ANALYZING THE PERFORMANCE OF ESG FACTORS IN A MIXED ASSET SETTING

Andreas G.F. Hoepner
Full Professor of Operational Risk, Banking & Finance,
University College Dublin

Analyzing ESG factor impacts is commonplace for equity portfolios but much less common in fixed income. This article describes the results of research done using financial data science analysis, which integrates environmental, social, and governance (ESG) issues into a mixed asset universe in which equity and fixed-income securities are examined in one analytical setting. I differentiate "mixed assets" from "multi-asset," because the latter builds asset class portfolios and then integrates them during the asset allocation process, whereas the former analyzes securities or various asset classes in one (mixed) analytical setting. In other words, multi-asset approaches usually involve at least three steps: a security selection process in the first asset class, another security selection process in the second asset class, and an asset allocation process between asset classes. Mixed assets, in contrast, combine security selection and asset allocation in one step, which implies that they require more statistical expertise to design but are more resource efficient to implement once developed.

Our research team's journey into mixed assets was made possible by the financial data science laboratory of Sociovestix Labs, the financial market artificial intelligence spin-off from the German Research Center for Artificial Intelligence. It was as challenging as it was exciting and had profound implications for my understanding of both ESG investing and investment management of several asset classes with multiple portfolios.

At the start of the journey, we posed a rather simple set of questions: Which of the dozens of ESG factors perform well in equity securities and corporate fixed-income securities? And which perform well in both? Conceptually, we viewed equity to be priced on the basis of a risk–return trade-off with temporary shifts caused by investor preferences for sustainability, whereas we considered corporate fixed income to be priced largely on the basis of central bank decisions and risk expectations. In the absence of central bank changes, investors who bought corporate bonds that turned out to be less risky (riskier) than previously expected would gain (lose). In this context, ESG key performance indicators (KPIs) are particularly interesting, because they tend

to be predictive of downside risks but have a much less predictable relationship with upside opportunities. Hence, our working hypothesis was that ESG KPIs would allow for many more outperformance opportunities in fixed income than in equities.

This hypothesis is consistent with Sanford Grossman and Joseph Stiglitz's 1976 articles on the paradox of market efficiency.[56] The number of investors developing and executing ESG factor–based strategies in equities is currently much larger than that in corporate fixed income, implying less competition and hence more opportunities. However, although we indeed found many more opportunities in fixed income than in equities with respect to environmental and social KPIs, we found fewer opportunities for governance KPIs.

Our natural reaction was to go back to all the potentially relevant details in the governance data. Looking at each indicator in depth, we started to wonder how many were actually aligned in their interest with bond investors. Although certainly all indicators were coded in the interest of shareholders, a substantial number of indicators were for that very reason not necessarily in the interest of every bond investor. This finding made intuitive sense but led us to the intriguing follow-up research question: Which governance KPIs would perform well for both shareholders and bond investors?

To answer this question, we built an investable universe of US equity and corporate fixed-income securities and merged our equity benchmark model (the three-level Carhart model of Andreas Hoepner, Hussain Rammal, and Michael Rezec)[57] with our fixed-income benchmark model (the extended Edwin Elton and Martin Gruber model of Hoepner and Marcus Nilsson).[58] Although merging the securities required only an adequate master list of securities with an asset-class-independent sector classification, such as Sustainable Accounting Standards Board's Sustainable Industry Classification System, the merging of asset pricing models for different asset classes represented uncharted waters. It worked quite well, however, and resulted in more than 90% in-sample explanatory power, as we would expect from a robust financial data science analysis. (Financial data scientists tend to think that the science of data starts at 50% explanatory power and, as one moves upward in explanatory power, one understands more than one doesn't understand. The higher the explanatory power, the lower the noise and, hence, on average, the more robust the prediction.) But merging asset classes unveiled a significant surprise in terms of factor loading: Elton and Gruber's bond

[56]S.J. Grossman and J.E. Stiglitz, "Information and Competitive Price Systems," *American Economic Review* 66 (1976): 246–253; S.J. Grossman and J.E. Stiglitz, "On the Impossibility of Informationally Efficient Markets," *American Economic Review* 70 (1980): 393–408.

[57]A.G.F. Hoepner, H.G. Rammal, and M. Rezec, "'Islamic Mutual Funds' Financial Performance and International Investment Style: Evidence from 20 Countries," *European Journal of Finance* 17 (2011): 829–850.

[58]A.G.F. Hoepner and M.A. Nilsson, "Fixed Income Asset Pricing: Extending the Elton et al. (1995) Four-Factor Model" (2015). www.fmaconferences.org/Boston/Hoepner_&_Nilsson_-_FMA.pdf.

factors had made Fama and French's value factor rather redundant. In other words, it seemed that high-quality bonds were taking over the role of the value stocks.

Although we will conduct much more research in the mixed asset setting to confirm this result and we have yet to integrate fixed-income securities from other entities, such as sovereigns, we have made a few observations directly relevant to investment management. Specifically, we have found that the interaction between shares and corporate bonds matters. To give an extreme example, it is possible that in crisis scenarios, zero-debt stocks are perceived as less risky than below-investment-grade bonds of highly levered companies. Hence, the systemic interrelationships between stocks and bonds are worth studying, especially in fragile markets.

Furthermore, we observed two potentially business-relevant implications for investment managers who manage various portfolios in multiple asset classes. First, the securities in the portfolios should be analyzed not only with regard to their relationship with securities of the same asset class in the same portfolio but also with regard to their relationships with all securities held by the investor. Otherwise, diversification and risk management may not be as effective from a fiduciary duty perspective. Second, investors may want to consider—at least for their liquid asset classes—whether the traditional multi-layered approach, with multiple individual managers overseeing what may be several separate portfolios per asset class over several liquid asset classes, is actually still resource efficient in this age of data science. Although separating investments among several asset management teams has the advantage of avoiding concentration risk, analyzing individual portfolios or individual asset classes without regard for the greater good of the overall investment portfolio makes little sense.