Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
COVID-19 and safer investment bets

Amanjot Singh

Deakin University, Melbourne, 3125, Australia

ARTICLE INFO

Keywords:
- Defensive
- EAFE
- Emerging markets
- ESG
- Return Spillover

JEL classification:
- G10
- G11
- G14

ABSTRACT

I examine the spillover effects across the three different long-short portfolio indices during the COVID-19 pandemic. The relative outperformance of the ESG portfolio, reported by Nofsinger and Varma (2014) and Lins et al. (2017), comes from the fact that the probability of its returns getting affected by the other safer investment strategies increases during an economic slowdown. It implies that investors become more attentive to corporate fundamentals – causing capital flowing away from the defensive and EAFE portfolios to the ESG portfolio during crisis periods. Investors find refuge in the ESG approach as it focuses on the long-run sustainability of firms.

1. Introduction

Financial crises coincide with a period of risk aversion or a flight toward safe-haven asset classes or investment strategies (Coudert and Gex, 2008). Numerous studies in the past have tried capturing the impact of return or volatility spillover effects from one asset class to another (like, Kenourgios and Samitas, 2011; Lehkonen and Heimonen, 2014; Koutmos, 2018; etc.). The underlying mechanism for such spillover effects is the growing integration across various asset classes domestically as well as internationally. Moreover, investors become more attentive to corporate fundamentals in an attempt to avoid downside risk during an economic slowdown (Hirshleifer, 2008; Nofsinger and Varma, 2014; Lins et al., 2017). In this study, I examine the spillover effects across the three different safer investment strategies, i.e. defensive, ESG (environmental, social and governance) and EAFE (stocks from Europe, Australasia and the Far East) based portfolios during the COVID-19 pandemic. These investment strategies are expected to outperform the market during crisis periods due to their relative safer stance.

The COVID-19 pandemic is the first of its kind, causing a sudden stop in the economic activities across the world. It is expected to cause a serious setback to the cash flow position of firms. Unlike the global financial crisis - which erupted on account of financial distress - the COVID-19 pandemic is a health crisis bearing economic implications for the whole world against the backdrop of disruptions caused by lockdowns and travel-related restrictions. There is a complete sense of uncertainty concerning its impact on the various structures of economic, social and political sectors. Future progress depends upon the availability of a vaccine, and how quickly consumer and business sentiments could restore to the levels seen before the pandemic.

Adequate corporate governance practices, digitization, environmental (awareness about adverse climate and biological events) and social factors (conducive work environment and access to healthcare) are the key pillars envisaging a recovery from the COVID-19 pandemic. These factors constitute an important essence in the ESG matrix. In other words, firms with a sustainable business
model, adequate governance environment and workplace efficiency, are expected to bear the brunt in a much more effective manner. It is insightful to understand how different investment strategies, particularly the safer ones, get affected by each other during times of extreme uncertainty, like the COVID-19 pandemic.

In particular, I examine the relative performance of the three different long-short portfolio indices, designed to outperform the market during an uncertain period, like the COVID-19 pandemic. The study considers portfolio investments in the defensive, ESG and EAFE related stocks for analyses. The defensive stocks are counter-cyclical characterized by a lower level of risk. A long-short portfolio index (long-150%/short-50%) aims to represent return spread between a long position in the defensive sector and a short position in the cyclical sector in the United States (US). The portfolio return spreads have been computed as a difference between the long and short portfolio returns, i.e. long minus short portfolio returns – reported in the form of an index for the respective portfolio strategies. The ESG based stocks are much more sustainable, involving an investment in some of the long-run value-creating stocks. A long-short portfolio index (long-150%/short-50%) aims to represent return spread between a long position in the top 100 ESG-based stocks and a short position in the bottom 100 ESG-based stocks in the US. Lastly, the EAFE strategy involves investing in some of the developed markets except the US and Canada. A long-short portfolio index (long-150%/short-50%) aims to represent return spread between a long position in the EAFE based stocks and a short position in the emerging markets’ (EMs) stocks. The emerging markets are becoming an important investment destination for the international portfolio investors in search of an extra yield (Koopke, 2018). But the latter markets have also become much more susceptible to the reversal of capital flows during times of uncertainty.

So, the overall objective of this study is to examine the relative performance of these three portfolios (which are relatively safer) during the COVID-19 pandemic, and if the relative performance effects can be attributed to the return spillovers (i.e., the spillover effect) across the three portfolios.

International equity markets witnessed a drastic fall after the declaration of COVID-19 as a pandemic by the World Health Organization (WHO) in March 2020. It reflects greater risk aversion on the part of equity investors in their search for safer investment bets. In the present study, the spillover effects are modelled by employing Diebold and Yilmaz’s (2012) pairwise spillover framework. The returns generated by the ESG portfolio started getting affected by the defensive and EAFE portfolios around the declaration of a pandemic by the WHO. In other words, investors become more attentive to corporate fundamentals during times of economic uncertainty – causing capital flowing away from the defensive and EAFE portfolios to the ESG portfolio. The ESG portfolio has a lower downside risk, as it is based on the long-run sustainability of firms. The pandemic is essentially a shock that increases risk aversion on the part of investors, making them to reassess the relative downside risks of the three safer portfolio strategies. This reassessment stimulates capital flows between our undertaken portfolios and better performance for the ESG portfolio.

The previous studies, like Nofsinger and Varma (2014), Bertrand and Lapointe (2015), Lesser et al. (2016) and Lins et al. (2017), have also looked into the relative outperformance or underperformance of the ESG approach to the overall market-wide performance or common risk factors - during different market regimes, like the financial and non-financial crisis periods. Unlike the prior studies, the present study focuses on understanding as to what extent different safer investment strategies (long-short portfolio returns) are affected by each other, especially during an unprecedented event, like the COVID-19 pandemic.

The ESG portfolio accounted for a decent recovery after the declaration of COVID-19 as a pandemic. It also helps in explaining the earlier findings - why the ESG approach outperforms or generate positive returns during crisis periods (Nofsinger and Varma, 2014; Lins et al., 2017). The latter approach provides refuge to the investors as they become more attentive to corporate fundamentals during an economic slowdown - as compared to the other two portfolios (which are perceived to be less safe). Overall, the findings are relevant to different market participants, especially the long-run investors, who look out for sustainable investment opportunities in the ESG space.

Section 2 discusses data and empirical methodology, Section 3 reports empirical findings and lastly, Section 4 concludes the paper.

2. Data and methodology

The sample period ranges from 1st May 2017 to 1st May 2020. I gathered data relating to different investment strategies, i.e. the long-short portfolio indices, from the Morgan Stanley Capital International’s (MSCI) website. The MSCI reports portfolio return spreads (long minus short portfolio returns) in the form of an index for the respective safer investment strategies. For instance, the portfolio return spreads for a long-short (long-150%/short-50%) portfolio of the ESG based stocks have been reported in the form of an index. A long position of 150% ensures a higher exposure toward the top ESG based stocks. In the present study, the continuously compounding gross index returns are computed for the respective indices, i.e. 

\[ R_t = \ln \left( \frac{P_t}{P_{t-1}} \right) \times 100 \]

Here, \( R_t \) is the daily return, \( \ln \) is the logarithmic term, \( P_t \) is the current day’s index price and \( P_{t-1} \) is the previous day’s index price. The respective indices are re-balanced periodically, such as a monthly basis for the EAFE and defensive portfolios, and quarterly for the ESG portfolio. These index returns have been further used in generating the net pairwise spillover effects.

Diebold and Yilmaz (2012) capture the total contribution of cross-market shocks using the generalized forecast error variance decompositions (FEVDs) (Singh and Singh, 2016; Singh and Kaur, 2017). It has widely been used to account for the spillover effects. The generalized version shows the percentage of variance to variable \( i \) on account of the innovations to variable \( j \).

Consider a N-dimensional vector, \( X_t \), depicting the returns of three different portfolios in a VAR model. A VAR (p) model can be specified as, 

\[ X_t = \sum_{i=1}^{p} \Phi_i X_{t-i} + \varepsilon_t \]

where \( \varepsilon_t \) is a vector of IID innovations, and \( X_t \) is a vector of \( N \) endogenous variables. The moving average representation is expressed as 

\[ X_t = \sum_{i=1}^{\infty} A_i \varepsilon_{t-i} \]

where \( A \) is a matrix of \( N \times N \) coefficient matrices. In general, the model proposes the share of both own as well as cross-market variances. For \( H \)-step-ahead FEVDs, we have:
The spillover effects are generated through the RATS software.

\[ g_{ij}^k (H) = \frac{\sigma_{ij}^{-1} \sum_{h=0}^{H-1} (e_i A_h \sum_{j} e_j)^2}{\sum_{h=0}^{H-1} (e_i A_h \sum_{j} A_h e_j)} \]  

(1)

Where, \( o_{ij} \) is the \( j \)th element on variance matrix for the error vector, and \( e_i \) is the selection vector. The normalization of each variance decomposition matrix has been done by the sum of the rows:

\[ g_{ij}^k (H) = \frac{g_{ij}^k (H)}{\sum_{i=1}^{N} g_{ij}^k (H)} \]

(2)

For the pairwise analysis, three different pairs have been created, considering the respective portfolios:

\[ S_{ij}^k (H) = \left[ \frac{g_{ij}^k (H)}{\sum_{i=1}^{N} g_{ij}^k (H)} - \frac{g_{ji}^k (H)}{\sum_{i=1}^{N} g_{ji}^k (H)} \right] \times 100 \]

(3)

The first component \( \frac{g_{ij}^k (H)}{\sum_{i=1}^{N} g_{ij}^k (H)} \) on the right hand side captures the spillover effects from portfolio \( i \) to \( j \), and the second component \( \frac{g_{ji}^k (H)}{\sum_{i=1}^{N} g_{ji}^k (H)} \) reports the spillover effects from portfolio \( j \) to \( i \). The net pairwise spillover effects are computed by deducting the receiving effects from the transmitting ones. I consider a rolling window estimation of 200 days across the sample period with 10 days ahead variances².

3. Empirical findings

Fig. 1 depicts the cumulative returns for the respective portfolios from 1st January 2020 to 1st May 2020. All the strategies witnessed a drastic reduction after 11th March 2020 (dotted line), when the COVID-19 was declared a pandemic by the WHO. The portfolio returns are higher for the ESG strategy followed by the defensive and EAFE strategies. The ESG strategy continues to witness a stronger recovery even after the market rout in March 2020. On average, the ESG strategy records a higher level of positive return (0.022%) as compared to the EAFE (−0.004%) and defensive (0.002%) strategies from 2017 to 2020. The total number of observations are 784. The unit root tests, like Augmented Dickey-Fuller (ADF), Kwiatkowski-Phillips-Schmidt-Shin (KPSS) and Zivot-Andrews (with a structural break), support a stationary distribution for the respective portfolio returns.

For the VAR model, the Schwarz Information Criterion (SC) supports the employment of two days’ lagged values in the regression framework. Table 1 reports the return spillover effects across all the portfolio returns from 2017 to 2020. Here, the term spillover effect is the extent to which returns generated by one strategy get affected by another safer investment strategy. The findings report that all the portfolio returns are greatly affected by each other because the total return spillover effects are higher than 50 percent.

The ESG and defensive portfolio strategies are the net transmitters of the return spillover effects. For the defensive strategy, it is 53.6–52.5 = 1.1 percent, and for the ESG strategy, it is 59.7–54.1 = 5.6 percent. On the other hand, the EAFE strategy is a net receiver of the return spillover effects from the other two portfolios, i.e. 44.3–37.7 = 6.6 percent. Overall, the EAFE portfolio returns get affected by both the defensive and ESG portfolios, i.e. the capital flowing away from the defensive and ESG portfolios to the EAFE portfolio in general.

Fig. 2 displays the spillover indices from 1st January 2020 to 1st May 2020 across all the portfolio strategies. As a robustness check, I also compute two different spillover indices considering a rolling window estimation of 250 days, and 2 and 10 days ahead variances. All the spillover indices depict a similar kind of a trend. The spillover effects started increasing well before 11th March 2020 across all the three portfolios. Investors started discounting the impact of COVID-19 in February 2020 per se in anticipation of a mass disruption coming on account of the biological crisis. Further, Fig. 3 shows the net pairwise spillover effects across the different portfolio strategies from 1st January 2020 to 1st May 2020.

The Diebold and Yilmaz’s net pairwise spillover series help in disentangling the return spillovers into transmitting (positive values) as well as receiving (negative values) effects for the respective portfolio pairs. In all the graphs, 11th March 2020 marked a significant change in the return spillover effects. For the defensive-EAFE pair, the defensive strategy was a net transmitter before the latter date. However, it started getting affected by the EAFE portfolio after the declaration of COVID-19 as a pandemic. It implies the capital flowing away from the EAFE portfolio to the defensive portfolio, as it is relatively safer than the EAFE approach. On an interesting note, the ESG portfolio transitioned from a higher net transmitter phase to a lower one after 11th March 2020. In other words, the returns generated by the ESG portfolio started getting affected by the defensive and EAFE portfolios after the declaration of COVID-19 as a pandemic. Lastly, I also look at the regime switches (two regimes and switching at the unconditional mean and standard deviation levels) for the respective net pairwise spillover series from 1st January 2020 to 1st May 2020. It implies switching at both the mean as well as standard deviation levels (Hamilton, 1989; Schaller and Norden, 1997):

\[ PS_t = a_0 (1 - S_t) + a_1 S_t + [\sigma_0 (1 - S_t) + \sigma_1 S_t] e_t \]

(4)

Where, \( PS_t \) is the net pairwise spillover series at time \( t \), and \( a_0, a_1, \sigma_0 \) and \( \sigma_1 \) are the mean and standard deviation levels during different regimes. The model follows a first-order Markov chain, and the probability that a given state will occur depends on the state \( (S_t) \) in

² The spillover effects are generated through the RATS software.
the last period. The respective average values for the net pairwise spillover series across the two different regimes are: for the defensive-EAFE pair – regime-1 = 4.65 (net transmitter) and regime-2 = −0.12 (net receiver), defensive-ESG pair – regime-1 = −1.60 (net receiver) and regime-2 = −1.30 (net receiver), and EAFE-ESG pair – regime-1 = −7.52 (net receiver) and regime-2 = −4.22 (net receiver). In both the regimes, the ESG portfolio transmits the return spillover effects to the other two portfolios (but with different magnitudes, i.e. higher (regime-1) and lower (regime-2)). Hence, Fig. 4 also displays the filtered probability of remaining in regime-1 for the respective portfolio pairs.

The COVID-19 market shock decreased the probability of transmitting the spillover effects from the defensive to EAFE portfolio. On a similar note, the COVID-19 market shock attenuated the likelihood of transmitting the spillover effects from a higher net transmitter phase to a lower one for the ESG portfolio (to the other two portfolios). In other words, the probability of its returns getting affected by the

---

**Table 1**

| Total Spillover Effects. | Defensive | EAFE | ESG | From Others |
|--------------------------|-----------|------|-----|-------------|
| Defensive                | 47.47     | 17.46| 35.07| 52.5        |
| EAFE                     | 19.71     | 55.69| 24.6 | 44.3        |
| ESG                      | 33.86     | 20.21| 45.93| 54.1        |
| To Others                | 53.6      | 37.7 | 59.7 | 150.9       |

150.9/3 = 50.3%.
defensive and EAFE portfolios increases during an economic slowdown. Investors become more attentive to corporate fundamentals during crisis periods – causing capital flowing away from the defensive and EAFE portfolios to the ESG portfolio. It also helps in explaining the earlier findings - why the ESG approach generates positive returns or outperforms during crisis periods (Nofsinger and Varma, 2014; Lins et al., 2017). Investors find refuge in the ESG approach as it focuses on the long-run sustainability of firms.

4. Conclusion

The study looks at the return spillover effects across the three different safer investment strategies during the COVID-19 pandemic - a long-short portfolio of the defensive-cyclical sectors, the EAFE-EMs and the Top ESG-Bottom ESG based stocks. Investors become more attentive to corporate fundamentals during an economic slowdown (Hirshleifer, 2008; Nofsinger and Varma, 2014; Lins et al., 2017). So, the relative outperformance of the ESG approach comes from the fact that the probability of its returns getting affected by the other two safer investment strategies increases during crisis periods. It implies the capital flowing away from the defensive and EAFE portfolios to the ESG portfolio. Investors find refuge in the ESG approach as it focuses on the long-run sustainability of firms.
Declaration of Competing Interest

None

Acknowledgement

I would like to thank the Guest Editor and an anonymous reviewer for providing immensely helpful comments and suggestions.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2020.101729.
References

Bertrand, P., Lapointe, V., 2015. How performance of risk-based strategies is modified by socially responsible investment universe? Int. Rev. Financ. Anal. 38, 175–190.

Coudert, V., Gex, M., 2008. Does risk aversion drive financial crises? Testing the predictive power of empirical indicators. J. Empir. Finance 15 (2), 167–184.

Diebold, F.X., Yilmaz, K., 2012. Better to give than to receive: predictive directional measurement of volatility spillovers. Int. J. Forecast. 28 (1), 57–66.

Hamilton, J.D., 1989. A new approach to the economic analysis of nonstationary time series and the business cycle. Econometrica: J. Econom. Soc. 357–384.

Hirshleifer, D., 2008. Psychological bias as a driver of financial regulation. Eur. Financ. Manage. 14 (5), 856–874.

Konourgios, D., Samitas, A., 2011. Equity market integration in emerging Balkan markets. Res. Int. Bus. Finance 25 (3), 296–307.

Koepke, R., 2018. Fed policy expectations and portfolio flows to emerging markets. J. Int. Financ. Markets Inst. Money 55, 170–194.

Koutmos, D., 2018. Return and volatility spillovers among cryptocurrencies. Econ. Lett. 173, 122–127.

Lehkonen, H., Heimonen, K., 2014. Timescale-dependent stock market comovement: BRICs vs. developed markets. J. Empir. Finance 28, 90–103.

Lesser, K., Rößle, F., Walkshäusl, C., 2016. Socially responsible, green, and faith-based investment strategies: screening activity matters! Finance Res. Lett. 16, 171–178.

Lins, K.V., Servaes, H., Tamayo, A., 2017. Social capital, trust, and firm performance: the value of corporate social responsibility during the financial crisis. J. Finance 72 (4), 1785–1824.

Nofsinger, J., Varma, A., 2014. Socially responsible funds and market crises. J. Bank Financ. 48, 180–193.

Schaller, H., Norden, S.V., 1997. Regime switching in stock market returns. Appl. Financ. Econ. 7 (2), 177–191.

Singh, A., Singh, M., 2016. US financial conditions index and its empirical impact on information transmissions across US-BRIC equity markets. The Journal of Finance Data Sci. 2 (2), 89–111.

Singh, A., Kaur, P., 2017. A short note on information transmissions across US-BRIC equity markets: evidence from volatility spillover index. J. Quant. Econ. 15 (1), 197–208.