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MEASURING ESG EFFECTS IN SYSTEMATIC INVESTING

**ARIK BEN DOR, ALBERT DESCLÉE, LEV DYNKIN,
JINGLING GUAN, JAY HYMAN, SIMON POLBENNIKOV**



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Measuring ESG Effects in Systematic Investing

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Measuring ESG Effects in Systematic Investing

ARIK BEN DOR, ALBERT
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Arik Ben Dor, Albert Desclée, Lev Dynkin, Jingling Guan, Jay Hyman, and Simon Polbennikov ©2024

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To my parents, Lya and Ron, for their lifelong dedication, love, and sacrifice, my wife Melina for her support and encouragement throughout, my brother Oren for always being there for me, and my biggest pride and achievement, my children Shiraz, Shelly, Tamir, and Nili

-ABD

To my wife, Anne-Louise, for her patience and support

-AD

To my wife Alina for her unwavering support and to my children David, Aryeh, Joseph, and Rachel who inspire all my work

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To my mother Zuohua Yu and my father Xiaogang Guan for their unconditional love, support, and encouragement

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To my dear wife Ella, who continually inspires and empowers me with her indomitable creative spirit

-JH

To my colleagues

-SP

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Foreword

There are many ways in which the financial industry can facilitate the path to a sustainable economy. These include financing relevant companies and projects, developing themed investment products, contributing to the development of regulatory guidelines, and influencing corporate disclosure in related areas. One of the key tasks in motivating the efforts in all of these directions is the quantification of the impact of ESG investing on the performance and valuation of financial assets. While financial performance is not the only decision variable in shaping the integration of sustainability principles into corporate practice and investment management, it is certainly an important consideration, given the fiduciary responsibilities of corporate boards to shareholders and portfolio managers to their investors.

Has an ESG tilt been additive, all else equal, to performance of credit and equity portfolios? Have investments by corporations in improving their ESG ratings paid off in improved valuation of their bonds and stock? Objective, data-driven answers to such questions have only recently become feasible because they require, in addition to quantitative research expertise, sufficient accumulation of historical data. The authors took full advantage of such data to develop innovative methodologies of quantifying ESG effects on financial assets.

The authors of this book are part of the top-ranked Quantitative Portfolio Strategy (QPS) team within Barclays Research.¹ They do not seek to present their views on ESG investing. Rather, they approach ESG investing from a purely quantitative perspective. They offer important methodologies for measuring ESG factor returns and quantifying their effects on portfolio performance. ESG is a firm-level attribute. Its impact on performance of financial assets must be analysed in a consistent fashion across the debt and equity securities of a company. An integrated approach not only provides the reader an opportunity to understand ESG effects more broadly, but also to demonstrate how robust these effects are. By drawing on their experience across bond and equity markets, as well as ESG-related expertise across Barclays Research, the authors of this book are uniquely positioned to offer readers a map for consistently navigating ESG implications in both credit and equity investing.

This work represents yet another successful installment in the research efforts of the QPS team.

C.S. Venkatakrisnan
Group Chief Executive Officer, Barclays

NOTE

1. The QPS team was ranked number 1 in quantitative analysis in the Fixed Income Institutional Investor Survey in 2023.

Preface

This book views the sustainability aspect of institutional investing—a topic often debated based on convictions and opinions—through a purely quantitative, objective lens. The authors are members of the Quantitative Portfolio Strategy (QPS) Group, which has been a part of Barclays’ research for over 15 years. The group’s mandate includes advising the largest institutional investors around the globe on any quantitative aspects of portfolio management across asset classes including fixed income and equity.

As a result, all of the research from this team, this book included, addresses practical issues of the investment process. The group enjoys a strong reputation in the industry as evidenced by its long-standing high ranking in the Institutional Investor Fixed Income research survey for the past 15 years and the readership of its prior four books—all on different aspects of quantitative portfolio management. The group’s dual focus on equity and fixed income portfolio management allows it to apply consistent methodologies across asset classes and perform additional verification of their robustness. QPS research on ESG investing is informed by the focus of the larger Barclays’ Research on various related topics—from the evolution of the regulatory landscape to natural language processing of ESG-related text.

This book doesn’t take sides in the debate on the merits of ESG investing but rather informs it by providing data-driven evidence of the impact of the sustainability tilt on portfolio performance and valuation. Quantifying this impact requires controlling all other systematic exposures in an ESG-compliant portfolio. The authors propose a comprehensive approach to isolating ESG-related effects on investment performance and valuation, apply it consistently to both credit and equity portfolios, and track these effects historically in both markets. The authors also address one of the main challenges of ESG research: the lack of an industry standard for what aspects of corporate activity should be measured as part of the evaluation of ESG compliance, how to measure them, and how to summarize the complex set of disparate activities undertaken across the breadth of a large corporation. The authors not only present a mechanism for normalizing diverse scores across providers to make them comparable, but also show that the extent of their dispersion itself has implications for future portfolio performance.¹

The authors investigate the impact of an ESG tilt on characteristics of traditional equity style factors and on systematic credit style factors such as value and momentum.

In addition to a detailed presentation of the issues facing ESG investors, the book discusses the implications for corporations of the investments they make to improve their ESG footprint.

The methodologies and findings described in this book are relevant to all investment practitioners active in sustainable investing in either equity or credit as well as to researchers, risk managers, and academics in this field.

Jeff Meli
Global Head of Research, Barclays

NOTE

- 1. This book is published for academic purposes. The information provided in this book does not constitute 'investment research' or a 'research report' and should not be relied on as such. This book does not contain investment advice or recommendations and it should not be used to make investment decisions. Information in this book does not constitute a financial benchmark. Information in this book may not be accurate or complete and may be sourced from third parties. Any past or simulated past performance including back-testing, modelling or scenario analysis contained herein is no indication as to future performance or results.*

Environmental, Social, and Governance ('ESG') Related Information: *There is currently no globally accepted framework or definition (legal, regulatory or otherwise) of, nor market consensus as to what constitutes, an 'ESG', 'green', 'sustainable', 'climate-friendly' or an equivalent company, investment, strategy or consideration or what precise attributes are required to be eligible to be categorized by such terms. This means there are different ways to evaluate a company or an investment and so different values may be placed on certain ESG credentials as well as adverse ESG-related impacts of companies and ESG controversies. The evolving nature of ESG considerations, models and methodologies means it can be challenging to definitively and universally classify a company or investment under an ESG label and there may be areas where such companies and investments could improve or where adverse ESG-related impacts or ESG controversies exist. The evolving nature of sustainable finance related regulations and the development of jurisdiction-specific regulatory criteria also means that there is likely to be a degree of divergence as to the interpretation of such terms in the market. It is expected that industry guidance, market practice, and regulations in this field will continue to evolve. Any references to 'sustainable', 'sustainability', 'green', 'social', 'ESG', 'ESG considerations', 'ESG factors', 'ESG issues' or other similar or related terms in this book are not references to any jurisdiction-specific regulatory definition or other interpretation of these terms, unless specified otherwise.*

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We would also like to thank our colleagues from other parts of Barclays Research: Maggie O’Neal for valuable discussions of ESG-related topics and for writing the introduction to Part IV; Ryan Preclaw and Adam Kelleher for their partnership in analyzing some of the large data sets used in this book; and Valerie Monchi and Amy Pompliano for their guidance on compliance aspects of the production of this book.

The authors are grateful to Jeff Meli, Global Head of Barclays Research, for his continued support of the group’s work.

Finally, the authors would like to thank their families for bearing over the years the sacrifices of family time necessary to produce the research in this book and prepare the book for publication.

Introduction

The ongoing debate about the merits of ESG (Environment, Social, Governance) investing in financial markets requires careful measurement of its effect on portfolio performance. Investors may choose to integrate ESG tilts in their portfolios for different reasons, based on sustainability considerations and/or because they believe that ESG ratings reflect material risks and corresponding performance opportunities. These considerations may be reflected in the investment policy in different ways, ranging from strict exclusion of companies and sectors involved in non-compliant activities to a more nuanced best-in-class approach that selects the companies with the best ESG rankings within each peer group.

A simple comparison between the returns of a sustainability index and the standard underlying index, whether in equities or in credit, can result in a distorted view of the ESG effect on performance. Two such indices could differ in sector allocations, average issue size, and credit ratings—all sources of performance with risk premia of their own. How should we measure the effect of ESG investing on portfolio performance? Do traditional risk factors in both equity and credit markets retain their properties when subjected to ESG constraints? Do measures taken by corporate issuers to improve their ESG profile help their subsequent ratings and the performance of their debt and equity securities? How should investors handle the lack of uniformity in ESG definitions? Addressing all these issues requires a quantitative framework aligned with the systematic approach to investing.

We pursue a consistent parallel analysis of the ESG effect on systematic strategies in equity and bond markets. Applied to security selection these strategies involve the systematic use of financial models for all securities within the investment universe, and the construction of highly diversified portfolios that reflect a number of investment themes, or factors, in a risk-efficient manner. While systematic investing has been in the mainstream of equity investing for decades, it has recently started gaining popularity among bond investors as well. There are several reasons for these past differences and for the recent convergence in acceptance of algorithmic investing between the two markets. Most equities are exchange traded and more liquid than bonds. Equity market data have been broadly available

to researchers in academia and the financial industry for many years. As a result, all aspects of quantitative investing in equities—from definition of the factors driving stock returns, to selection signals predictive of future security or sector performance, to portfolio optimization methodologies—have been well researched, exploited by investors, and widely accepted alongside the traditional fundamental, discretionary investment style. In the past few years fixed-income investors also saw increased availability of bond market data from vendors, improved price transparency, increased liquidity due to regulatory reporting requirements to shared databases such as TRACE, and a rise in e-trading, ETFs, and portfolio trading. All of these developments, coupled with the influence of established quantitative insights from the equity markets, enabled the expansion of systematic investing to fixed income, as we discussed in our book, *Systematic Investing in Credit* (Wiley, 2021). In the current volume, we focus on the intersection of systematic investing with the trend towards ESG integration, particularly on the impact of an ESG ratings tilt (‘positive screening’) or of ESG-related exclusions (‘negative screening’) on the performance of systematic strategies in credit and equities and on the valuation of securities. Our objectives are to offer consistent methodologies for measuring the effects of ESG on the performance of equity and fixed income portfolios, to document the historical magnitude of these effects and the related valuation trends, to quantify the impact of ESG constraints on the performance of systematic strategies and style factors, and to measure the efficacy of corporate actions in the sustainability area.

The book is purely methodological and relies on historical analysis of market data,¹ offering no subjective views on the merits of ESG investing. This is in line with the long-standing mandate of our research group. The authors are members of the Quantitative Portfolio Strategy (QPS) group, which has been a part of Barclays (and previously Lehman Brothers) Research for over three decades. The group has a unique focus on working with major institutional investors across the globe on any issues of portfolio management that are quantitative in nature. As a result of this focus, research produced by the group tends to be practical and implementable. The group’s publications target portfolio managers and other investment practitioners, as well as research analysts and academics. The group’s past involvement in the creation of fixed-income indices and expertise in quantitative research in both equities and bonds further helped it develop consistent methodologies across the two markets. To enable parallel analysis in equity and bond markets, we rely on a proprietary issuer-level historical mapping (that accounts for corporate events) between corporate bonds and equity of a given company. The approach taken in this book is fully objective and free of any views or opinions. Rather, we ‘let the data speak’.

The conventional definition of systematic strategies includes fully rule-based algorithmic methodologies aimed at improving portfolio performance by generating alpha. Some of them fall into the ‘smart beta’ category and take advantage of inefficiencies in the design of traditional market indices. Others harvest risk premia associated with risk factors, both traditional and new. In this book, we take a more expansive view of systematic investing to include any aspects of portfolio construction that are quantitative in nature. For example, we will include in this expanded definition methodologies for isolating the ESG risk premium from other unrelated systematic exposures. In the language of systematic investing, a risk factor is a source of portfolio risk independent of other established risk factors, which is priced in the market and is expected to be compensated by extra portfolio return—the risk premium. Is ESG a risk factor? Do bonds issued by firms that have strong ESG ratings have fundamentally different risk profiles than those with low ESG ratings? On the one hand, many proponents of ESG investing hold the view that stronger governance is associated with management quality, and hence corporate decisions that lead to higher investor cash flows. Stronger credentials on the Environmental and Social dimensions may reduce exposure to adverse corporate developments such as litigation, changes in regulation, or changes in customer acceptance. On the other hand, there has been insufficient empirical evidence so far that ESG ratings are indeed associated with systematic risk. In this book, although we use the term ‘ESG risk premium’ to refer to the isolated ESG-related return (free of any other risk factor exposures and idiosyncratic risk), we are not taking a view on whether ESG exposure is a risk factor that should be expected to carry a risk premium. (In fact, in Chapter 4 we show that for sovereign bonds the ESG-related return is subsumed by the credit rating.) We hope that our work to document the relationships between ESG characteristics will help inform this discussion going forward.

All the materials included in the book reflect original QPS research as it was first published. With few exceptions where an update was essential, we decided against going back and updating the data analysis in individual chapters to avoid any possibility of hindsight tainting the results.

This book is structured in four parts.

In Part I, we address the seemingly simple question of how to measure the returns associated with an ESG tilt in a portfolio or an index. Most sustainable versions of broad market indices in both equity and credit are defined by exclusion of non-compliant issuers or industries. However, the difference in performance between these sustainable indices and the original index cannot be interpreted as return due to ESG, as the two indices differ in sector allocations, credit quality, issuer size, and a number of other characteristics that also affect security returns. Even if sector allocations are constrained to match

the broad index, tilting a portfolio within sectors towards high ESG issuers will simultaneously tilt it towards higher rated, large-cap companies, which tend to be more compliant. We propose a methodology for isolating the performance effect of ESG while matching the underlying index in all other risk dimensions, and we document the behaviour of this premium in equities and bonds over time. The ESG risk premium obtained in this exposure-matched way, free of all systematic biases, can differ from the simple performance differential between a sustainable and standard index not only in magnitude, but also in sign. Separately we study the ESG effect on the pricing and performance of sovereign bond portfolios. In addition to our methodology for measuring the performance of ‘best-in-class’ ESG investing, we also study the effect of the exclusionary approach of Socially Responsible Investing (SRI) on credit portfolio performance. The negative screening of entire industry groups makes it difficult to exactly match index risk characteristics; we therefore introduce a new technique for measuring the performance effect of such constraints.

In Part II, we measure the impact of ESG constraints on the performance of a systematic credit strategy that utilizes three of our proprietary signals—value, momentum, and sentiment. The key question addressed is whether the ESG constraints interfere with the strategy’s ability to generate alpha. We follow this up with a study of the ESG effect on the return profile of equity style factors introduced by our group. These include, among others, well-established factors such as momentum, value, growth, quality, yield, low volatility, and size (some of them with proprietary changes in definition), which our group publishes across global equity markets. We test whether the return profile associated with each factor is preserved after applying ESG constraints of different types.

In Part III, we switch our focus from studies of ESG-related choices made by investors to the implications of ESG-related activities of the issuers. Does the market reward corporations with improving ESG scores by raising the valuations of their debt and equity? Do ratings providers reward companies that hire for ESG-related positions at a greater rate than their peers by raising their ESG ratings? Does improved corporate governance as measured by the G in the ESG ratings lead to higher company profitability?

In Part IV, we analyse the investment implications of the dispersion in ESG scores across different providers and of ESG labelling of mutual funds. Sustainable investing is still a young field and convergence to standards is not yet complete. This applies both to ESG rating methodologies and to the scale on which these ratings are assigned. This dispersion complicates score comparison across vendors. We show how to properly calculate a consensus score

among multiple providers despite these difficulties by first normalizing the scores. Even after this normalization, there can be significant disagreement among score providers. Does such disagreement have implications for future ESG returns? A similar lack of clarity can be found in the labelling of mutual funds, particularly in the United States. Do ESG-labelled funds indeed invest in issuers with above-average ESG ratings? How does this label influence fund performance, fund flows, and AUM?

This book could not have been written until a sufficient history of ESG scores became available across multiple vendors utilizing comparable (even if different) methodologies. Some of the ESG-related effects discussed in Parts III and IV had persistent implications for performance of equities and bonds over the period of the respective studies. We find that both equity and credit securities of issuers with improving ESG ratings outperformed their peers with unchanged or declining ESG scores on an all-else-equal basis. Securities of issuers with significant dispersion of ESG scores across rating providers underperformed their risk-matched peers with more consensus on their ratings. Firms with an above-average rate of ESG-related hiring saw their ratings subsequently improve and their equity outperform risk-matched peers. We document these predictive relationships between ESG attributes and subsequent performance, but hesitate to label them as persistent alpha sources since these relationships may change according to investor interest in ESG investing. In fact, all of our numeric findings are subject to change—ESG-related returns that were positive over one period of history can turn negative in another. The evolving regulatory landscape can change the dynamics of ESG ratings produced by different vendors or the rules of ESG fund labelling. However, it is our hope that the methodologies outlined here will remain applicable throughout changing markets and regulations and will help investors navigate ESG-related decisions in their bond and equity portfolios.

We would like to thank our clients for the stimulating questions and continual dialogue that led to many of the results covered in this book, our colleagues who provided invaluable help with the analysis and preparation of the manuscript, and the senior management of Barclays for their unwavering support and encouragement of our work. We hope that portfolio managers, research analysts, and academics in the field of systematic investing, in both fixed income and equities, will find these chapters useful. As always, we welcome inquiries and challenges to our work.

Lev Dynkin
Global Head of Quantitative Portfolio Strategy, Barclays Research

NOTE:

Notes on Data Providers:

“MSCI” refers to MSCI ESG Research.

“Compustat” refers to S&P Global Market Intelligence Compustat®.

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Effect of ESG Constraints on Portfolio Performance and Valuation

INTRODUCTION TO PART I

The very first question to address in discussing ESG-related investing is the effect an ESG tilt has on portfolio performance and the valuation of securities. Has ESG compliance been a benefit or a cost to portfolio returns? Have investors who elected to introduce an ESG tilt been rewarded by superior performance compared with ones that ignored this tilt or even took a contrarian view on its return impact? In markets and time periods when the ESG tilt benefited the portfolio performance, has it been achieved by an increase in valuation of high-ESG securities, which should at some point stop, mean-revert, and generate future underperformance? Given the fact that ESG ratings are formed at the issuer level, has the ESG risk premium been consistent across the equity and bonds of an issuer? With European asset managers leading the United States in ESG adoption, has this risk premium been consistent across the two geographies?

This seemingly simple question of what part of a portfolio return is related to ESG is often answered incorrectly. One approach to computing this risk premium is to sort the universe of securities by ESG scores and measure the performance difference between the highly rated and low-rated parts of this universe. Another common approach is to compare the return of a standard

index describing a given market segment to its sustainable version, often built by excluding non-ESG-compliant sectors and issuers. In Part I we argue that both of these approaches are misleading. As we show in Chapter 1, securities with high ESG ratings tend to be issued by large, highly rated companies which are able to fund ESG compliance initiatives and related reporting. They also tend to be concentrated in compliant market sectors which can perform differently from the broad market. So a simple difference between the performance of a high-ESG-rated portfolio and one with low ESG scores can reflect a size risk premium, a quality premium, or sector timing mixed in with the ESG risk premium.

In Chapters 2 and 3, we propose a consistent approach across credit and equity markets to computing a pure ESG risk premium (or the ESG part of the return) in isolation, controlling for all other risk factors. For a given market segment (e.g. S&P 500, investment grade credit, high yield) we create portfolios that are risk-matched to the corresponding index in every risk exposure except the ESG rating. We first seek to maximize this rating subject to constraints on all other systematic risk exposures and to a diversification constraint (to avoid impact of issuer-specific risk). We then we similarly find the low-ESG risk-matched portfolio. These two portfolios match in all risk attributes that affect performance (average issue size, credit rating, sector distribution, etc.) and differ only in their ESG exposure. We suggest that the difference in returns between these max-ESG and min-ESG portfolios represents a pure ESG risk premium and can be used to evaluate the effect of an ESG tilt on portfolio performance. We apply this risk-matched approach consistently across credit, high yield, and equities in different geographies and document the trajectory of this pure ESG risk premium in all these markets over the study period. Interestingly, results obtained using this risk-matched methodology can differ from the naïve measures of the ESG risk premium described earlier not only in magnitude but also in sign.

In Chapter 4, we study the effect of ESG on the pricing and performance of sovereign bonds. As in corporate markets, we find that ESG criteria tend to favour higher-quality sovereign issuers. ESG-tilted sovereign bond portfolios, if unconstrained, will therefore have higher credit quality and lower spreads. However, once we control for credit quality, we find that ESG attributes do not have a statistically significant effect on either spreads or portfolio returns. This is established using both a statistical approach and using our risk-matched portfolio construction methodology.

The risk-matched methodology featured in Chapters 2 to 4 is aligned with the ‘best-in-class’ approach, in which each market sector is represented in the portfolio by the issuers with the highest ESG ratings in the sector. However, many ESG-labelled credit funds employ a negative screening approach, in which they exclude issuers whose business activities conflict with certain

values or social norms. The negative screening approach can lead to a very different effect on portfolio performance, as the systematic risk premium of the excluded sectors may fluctuate with market regimes and result in unintended portfolio volatility. In Chapter 5, we analyse the effect of such negative screening strategies, often referred to as Socially Responsible Investing (SRI), on the performance of credit portfolios, from both a bottom-up and a top-down perspective.

