**Response to Referee’s Report #1  
‘Sustainable Factor Investing: Where Doing Well Meets Doing Good’**IREF\_2019\_983R1

# INTRODUCTION

First of all, we would like to thank the Editor, Professor Brian Lucey, and the Associate Editor, Professor Larisa Yarovaya, for forwarding the constructive feedback of the Referee and for providing us with the opportunity to submit a revised version of our paper. We would also like to thank the Referee for the positive feedback and the thoughtful comments, which we believe have significantly improved the paper. We have amended the manuscript taking all remarks carefully into consideration.

In Section 2, we re-iterate the comments of the referee (*in italics*) and explain the revisions made in the paper to address each of these comments.

# RESPONSE TO COMMENTS

**Comment a:**

*I do not fully agree to the authors’ very first sentence “Responsible investors seek companies with strong financial performance whilst integrating non-financial factors such as environmental (E), social (S) and governance (G) scores into the investment decision process.” (page 1) as a non-negligible share of investors is willing to sacrifice return in order to invest in a socially responsible manner (e.g.* *Bollen, 2007; Gutsche and Ziegler, 2019).*

The comment is well-taken.

To improve the clarity and precision, the very first sentence is amended by removing “the strong financial performance”. The sentence now reads as “Responsible investors seek companies with strong non-financial factors such as environmental (Env), social (Soc) and governance (Gov) scores(Bollen, 2007; Gutsche and Ziegler, 2019).” We also wish to thank the referee for providing the references.

**Comment b:**

*Equation (1) is wrong as it should be ()^2. Please define all components of the formula, i.e. r, n, and the indexes. This also applies to other equations (e.g. index t in equation (3) on page 12).*

We are grateful to the referee for pointing out these errors. Following the advice of the referee, Equation (1) on page 10 has been amended to include the power, the return (r), number of asset observations (n) and time (t) are also defined. Equation (3) on page 12 has also been amended.

**Comment c:**

*The upper limit of the summation in equation (2) should be 11 and not 10.*

Once again, we are grateful to the referee for pointing out this minor error. The upper limit has been corrected to 11 instead of 10.

**Comment d:**

*Page 10: I suggest to simply use the term “book-to-price ratio” instead of “inverse of price-to-book ratio”.*

Following the advice of the referee, “Inverse of price-to-book” has been amended to “book-to-price” on pages 10, 12 and 35 (Table 2 description).

**Comment e:**

*Page 11: One should add the index t to the formula for the combined signal for each stock i (as portfolios are formed each month*).

The index *t* is added to the formula on page 11 as per the suggestion of the referee. The expression now reads as: [0.5 × ESG\_score*it* + 0.5 × Signal\_score*it*].

**Comment f:**

*Page 12: It should be “beta\_3i” and not “B\_3i”.*

We are grateful to the referee for pointing out this minor inconsistency. Eq(3) on page 12 now includes “” instead of “”. Eq(3) now reads as:

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**Comment g:**

*I do not understand the last sentence of section 2 (“Overall, the distribution of disclosure scores is consistent with Gompers, Ishii, and Metrick (2003), Cremers and Nair (2005), Humphrey et al. (2012b) and Lee et al. (2018).”), as some of these studies partly do not report ESG scores for different industries (e.g. Cremers and Nair, 2005) or consider different industries (e.g. Humphrey et al., 2012b).*

This comment is well taken.

Upon further reflecting, we realized that we may have been too general when discussing the distributional plot. As the referee rightly pointed out, our plot illustrates the industry breakdown of the ESG scores rather than the market wide ESG scores. Therefore, to eliminate this ambiguity, this sentence on Page 8 has been removed from the revised manuscript.

**Comment h:**

*It is indeed important to explain differences (and similarities) between the Bloomberg ESG scores and other ratings, e.g. those provided by Asset4. However, I’d recommend to constraint this description to those points, which are relevant for the analysis, and to skip promotional passages for Bloomberg (e.g. with respect to information about carbon emissions or that it is possible to customize equity and bond portfolios).*

The comment is well-taken.

Following the advice of the referee, the promotional passage “In addition, Bloomberg has the ability to measure and compare portfolio carbon emissions against a selected benchmark, whilst also allowing custom equity and bond portfolios to be generated with the ESG score embedded.” has been removed from the manuscript.

**Comment h:**

*Please also add some information (maybe in a footnote) on the SPPR database and SIRCA.*

Following the advice of the referee, the following passage was added as footnote 4 on page 5. We also fully spelled out the acronyms in the revised version of the manuscript.

“SIRCA is a leading independent provider of financial data services for Australian and New Zealand universities. SIRCA’s SPPR Database contains monthly share price movements, company names and name changes for Australian Stock Exchange (ASX) listed firms dating back to the 1950s. See <https://www.sirca.org.au/about-sirca/> for details”

**Comment j:**

*Some statements and interpretations are too broad and/or strong. From my reading, the authors generally tend to highlight findings that show the outperformance of strategy M3 over the standard method, but tend to neglect cases where ESG integration leads to a similar or worse performance. Further, valuations of differences between strategies (e.g. with respect to average monthly returns or Sharpe ratios) are rather based on “gut feelings” than statistical measures. For example, on page 14, the authors write “For quality, momentum and size, M2, which results in unbalanced long-short portfolios, outperforms the standard method.”. However, differences are rather small, i.e. 1.37% vs 1.31%, 0.72% vs 0.69%, 1.48% vs 1.35%, respectively, and probably not statistically different from each other. At the same time, they state that “ESG integrated factors deliver Sharpe ratios which are of similar magnitude to those reported by standard quality, size and momentum strategies (depending on the integration method).” (page 14). This is obviously very vague and subjective given, for example, the Sharpe ratios for the category “Size” which amount to 1.09, 0.55, 0.80, and 0.58, respectively. Also volatility is generally higher under ESG integration strategies than under the standard strategy, which is solely discussed at the surface. Similarly, statements like “jointly exploiting ESG scores with factor signals not only does not detract performance, but can be beneficial for investors in the long-run.” (page 29) are too strong. Therefore, the authors need to tone down these kinds of statements throughout the paper and/or provide statistical measures (e.g. test statistics) which allow stronger statements.*

The comment is well-taken.

Upon reflecting on the comments of the referee, we realize some statements indeed lack clarity and precision. To ensure there is no confusions for the reader, we have toned down the use of “outperformance” throughout the revised manuscript.

On page 14, the statement “*For quality, momentum and size, M2, which results in unbalanced long-short portfolios, outperforms the standard method.”* has been amended to “*For quality, momentum and size, M2, which results in unbalanced long-short portfolios, report similar performance to the standard method.”*

On page 14, the statement “*In particular, size reports the highest average return under M2*”has been amended to “*In particular, size reports the highest average return under M2, however the increased volatility subdues the Sharpe ratio*”.

On page 14, the statement “*The M3, which captures the interaction between ESG scores and factor signals, reports outperformance over the standard quality and momentum strategies at 1.52% and 1.55% per month, respectively*.” has been amended to “*The M3, which captures the interaction between ESG scores and factor signals, reports higher returns over the standard quality and momentum strategies at 1.52% and 1.55% per month, respectively*.

On page 14, the statement “*Although the opportunity set is reduced for integrated strategies, ESG integrated factors deliver Sharpe ratios which are of similar magnitude to those reported by standard quality, size and momentum strategies (depending on the integration method)*” has been amended to “*Although the opportunity set is reduced for integrated strategies, ESG integrated quality strategies deliver Sharpe ratios which are of similar magnitude to those reported by the standard quality..*

On pages 19 and 29, the statement “*jointly exploiting ESG scores with factor signals not only does not detract performance, but can be beneficial for investors in the long-run”* are amended. The sentence now reads “*Jointly exploiting ESG scores with factor signals does not significantly detract performance of factor strategies, integration could add value for investors in the long-run.”*

**Comment k:**

*The authors also state that “findings imply that traditional ESG investing through negative screens would likely lead to inferior investment outcomes.” (e.g. page 15). This statement might confuse readers, since the term “negative screening” typically describes investment strategies that exclude specific (sin) industries or countries. In this paper, however, the authors “perform a negative screen by excluding non-ESG rated firms from the “All” sample.” (page 11), i.e. they exclude all firms with no ESG rating. Thus the meaning is totally different, which needs to be clarified.*

The comment is well-taken.

We are grateful to the referee for pointing out this potential confusion. To address this concern, we clearly distinguish our approach from traditional “negative screening” in the revised manuscript. Terms like “negatively screened” and “negative screening” have either been removed or reworded in the following sections of the manuscript.

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| * + - Abstract, line 2     - Page 2, paragraph 3, line 2     - Page 4, paragraph 1, line 1     - Page 11, paragraph 2, line 1     - Page 11, paragraph 4, line 1     - Page 13, paragraph 4, line 2     - Page 15, paragraph 1, line 11     - Page 21, paragraph 4, line 5     - Page 22, paragraph 2, line 6 | * + - Page 28, paragraph 3, line 8     - Page 28, paragraph 4, line 2     - Page 34, Table 2 description     - Page 38, Table 5 description     - Page 39, Table 6 description     - Page 40, Table 7 description     - Page 41, Table 8 description     - Page 43, Figure 2 description |

**Comment l:**

*Figure 3 and 4 reveal that M3 performs well in the time period between 2012 and 2016. Do the authors have any explanations for this interesting finding?*

We thank the referee for this comment.

As briefly noted in the conclusion, we believe that M3 performs well in the second half of the sample period because ESG has become increasingly relevant to the pricing of Australian stocks. Thus, blending ESG with quality and momentum indicators have strong potential to add value in the long-run compared to non-integrated factors. This is most prominent for the momentum strategy, due partly to the muted performance of the momentum factor post-GFC.

We have amended the text in the last paragraph of section 4.1 to reflect the above discussion.

**Comment m:**

*Table 3 does not report results for strategy M2. Please add results or a short note with an explanation for the non-consideration of M2.*

The comment is well-taken.

M2 is not included in the table mainly due to space limitations. Meanwhile, we choose to focus on M1 and M3 because the M2 strategy takes dynamic net long or net short positions as opposed to “zero-investment” long-short positions. While it is considerably riskier, the M2 does not appear to outperform M1 and M3 strategies.

A new footnote (#14) has been added on page (x16) paragraph (y3) to explain why M2 results are not present in Table 3.

**Comment n:**

*The statements in footnote 14 and 15 are very important and should be shifted to the main text.*

Following the advice of the referee, Footnotes 14 and 15 in the previous version of the manuscript have been shifted to the main text.

**Comment o:**

*In Table 4, the results for the factor quality are very similar across all four strategies. Thus, why do the “findings confirm a strong empirical link between quality and ESG ratings, whilst indicating the potential of ESG integration in portfolio risk reduction.” (page 18)?*

The comment is well-taken. We thank the referee for pointing out this confusion.

We understand the referee’s concern about the statement on the empirical link between ESG ratings and quality. Since we do not provide a direct test, a more appropriate statement would be “our findings suggest that ESG integration does not significantly reduce the alpha of the quality factor, nor does it alter the loadings on MKT, SMB and HML factors.”

Our rationale for the original statement is as follows. ESG integrated quality reports similar results compared to non-ESG integrated quality, while ESG integrated momentum report strong alpha and considerably different loadings on SMB and HML compared to the non-integrated momentum. The result would imply that ESG ratings are more closely related to quality than they are to momentum. As for the second part of the statement, “The potential of ESG integration in portfolio risk reduction” is mainly referring to the performance of ESG integrated factors during adverse market conditions. In Table 3, ESG integrated quality and momentum (M3) factors strongly outperform the non-integrated strategies during low growth, higher inflation and high credit risk periods. However, for precision and better clarity, we have replaced the original statement to the above on page 18 paragraph 3.

**Comment p:**

*Panel D in Table 5 does not contain information on the past 12-month return (in contrast to Panel A to C).*

We thank the referee for pointing this out. In fact, this is intended by the authors.

Pane A of Table 5 includes all metrics because we believe it is informative for readers to compare the results between ESG tilt strategies which ignore fundamental characteristics versus ESG integrated factor strategies constructed by fundamental factor signals.

As noticed by the referee, only Returns, ESG and log(Market-cap) are reported across all Panels, because they are relevant for all factors or strategies in terms of performance, ESG integration and portfolio weighting, respectively. For Panels B through to D, our intention is to assess the impact of ESG integration on each respective factor. i.e. ROE for quality, Past 12M return for momentum and log(market-cap) for size. Therefore, only the respective sorting variable is reported.

**Comment q:**

*The explanation for the portfolio construction according to the BOS strategy in Section 4.7 can be improved. I recommend to simply use the same explanation as already used in the caption of Table 7.*

Following the suggestion of the referee, we have included the description of BOS strategy in Table 7 into Section 4.7 on page (x26) paragraph (y3).

**Comment r:**

*Please define all relevant abbreviations, although readers of financial journals should be familiar with them (e.g. GICS). ROE is defined on page 9, but is already used on page 5. The abbreviation “S” is used twice, i.e. for “Social” and “Standard”.*

We are grateful to the referee for pointing out these potential confusions.

To address these concerns, the abbreviation for “Social” is amended to “Soc”. To ensure consistency, “Environment” abbreviation is changed from “E” to “Env” and “Governance” is now defined as “Gov” instead of “G”. Thus, “S” remains as “standard” in the revised manuscript. Furthermore, Return on equity (ROE) is defined on page 3, paragraph 3. Global Industry Classification Standard (GICS), Securities Industry Research Centre of Asia-Pacific (SIRCA) and Share Price & Price Relatives (SPPR) are defined on page 5, paragraph 3.

**Comment s:**

*The following sentence on page 6 needs to be revised: “As high polluting industries face greater pressure from government regulatory bodies and environmental groups in relation to their environmental and social impact report lower average ESG scores.”*

We are extremely grateful to referee for her/his persistent efforts in improving the manuscript. To address this potential confusion, the statement has been revised to the following:

“As high polluting industries face greater pressure from government regulatory bodies and environmental groups, these industries should continually seek to improve their ESG performance and reporting.”

# FINAL COMMENT

We are indebted to the referee for helping us improve the quality of the paper. We would like to sincerely thank the anonymous referee again for her/his constructive feedback. We have made our best efforts to address these comments, we hope that our revisions meet your expectations. We have no doubts that the paper has benefited significantly from this exercise.