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Reconsidering systematic factors during the Covid-19 pandemic – The rising importance of ESG

Violeta Díaz *, Denada Ibrushi, Jialin Zhao

St. Mary’s University, 1 Camino Santa Maria, San Antonio, TX 78228

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ABSTRACT

We investigate the importance of Environmental, Social and Governance (ESG) ratings in explaining different industry returns during the Covid-19 window. We build our ESG factor as the spread in returns between firms in the top ESG quartile and those in the bottom ESG quartile. The ESG factor shows to significantly explain industry returns in addition to the Fama-French factors. We also analyze the individual Environmental, Social, and Governance components of ESG. Environmental and Social dimensions are the main drivers of the ESG impact on different industries.

1. Introduction

As the Covid-19 spread globally during the first quarter of 2020, financial markets turned extremely volatile in the U.S. and worldwide. On March 16, 2020, the VIX index reached an unprecedented price of 82.69, with the second highest registered at 80.86 on November 20, 2008. Baker et al. (2020) document that there were 18 daily market moves of 2.5% or more out of the 22 trading days from February 24 to March 24, 2020. The impact of Covid-19 has affected policy makers, investors, and firms on a global scale. Notably, during such volatile market conditions, Environmental, Social, and Governance (ESG) investment strategies have gained popularity worldwide. According to Morningstar, ESG funds account for almost one third of all European fund sales from April to June in 2020, with sustainable equity funds attracting 63 percent more than their traditional counterparts. On a global scale, ESG fund draws inflows of $71.1 billion in the second quarter and reaches a record of $1 trillion in market capitalization in 2020.

It is worth noting that the popularity of ESG investing was already growing before the start of the pandemic. The Wall Street Journal reported on June 24, 2019 that investors have become more selective about their portfolios by increasing their holdings of companies that align with their values related in particular to environment and social issues. In addition, according to a recent report by Deutsche Bank Research, crisis events routinely uncover accounting problems that could be kept hidden during a booming economy. The 2008 crisis uncovered accounting and audit mismanagement in financial institutions and the dotcom bubble sparked the investigation of Enron and WorldCom. Given the extensive reach of the pandemic and the disruption it has caused worldwide in economies and society at large, it is not surprising that investors and companies have recently increased their attention not only in accounting practices, but also in other governance and social impact measures included in ESG ratings. According to recent research, firms that neglect social responsibilities or lack efficient governance have significant “hidden” risks. For example, the demand for better control of hate speech resulted in the advertising boycott of Facebook by different well-known companies and the weak governance of WeWork caused severe financial losses for its main investor, SoftBank. Similarly, environmentally unfriendly firms are more likely to experience the costly settlements of environmental lawsuits. A high ESG score may indicate a better chance of avoiding such incidents, suggesting that ESG

* Corresponding author.

E-mail addresses: vdia8@stmarytx.edu (V. Díaz), dibrushi@stmarytx.edu (D. Ibrushi), jzhao1@stmarytx.edu (J. Zhao).

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indirectly speaks to a firm’s capability of mitigating stakeholder-related risks. Under this premise, firms with stronger ESG characteristics are expected to be more resilient during volatile market conditions. By including the recent pandemic in our empirical study, this paper is poised to provide novel insights into the ongoing debate of ESG investing (Aupperle et al., 1985; Hamilton et al., 1993; Eicholtz et al., 2012; Melas et al., 2017; Breedt et al., 2019; Pollard et al., 2018).

Our approach of evaluating the role of ESG builds upon the classic Fama-French three-factor model (Fama and French, 1992), a model that establishes market, size, and value factors to describe average returns. These established factors do not stay constant over time and additional factors exist (Pastor and Stambaugh, 2003; Brender et al., 2014; Fama and French, 2015). With the well-known Fama-French three factors accounted for, the acceptance of ESG as a new systematic factor can be supported by its statistical significance in explaining returns. Ranking firms based on their ESG scores, we construct an ESG factor as the difference in returns between firms in the top and bottom quartiles. To the best of our knowledge, this is the first article examining ESG characteristics during the Covid-19 pandemic as a potential risk factor along with the Fama-French factors.

Our analysis shows that firms with high ESG scores outperform the S&P 500 index and firms with low ESG scores underperform the S&P 500 during the Covid-19 window. This motivates the potential of ESG as a new systematic factor in addition to the traditional Fama-French factors, especially if uncertainty related to the Covid-19 pandemic persists. Built upon the Fama-French three-factor model, our empirical study documents evidence that the ESG factor explains significantly industry portfolio returns. In agreement with the literature, our results also suggest that the impacts of ESG rankings vary across industries. However, when compared with recent pre-Covid findings in the literature (Callahan, 2019), we find that such impacts reverse directions during the Covid-19 window. Furthermore, we show that the Environmental and Social dimensions are the main drivers behind our overall ESG results.

By documenting the significance of an ESG factor in describing industry returns, this article joins a stream of research that motivates the acceptance of ESG as a new risk factor (Czerwińska and Kazmierkiewicz, 2015; Auer, 2016; Pollard et al., 2018; Albuquerque et al., 2020). The closest study to ours is Callahan (2019) who also shows that, overall, ESG stock selection contributes positively to performance, but this effect changes across industries. Nevertheless, our study shows that the industry-ESG relationship reported in Callahan (2019) does not hold during the first quarter of 2020. Communication services is the only sector for which the results persist during the Covid-19 pandemic. Building our ESG factor and documenting its importance in the context of Covid-19, we expect our article to motivate and add to future studies in ESG investing during large-scale pandemics. Furthermore, our findings that the Environmental and Social dimensions are main drivers of the ESG impact motivate future research to empirically study and discuss theoretically industry-ESG relationships considering each of the Environmental, Social, and Governance pillars. Last but not least, we contribute to the emerging literature studying the impact of Covid-19 on financial markets (Goodell, 2020; Zhang et al., 2020).

The rest of the paper is structured as follows. Section 2 describes the data, Section 3 presents methodology and results, and Section 4 concludes.

2. Data Description

Focusing on the recent Covid-19 pandemic, our sample consists of daily data from January to April, 2020. We collect Sustainalytics1 rankings from Bloomberg to identify ESG relative scores and sort companies based on their ESG characteristics. We gather the overall ESG percentile rankings associated with the company relative to its industry peers and percentile ranks based on each of the ESG pillars, Environmental, Social, and Governance. The rankings are available for approximately 1700 companies, roughly representing the members of the MSCI World Index. However, in this study, we limit our research to companies trading in the U.S. stock market and available ESG rank data. Our objective is to analyze the existence of an ESG factor in the U.S. market.

To analyze the impact of the ESG factor in each industry during the sample period, we create industry portfolios for each classification in the Global Industry Classification Standard (GICS). Specifically, we construct ESG value-weighted portfolios by ranking companies every month based on their Sustainalytics ESG ranks. Every month, companies in the top 25% are included in the Top25 ESG portfolio and companies with ranks in the bottom quartile are included in the Bottom25 ESG portfolio. We also construct Top25 and Bottom25 portfolios for each ESG pillar: Environmental, Social, and Governance. Table 1 and Figure 1 compare the performance of the S&P 500 index vs. Top25 and Bottom25 ESG portfolios. We observe that Top25 ESG outperforms the S&P 500 index whereas the Bottom 25 ESG underperforms the S&P 500 index. Paired t-tests suggest that the returns of constructed ESG portfolios are significantly different from the S&P 500 index2. It is also worth noting that the interpretation of the negative Sharpe Ratio and Information Ratio in

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1 Sustainalytics is a global investment research firm specializing in environmental, social, and governance research and analysis http://www.sustainalytics.com.
2 Results available upon request.
Table 1 requires caution. A less negative ratio can be a result of either a smaller loss or a higher volatility during the pandemic. Nevertheless, given that the standard deviations of constructed portfolios are similar, we believe that these ratios still provide decent evaluations to some extent.

Our model also controls for the three factors of the Fama-French model: market, value, and size. We obtain the daily data for each of these factors, the industry return data, and the risk-free rates of return from Professor Kenneth French’s website.

3. Methodology and Results

In this section, we build the ESG factor and study its relationship with industry returns during the Covid-19. We construct the ESG factor as the return difference between Top25 and Bottom25 ESG portfolios. To analyze the importance of ESG, we control for the three Fama-French factors that describe stock returns through (a) market return in excess of riskless rate, (b) size factor capturing the outperformance of small firms relative to large firms, and (c) value factor capturing the outperformance of value firms with a high book-to-market ratio versus growth firms with a low book-to-market ratio. In unreported tests, we also consider the four-factor and the five-factor models, and our findings (available upon request) are characteristically similar. Considering such results along with the limited number of observations, we employ the more restrictive three-factor model in this paper.

Motivated by Lewellen et al. (2010), this paper runs models using industry portfolios. Lewellen et al. (2010) review a variety of asset-pricing models and provide several suggestions to improve these models. Their main critique lies in the strong factor structure of size and book-to-market portfolios. One suggestion Lewellen et al. (2010) offer consists of running the models for portfolios built on characteristics different from those utilized to develop the factors, such as industry portfolios.

In Equation (1) we regress the excess industry returns on the control variables from Fama-French and the ESG factor:

\[ R_i = \alpha_i + \beta_1Mkt + \beta_2Smb + \beta_3Hml + \beta_4ESG + \epsilon_i \]

where \( R_i \) indicates the excess return on industry \( i \). \( Mkt \) is the market excess return, \( Smb \) is the small-minus-big factor controlling for size, \( Hml \) is the high-minus-low factor controlling for value, and \( ESG \) measures the spread in returns between the top and bottom quarter of firms sorted based on the ESG rankings.

Table 2 presents our regression results from Equation (1). We find that the ESG factor has a significantly positive effect on Communications, Consumer Staples, and Technology sectors. However, it has an opposite impact on Consumer Discretionary, Industrials, and Energy. We also consider the Financial and Real Estate sectors where the impact remains significantly negative. ESG does not affect Utilities, Materials, and Health sectors. It is worth noting and subject to future research the fact that the size factor does not affect as many portfolios at a high significance level in the presence of the ESG factor. Value factor on the other side, affects

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3 [https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html].

4 While we realize the optimality of considering the top and bottom firms of the population, we are constrained by the fact that not all firms have an ESG ranking and ultimately, we would have a small ESG representative sample across several size categories. We believe that controlling for the size-factor of Fama and French helps address this limitation. In addition, we include all companies trading in the U.S. with available ESG ranking data.
Table 2
Impact of ESG Factor on Industry Returns.

| Industry        | α      | β₁    | β₂   | β₃   | β₄   |
|-----------------|--------|-------|------|------|------|
| Communications  | -0.0544| 0.8773*** | 0.2545*** | -0.2217*** | 0.3886*** |
| Consumer Discretionary | 0.0350 | 0.9605*** | 0.1363 | -0.3788*** | -0.6526 *** |
| Consumer Staples | -0.1028| 0.7501*** | -0.2470*** | -0.0586 | 0.3515* |
| Utilities       | -0.0022| 1.0059*** | -0.2428 | 0.1255 | 0.0195 |
| Materials       | 0.0558 | 0.9530*** | 0.2592*** | 0.3801*** | -0.0576 |
| Industrials     | 0.0201 | 1.0092*** | -0.0676 | 0.3208*** | -0.6030 *** |
| Energy          | 0.1006 | 1.1059*** | 0.1001 | 0.8951*** | -1.1909 *** |
| Health          | 0.0067 | 0.9066*** | -0.1395* | -0.2009*** | -0.0603 |
| Technology      | 0.0096 | 1.1221*** | 0.1135 | 0.2567*** | 0.3420 *** |
| Financials      | 0.0545 | 1.0360*** | -0.0777 | 0.7487*** | -0.2080 ** |
| Real Estate     | 0.0805 | 1.0834*** | -0.0581 | 0.2948** | -0.6240 ** |

Note: This table provides the coefficient estimates from Equation (1) where the independent variable consists of each of the excess industry returns shown in the first column. Mktrf, Smb, and Hml are the control variables for market excess returns, small-minus-big, and high-minus-low factors, respectively. The last column provides the coefficient estimates on the ESG factor. ***, **, and * indicate significance levels at 10%, 5%, and 1%, respectively.

Table 3
Impact of ESG Pillars on Industry Returns

Panel A

| Industry | Intercept | Mktrf | Smb | Hml | E   |
|----------|-----------|-------|-----|-----|-----|
| Commun.  | -0.0380   | 0.8226*** | 0.3145*** | -0.1800*** | 0.7506*** |
| Cons. Dis. | 0.0109    | 0.9469*** | 0.2389*** | -0.3260*** | -0.4102** |
| Cons. Stap. | -0.0907   | 0.7861*** | -0.3574*** | -0.1200 | -0.0099 |
| Utilities | -0.0064   | 1.1565*** | -0.5351*** | -0.0512 | -1.1978*** |
| Materials | 0.0525    | 0.9869*** | 0.2007**  | 0.3440*** | -0.3189 |
| Industrials | -0.0034   | 1.0318*** | -0.0405 | 0.3280*** | -0.6624*** |
| Energy    | 0.0582    | 1.0311*** | 0.3837 | 1.0500*** | -0.3452 |
| Health    | 0.0027    | 0.9609*** | -0.2369*** | -0.2610*** | -0.4852** |
| Technology | 0.0239    | 1.0785*** | 0.1575*** | -0.2250*** | 0.6237*** |
| Financials | 0.0461    | 1.0534*** | -0.0869 | 0.7400*** | -0.3059*** |
| Real Estate | 0.0540    | 1.1716*** | -0.1550 | 0.2269 | -1.2081*** |

Panel B

| Industry | Intercept | Mktrf | Smb | Hml | S   |
|----------|-----------|-------|-----|-----|-----|
| Commun.  | -0.0583   | 0.8752*** | 0.2310*** | -0.1938*** | 0.5326*** |
| Cons. Dis. | 0.0370    | 0.9531*** | 0.2013*** | -0.4006*** | -0.7528** |
| Cons. Stap. | -0.0908   | 0.7847*** | -0.3546*** | -0.1184 | 0.0026 |
| Utilities | 0.0142    | 1.0448*** | -0.3363*  | 0.0359 | -0.4860 |
| Materials | 0.0586    | 0.9585*** | 0.2505*** | 0.3640*** | -0.1465 |
| Industrials | 0.0175    | 0.9920*** | 0.0173 | 0.3250*** | -0.5584*** |
| Energy    | 0.0673    | 1.0651*** | 0.4238*** | 1.0574*** | -0.2355 |
| Health    | 0.0036    | 0.8982*** | -0.1150 | -0.1847** | 0.0328 |
| Technology | 0.0073    | 1.1231*** | 0.0861 | -0.2387*** | 0.4315*** |
| Financials | 0.0558    | 1.0350*** | -0.0603 | 0.7384*** | -0.2583*** |
| Real Estate | 0.0917    | 1.0983*** | -0.0479 | 0.2228 | -1.0083*** |

Panel C

| Industry | Intercept | Mktrf | Smb | Hml | G   |
|----------|-----------|-------|-----|-----|-----|
| Commun.  | -0.0303   | 0.9741*** | -0.0351 | -0.2338*** | -0.5443*** |
| Cons. Dis. | 0.0286    | 0.9834*** | 0.0819 | -0.1852*** | -0.8158*** |
| Cons. Stap. | -0.1073   | 0.6943*** | -0.0910 | -0.2035*** | 0.8446*** |
| Utilities | -0.0319   | 0.8430*** | 0.2319 | -0.0318 | 1.5372*** |
| Materials | 0.0493    | 0.9229*** | 0.3483*** | 0.3671*** | 0.2284* |
| Industrials | 0.0000    | 0.9535*** | 0.1066 | 0.4278*** | -0.0360 |
| Energy    | 0.0904    | 1.1557*** | -0.0220 | 1.2557*** | -1.5614*** |
| Health    | -0.0032   | 0.8577*** | 0.0044 | -0.2307*** | 0.4008*** |
| Technology | 0.0250    | 1.1760*** | -0.0503 | -0.2965*** | -0.1876** |
| Financials | 0.0449    | 1.0020*** | 0.0254 | 0.7718*** | 0.1253* |
| Real Estate | 0.0464    | 0.9531*** | 0.3339*** | 0.3377*** | 0.6398 |
significantly nine out of the eleventh portfolios. As expected, the market factor shows to have a significantly positive effect on all industry portfolios.

Considering the main patterns in our findings, we seek to investigate each of the \textit{Environmental}, \textit{Social}, and \textit{Governance} pillars to determine through which channel ESG affects industry returns. Panel (a) in Table 3 shows that \textit{Environmental} affects all sectors except for Consumer Staples and Energy. Panel (b) indicates that \textit{Social} affects significantly Communications, Consumer Discretionary, Industrials, Technology, Financials, and Real Estate. Panel (c) documents that \textit{Governance} affects all sectors except for Industrials, Financials, and Real Estate. Considering these findings along with the sign and magnitude of the ESG coefficient in Equation (1), we observe that it is the \textit{Environmental} and \textit{Social} dimensions driving the relationship for Communications, Industrials, Technology, Financials, and Real Estate. More specifically, the overall positive ESG impact on Communications is attributed to the positive effects of \textit{Environmental} and \textit{Social} components where the former has an impact of slightly higher magnitude. \textit{Governance} and \textit{Social} show to affect Communications at comparable degrees but with opposite signs. This in turn explains the overall positive ESG impact on Communications. The same holds for Technology. The Financials sector is affected negatively by \textit{Social} and \textit{Environmental} and marginally positively by \textit{Governance}. Considering Industrials and Real Estate, they are solely affected by \textit{Social} and \textit{Environmental} where \textit{Environmental} plays the main role. Furthermore, \textit{Environmental} and \textit{Social} affect Utilities, Materials, and Health with opposite signs. This is consistent with the overall insignificant impact of ESG factor. \textit{Governance} on the other side is the sole driver for the ESG results of Consumer Staples and Energy. Consumer Discretionary is the only sector affected significantly negatively by all ESG pillars.

Overall, our findings suggest that ESG owns its own place next to the traditional Fama-French factors when explaining daily industry returns during Covid-19. The ESG impact varies across industries and for most of them this impact is mostly due to the \textit{Environmental} and \textit{Social} pillars.

4. Conclusion

The Covid-19 pandemic has moved ESG investing strategies into the spotlight. Our study shows the importance of accounting for \textit{Environmental}, \textit{Social} and \textit{Governance} factors into investment decisions. Our contribution to the ESG literature is three-fold: 1) ESG significantly explains the returns of industry portfolios during this pandemic, 2) the \textit{Environmental} and the \textit{Social} pillars of the ESG are the key drivers of the observed patterns, and 3) the impact of ESG and its pillars varies across industries.

In summary, our paper provides evidence that ESG is indispensable to understand factor investing in the new era of Covid-19. Moreover, the \textit{Social} and \textit{Environmental} pillars may be the catalysts for the full recognition of ESG investing as a successful investment strategy as we recover from the current economic crisis. Our recommendation is that investors pay attention to not only the general ESG rankings in their investment strategies, but also to the individual E, S and G rankings.

Authorship Statement

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All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript.

Authorship Contributions

Conception and design of study: V. Diaz, D. Ibrushi, J. Zhao
Acquisition of data: V. Diaz, D. Ibrushi, J. Zhao
Analysis and interpretation of data: V. Diaz, D. Ibrushi, J. Zhao
Drafting the manuscript: V. Diaz, D. Ibrushi, J. Zhao
Revising the manuscript: V. Diaz, D. Ibrushi, J. Zhao
Approval of the version of the manuscript to be published: V. Diaz, D. Ibrushi, J. Zhao

Supplementary materials

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References

Albuquerque, R., Koskinen, Y., Yang, S., Zhang, C., 2020. Resiliency of environmental and social stocks: an analysis of the exogenous COVID-19 market crash. The Review of Corporate Finance Studies.

Aupperle, K.E., Carroll, A.B., Hatfield, J.D., 1985. An empirical examination of the relationship between corporate social responsibility and profitability. Academy of management Journal 28 (2), 446–463.

Baker, S.R., Bloom, N., Davis, S.J., Terry, S.J., 2020. Covid-induced economic uncertainty (No. w26983). National Bureau of Economic Research.

Bender, J., Hammond, P.B., Mok, W., 2014. Can alpha be captured by risk premia? The Journal of Portfolio Management 40 (2), 18–29.

Callahan, C., 2019. ESG Investing: Sector, industry & stock impact on ESG investing. ICON. Retrieved from. https://iconadvisers.com/esg-investing/.
Czerwińska, T., Kazmierkiewicz, P., 2015. ESG rating in investment risk analysis of companies listed on the public market in Poland. Economic Notes: Review of Banking, Finance and Monetary Economics 44 (2), 211–248.

Fama, E.F., French, K.R., 1992. The cross-section of expected stock returns. the Journal of Finance 47 (2), 427–465.

Fama, E.F., French, K.R., 2015. A five-factor asset pricing model. Journal of financial economics 116 (1), 1–22.

Goodell, J.W., 2020. COVID-19 and finance: Agendas for future research. Finance Research Letters, 101512.

Hamilton, S., Jo, H., Statman, M., 1993. Doing well while doing good? The investment performance of socially responsible mutual funds. Financial Analysts Journal 49 (6), 62-66.

Lewellen, J., Nagel, S., Shanken, J., 2010. A skeptical appraisal of asset pricing tests. Journal of Financial Economics 96 (2), 175–194.

Melas, D., Nagy, Z., Kulkarni, P., 2017. Factor investing and ESG integration. Factor Investing. Elsevier, pp. 389–413.

Pistor, L., Stambaugh, R.F., 2003. Liquidity risk and expected stock returns. Journal of Political economy 111 (3), 642–685.

Pollard, J.L., Sherwood, M.W., Klobus, R.G., 2018. Establishing ESG as risk premia. Journal of Investment Management 16 (1), 32-43.

Zhang, D., Hu, M., Ji, Q., 2020. Financial markets under the global pandemic of COVID-19. Finance Research Letters, 101528.