as MSCI, Sustainalytics and Robeco, have correlated overall ESG scores, however when investigating each ESG pillar specifically, the results diverge significantly, sometimes even resulting in negative correlation (Gratcheva, 2021). This has implications for the applicability of such ESG frameworks for performance tracking and investing implementations, as they can't be deemed objective. Atkins et al. (2023) investigate the current ESG framework and examine the effectiveness of ESG measures in a stressed period, resembled by the COVID-19 pandemic. The currently practiced weighting methods of each indicator and issue category have resulted in subjective outcomes and perceptions of ESG performance. They find that to best capture ESG performance, the distinction between the issue categories of Environmental, Social and Governance should be abandoned, and a more holistic approach should be applied.

Sovereign ESG performance can be evaluated in the context of a country's progress towards achieving the SDGs. The SDGs provide a global framework for addressing pressing global challenges, and Sovereign ESG performance can be assessed based on a nation's alignment with and contributions to these goals. The Sustainable Development Solutions Network (SDSN) assists the UN in tracking the achievement of the 17 SDGs for all 193 UN member countries. For each goal, a number of indicators are assigned, allowing high-frequency monitoring, which are statistically valid and robust and can be quantifiable in its contributions to the SDGs. To ensure data comparability across indicators, each indicator is normalized using Formula 1.

$$x' = \frac{x - x_{min}}{x_{max} - x_{min}} * 100 \quad (1)$$

After normalization, a score is computed for each goal using the arithmetic mean of indicators for that goal. To obtain the SDG index, the goal scores are multiplied by weights. The researchers at SDSN opted for an equal weighting method (Formula 2), to reflect a policymaker's commitment to treat all SDGs equally and as an integrated and indivisible set of goals. Thus, countries need to focus on all goals. The final score is a rate between 0 and 100 which can be interpreted as the overall Sovereign ESG performance towards achieving SDGs.

This methodology is in line with the proposed holistic approach from Atkins et al. (2023), and moreover addresses the subjectivity issue, which are additional benefits of applying this metric as proxy for Sovereign ESG.

$$ESG = \frac{1}{n} * \sum_{i=1}^{n} SDG_i \quad (2)$$

## 3.3. Variables

### 3.3.1. Hypothesis 1

For H1, the dependent variable is Sovereign ESG and the independent variable is the COVID-19 dummy (year ≥ 2020) which observes the post-COVID impact on ESG. Other drivers of Sovereign ESG are internalized as control variables. Three indicators from Yale University's Environmental Performance Index (EPI) are applied to proxy for the Environmental drivers of ESG. These are; the adjusted emission growth rate for carbon dioxide (CO2) which stems from the Climate Change pillar of EPI; the PM2.5 exposure (PM25) as adjusted years of life deterioration per 100,000 inhabitants, which represents Environmental Health; and the Species Protection Index (SPI) which assesses countries' actions toward protecting/retaining natural ecosystems and the full range of biodiversity. Social performance is measured using the Human Development Index (HDI), which is a composite index of life expectancy, education, and per capita income. This index is updated on a yearly basis by the United Nations Development Program to track the human development of countries. Finally, Governance performance is determined using Institutional Quality (IQ), proxied by Government Effectiveness (GE).

*Table 1: Overview of the variables applied in hypothesis 1*

| Type | Variable | Description | Abbreviation | Source |
|---|---|---|---|---|
| Dependent | Sovereign ESG | SDG index | ESG | SDSN |
| Independent H1 | Post-COVID | Year ≥ 2020 | PCESG | Dummy variable |
| Control Environment | Environmental performance | Three indicators from Environmental Performance Index (EPI) | CO2, PM25, SPI | Yale University |
| Control Social | Human development | Composite index of life expectancy, education and per capita income | HDI | UNDP |
| Control Governance | Institutional quality | Government Effectiveness | GE | World Bank |

*This table presents an overview of the variables applied in hypothesis 1. Variable type is stated, what indicator the variable represents, a detailed description of the proxy, the abbreviation used in the regression equations and the source from which the variable is extracted.*

### 3.3.2. Hypothesis 2-3-4

The dependent variable in H2, H3 and H4 are FDI inflows as a percentage of GDP, offering a relative measure enabling comparisons across countries with varying levels of GDP. This ratio allows for an assessment of FDI flows relative to the size of the economy. A higher share can suggest relative attractiveness to foreign investors, irrespective of the country's economic size, while also indicating the impact of foreign investment in proportion to the overall economic scale. This helps in determining both the attractiveness of a country for foreign investors and the potential economic impact of foreign investment within that country's economy.

The independent variable of H2 (COVID-19) are peak pandemic years, 2020 and 2021, for which a dummy will be used. The independent variable of H3 is Sovereign ESG, and the independent variable of H4 is the interaction term of post-COVID period (year ≥ 2020) and Sovereign ESG. This term uses a dummy for the years from and including 2020 for Sovereign ESG to clarify whether the importance of Sovereign ESG for attracting FDI (following the post-COVID) period has increased. Control variables applied are other drivers of FDI for which there is academic consensus. GDP percentage growth (GDPG) represents expanding markets and increase of potential profit opportunities (Blonigen, 2005, Dellis, 2022). Trade Openness (TO), measured as imports and exports, dividing by GDP, refers to the degree of integration with the global economy through international trade and can moreover be used as a proxy for market accessibility (Liargovasm, 2012, Dellis, 2022). Government Effectiveness (GE) resembles the country's Institutional Quality. Institutional Quality mainly benefits FDI attraction through stability and predictability (Kwok, 2006, Buchanan, 2012). The balance of payments is determined using the current account balance and impacts FDI as it is suggested that a deficit increases a country's necessity to attract foreign capital to bridge the savings gap (Chowdhury, 2023). Inflation (INFL) using the GDP deflator is added to control for economic stability. In general, inflation negatively influences FDI inflows (Kok, 2009). The theory of the relationship between inflation and FDI proposed by Agudze et al. (2021) nuances this and states that only once inflation rises to a certain threshold, it negatively impacts FDI. Thresholds vary per country and up till that threshold, the impact is negligible.

*Table 2: Overview of the variables applied in hypothesis 2, 3 and 4*

| **Type** | **Variable** | **Description** | **Abbreviation** | **Source** |
|---|---|---|---|---|
| Dependent | FDI | FDI inflows as % of GDP | FDI | World Bank |
| Independent H2 | COVID-19 | Year = 2020 & 2021 | COVID19 | Dummy variable |
| Independent H3 | Sovereign ESG | SDG index | ESG | SDSN |
| Independent H4 | Post-COVID * ESG | Year ≥ 2020 for Sovereign ESG | PCESG | Dummy variable |
| Control | GDP growth % | GDP growth % | GDPG | World Bank |
| Control | Trade Openness | (Imports + Exports) / GDP | TO | World Bank |
| Control | Institutional Quality | Government Effectiveness | GE | World Bank |
| Control | Balance of payments | Current account balance % GDP | CAB | World Bank |
| Control | Inflation | GDP deflator | INF | World Bank |

*This table presents an overview of the variables applied in hypothesis 2, 3 and 4. Variable type is stated, what indicator the variable represents, a detailed description of the proxy, the abbreviation used in the regression equations and the source from which the variable is extracted.*

# 4. Methodology

## 4.1. Methodology

A panel data analysis is applied as it combines cross-sectional observations with a time-series dimension and therefore allows incorporating multiple countries (i) during multiple years (t). First a Pooled OLS regression model is applied. This model combines cross-sectional and time-series variations in the data to estimate a single regression equation. This analysis is limited as it can't account for either cross-sectional and time differences. Therefore, the analysis is expanded by moving towards a fixed effects model. A Hausman test is performed to differentiate between Fixed Effects model (FE) and random effects model (RE), by testing whether the differences in coefficients are random (H0) or systematic (Ha), resulting in the rejection of H0 and therefore the selection of the FE model. This analysis helps to control for unobserved heterogeneity and accounts for country-specific (individual) factors that could bias the results. These are characteristcs that remain constant over time, but might vary across countries. These comprise of differences in geography, culture, and institutions. This approach isolates the impact of time-varying factors, enabling comparisons within countries throughout time. The Time Fixed Effects (TFE) model does the same only for time-varying factors that purely vary across the cross-section and affect all countries equal, such as events, trends and shocks. The COVID-19 outbreak is considered such an occasion. This model therefore accounts for time-specific effects and controls for overall time trends, allowing to focus on the effect of the independent variables of interest. A joint F-test for the time (years) dummies is performed, to test whether time dummies are significant, resulting in the decision to use also incorporate Time Fixed Effects (TFE). This combined model of both Country FE and Time FE is referred to as the dual fixed effects model. The results sections can be considered a follow-through of the mentioned analysis models.

The variables are tested for collinearity using a variance inflation factor (VIF) test and results show no problematic multicollinearity. Additionally, a test for normality and linearity is conducted using a normality probability plot (Q-Q plots) and distribution plots, presenting no normality, nor linearity issues. The stationarity assumption is validated using a Fisher-type unit root test based on Augmented Dickey-Fuller tests. To correct for complications of heteroscedasticity and autocorrelation (confirmed using Wald-statistic and Breusch-Pagan Lagrange Multiplier-test), analysis models with robust standard errors are incorporated in the models. The results of the assumption tests are included in the appendix.

## 4.2. Regression equations

### 4.2.1. Hypothesis 1

The regression equation to test the first hypothesis, is defined as follows:

$$\Delta X_{n_{it}} = X_{n_{it}} - X_{n_{it-1}} \quad (3)$$

$$\Delta ESG_{it} = \beta_0 + \beta_1 \Delta PCOVID19_i + \beta_2 \Delta GE_{it} + \beta_3 \Delta HDI_{it} + \beta_4 \Delta CO2_{it} + \beta_5 \Delta PM2.5_{it} + \beta_6 \Delta SPI_{it} + e_{it} \quad (4)$$

First the yearly change for each $n$ variable will be calculated by subtracting the previous year value, $X_{n_{it-1}}$ of the the current year value, $X_{n_{it}}$, to indicate the yearly differences of the variables (Formula 3). The $i$ stands for the country and $t$ for the year (time). In Formula 4, $\beta_0$ is the intercept or constant term of the model and $e_{it}$ is the overall error term to control for unobserved time- and country-dependent variations that are not incorporated in the model. To accept H1, beta-coefficient $\beta_1$ should be significantly larger than zero.

### 4.2.2. Hypothesis 2-3-4

The hypotheses for H2, H3, and H4 are tested sequentially. Step-by-step the regression equations are expanded, and by each iteration, the independent variable of the following hypothesis is incorporated. Finally, for H4 all independent variables are used. Therefore, Formula 5 tests H2, Formula 6 tests H3, Formula 7 tests H2 and H3 and Formula 8 tests H2, H3 and H4. The regression equations used for the panel regression analysis are:

$$FDI_{it} = \beta_0 + \beta_1 COVID19_i + \beta_x Z_{xit} + e_{it} \quad (5)$$

$$FDI_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_x Z_{xit} + e_{it} \quad (6)$$

$$FDI_{it} = \beta_0 + \beta_1 COVID19_i + \beta_2 ESG_{it} + \beta_x Z_{xit} + e_{it} \quad (7)$$

$$FDI_{it} = \beta_0 + \beta_1 COVID19_i + \beta_2 ESG_{it} + \beta_3 PCESG_{it} + \beta_x Z_{xit} + e_{it} \quad (8)$$

Where $\beta_x Z_{xij}$ is the matrix of control variables (x), defined below (Formula 9):

$$\beta_x Z_{xit} = \beta_1 GDPG_{it} + \beta_2 TO_{it} + \beta_3 GE_{it} + \beta_4 CAB_{it} + \beta_5 INF_{it} \quad (9)$$

To accept H2, $\beta_1$ of regression equation 5, 7 and 8 should be significantly smaller than zero, indicating a negative effect of the COVID-19 period for FDI. To accept H3, $\beta_1$ of regression equation 6 and $\beta_2$ of regression equation 7 and 8 should be significantly larger than zero, implying that high ESG-performing countries have a higher FDI inflow as percentage of GDP. Finally, to accept H4, $\beta_3$ should be significantly larger than zero, signifying that more FDI inflows were channeled towards high ESG performing countries after the COVID-19 events.

# 5. Results

## 5.1. Descriptive Statistics

### 5.1.1. Summary of statistics

*Table 3: Summary of statistics for the variables applied in hypothesis 1 to 4*

| Variable | Obs | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| FDI | 3218 | 4.328 | 7.705 | -57.532 | 138.215 |
| ESG | 3289 | 64.738 | 10.543 | 38.175 | 86.761 |
| CO2 | 3276 | 33.702 | 23.904 | 0 | 99.146 |
| PM25 | 3260 | 35.562 | 24.335 | 0 | 99.754 |
| SPI | 3266 | 42.068 | 26.081 | 0 | 92.34 |
| HDI | 3121 | .626 | .255 | .004 | .962 |
| GE | 2998 | .037 | .964 | -2.187 | 2.426 |
| CAB | 3056 | -2.011 | 9.274 | -65.257 | 48.209 |
| GDPG | 3272 | 3.713 | 4.714 | -36.658 | 57.8 |
| TO | 3133 | .844 | .492 | .027 | 4.373 |
| INF | 3271 | 7.719 | 48.095 | -30.2 | 2630.123 |

*This table presents the number of observations, mean, standard deviation, minimum and maximum value of the variables that are applied in hypothesis 1 to 4. Note that the COVID19 and PCESG variable are left out as these are dummy variables and solely have a value of either 0 or 1.*

The summary of statistics shows no irregular behavior of variables. Negative values of FDI net inflows for a particular year show that the value of disinvestment by foreign investors was more than the value of capital newly invested in the reporting economy. Government effectiveness is measured as a score between -2.5 and 2.5. A positive CAB (surplus) implies that a country is a net lender, whereas a negative CAB (deficit) implies a country is a net borrower from the rest of the world.

### 5.1.2. Correlation matrix

*Table 4: Pair-wise correlation matrix of the variables applied in hypothesis 1 to 4*

| Variables | (1) FDI | (2) ESG | (3) CO2 | (4) PM25 | (5) SPI | (6) HDI | (7) GE | (8) CAB | (9) GDPG | (10) TO | (11) INF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | 1.000 | | | | | | | | | | |
| (2) | 0.064 | 1.000 | | | | | | | | | |
| (3) | 0.033 | 0.327 | 1.000 | | | | | | | | |
| (4) | 0.036 | 0.178 | 0.100 | 1.000 | | | | | | | |
| (5) | 0.042 | 0.179 | 0.086 | 0.125 | 1.000 | | | | | | |
| (6) | 0.045 | 0.565 | 0.194 | 0.108 | 0.092 | 1.000 | | | | | |
| (7) | 0.103 | 0.749 | 0.282 | 0.284 | 0.158 | 0.511 | 1.000 | | | | |
| (8) | -0.178 | 0.112 | 0.110 | 0.039 | 0.078 | 0.165 | 0.229 | 1.000 | | | |
| (9) | 0.103 | -0.182 | -0.103 | -0.054 | -0.054 | -0.135 | -0.155 | -0.023 | 1.000 | | |
| (10) | 0.355 | 0.254 | 0.175 | 0.075 | 0.166 | 0.179 | 0.325 | 0.173 | 0.043 | 1.000 | |
| (11) | -0.011 | -0.078 | 0.023 | -0.034 | -0.027 | -0.050 | -0.097 | 0.009 | -0.026 | -0.037 | 1.000 |

*This table presents a pair-wise correlation matrix of the variables applied in hypothesis 1 to 4. Note that dummy variables are left out.*

The correlation matrix displays the relationships between all variables and shows no problematic multicollinearity issues, ensuring the independence of the variables, minimizing standard errors and resulting in stable and reliable coefficient estimates.

## 5.2. Hypothesis 1

### 5.2.1. Results

*Table 5: Regression output regarding hypothesis 1*

| **Dependent variable** | **Model 1** | **Model 2** | **Model 3** |
|---|---|---|---|
| *Δ ESG* | Pooled OLS | Fixed Effects | Time Fixed Effects |
| **Country FE** | **No** | **Yes** | **Yes** |
| **Time FE** | **No** | **No** | **Yes** |
| **Independent variable** | | | |
| *PCOVID19* | -0.0842*** | -0.0860*** | |
| | (0.0325) | (0.0281) | |
| *Year = 2020* | | | 0.0217 |
| | | | (0.0463) |
| *Year = 2021* | | | 0.147*** |
| | | | (0.0490) |
| **Control variables** | | | |
| *Δ CO2* | -0.00118*** | -0.00112*** | -0.00110*** |
| | (0.000448) | (0.000382) | (0.000366) |
| *Δ PM2.5* | 0.000201 | 0.000140 | 4.00e-05 |
| | (0.000545) | (0.000484) | (0.000454) |
| *Δ SPI* | 0.0108*** | 0.0120*** | 0.0132*** |
| | (0.00209) | (0.00299) | (0.00305) |
| *Δ HDI* | 0.0116 | 0.0108 | 0.0192 |
| | (0.0343) | (0.0372) | (0.0365) |
| *Δ GE* | 0.184** | 0.135 | 0.120 |
| | (0.0803) | (0.0895) | (0.0855) |
| *Constant* | 0.354*** | 0.353*** | 0.182*** |
| | (0.0108) | (0.00458) | (0.0256) |
| Observations | 2,634 | 2,634 | 2,634 |
| $R^2$ | 0.017 | 0.019 | 0.063 |

*This table presents the regression output of regression stated in Formula 4 which relates to hypothesis 1. The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. In Model 3 (TFE), the year dummies other than 2020 and 2021 are left out. A regression output table with all year dummies is included in the appendix. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

The results of the independent variable (post-COVID period) on the dependent variable vary across the models. In the Pooled OLS model, PCOVID19 (Year ≥ 2020) has a negative coefficient of -0.0842, significant on the 1% level. The same results are found in model 2, which differs from model 1 by including country-fixed effects, that is country-specific characteristics which are constant over time and only vary on the cross-sectional dimension. Here the coefficient slightly decreases and is equal to -0.086, at the same significance level (1%). These findings indicate a negative relationship between absolute growth of Sovereign ESG performance. Lastly model 3, the Time Fixed Effects (TFE) model, provides a statistically significant positive relationship between the PCOVID years, year 2020 and 2021, and Δ ESG being 0.0217 and 0.147 (on 1% significance level) respectively. The results of the control variables are robust as they have similar coefficients, signs and significance. The directions of the relationship are as expected, apart from Δ CO2, which holds a negative relationship with ESG growth.

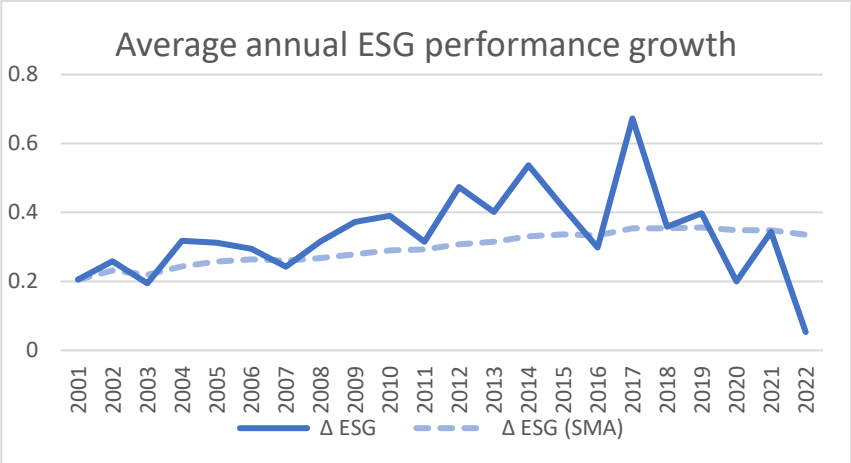
### 5.2.2. Discussion

The Pooled OLS model and FE model yield very similar results for the PCOVID19 dummy. The similarity indicates that the within-country variability is relatively low compared to the between-group variability. Country FE (cross-sectional variance), and its corresponding individual fixed effects are expected to be nearly zero, and therefore the model behaves similarly to Pooled OLS. The TFE model on the other hand is highly different from the other two models. The addition of the time dummies lowers the intercept value, being 0.18. This is the benchmark Δ ESG of the year 2003. The total time effect of each year T is the intercept *plus* the dummy coefficient of year T. In 2020 and 2021, the total time effect is therefore respectively 0.20 and 0.33, averaging 0.266. The results are therefore similar to the results from model 1 and 2 as the PCOVID dummy had a value of -0.085 and intercept 0.35, yielding an average Δ ESG score for the post-COVID years of 0.265. The TFE model year dummy variables are more difficult to interpret as an inspection of the other year dummy variables (included in the appendix) is needed here. Simply stating that the year dummy for 2021 is 0.147 (significant at 1% level) leads to biased conclusions. One should consider the constant (benchmark year) and examine each year's dummy before drawing conclusions. Due to this complication of the TFE (even though similar results after inspection), the results from models 1 and 2, which are similar, are selected for further interpretation.

This negative effect of PCOVID (-0.085, significant at 1% level) can be visually explained by plotting the annual growth of ESG scores and the trend of annual growth (Figure 3). The graph shows a sharp decline of annual growth since 2017, which is below the average growth of ESG (*SMA*). For the post-COVID years (≥ 2020), the growth rate has even further decreased. The negative coefficient of PCOVID is a derivative of this phenomena, exhibiting that on average the annual growth of the ESG performance, even though positive, is 0.085 points behind the trend of average yearly ESG performance growth.

According to the findings of this study, the theory that the pandemic has provided governments and institutions an opportunity to improve its ESG performance, through the punctuated equilibrium theory, can be rejected as the results indicate the opposite of the existing hypothesis. This finding may be explained by the lagged response proposition of Moschella (2011), suggesting that the real impact of the pandemic on policy, and therefore ESG performance, is still to be made and therefore not observed yet in ESG performance rankings.

*Figure 3: Average annual ESG performance growth rates*




*This graph presents the average annual growth rate of the SDG index rating from SDSN, which is used as proxy for Sovereign ESG. The blue line represents the actual average annual growth and the dotted line reflects the simple moving average (SMA) growth rate. The time period applied is 2000 up to 2022.*

Limitations of the study mainly entail the variable selection. The control variables for the Environmental pillar stem from the EPI, released by Yale University (Environmental Performance Index, 2022). Their respective coefficient is very low and even has a negative coefficient for the CO2 variable. Instead of using the EPI indicators, other indicators or raw, non-processed variables could be applied to enhance the test.

## 5.3. Hypotheses 2-3-4

### 5.3.1. Results: Pooled OLS

*Table 6: Regression output Pooled OLS model*

| **Dependent variable** | **Pooled Ordinary Least Squares (OLS)** | | | |
|---|---|---|---|---|
| FDI | **H2** | **H3** | **H2-H3** | **H2-H3-H4** |
| **Country FE** | **No** | **No** | **No** | **No** |
| **Time FE** | **No** | **No** | **No** | **No** |
| **Independent variables** | | | | |
| *COVID19* | 0.0109 | | 0.111 | 2.068 |
| *(Year 2020 & 2021)* | (0.487) | | (0.493) | (3.431) |
| *ESG* | | -0.0273 | -0.0280 | -0.0257 |
| | | (0.0204) | (0.0206) | (0.0210) |
| *PCESG* | | | | -0.0283 |
| *(Year ≥ 2020)* | | | | (0.0491) |
| **Control variables** | | | | |
| *GDPG* | 0.185*** | 0.180*** | 0.181*** | 0.182*** |
| | (0.0336) | (0.0330) | (0.0337) | (0.0338) |
| *CAB* | -0.209*** | -0.211*** | -0.211*** | -0.210*** |
| | (0.0155) | (0.0156) | (0.0156) | (0.0156) |
| *TO* | 6.003*** | 6.014*** | 6.014*** | 6.018*** |
| | (0.297) | (0.297) | (0.298) | (0.298) |
| *INF* | 0.0195* | 0.0195* | 0.0194* | 0.0192* |
| | (0.0101) | (0.0101) | (0.0101) | (0.0101) |
| *GE* | 0.578*** | 0.793*** | 0.799*** | 0.799*** |
| | (0.160) | (0.227) | (0.229) | (0.229) |
| *Constant* | -1.960*** | -0.183 | -0.154 | -0.310 |
| | (0.316) | (1.361) | (1.367) | (1.394) |
| Observations | 2,723 | 2,723 | 2,723 | 2,723 |
| $R^2$ | 0.189 | 0.189 | 0.189 | 0.190 |

*This table presents the regression output of the Pooled OLS model of the regressions stated in Formulas 5, 6, 7, and 8, which relate to hypotheses 2, 3, 2-3, and 2-3-4. The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

The results from the Pooled OLS regressions display statistically insignificant results for the independent variables. The magnitude of the COVID-19 dummy coefficients differs heavily across the regressions (0.0109 in H2 to 2.068 in H2-H3-H4) and its standard errors are relatively high. Sovereign ESG performance seems to have a insignificant, negative impact on FDI which is robust across the regression at around minus 0.027. The post-COVID ESG dummy is slightly negative and insignificant (-0.0283). The control variables are all highly significant, show expected signs, and are robust, thus justifying the choice of the control variables. The significant control variables contribute to the relatively high explanatory power of the regressions ($R^2$= 0.189).

The statistical validity of the Pooled OLS model for this study can be disputed as it does not differentiate between countries and time periods, by combining (pooling) all data points across time and countries into one single dataset, therefore not accounting for unobserved heterogeneity and/or time trends. This is a problem as country-specific characteristics can't be neglected in this study which aims to explain FDI inflow differences between countries by their respective Sovereign ESG performance. To solve this issue, the Fixed Effects model, which incorporates country/time-invariant heterogeneity, is applied next.

### 5.3.2. Results: Fixed Effects

*Table 7: Regression output Fixed Effects model*

| **Dependent variable** | **Fixed Effects model** | | | |
|---|---|---|---|---|
| FDI | **H2** | **H3** | **H2-H3** | **H2-H3-H4** |
| **Country FE** | **Yes** | **Yes** | **Yes** | **Yes** |
| **Time FE** | **No** | **No** | **No** | **No** |
| **Independent variables** | | | | |
| *COVID19* | -0.0987 | | 0.388 | 1.420 |
| *(Year 2020 & 2021)* | (0.703) | | (0.770) | (5.093) |
| *ESG* | | -0.112* | -0.133** | -0.133** |
| | | (0.0574) | (0.0616) | (0.0606) |
| *PCESG* | | | | -0.0148 |
| *(Year ≥ 2020)* | | | | (0.0813) |
| **Control variables** | | | | |
| *GDPG* | 0.181*** | 0.168*** | 0.172*** | 0.173*** |
| | (0.0481) | (0.0509) | (0.0482) | (0.0490) |
| *CAB* | -0.234*** | -0.236*** | -0.238*** | -0.238*** |
| | (0.0501) | (0.0497) | (0.0502) | (0.0502) |
| *TO* | 3.191** | 3.327*** | 3.372** | 3.405*** |
| | (1.263) | (1.263) | (1.299) | (1.278) |
| *INF* | 0.0266*** | 0.0243*** | 0.0236*** | 0.0234*** |
| | (0.00708) | (0.00698) | (0.00699) | (0.00714) |
| *GE* | -0.122 | 0.111 | 0.138 | 0.139 |
| | (0.860) | (0.848) | (0.846) | (0.844) |
| Observations | 2,723 | 2,723 | 2,723 | 2,723 |
| $R^2$ | 0.056 | 0.058 | 0.058 | 0.058 |

*This table presents the regression output of the Fixed Effects model of the regressions stated in Formulas 5, 6, 7, and 8, which relate to hypotheses 2, 3, 2-3, and 2-3-4. The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. Constants are left out as these are not interpretable. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

When including country-fixed effects (or time-invariant, i.e. country-specific, factors), the results for the independent variables change. COVID-19 remains positive (except for H2, however small magnitude; -0.0987) and statistically insignificant due to the high standard errors which was also similar to the Pooled OLS model. Sovereign ESG performance becomes significantly negative (~ 0.13 on 5% significance interval), implying that when ESG performance improves, FDI inflows decrease. Post-COVID ESG remains slightly negative and insignificant (-0.0148). The control variables of the Pooled OLS model and Fixed Effects model have only minor differences (Trade Openness magnitude decreases and Government Effectiveness becomes insignificant), but the outcomes are in general highly comparable and hence also robust across the models. The $R^2$ of the model (≈ 0.057) is lower than that of Pooled OLS, due to the

control for Fixed Effects, which essentially implies a reduction of the within-country variation in the dependent variable (FDI). The decreased $R^2$ is therefore not an issue.

To improve the model, time fixed effects (TFE) are included to control for the time trends that impact all countries equally. This expansion is essential in the context of the COVID-19 epidemic, as it affects all countries in the dataset. In practice, it comprises a year dummy for each t year represented in the sample, which coefficient resembles the incremental effect on FDI in time period t that is the same for all the firms. The COVID-19 dummy is replaced with the year dummy, to prevent multicollinearity. Note that the total year effect is considered when discussing the year dummies of 2020 and 2021 (COVID-19).

### 5.3.3. Results: Time Fixed Effects model

*Table 8: Regression output Time Fixed Effect*

| **Dependent variable** | **Time Fixed Effects model** | | |
|---|---|---|---|
| FDI | **H2** | **H2-H3** | **H2-H3-H4** |
| **Country FE** | **Yes** | **Yes** | **Yes** |
| **Time FE** | **Yes** | **Yes** | **Yes** |
| **Independent variables** | | | |
| *Year = 2020* | 1.827 | -0.456 | -6.710 |
| | (1.631) | (1.993) | (8.123) |
| *Year = 2021* | -1.145* | -3.551** | 2.182 |
| | (0.649) | (1.418) | (3.890) |
| *ESG* | | 0.333** | 0.333** |
| | | (0.136) | (0.130) |
| *PCESG* | | | 0.0928 |
| *(Year = 2020)* | | | (0.141) |
| *PCESG* | | | -0.0835 |
| *(Year = 2021)* | | | (0.0620) |
| **Control variables** | | | |
| *GDPG* | 0.220*** | 0.220*** | 0.227*** |
| | (0.0589) | (0.0595) | (0.0610) |
| *CAB* | -0.237*** | -0.233*** | -0.233*** |
| | (0.0514) | (0.0515) | (0.0516) |
| *TO* | 2.965** | 3.014** | 2.993** |
| | (1.389) | (1.388) | (1.375) |
| *INF* | 0.0276*** | 0.0282*** | 0.0275*** |
| | (0.00796) | (0.00774) | (0.00785) |
| *GE* | 0.225 | -0.147 | -0.143 |
| | (0.821) | (0.822) | (0.818) |
| *Constant* | 0.0347 | -20.65** | -20.67** |
| | (1.271) | (8.482) | (8.118) |
| Observations | 2,723 | 2,723 | 2,723 |
| $R^2$ | 0.083 | 0.086 | 0.087 |

*This table presents the regression output of the Time Fixed Effects model of the regressions stated in Formulas 5, 7, and 8, which relate to hypotheses 2, 2-3, and 2-3-4. Note that regression equation 6 (H3) is left out, as due to the nature of the TFE Model, the COVID-19 dummy variables (year dummies) cant be left out. The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. In the appendix, a regression table with all the year dummies (not exclusively 2020 and 2021) is included. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

The TFE results for the independent variables are highly different from the past two models. The 2020-dummy has a positive coefficient (1.827) not significant. The 2021-dummy has a negative coefficient (-1.145), significant at the 10% level. The results of H2 for the COVID-19 years fluctuate amongst the other regression models, displaying weak robustness of the results. Especially, when PCESG (post-COVID ESG) dummies are added, the regression parameters change significantly, and standard errors increase heavily. The models do show a robust significant positive impact of Sovereign ESG on FDI which holds across the different regression models (0.333 and significant on 5% level). Finally, the post-COVID ESG dummies, PCESG, are weakly positive (0.0928) and negative (-0.0835) for 2020 and 2021 respectively. These findings are furthermore insignificant. The outcome of the regression coefficients of the control variables are similar to the results of the FE-model. The inclusion of year dummies has improved the model fit as $R^2$ is now 0.087 compared to 0.058 of the FE-model.

### 5.3.4. Discussion

#### 5.3.4.1. Model selection

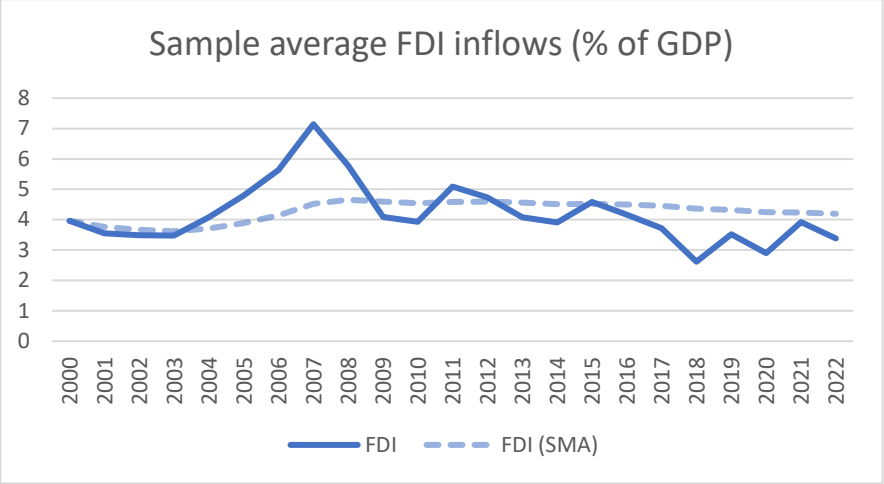
Three different models are proposed to test hypothesis 2, 3 and 4. The Pooled OLS regression is a simple linear regression model that doesn't account for individual or time-specific variation, making the model simple to comprehend and apply, yet not as applicable in cases of unobserved heterogeneity on the cross-sectional dimension or time-dimension. To account for the country-specific effects, the FE model was applied. This model yielded more accurate results due to the removal of country-specific variation, allowing more precise estimations of the time-varying effects. The FE model can be further improved by including time-fixed effects. This is significant when there is a belief that unobserved factors vary systematically over time. The COVID-19 outbreak (2020-2021) and the Great Financial Crisis (2007-2008) are deemed such events, as they affected all countries equally. The joint F-test for time-fixed-effects yields a P-value < 0.01 and the higher explanatory power compared to the FE model statistically justifies the choice for TFE over FE.

#### 5.3.4.2. Hypothesis 2

When computing a graph of the average FDI (Figure 4), it is observed that since 2015, FDI inflows have been beneath the simple moving average FDI inflows, which proxies the trend. In the graph, for 2020 a small decrease is observed, whereas the opposite is noted in the regression results (positive 1.827, not significant). This relationship of the 2020 dummy and FDI inverts for the H2-H3 regression being -0.456 insignificant. For 2021 a negative relationship holds (-1.145, significant at 10% level), which remains negative (-3.551 significant on 5%). To correctly interpret the COVID19 dummy coefficients of 2020 and 2021 an examination of the other year dummies is necessary (included in the appendix). In 2018 a decline in FDI inflows was witnessed, which is also stated in the year dummy for 2018 in the regression (-2.33, significant at 1% level). The same goes for 2006 and 2007, where both highly positive significant coefficients are noted, combined with an increase in the graph. For 2020 and 2021, the findings aren't as conclusive as for 2006, 2007 and 2018 as the results fluctuate in direction/significance and are partly inconsistent with the observations from Figure 4. The combination of this is that the evidence doesn't fully support the hypothesis and is therefore rejected.

The outcome can be explained by two factors. First, FDI inflows were already relatively low before the pandemic. In 2018 the natural resources markets experienced increased volatility, mainly the oil market, and the US-China trade conflict started as the US implemented tax reforms aimed at protecting the US economy ('Trump tariffs'). Therefore, the markets were already cooling down. Second, during the pandemic, GDP decreased as well (Figure 1). The dependent variable (FDI) is a relative measure of GDP, and when both the numerator (FDI) and the denominator (GDP) become smaller, the fraction (FDI as a percentage of GDP) remains roughly the same.

*Figure 4: Sample average FDI (% of GDP)*




*This graph presents the average FDI inflows (as percentage of GDP) of all the countries in the data sample combined from 2000 up to 2022. The dotted line is the simple moving average (SMA) of FDI inflows (as percentage of GDP).*

#### 5.3.4.3. Hypothesis 3

The research findings reveal a strong positive relationship between Sovereign ESG performance and FDI inflows. The study identifies a positive impact of ESG factors on FDI, quantified at a significant 0.333 level within a 5% confidence interval. Moreover, the robustness of these results across various regression models (H3, H2-H3, and H2-H3-H4) underscores the validity. The consistent magnitude and significance levels observed across these models strengthen the allegation that countries with superior ESG performance tend to attract higher FDI. As a result, the hypothesis is accepted.

The positive measure can be interpreted as the increased attractiveness of countries that perform better on ESG factors. On average for each additional point on Sovereign ESG performance, countries can expect an increase of FDI inflows of 0.33%. This conclusion is consistent with the expectations from theory on corporate ESG and investor sentiment, thus demonstrating that investors tend to be drawn to high ESG-performing countries. Signaling theory provides insight, as countries that score highly on ESG issues are able to demonstrate their commitment to social welfare, environmental conservation, and strong governance. This signal indicates the long-term stability and viability of the country's market and economy, providing investors with reliable and useful information. Strong ESG performance is perceived by investors as a measure of a nation's general well-being since it lowers risks, improves operational effectiveness, and increases resilience to social, environmental, and economic shocks, such as the COVID-19 examined in the study. As a result, they are more likely to distribute their wealth in these nations, which raises FDI inflows for high performing ESG countries. .

#### 5.3.4.4. Hypothesis 4

The post-COVID impact of FDI, through Sovereign ESG performance is slightly positive and insignificant for 2020 (0.0928). For 2021, the opposite is observed as the relationship is slightly negative and insignificant (-0.0835). This suggests that countries that improved their ESG performance during and after the pandemic did not necessarily attract more FDI inflows compared to low ESG, thus rejecting the hypothesis. This finding is in line with the finding of hypothesis 1, as ESG performances haven't increased significantly, and consequently countries haven't become more (or less) attractable for foreign direct investors.

Explanaition for this is that the attention of governments has been on attracting inflows of FDI in general, rather than on ESG matters and quality FDI. The same holds for foreign investors; during/after the pandemic, investors sentiment towards ESG performance hasn't been affected. The implication of this is that after the pandemic, the distribution of FDI inflows has remained similar in terms of ESG performance.

## 5.4. Control variables

Its important to notice that the control variables applied in hypotheses 2, 3, and 4, appear very robust. For all the models the regression coefficients were significant and had expected signs. GDPG is a significantly positive determinant of FDI as GDP growth (%) indicates growing and better-performing economies, therefore fostering FDI inflows. The CAB a significant negative factor of FDI, showing that when countries are net borrowers (deficit), FDI inflows are expected to be higher, i.e., when a country experiences a CAB deficit, this increases the country's dependency on external capital to secure their budgets. Trade Openness and Inflation have a significant positive impact on FDI, which is consistent with theory. Finally for Government Effectiveness, which is used as a proxy for Institutional Quality, the impact varies, but is positive for the models that exclude Sovereign ESG, and negative for the regressions including Sovereign ESG. This can be explained as the correlation between Sovereign ESG and GE is relatively high, therefore Sovereign ESG explains part of the variance which otherwise would be explained by GE. When excluding GE, this minor correlation problem disappears, and additionally, the time-period of the data increases a year (2022) as this was the limiting variable in the sample. Those results are moreover robust and show same pattern and statistical significance as the models with GE.

## 5.5. Robustness

During the data processing, outliers were left in the sample as they possibly contain valuable information about the unique characteristics or situation These outliers represent natural variations which increases the reliability of the results, and eliminating them can cause biased results. However, some outliers exist due to measurement errors or mistakes from the data processing. Removing these outliers improves the results as the variability they generate decreases, enhancing the goodness of fit of the model. Deviating between true outliers and error outliers is complex and a thorough understanding of the data is necessary. However, in academics, removing these outliers is often used as robustness check to examine whether the findings still hold, demonstrating that the results do not rely on the extreme value of the sample. Using winsorization, these outliers can be effectively removed and their extreme values are replaced by their respective closest observation still in the sample. This process maintains the integrity of the dataset (preserving the number of observations) while minimizing the disproportionate influence of outliers. In this study, the variables are winsorized at 5% level, indicating that the bottom and top 5% of the values per variable are modified and revalued. Then, the regressions are run as in section 5.3.3. (TFE model). The results (included in the appendix), show similar findings to the results from Table 8; ESG significant positive to FDI; Post-COVID ESG remains insignificant; the control variables have equal statistical significance and direction. The only noticeable difference is that of the COVID-19 year dummies, as they are negative for both 2020 and 2021. The explanatory power of the model has significantly increased ($R^2$= 0.17) for the winsorized results, signifying the decrease in unexplained variance caused by the outliers. The conclusion can be drawn that the results and consequent findings are robust and consistent across different (statistical) conditions.

# 6. Extension

## 6.1. Endogeneity of FDI and GDP

### 6.1.1. Literature review

In the previous sections, it is assumed that the relations are strictly exogenous, i.e. the independent variables and control variables solely affect the dependent variable. In the case of FDI and GDP, this is however doubtful. Empirical evidence reveals that there is a bi-directional causality link between FDI and GDP. Hansen et al. (2006) apply a Granger causality model and find that FDI (% of GDP) has a long-run impact on GDP growth, similar to domestic investments enhancing economic prosperity. On the other hand, the impact of GDP on FDI (% of GDP) is more short-term and less significant. Iamsiraroj (2016) investigates the FDI-GDP nexus for a substantial time period (1971-2020) in 124 countries and reveals that FDI is associated with higher rates of economic growth and vice versa. Her results suggest the existence of a virtuous cycle of GDP growth and FDI inflows. Li et al. (2005) show that FDI not only boosts the economy directly but also indirectly through interaction terms (human capital, infrastructure and the technology gap). As a result, the relationship between FDI and GDP (and vice versa) has become increasingly endogenous over the years.

### 6.1.2. Methodology

Using a Durbin-Whu-Hausman test, suspected endogeneity between FDI and GDPG is confirmed, indicating a correlation between GDPG and the unexplained variation (error term) of FDI, which may cause biased coefficient estimates. To control for this, a manual Two-Stage-Least-Squares (2SLS) analysis is conducted to control for endogeneity between FDI and GDPG, while also including robust standard errors. In the first stage, a TFE regression is performed with GDPG as the dependent variable, the control variables of FDI as independent variables, and additional Inflation and Employment as instruments (Formula 10).

$$GDPG_{it} = \beta_1 COVID19_i + \beta_2 ESG_{it} + \beta_3 PCESG_{it} + \beta_4 TO_{it} + \beta_5 GE_{it} + \beta_6 CAB_{it} + \beta_7 INF_{it} + \beta_8 EMP_{it} + e_{it} \quad (10)$$

The fitted values from this regression are then obtained and stored as GDP growth Instrument Variable ($GDPG\_IV$) and used in the second stage as replacement of $GDPG$. The regression from the second stage is a TFE model as applied in section 5.3.3. Note that Inflation and Employment are left out of the second-stage regression (Formula 11).

$$FDI_{it} = \beta_1 COVID19_i + \beta_2 ESG_{it} + \beta_3 PCESG_{it} + \beta_4 GDPG\_IV_{it} + \beta_5 TO_{it} + \beta_6 GE_{it} + \beta_7 CAB_{it} + e_{it} \quad (11)$$

### 6.1.3. Results: Two-Stages-Least-Squares (2SLS)

The results for the first stage show a large significant positive coefficient for the 2020 dummy (-17.54, significant at 1% level), indicating a decrease in GDPG for 2020. Sovereign ESG is significantly negative (-0.162 at 10% level), and PCESG is significantly positive, signifying that countries with higher ESG performance experienced greater GDP growth during COVID-19 (0.127 significant at 5% level for 2020 and 0.0832 significant at 10% level for 2021). The explanatory power of these regression results is relatively high at $R^2$ = 0.462.

*Table 9: Regression output 2SLS model*

| **2SLS Model** | **First stage** | **Second stage** | | |
|---|---|---|---|---|
| Dependent variable | GDPG | FDI | | |
| | **-** | **H2** | **H2-H3** | **H2-H3-H4** |
| **Country FE** | **Yes** | **Yes** | **Yes** | **Yes** |
| **Time FE** | **Yes** | **Yes** | **Yes** | **Yes** |
| **Independent variables** | | | | |
| *Year = 2020* | -17.54*** | -8.834 | -6.674 | -70.77** |
| | (4.585) | (8.725) | (9.235) | (35.49) |
| *Year = 2021* | -3.457 | -0.294 | -2.385 | -16.02** |
| | (3.815) | (1.141) | (2.645) | (7.217) |
| *ESG* | -0.162* | | 0.219 | -0.238 |
| | (0.0900) | | (0.209) | (0.313) |
| *PCESG* | 0.127** | | | 0.534 |
| *(Year = 2020)* | (0.0603) | | | (0.349) |
| *PCESG* | 0.0835* | | | 0.294** |
| *(Year = 2021)* | (0.0503) | | | (0.148) |
| **Control variables** | | | | |
| *GDPG_IV* | | -0.911 | -0.520 | -3.580** |
| | | (0.788) | (0.894) | (1.638) |
| *CAB* | -0.0128 | -0.263*** | -0.255*** | -0.306*** |
| | (0.0268) | (0.0808) | (0.0834) | (0.0928) |
| *TO* | 3.615*** | 6.597* | 5.161 | 15.98** |
| | (0.841) | (3.414) | (3.757) | (6.554) |
| *GE* | -0.490 | -0.773 | -0.780 | -2.075 |
| | (0.600) | (1.489) | (1.495) | (1.588) |
| **Instruments** | | | | |
| INF | -0.0239 | | | |
| | (0.0229) | | | |
| EMP | -0.00170 | | | |
| | (0.0189) | | | |
| *Constant* | 12.60** | 3.584 | -11.47 | 23.56 |
| | (5.723) | (2.307) | (14.75) | (22.44) |
| Observations | 1,891 | 1,890 | 1,890 | 1,890 |
| $R^2$ | 0.462 | 0.062 | 0.063 | 0.066 |

*This table presents the regression output of the First stage and Second stage of the 2SLS Model. The regression equations stated in Formulas 10, and 11, are applied. The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. In the appendix, a regression table with all the year dummies (not exclusively 2020 and 2021) is included. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

In the second stage the results show that the COVID-19 year dummies are highly negative (2020; -8.834 and 2021; -0.294), yet not significant. These coefficients remain highly negative for the H2-H3 regression and even experience a large increase in magnitude for the H2-H3-H4 regression, being significant moreover. The Sovereign ESG performance coefficient is 0.219 in H2-H3 and -0.238 in H2-H3-H4, both insignificant. The PCESG dummies are positive for both 2020 (0.534) and 2021 (0.294), and significantly positive at the 5% level for 2021. The control variables all show different results from the previous regression output. Considerable differences are that of the sign and magnitude of GDPG_IV, which becomes negative and insignificant.

### 6.1.4. Discussion

When comparing the results of the 2SLS model to the TFE model results, it is observed that the magnitude of the year dummies is inflated in the 2SLS model, the significance of the control variables is depleted and the impact of GDPG on FDI becomes negative, which contradicts the theory. The differences between the TFE and 2SLS results can be explained through the instrument validity criteria. An instrument(s) of an endogenous variable must satisfy (1) relevance and (2) exogeneity. Relevance indicates that the instrumental variables strongly correlate to the endogenous variable. In the case of Employment and Inflation this is the case as these variables affect GDP growth. Employment rate is a proxy of a country's productivity, thus determining GDP growth. Inflation influences GDP growth, as high inflation indicates erosion of purchasing power and increases uncertainty of investments, whereas low inflation (or deflation) slows down markets. The exogeneity criterion relates to the instruments being uncorrelated to the error term of the dependent variable, i.e. the instruments affects the dependent variable only through the endogenous variable. This assumption is violated. Inflation on itself is applied in the previous models as a control variable of FDI, yielding significant results. Employment impacts FDI inflows as it indicates labour availability, which affects foreign investors, seeking employees for their (greenfield) FDI investments.

Finding more suitable instruments for GDP growth, in the context of FDI, has proven to be difficult. The drivers of GDP growth are inherently connected to FDI, complicating the instrument selection. Another method to deal with the endogeneity issue is using a lagged (temporal differences) measure of the GDP growth variable, as an instrument for itself. This method is not applied in this study, but is proposed as possible future follow-up research.

## 6.2. Development and Policy Stringency

### 6.2.1. Methodology

Two extensions are derived from the literature review. First, to control for country differences, a split in the country sample will be made in developing and developed countries using a dummy variable. The classification used is from the World Bank and IMF which categorize by GDP per capita. For each year of the sample, the country's GDP per capita is compared with the GDP per capita threshold of that year (as set by the IMF) and consequently considered developed when above threshold and developing when below threshold. Following Figure 1, the hypothesis is that during COVID-19, developing countries experienced less impact on their FDI inflows (H5). This can be substantiated by the literature of relationship 2. Secondly, a policy stringency index (PSI), derived from the Oxford Government Response Tracker, will be integrated into the model, to control for differences in policy responses during the pandemic. The country sample will be split into either stringent or non-stringent (lenient), using a dummy variable. The median value of all indices will be used as the division criteria, resulting in 91 stringent countries and 51 non-stringent countries. It is assumed that stringent countries i.e. countries with relatively many restrictions such as school/workplace closures, international movement limitations etc., will face more impact on their FDI inflows (H6). The regression equations to test the extensions hypotheses (5 and 6) are defined as follows:

$$FDI_{it} = \beta_0 + \beta_1 COVID19_i + \beta_2 DEV_{it} + \beta_3 (COVID19_i * DEV_{it}) + \beta_x Z_{xit} + e_{it} \quad (12)$$

$$FDI_{it} = \beta_0 + \beta_1 COVID19_i + \beta_2 PSI_i + \beta_3 (COVID19_i * PSI_i) + \beta_x Z_{xit} + e_{it} \quad (13)$$

Note that $\beta_x Z_{xit}$ is the same set of control variables used for H2, H3 and H4, and is defined in Formula 9. To accept H5 and H6, $\beta_3$ respectively from equation 12 and 13 should be significantly smaller than zero.

The decision to apply a Pooled OLS model for the extensions stems from its ability to incorporate various types of time-invariant fixed effects using a dummy, which in this case is the development of countries and the policy stringency classification. This would not be possible in a regular FE model due to its default inclusion of country FE, and therefore including an additional time-invariant dummy will cause perfect multicollinearity. Furthermore, the Pooled OLS model allows the inclusion of TFE through year dummies, increasing the validity of the results.

### 6.2.2. Results H5: Development

*Table 10: Regression output for Hypothesis 5 (DEVCOV)*

| **Dependent variable** | **Pooled Ordinary Least Squares (OLS)** | |
|---|---|---|
| FDI | **DEV** | **DEVCOV** |
| **Country FE** | **No** | **No** |
| **Time FE** | **Yes** | **Yes** |
| **Independent variables** | | |
| *DEV* | 0.785* | 0.798* |
| | (0.441) | (0.430) |
| *Year = 2020* | 2.082 | 3.291** |
| | (1.530) | (1.669) |
| *Year = 2021* | -1.208* | -1.165 |
| | (0.642) | (0.916) |
| *DEVCOV* | | -0.122 |
| | | (1.991) |
| **Control variables** | | |
| *GDPG* | 0.232*** | 0.232*** |
| | (0.0556) | (0.0553) |
| *CAB* | -0.216*** | -0.216*** |
| | (0.0189) | (0.0188) |
| *TO* | 5.994*** | 5.995*** |
| | (0.843) | (0.834) |
| *INF* | 0.0201*** | 0.0200*** |
| | (0.00713) | (0.00722) |
| *GE* | 0.347 | 0.346 |
| | (0.213) | (0.211) |
| *Constant* | -2.710*** | -2.716*** |
| | (0.902) | (0.869) |
| Observations | 2,723 | 2,723 |
| $R^2$ | 0.209 | 0.209 |

*This table presents the regression output of the regressions stated in Formula 12, which relates to hypotheses 5. First the development dummy is added, and then the interaction-term with COVID-19 and Development. The sample period is from 2000-2022 and 142 countries are included in this study. 59 countries are categorized as developed and 83 are categorized as developing. Explanatory power is described by $R^2$. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

The regression output in table 10 presents a robust positive coefficient for developed countries (≈ 0.079), significant on 10% level. Furthermore, the impact of 2020 is positive and significantly positive (2.082 and 3.291 significant at 5% level). The impact of 2021 on FDI, is negative (-1.208 significant on 10% level, and -1.165 insignificant). The interaction effect between developed countries and the COVID-19 time period shows an insignificant slightly negative relationship (-0.122), signifying the decrease of FDI

inflows for developed countries during the pandemic and suggesting that FDI inflows towards developing countries were more resilient. The control variables are highly significant and have expected signs. The overall explanatory power of the model is relatively high ($R^2$ = 0.209), indicating strong predictive power.

### 6.2.3. Results H6: Policy stringency

*Table 11: Regression output for Hypothesis 6 (PSICOV)*

| **Dependent variable** | **Pooled Ordinary Least Squares (OLS)** | |
|---|---|---|
| FDI | **COVID19** | **PSICOV** |
| **Country FE** | **No** | **No** |
| **Time FE** | **Yes** | **Yes** |
| **Independent variables** | | |
| PSI | 0.00267 | 0.240 |
| | (0.264) | (0.272) |
| *Year = 2020* | 2.062 | 3.101* |
| | (1.527) | (1.603) |
| *Year = 2021* | -1.134* | 0.502 |
| | (0.637) | (1.383) |
| PSICOV | | -2.572 |
| | | (1.811) |
| **Control variables** | | |
| GDPG | 0.224*** | 0.219*** |
| | (0.0544) | (0.0542) |
| CAB | -0.211*** | -0.212*** |
| | (0.0182) | (0.0183) |
| TO | 5.970*** | 5.954*** |
| | (0.825) | (0.817) |
| INF | 0.0204*** | 0.0200*** |
| | (0.00719) | (0.00713) |
| GE | 0.637*** | 0.636*** |
| | (0.148) | (0.148) |
| Constant | -2.466*** | -2.582*** |
| | (0.824) | (0.852) |
| Observations | 2,723 | 2,723 |
| $R^2$ | 0.208 | 0.211 |

*This table presents the regression output of the regressions stated in Formula 13, which relates to hypotheses 6. First the stringency dummy is added, and then interaction-term of COVDI-19 and stringency. The sample period is from 2000-2022 and 142 countries are included in this study. 91 countries are categorized as stringent and 51 are categorized as non-stringent (lenient). Explanatory power is described by $R^2$. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

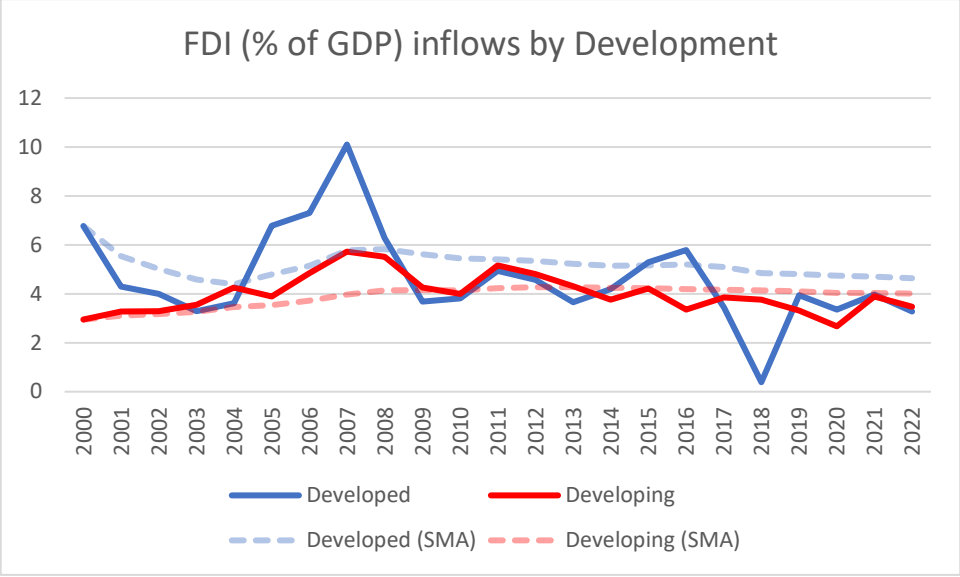
The output shows a weakly positive relationship for politically stringent countries (PSI), as the regression coefficient is only 0.00267. The impact of 2020 is both positive and significantly positive (2.062 and 3.101 within 5% confidence interval). The 2021-dummy has a regression parameter of -1.134, significant at 10% level and a positive insignificant coefficient in the latter regression (0.502). Finally, the PSICOV

dummy, which proxies for stringent countries during the COVID-period, has a large negative effect which is insignificant (-2.572). The control variables show predicted relations and are significant.

### 6.2.4. Discussion

The aim of hypotheses 5 and 6 is to assess the difference in the impact of the COVID-19 pandemic on developed and developing countries (H5) and stringent and non-stringent policy countries (H6). The results of H5 show a significant positive relationship between FDI and developed countries, signifying the increased FDI inflows for developed countries (~ 0.79% more FDI inflows compared to developing). These results are robust as it holds across the different regressions in H5. The dummies for 2020 and 2021 show mixed findings for the COVID-19 – FDI relationship, which is in line with the conclusions drawn in section 5.3.4.2.. The interaction of developed countries and the COVID-19 dummy has a negative coefficient, signifying an inverse relationship between developed countries during 2020 – 2021, and their FDI inflows. However, not enough support is found to accept the hypothesis, due to the insignificance (high standard error) of the regression coefficient. Even though trivial, both the general higher influx of FDI for developed countries and its greater decrease during COVID-19 compared to developing countries, partly confirm the presumption made by observing Figure 1. The divergence between the observations of Figure 1 and the results has two causes; (1) the graph in Figure 1 uses total FDI inflows in millions of US$, whereas this study uses FDI inflows as percentage of GDP, and (2) the classification of developed countries differs as the UNCTAD (source of Figure 1) classifies on 8 different indicators, including, but not limited to life expectancy, fundamental rights index and income per capita (Hoffmeister, 2020), while the classification used in this study stems solely from GDP per capita threshold set by the IMF. The classification of developed and developing countries is crucial for the outcome and is therefore also seen as a limitation; applying a different definition may yield different results. Figure 5 represents the actual FDI inflows by development type as used in this study.

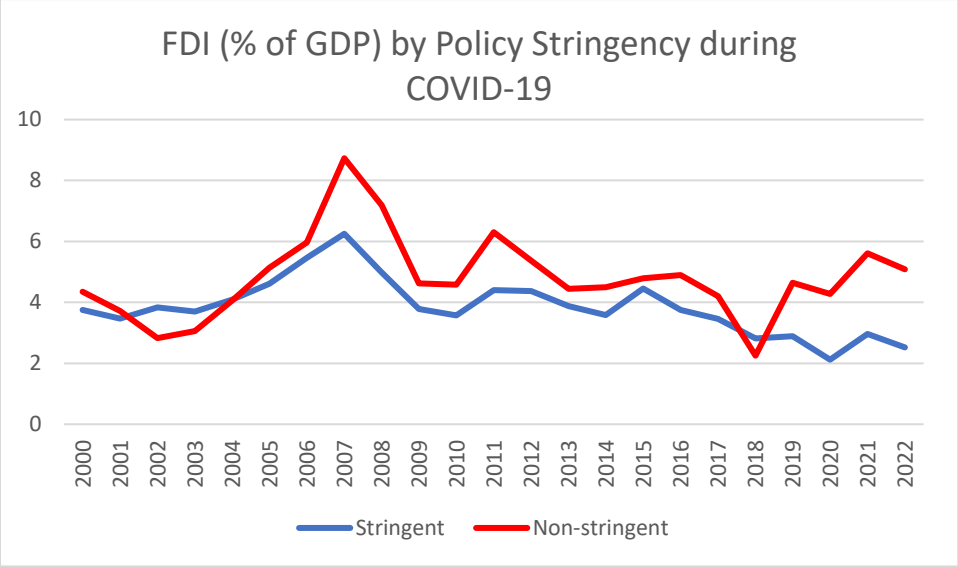
*Figure 5: FDI inflows (as percentage of GDP) by development type*




*This graph presents the average FDI inflows (as percentage of GDP) of developed countries (blue) and developing countries (red) from 2000 up to 2022. The dotted line is the simple moving average (SMA) of FDI inflows (as percentage of GDP).*

The results of hypothesis 6 demonstrate that, across the full time-series, the regression coefficient of stringent countries is limited positive and insignificant (0.00267), thus indicating that stringent countries are equally capable of attracting FDI flows as non-stringent or mild countries. The results of the COVID-19 period is consistent with the findings in section 5.3.4.2.. The interaction coefficient is highly negative, yet not significant. The combined magnitude of the coefficients of independent variables of the last regression, representing the total impact of COVID-19 solely for stringent countries, is -1.83. Compared to -1.13 of COVID-19 impact of the second regression, the average additional reduction of FDI inflows for stringent countries is 0.7%. This finding is however insignificant, and therefore the hypothesis can't be accepted. The outcome does nonetheless show a negative impact on FDI for stringent countries. This negative relation is expected from theory as increased policy stringency during COVID-19 signifies tighter policy, which results in a greater impact to the economy by means of restrictions on travel, trade and workplace closures. The FDI inflows by policy stringency can be observed in Figure 6.

*Figure 6: FDI inflows (as % of GDP) by policy stringency during COVID-19*




*This graph presents the average FDI inflows (as percentage of GDP) of stringent countries (blue) and non-stringent countries (red) from 2000 up to 2022.*

## 6.3. Foreign Portfolio Investment (FPI)

### 6.3.1. Literature review

Foreign Investments are largely divided in Direct Investments (FDI) and Indirect Investments, also known as Portfolio Investments (FPI). FDI is defined as lasting interest via the establishment of new businesses (greenfield) or an ownership stake of at least 10% (brownfield), whereas FPIs are generally smaller, passive investments that don't involve active ownership and take place in the short-medium term. FPI involves investors buying foreign financial assets such as fixed deposits, stocks and mutual funds, primarily to earn financial return or lower idiosyncratic risk by diversifying. The main difference between FDI and FPI is the intensity of involvement. FDI-engaging activities have a higher entry-level threshold, entail more active participation in operations, management, and decision-making, and are associated with higher risk due to its long-term nature. FPI on the other hand have a short time frame, exert no control over the practices surrounding their investments and are bought and sold easily. This increased liquidity of FPI has the drawback of being more volatile, especially under stressed circumstances such as recessions, political turmoil or developing country environment. Consequently, Goldstein et al. (2006)

advocate for a trade-off between efficiency and liquidity, where higher control over investments i.e. increased information access, transparency in business practices and improvement of firm performance (Perez-Gonzalez, 2004), lowers exit possibilities, hence creating stability.

The fundamental differences between FDI and FPI result in different points of interest when engaging in either FDI or FPI. Long-term/macro-economical characteristics of host countries, described in the data section (3.2.2.), are important drivers of FDI inflows. Foreign Portfolio Investors may also consider these determinants but are more interested in factors such as interest rate, exchange rates, and (stock/bond) market conditions In general a high market capitalization attracts investments, and well performing markets are favoured (Makoni, 2020). Favourable risk characteristics of markets depend on risk-appetite of portfolio investors. Risk-averse investors tend to divest during unstable/volatile times, whereas risk-seeking investors are willing to invest under similar circumstances in return for potentially higher expected returns. Volatility, expected return and especially risk-attitude are therefore fundamental in determining investment (behaviour) (Weber, 2013).

In the context of the COVID-19 epidemic, predicting investments has proven to be difficult due to the risk-return trade-off exhibited. At first, March 2020, global stock markets experienced a significant decrease in value, causing divestments. However, in the course of Q2 of 2020, governments announced large quantitative easing in the form of asset purchasing programs (APP) to sustain economies. A by-product of this was increased investors sentiment resulting in rebounding stock markets (Nozawa, 2021). The APP provided capital to all firms in need; firms that were financially healthy and required the credit to bridge depleted revenue, but also firms that were already on the brink of collapse post-COVID. These 'zombie firms' only survived credit to credit, causing rollover risk. The outcome of credit misallocation, was a decrease in firm defaults (Acharya, 2022). Consequently, investors became overly positive and stock markets overshot, further increasing investments. Therefore, the hypothesis is that COVID-19 has positively impacted (foreign) portfolio investments. Considering Sovereign ESG and FPI, the same positive relationship is hypothesized as for FDI, as it is expected that the risk-mitigation qualities of Sovereign ESG apply to both types of foreign investments.

### 6.3.2. Methodology

To examine the impact of COVID-19 and ESG on FPI, the portfolio equity inflows as percentage of GDP is used, which proxies foreign portfolio investments (FPI). These are net inflows from equity securities other than those recorded as direct investment and including shares, stocks, depository receipts (American or global), and direct purchases of shares in local stock markets by foreign investors (World Bank). The TFE model will be applied due to its incorporation of country and time fixed effects. The regressions are expanded similarly as in section 4.2.2.. The independent variables are the COVID-19 time dummy and Sovereign ESG from the SDG ranking index. The control variables are equal to the control variables used in H2-H3-H4 regressions. Additionally, the exchange rate (LCU per US$), and the deposit interest rate (%) are included in the model as well to control for portfolio investors' considerations of investing. Market capitalization of listed domestic companies is not included as this data is only available up till 2019. The regression equation is defined as follows (Formula 14):

$$FPI_{it} = \beta_0 + \beta_1 COVID19_i + \beta_2 ESG_{it} + \beta_3 (COVID19_i * ESG_{it}) + \beta_x Z_{xit} + e_{it} \quad (14)$$

### 6.3.3. Results

*Table 12: Regression output extension*

| **Dependent variable** | **Time Fixed Effects model** | | |
|---|---|---|---|
| FPI | **COVID19** | **ESG** | **COVID19 - ESG** |
| **Country FE** | **No** | **No** | **No** |
| **Time FE** | **Yes** | **Yes** | **Yes** |
| **Independent variables** | | | |
| *Year = 2020* | -0.288 | 0.378 | 1.011 |
| | (0.230) | (0.781) | (0.654) |
| *Year = 2021* | 0.981 | 1.686 | 0.836 |
| | (1.196) | (1.925) | (1.650) |
| *ESG* | | -0.0993 | -0.100 |
| | | (0.107) | (0.107) |
| *PCESG* | | | -0.0208* |
| *(Year = 2020)* | | | (0.0112) |
| *PCESG* | | | 0.000834 |
| *(Year = 2021)* | | | (0.0203) |
| **Control variables** | | | |
| GDPG | -0.0227 | -0.0226 | -0.0231 |
| | (0.0245) | (0.0244) | (0.0246) |
| CAB | -0.0262 | -0.0281 | -0.0283 |
| | (0.0283) | (0.0302) | (0.0303) |
| INF | 0.00486 | 0.00429 | 0.00443 |
| | (0.00336) | (0.00331) | (0.00332) |
| TO | -0.0818 | -0.0398 | -0.0387 |
| | (0.304) | (0.282) | (0.282) |
| GE | 0.315 | 0.407 | 0.410 |
| | (0.215) | (0.276) | (0.275) |
| EXCH | -3.03e-05 | -1.97e-05 | -2.71e-05 |
| | (5.30e-05) | (4.73e-05) | (4.46e-05) |
| INT | -0.0324 | -0.0325 | -0.0330 |
| | (0.0265) | (0.0263) | (0.0264) |
| Observations | 1,686 | 1,686 | 1,686 |
| $R^2$ | 0.018 | 0.019 | 0.019 |

*This table presents the regression output of the Time Fixed Effects model of the regressions stated in Formula 14. The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

Note that no irregular observations or multicollinearity issues were detected in the FPI data. The results shows a negative coefficient for the 2020 year dummy (-0.288) and a positive coefficient for the 2021 year (0.981). The negative relation for 2020 reverses in the second and third regression, when ESG is added. The 2021-dummy remains negative. The evidence is however weak as it is does not reach the preferred level of significance. Sovereign ESG has a slightly negative, yet also insignificant relation with FPI, being approximately -0.1. The post-COVID impact of 2020 is -0.02, significant on the 10% level and negligible zero for 2021 (insignificant). The control variables are not significant and show different signs from the FDI regressions.

### 6.3.4. Discussion

The aim of the extension is to study how the COVID-19 and ESG context relates to FPI as opposed to FDI. To examine the differences, the FPI regression was set up using the same independent and control variables as with the FDI regression. The results from the extension show that COVID-19 period wasn't necessary of negative influence for FPI. Instead, the coefficients were mostly positive, indicating that during 2020 and 2021, the activity on the FPI-market hasn't slowed down. This namely holds for 2021, as the positive relationship holds across the regressions. However, these results were insignificant therefore invalidating the statement that during COVID-19 the FPI market experienced a growth. For Sovereign ESG a negative, insignificant relationship is observed. This is opposite to the perceived positive connection of Sovereign ESG and FDI. For the PCESG-dummy of 2020 has a significant negative coefficient representing a negative effect of countries ESG performance during 2020 and FPI inflows. This implies that during 2020, an increase in Sovereign ESG performance, lowered foreign portfolio investments inflows. For 2021, the PCESG-dummy has a negligible positive and insignificant impact on FPI. The main conclusion from the results of the independent variables is that FPI is very different from FDI, hence confirming theory. The differences between FPI and FDI discussed in section 5, result in altered outcomes regarding the COVID-19 pandemic, the perception towards ESG and the interaction of these two. This is ratified when examining the control variables. The control variables of H2, H3 and H4 were robust across the models, highly significant and contributed to explanatory power and validity of the results. The same can't be specified when inspecting these control variables in the FPI regressions. The lack of adequate control variables is simultaneously a considerable limitation in this study. With different, more suitable controls such as market capitalization, equity market movements and other market related drivers of FPI, the results could show different results.

# 7. Limitations

Next to the limitations mentioned per hypothesis, there are some general limitations that apply to the entire study. The first limitation entails the recency of the subject. Even though the COVID-19 pandemic has formally ended, many economies are still recovering and rebuilding, and the long-term impact of the pandemic on qualitative factors such as ESG awareness is hard to determine. In this study, most data were only available up until 2021 and occasionally 2022. The conclusions drawn about the COVID-19 context of FDI inflows are therefore very current and possibly conclusions are drawn that could be refuted in the future.

The second limitation involves the statistical problem of the COVID-19 dummy in combination with interaction terms that also involve the COVID-19 time-period. As a result, multicollinearity arises, inflating standard errors and biasing results. This impacts the results of the regression with the COVID-19 dummy (or year dummies in TFE models) in combination with the post-COVID ESG dummies. Therefore, when discussing the COVID-19 relationship to the dependent variable, the results of the regressions without the interaction term were used.

The last limitation comprises the selection of the Institutional Quality (IQ) proxy, Government Effectiveness (GE). Instead of using GE, other measures such as the World Bank's control of corruption (COC) or Political Stability could have been used. The addition of these determinants to the existing regression would have caused multicollinearity issues due to the high correlation of these variables as they were all modified to be between -2.5 and 2.5 by the World Bank. The use of a different determinant from the World Bank or an entirely different proxy could alter the results and maybe more accurate predict the IQ – FDI relationship.

# 8. Conclusion

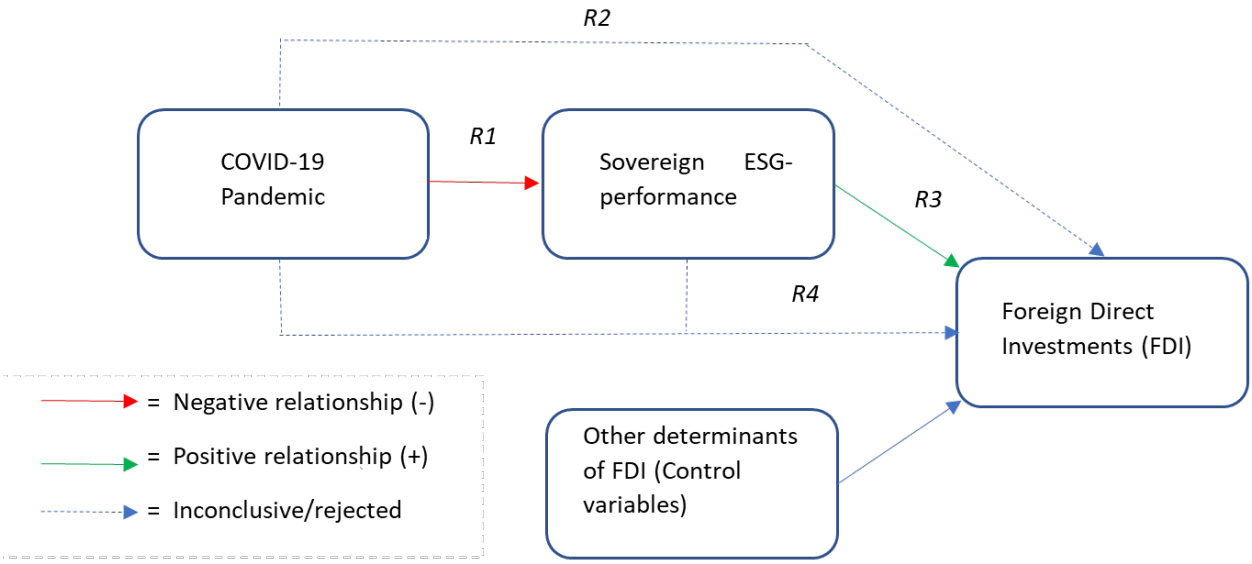
The pandemic has influenced the economy through policies aimed at preventing the spread of the virus. The consequence of the policy implementations was an increase in economic uncertainty, whereas the opposite effect of the outbreak was lower carbon emissions and increased biodiversity. The global scale of the pandemic has increased governments awareness on the risks of globalism and the vulnerability that comes with this. This study suggests that this translates to governments and institutions altering their behaviour towards ESG matters. In this study, Foreign Direct Investments are used to proxy for globalism and investigate whether beliefs towards this have changed. The objective of this study has been to clarify the relationship of FDI and ESG in a COVID-19 context, by providing an overview of the various components that influence this relationship and shedding light on these connections. Four hypotheses are developed and tested. Hypothesis 1 considers the COVID-19-ESG relation. Hypothesis 2 studies the impact of COVID-19 on FDI inflows. Hypotheses 3 investigates the ESG – FDI nexus. Finally, by combining hypotheses 1 to 3, hypothesis 4 is formulated, which analyses the interaction between COVID-19 and ESG and its respective impact on FDI inflows. FDI inflows are important for countries as they increase employment, production and trade. Furthermore, relation to the pandemic, FDI fosters economic recovery. Governments can actively steer FDI inflows by employing FDI attracting policies. The implication is that improvement of country-specific ESG performance may be such a factor and that during COVID-19 awareness towards this has increased.

In the literature review, punctuated equilibrium theory (PET) is used to predict how events such as the GFC and COVID-19 can cause governmental paradigm shifts. This has mildly been observed for companies, and regulators have also been investigating the ESG-reporting framework, emphasizing the growing importance of ESG in investing. This importance of ESG has been observed for investors as large funds increasingly channel their capital towards ESG stocks, and other investors use ESG-stock to mitigate risks. The risk-mitigating properties of these stocks are best exhibited during economic turmoil. In general, political instability (caused by sudden events) has a lowering impact on financial activity. During COVID-19, FDI flows has mainly been impacted for developed countries.

The methodology applied is a multiple regression model for panel data. The control variables are empirically established determinants of FDI; GDP growth, Current Account Balance, Inflation, Trade Openness and Government Effectiveness. Various models are employed and evaluated. The TFE model is found to be most suitable for this study and used in the discussion/analysis.

The outcome of H1 analysis displays a clear negative impact of the post-COVID period on Sovereign ESG performance. This contradictive finding is opposite of what was hypothesized, indicating that governments and policy makers haven't actively acted upon ESG matters following the COVID outbreak. The results of H2 are inconclusive as to whether accept or reject the hypothesis. The negative relationship between COVID-19 and FDI isn't perceived as robust (mainly for 2020), as the coefficient, directions and significance vary. The findings of H3 show a clear positive relationship between Sovereign ESG and FDI inflows. These results emphasize the importance of ESG performance for country's attractiveness to foreign investors. Lastly, hypothesis 4 is rejected. The analysis shows small insignificant parameter coefficients for its respective dummies. The results indicate that the impact of Sovereign ESG for FDI inflows hasn't increased during the pandemic. This result is partly in line with the conclusion on H1, as it shows that during COVID-19 governments haven't improved ESG performance and consequently hasn't become more important to investors during COVID-19. The findings of H2, H3 and H4 are summarized below, using the conceptual framework below.

*Figure 7: Conceptual framework: summary of results*




When studying the COVID-19 impact by country development, the results show that developed countries had on average higher levels of FDI inflows, but experienced a negative FDI inflow impact during COVID-19 compared to developing countries. This finding was however not significant. Investigation of country policy stringency during COVID-19 and its respective impact on FDI shows that more stringent countries had reduced FDI inflows, compared to non-stringent countries. The extension observes how the findings on FDI relate to FPI, and shows that COVID-19 and ESG impacts on FDI aren't adopted by FPI. On the contrary, COVID-19 seems to have a positive (insignificant) impact on FPI and ESG performance negatively affects FPI inflows (insignificant). For 2020 in specific, a small significant negative relationship is observed between ESG and FPI. Furthermore, the determinants of FDI do not hold for FPI, showing that different factors drive FPI compared to FDI.

To conclude, the turmoil caused by the pandemic affected foreign direct investors as characteristics of their investments are long-lasting, capital-intensive and entails exhaustive relationship between investor and host-country. Sovereign ESG performance strengthens the bond between these investors, ensuring foreign capital inflows during times of economic instability, as this study finds that high ESG performance relates to increased FDI inflow. This additional capital bridges the savings-investment gap of countries and fosters recovery. ESG development furthermore might benefit countries through stronger, more stable, FDI inflows by attracting more sustainable investments that last longer and are more robust. In the light of the SDGs, sustainable investments can facilitate governments by reaching those goals. The COVID-19 crisis can be perceived as an ideal opportunity to improve ESG related issues as 1) economic activity slowed down and 2) the pandemic exposed possible vulnerabilities towards ESG matters, as a result of increasing globalization. The opportunity is however not capitalized; the results show that the progress of growth of ESG performance has in fact worsened during and after COVID-19. Correspondingly, during COVID-19, the importance of ESG for FDI hasn't increased or decreased. It is possible that during COVID-19 most countries were more occupied with ensuring external funding. This study however suggests that, despite limited improvement during COVID-19, the significance of ESG for FDI is still insurmountable and that policymakers may shift their policy more towards attracting quality FDI rather than the quantity of FDI.

Including different proxies for the dependent and independent variable is suggested for further research. Instead of using FDI inflows, M&A activity may be used, and the polity index might be a better proxy for Instutional Quality. Also, a different methodology may be applied when analyzing the data. For example, in the endogeneity extension, a lagged version of GDP growth as instrument as suggested. This approach may yield better results. Furthermore, studies including additional Sovereign ESG metrics can increase the robustness of the results. When such indices become more common, an update of the study can be conducted to investigate whether the findings still hold. If these ratings become historically available, it may be interesting to investigate the relation between Sovereign ESG performance and different crises, such as the GFC. Lastly, an extension of FDI inflows is proposed by dividing FDI inflows in greenfield and brownfield investments, and examining whether these are differently impacted during the COVID-19.

# Appendix

## List of countries in the dataset

| List of countries in the dataset (142 countries) | | | | |
|---|---|---|---|---|
| Albania | Chad | Guatemala | Malaysia | Portugal |
| Algeria | Chile | Guinea | Maldives | Qatar |
| Angola | China | Guyana | Mali | Romania |
| Argentina | Colombia | Haiti | Mauritania | Russian Federation |
| Armenia | Comoros | Honduras | Mauritius | Rwanda |
| Australia | Congo, Dem. Rep. | Hungary | Mexico | Saudi Arabia |
| Austria | Congo, Rep. | Iceland | Moldova | Senegal |
| Azerbaijan | Costa Rica | India | Mongolia | Serbia |
| Bahamas, The | Cote d'Ivoire | Indonesia | Montenegro | Sierra Leone |
| Bahrain | Croatia | Iran, Islamic Rep. | Morocco | Singapore |
| Bangladesh | Czechia | Iraq | Mozambique | Slovak Republic |
| Barbados | Denmark | Ireland | Myanmar | Slovenia |
| Belarus | Djibouti | Israel | Namibia | Spain |
| Belgium | Dominican Rep. | Italy | Nepal | Sri Lanka |
| Belize | Ecuador | Jamaica | Netherlands | Sudan |
| Benin | Egypt, Arab Rep. | Japan | New Zealand | Suriname |
| Bhutan | El Salvador | Jordan | Nicaragua | Sweden |
| Bolivia | Estonia | Kazakhstan | Niger | Switzerland |
| Bosnia and Herzegovina | Eswatini | Kenya | Nigeria | Tajikistan |
| Botswana | Ethiopia | Korea, Rep. | Macedonia | Tanzania |
| Brazil | Fiji | Kuwait | Norway | Thailand |
| Brunei Darussalam | Finland | Kyrgyz Republic | Oman | Togo |
| Bulgaria | France | Lao PDR | Pakistan | Tunisia |
| Burkina Faso | Gabon | Latvia | Panama | Türkiye |
| Burundi | Gambia, The | Lebanon | New Guinea | Uganda |
| Cabo Verde | Georgia | Lesotho | Paraguay | United Kingdom |
| Cambodia | Germany | Lithuania | Peru | United States |
| Cameroon | Ghana | Luxembourg | Philippines | |
| Canada | Greece | Madagascar | Poland | |

## Assumption tests

### Wooldridge test for serial correlation (autocorrelation)

| **Wooldridge test for autocorrelation (Hypothesis 1)** | |
|---|---|
| H0: no first-order autocorrelation | |
| F-statistic | 12.168 |
| P-value | 0.0006 |

| **Wooldridge test for autocorrelation (Hypothesis 2-3-4)** | |
|---|---|
| H0: no first-order autocorrelation | |
| F-statistic | 10.220 |
| P-value | 0.0017 |

## Variance Inflation Factor (VIF) test

| **Variance Inflation Factor table of variables (Hypothesis 1)** | | |
|---|---|---|
| *Variable* | *VIF* | *1/VIF* |
| GED | 1.00 | 0.997597 |
| CO2D | 1.00 | 0.998252 |
| PM25D | 1.00 | 0.998320 |
| SPID | 1.00 | 0.999060 |
| HDID | 1.00 | 0.999236 |
| COVID19 | 1.00 | 0.999422 |

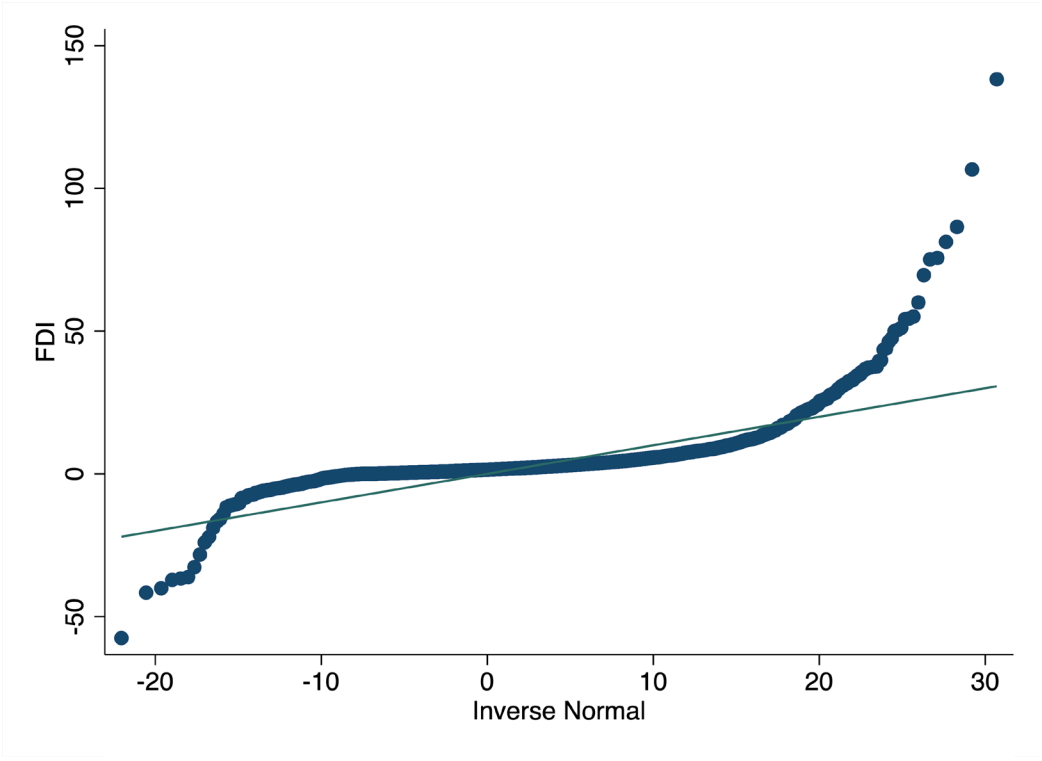
| **Variance Inflation Factor table of variables (Hypothesis 2-3-4)** | | |
|---|---|---|
| *Variable* | *VIF* | *1/VIF* |
| GE | 2.60 | 0.384425 |
| ESG | 2.38 | 0.419939 |
| TO | 1.15 | 0.872721 |
| GDPG | 1.10 | 0.906166 |
| CAB | 1.09 | 0.918061 |
| COVID19 | 1.07 | 0.931697 |

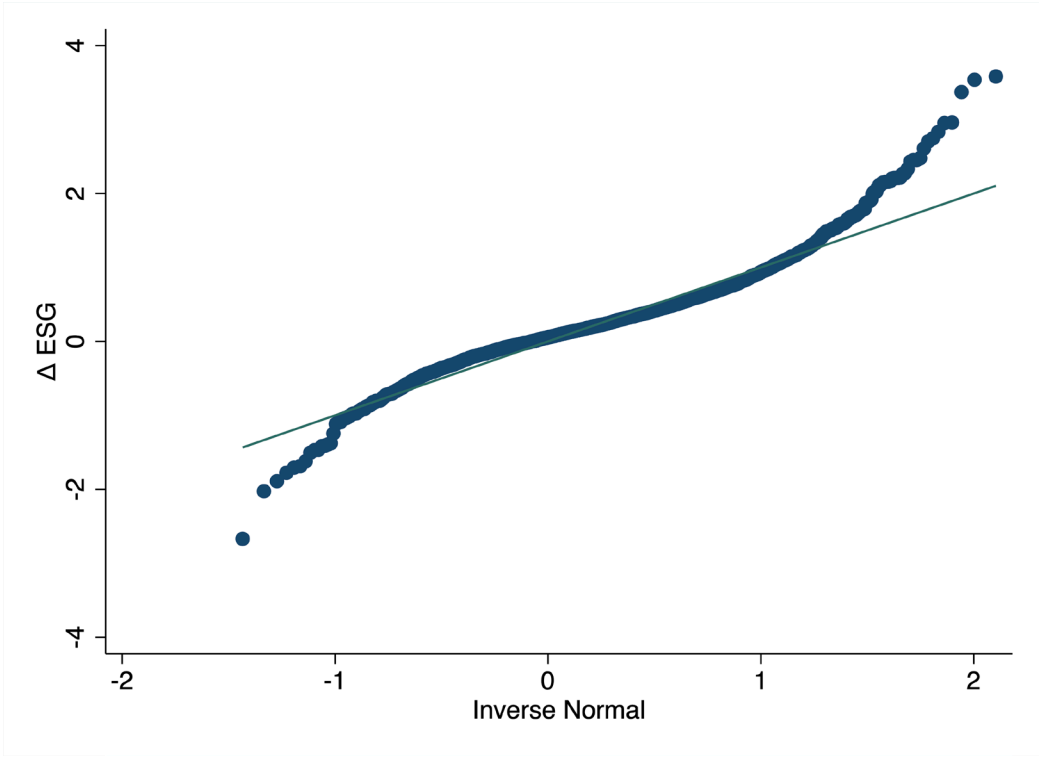
## Stationarity tests (Augemented Dickey-Fuller)

| **Fisher-type unit-root test for FDI** | | |
|---|---|---|
| *Based on augmented Dickey–Fuller tests* | | |
| H0: All panels contain unit-roots | | |
| Ha: At least one panel is stationary | | |
| | Statistic | P-value |
| Inverse chi-squared(286) | 575.7620 | 0.0000 |
| Inverse normal | -8.3069 | 0.0000 |
| Inverse logit t(719) | -9.3079 | 0.0000 |
| Modified inv. chi-squared | 12.1156 | 0.0000 |

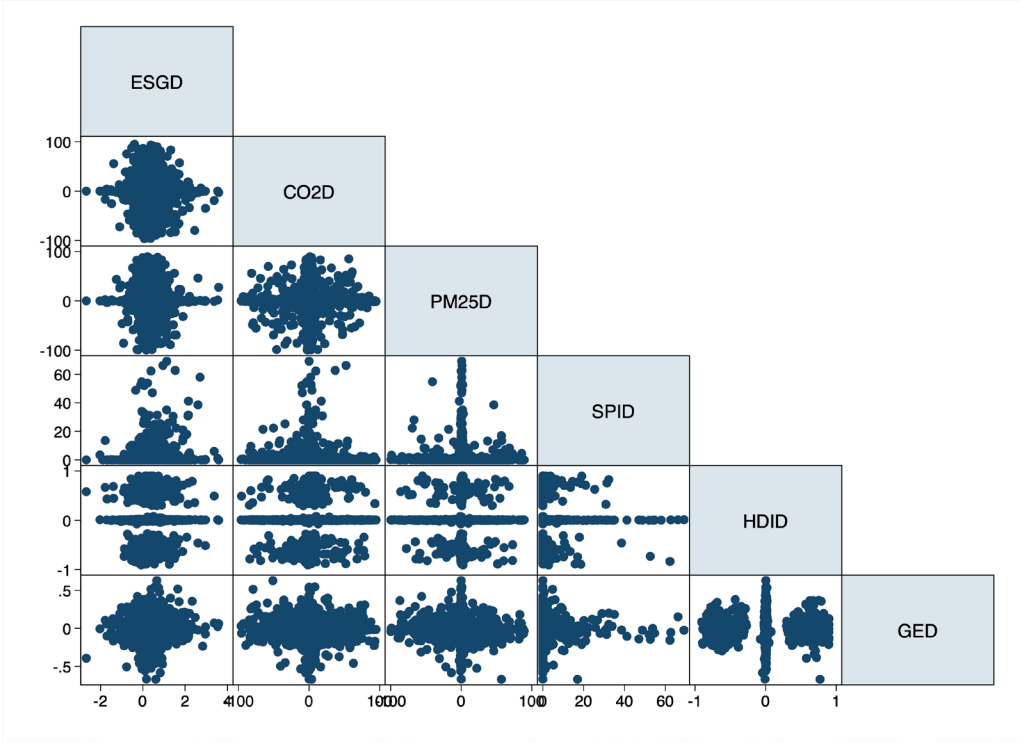
| **Fisher-type unit-root test for ESGD** | | |
|---|---|---|
| *Based on augmented Dickey–Fuller tests* | | |
| H0: All panels contain unit-roots | | |
| Ha: At least one panel is stationary | | |
| | Statistic | P-value |
| Inverse chi-squared(286) | 1044.5144 | 0.0000 |
| Inverse normal | -19.9826 | 0.0000 |
| Inverse logit t(719) | -22.5769 | 0.0000 |
| Modified inv. chi-squared | 31.7151 | 0.0000 |

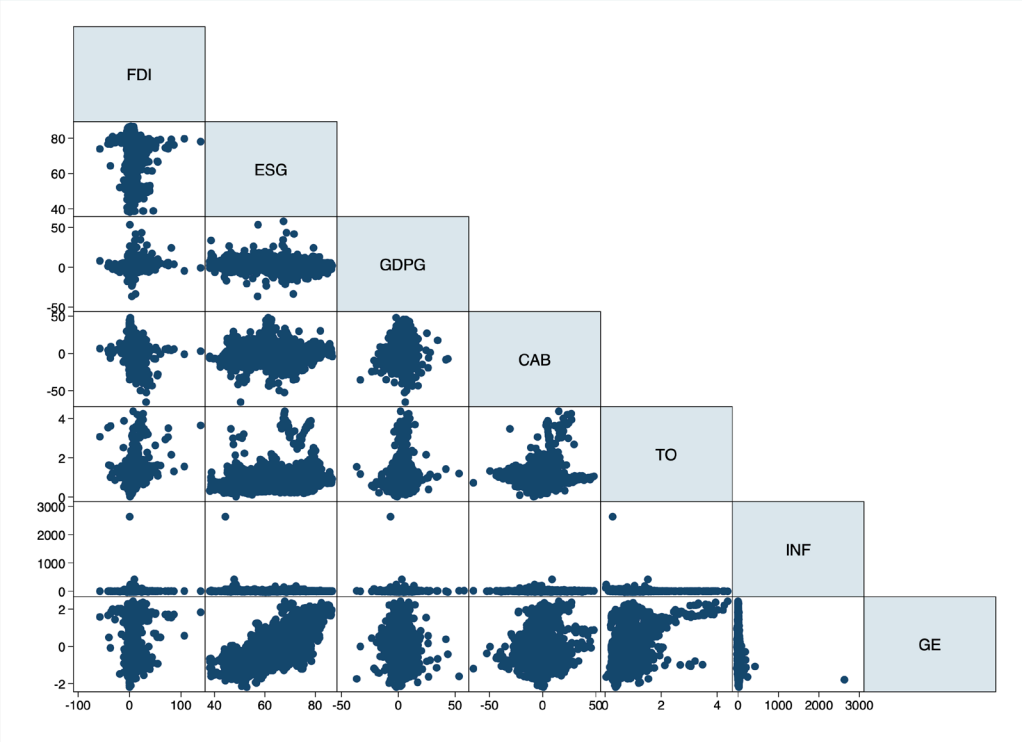
Normality tests (Q-Q plot) independent variables



## Linearity test



## Wald test for heteroskedasticity

| **Wald test for groupwise heteroskedasticity (Hypothesis 1)** | |
|---|---|
| *H0: sigma(i)^2 = sigma^2 for all* | |
| Chi-squared | 2861.33 |
| P-value | 0.0000 |

| **Wald test for groupwise heteroskedasticity (Hypothesis 2-3-4)** | |
|---|---|
| *H0: sigma(i)^2 = sigma^2 for all* | |
| Chi-squared | 2.1e+06 |
| P-value | 0.0000 |

## Year dummy variables

### Regression results (Hypthesis 1, 2, 3 and 4): year dummy coefficients

| Reference Hypothesis | Table 5 H1 | Table 8 H2 | Table 8 H2-H3 | Table 8 H2-H3-H4 | Table 9 H2 | Table 9 H2-H3 | Table 9 H2-H3-H4 |
|---|---|---|---|---|---|---|---|
| Variable | | | | | | | |
| 2002.Year | | -0.338 | -0.496 | -0.498 | -2.155* | -1.788 | -5.464*** |
| | | (0.436) | (0.445) | (0.444) | (1.227) | (1.266) | (2.017) |
| 2003.Year | | -0.300 | -0.505 | -0.513 | -1.082 | -1.158 | -1.337 |
| | | (0.575) | (0.586) | (0.585) | (0.826) | (0.840) | (0.846) |
| 2004.Year | 0.0961* | 0.188 | -0.141 | -0.153 | 0.814 | 0.254 | 3.296* |
| | (0.0569) | (0.540) | (0.551) | (0.552) | (1.154) | (1.349) | (1.836) |
| 2005.Year | 0.120*** | 0.822 | 0.381 | 0.373 | 0.809 | 0.421 | 1.728 |
| | (0.0398) | (0.550) | (0.560) | (0.557) | (0.866) | (0.920) | (1.094) |
| 2006.Year | 0.101*** | 2.258*** | 1.731** | 1.717** | 3.530** | 2.790* | 6.651** |
| | (0.0386) | (0.730) | (0.712) | (0.703) | (1.448) | (1.502) | (2.600) |
| 2007.Year | 0.0174 | 2.355** | 1.763* | 1.749 | 3.464* | 2.647 | 6.800*** |
| | (0.0451) | (1.063) | (1.054) | (1.062) | (2.013) | (2.165) | (2.184) |
| 2008.Year | 0.109*** | 1.277** | 0.593 | 0.594 | -0.797 | -0.637 | -4.420* |
| | (0.0412) | (0.595) | (0.672) | (0.663) | (1.664) | (1.690) | (2.414) |
| 2009.Year | 0.177*** | 1.546** | 0.736 | 0.761 | -6.222 | -4.246 | -22.92** |
| | (0.0474) | (0.678) | (0.722) | (0.712) | (5.100) | (5.563) | (9.757) |
| 2010.Year | 0.188*** | 0.429 | -0.502 | -0.506 | -1.185 | -1.377 | -3.341*** |
| | (0.0489) | (0.637) | (0.717) | (0.702) | (1.103) | (1.112) | (1.139) |
| 2011.Year | 0.133** | 0.746 | -0.288 | -0.288 | -1.391 | -1.544 | -4.146** |
| | (0.0567) | (0.552) | (0.651) | (0.649) | (1.167) | (1.180) | (1.698) |
| 2012.Year | 0.269*** | 0.496 | -0.697 | -0.695 | -2.625 | -2.487 | -7.966** |
| | (0.0524) | (0.532) | (0.692) | (0.687) | (1.820) | (1.819) | (3.126) |
| 2013.Year | 0.207*** | 0.0916 | -1.229* | -1.230* | -2.571* | -2.780** | -6.100*** |
| | (0.0512) | (0.556) | (0.690) | (0.677) | (1.336) | (1.329) | (1.879) |
| 2014.Year | 0.327*** | 0.0941 | -1.396* | -1.399* | -2.380 | -2.708* | -5.803*** |
| | (0.0530) | (0.511) | (0.787) | (0.759) | (1.438) | (1.447) | (1.847) |
| 2015.Year | 0.205*** | 1.068 | -0.556 | -0.557 | -1.184 | -1.586 | -4.338*** |
| | (0.0550) | (0.874) | (0.932) | (0.908) | (1.337) | (1.302) | (1.406) |
| 2016.Year | 0.0992** | 0.222 | -1.501 | -1.502* | -2.062 | -2.475 | -5.566** |
| | (0.0464) | (0.701) | (0.918) | (0.879) | (1.810) | (1.749) | (2.136) |
| 2017.Year | 0.465*** | -1.004 | -2.950*** | -2.951*** | -3.173** | -3.882** | -5.422*** |
| | (0.0529) | (0.674) | (1.092) | (1.096) | (1.264) | (1.582) | (1.921) |
| 2018.Year | 0.161*** | -2.331*** | -4.402*** | -4.402*** | -5.109*** | -5.866*** | -7.394*** |
| | (0.0610) | (0.813) | (1.408) | (1.392) | (1.661) | (2.050) | (2.243) |
| 2019.Year | 0.200*** | -0.507 | -2.713** | -2.711** | -3.502 | -4.083* | -7.583*** |
| | (0.0442) | (0.706) | (1.324) | (1.265) | (2.315) | (2.354) | (2.559) |
| 2020.Year | 0.0217 | 1.827 | -0.456 | -6.710 | -8.834 | -6.674 | -70.77** |
| | (0.0463) | (1.631) | (1.993) | (8.123) | (8.725) | (9.235) | (35.49) |
| 2021.Year | 0.147*** | -1.145* | -3.551** | 2.182 | -0.294 | -2.385 | -16.02** |
| | (0.0490) | (0.649) | (1.418) | (3.890) | (1.141) | (2.645) | (7.217) |

*This table presents the coefficients of the year dummy variables used in the models with TFE. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

## Regression results extensions: year dummy coefficients

| Reference Hypothesis | Table 10 (DEV) | Table 10 (DEVCOV) | Table 11 (PSI) | Table 11 (PSICOV) | Table 12 FPI | Table 12 FPI | Table 12 FPI |
|---|---|---|---|---|---|---|---|
| Variable | | | | | | | |
| 2002.Year | -0.255 | -0.255 | -0.238 | -0.243 | -0.307 | -0.272 | -0.271 |
| | (0.494) | (0.494) | (0.495) | (0.494) | (0.191) | (0.191) | (0.191) |
| 2003.Year | -0.260 | -0.261 | -0.235 | -0.234 | -0.0402 | 0.00764 | 0.00884 |
| | (0.586) | (0.586) | (0.588) | (0.588) | (0.201) | (0.196) | (0.196) |
| 2004.Year | 0.134 | 0.133 | 0.173 | 0.178 | -0.113 | -0.0357 | -0.0339 |
| | (0.571) | (0.571) | (0.572) | (0.571) | (0.196) | (0.205) | (0.205) |
| 2005.Year | 0.795 | 0.793 | 0.865 | 0.872 | 0.399 | 0.503* | 0.506* |
| | (0.583) | (0.582) | (0.581) | (0.581) | (0.258) | (0.276) | (0.276) |
| 2006.Year | 2.017*** | 2.016*** | 2.091*** | 2.104*** | 0.281 | 0.411 | 0.414 |
| | (0.760) | (0.758) | (0.758) | (0.758) | (0.215) | (0.283) | (0.283) |
| 2007.Year | 2.133** | 2.131** | 2.213** | 2.224** | -0.133 | 0.0194 | 0.0229 |
| | (1.021) | (1.019) | (1.023) | (1.023) | (0.371) | (0.413) | (0.414) |
| 2008.Year | 1.048* | 1.046* | 1.130* | 1.133* | -0.454* | -0.272 | -0.270 |
| | (0.614) | (0.612) | (0.615) | (0.615) | (0.243) | (0.288) | (0.288) |
| 2009.Year | 1.655*** | 1.656*** | 1.670*** | 1.647*** | -0.0668 | 0.152 | 0.153 |
| | (0.634) | (0.634) | (0.635) | (0.635) | (0.219) | (0.204) | (0.205) |
| 2010.Year | 0.382 | 0.380 | 0.454 | 0.456 | 0.895 | 1.152 | 1.154 |
| | (0.665) | (0.665) | (0.665) | (0.666) | (0.852) | (1.108) | (1.108) |
| 2011.Year | 0.620 | 0.619 | 0.704 | 0.705 | 0.327 | 0.610 | 0.612 |
| | (0.593) | (0.592) | (0.592) | (0.592) | (0.566) | (0.849) | (0.849) |
| 2012.Year | 0.362 | 0.361 | 0.447 | 0.445 | -0.0673 | 0.265 | 0.268 |
| | (0.565) | (0.565) | (0.564) | (0.564) | (0.199) | (0.374) | (0.374) |
| 2013.Year | -0.0230 | -0.0245 | 0.0589 | 0.0564 | -0.102 | 0.269 | 0.272 |
| | (0.596) | (0.595) | (0.594) | (0.594) | (0.190) | (0.437) | (0.437) |
| 2014.Year | -0.0419 | -0.0433 | 0.0339 | 0.0345 | -0.303 | 0.116 | 0.120 |
| | (0.515) | (0.515) | (0.514) | (0.514) | (0.286) | (0.319) | (0.318) |
| 2015.Year | 1.056 | 1.054 | 1.126 | 1.121 | -0.222 | 0.235 | 0.240 |
| | (0.880) | (0.879) | (0.886) | (0.887) | (0.209) | (0.522) | (0.521) |
| 2016.Year | 0.267 | 0.266 | 0.330 | 0.326 | -0.613 | -0.119 | -0.113 |
| | (0.715) | (0.714) | (0.717) | (0.718) | (0.534) | (0.243) | (0.242) |
| 2017.Year | -1.061 | -1.062 | -1.005 | -1.005 | -0.0177 | 0.550 | 0.556 |
| | (0.717) | (0.717) | (0.715) | (0.714) | (0.263) | (0.784) | (0.784) |
| 2018.Year | -2.485*** | -2.486*** | -2.423*** | -2.422*** | -0.589** | 0.0165 | 0.0230 |
| | (0.790) | (0.789) | (0.790) | (0.788) | (0.281) | (0.520) | (0.519) |
| 2019.Year | -0.591 | -0.592 | -0.546 | -0.547 | -0.301 | 0.339 | 0.347 |
| | (0.663) | (0.663) | (0.669) | (0.670) | (0.225) | (0.623) | (0.623) |
| 2020.Year | 2.082 | 3.291** | 2.062 | 3.101* | -0.288 | 0.378 | 1.777 |
| | (1.530) | (1.669) | (1.527) | (1.603) | (0.230) | (0.781) | (1.157) |
| 2021.Year | -1.208* | -1.165 | -1.134* | 0.502 | 0.981 | 1.686 | 1.638 |
| | (0.642) | (0.916) | (0.637) | (1.383) | (1.196) | (1.925) | (2.265) |

*This table presents the coefficients of the year dummy variables used in the models with TFE. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

## Robustness check: winsorization (H2-H3-H4)

| **Dependent variable** | **Time Fixed Effects model** | | |
|---|---|---|---|
| wFDI | **H2** | **H2-H3** | **H2-H3-H4** |
| **Country FE** | **Yes** | **Yes** | **Yes** |
| **Time FE** | **Yes** | **Yes** | **Yes** |
| **Independent variables** | | | |
| *Year = 2020* | -0.265 | -1.100* | 0.366 |
| | (0.409) | (0.635) | (1.522) |
| *Year = 2021* | -0.764* | -1.660** | -0.229 |
| | (0.392) | (0.641) | (1.985) |
| *wESG* | | 0.133* | 0.139* |
| | | (0.0762) | (0.0716) |
| *wPCESG* | | | -0.0209 |
| *(Year = 2020)* | | | (0.0246) |
| *PCESG* | | | -0.0219 |
| *(Year = 2021)* | | | (0.0291) |
| **Control variables** | | | |
| *wGDPG* | 0.128*** | 0.129*** | 0.106*** |
| | (0.0236) | (0.0238) | (0.0188) |
| *wCAB* | -0.138*** | -0.136*** | -0.109*** |
| | (0.0233) | (0.0234) | (0.0158) |
| *wTO* | 3.562*** | 3.604*** | 3.269*** |
| | (0.806) | (0.793) | (0.754) |
| *wINF* | 0.0187* | 0.0212* | 0.0257** |
| | (0.0110) | (0.0112) | (0.0107) |
| *wGE* | 0.724 | 0.569 | 0.499 |
| | (0.450) | (0.448) | (0.430) |
| *wConstant* | 0.254 | -8.058* | -8.010* |
| | (0.701) | (4.807) | (4.523) |
| Observations | 2,723 | 2,723 | 2,723 |
| $R^2$ | 0.169 | 0.172 | 0.182 |

*This table presents the regression output of the Time Fixed Effects model of the regressions stated in Formulas 5, 7, and 8, which relate to hypotheses 2, 2-3, and 2-3-4. Note that the variables are winsorized (at the 5% level). The sample period is from 2000-2022 and 142 countries are included in this study. Explanatory power is described by $R^2$. The robust standard errors are noted in the parentheses. ***, ** and * indicate a significance level of 1%, 5% and 10%.*

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