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Proxy voting: a founding pillar of stewardship

By Cathrine de Coninck-Lopez and Zoje Vataj

Proxy voting is among the most powerful ways of ensuring that investors' voices are heard. It can also be among the most challenging, particularly when it comes to putting environmental, social and governance (ESG) principles into practice. Invesco's approach aims to increase the impact of active stewardship by leveraging the voting strength of our passive strategies on behalf of clients – because every vote counts in the era of responsible investing.

We combine the voting decisions of our active managers with the voting strength of our passive strategies.

Annual general meetings (AGMs) and similar gatherings have always presented a compelling arena in which to demonstrate how a business's behavior affects shareholders' inclinations to buy, hold or sell a company's stock. Today, with the corporate landscape and beyond in a state of near-permanent flux, the importance of making investors' voices heard is perhaps greater than ever.

Thus, it is vital that asset managers appreciate the enormous role proxy voting[1] can play in fulfilling their fiduciary duty of maximizing long-term shareholder value. Clients rely increasingly on asset managers' expertise and active engagement with investee companies to produce voting decisions that are in their clients' best interest and align with their objectives and beliefs.

Particularly in the era of responsible investing, active stewardship must also be recognized as an essential lever for delivering non-financial outcomes increasingly sought by investors. It offers opportunities to encourage continual improvement and to ensure our clients' interests are represented and protected. If a company repeatedly fails to exhibit progress on ESG matters, asset managers may take voting action to signal their concerns.

Despite all this, proxy voting has not escaped criticism. There have been claims that the third-party proxy advisory industry wields excessive influence[2] and that some asset managers are content to blindly follow the recommendations of proxy advisers.[3] But on the other hand, there have also been concerns that some asset managers willfully ignore the guidance they receive.[4]

Invesco seeks to avoid such potential difficulties by taking an investment-led approach to proxy voting, using our good governance principles to inform voting decisions in the context of financial materiality. As we will explain, a unique feature of this approach is the way in which we combine the voting decisions of our active managers with the voting strength of our passive strategies to ensure that every vote truly counts in the quest to maximize shareholder value and drive positive outcomes.

The role of third-party specialists

Although undoubtedly more convenient, not having to be physically present at every shareholder meeting still leaves investors with a logistical challenge. The US proxy season, for example, is concentrated into just a few months, which means the decision-making process is likely to come under extreme time and resource pressures. A small internal team might need to review several hundred

Figure 1
The scale of the proxy voting challenge

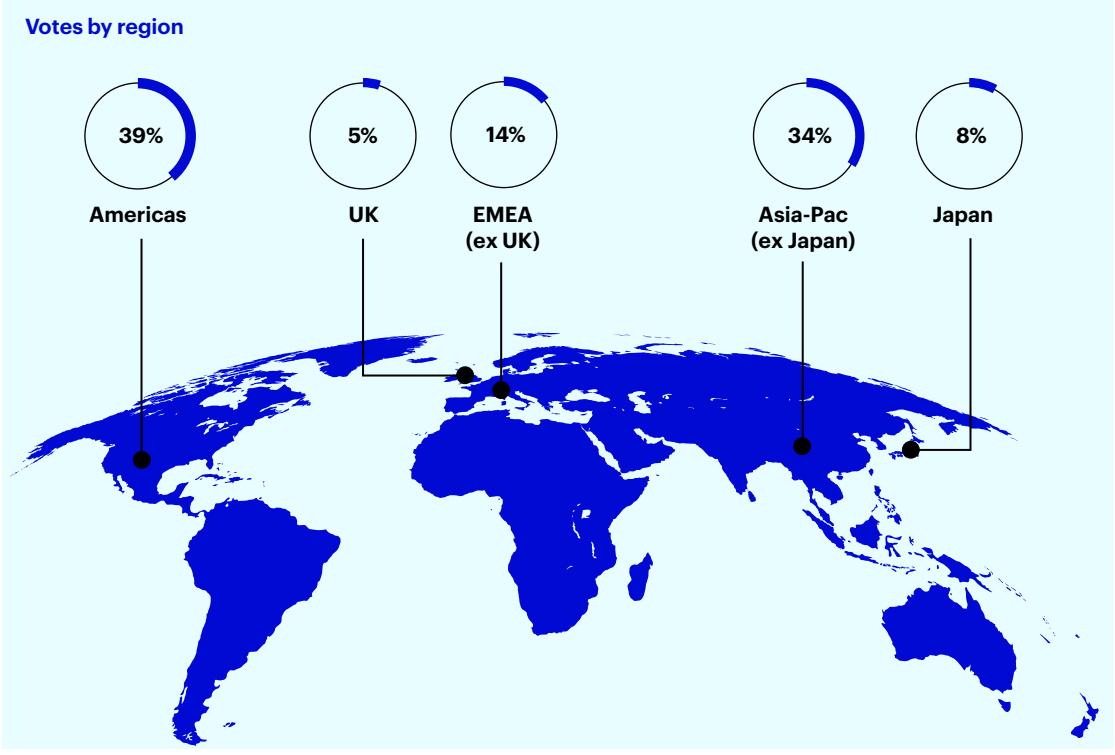
Meetings voted
12,093

Companies voted
9,057

Markets voted
73

Proposals voted
116,496

Ballots
132,605



This represents execution on more than 98.4% of eligible meetings.

Source: Invesco (2022a): 2021 ESG Stewardship Report, 2022.

proposals a day – a daunting and frequently unrealistic prospect. The inputs of proxy advisers can therefore be highly valuable.

The main global proxy voting advisory firms include Institutional Shareholder Services (ISS) and Glass Lewis. These are routinely reported to account for 97% of market share,[5] although ISS has stressed that it has not verified this statistic.[6] There is nothing remarkable in the fact that Invesco, too, draws on research from both firms. This is, after all, common among the vast majority of the largest global asset managers. However, we believe that the way we incorporate their advice is far from typical.

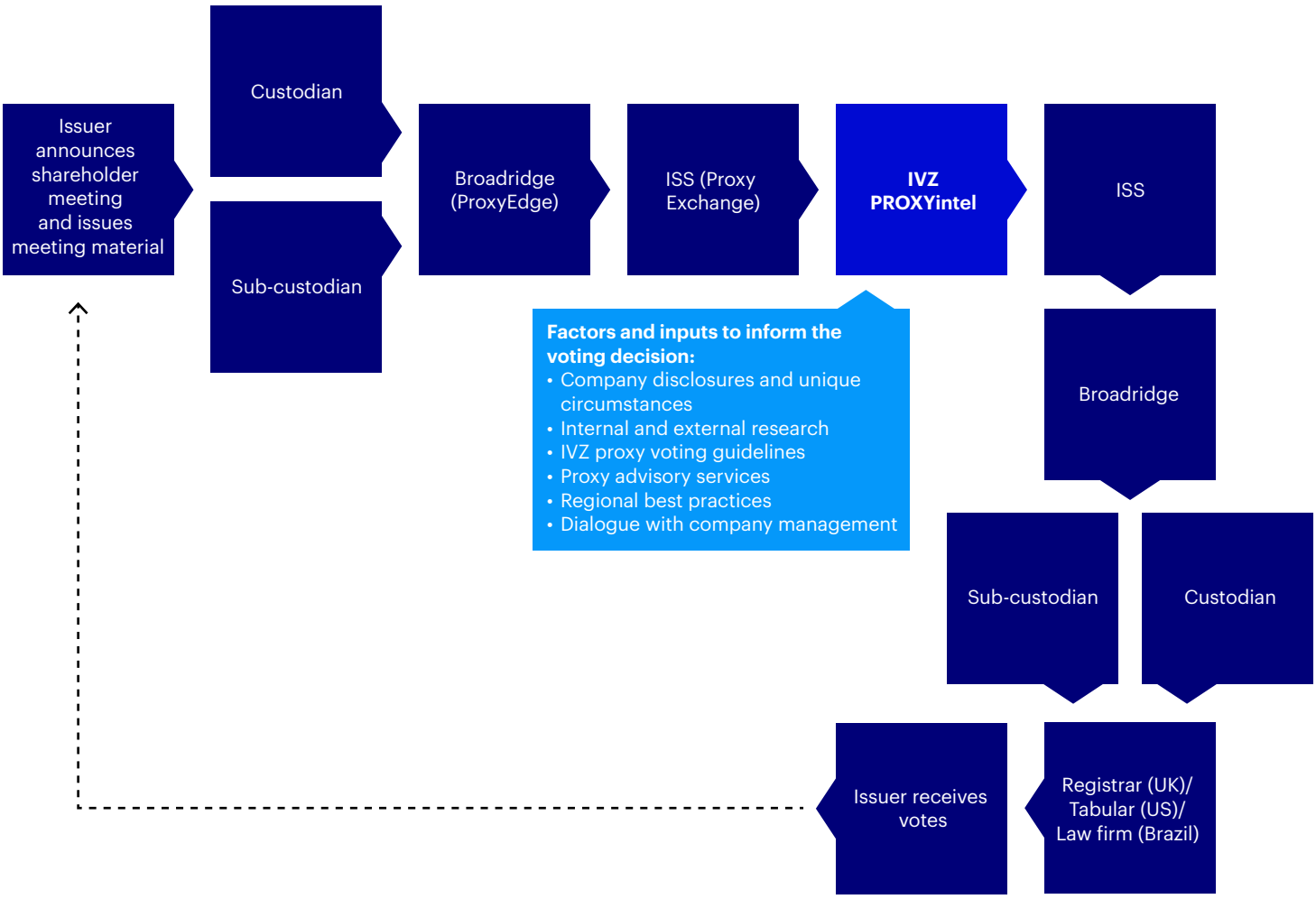
Smaller institutions might leverage the baseline policies of third-party proxy providers or outsource all voting responsibilities. Some larger institutions might instead centralize decision making and insist on a uniform vote – a policy that could discourage investment managers from proactively appraising resolutions. By contrast, Invesco prefers its investment managers to make their own decisions. This philosophy reflects our appreciation of diversity of thought, our resolve to be transparent and our belief that the people who oversee our clients' portfolios are uniquely placed to assess the issues at hand – not least with regard to ESG.

In 2021, we voted on over 100,000 resolutions at more than 12,000 shareholder meetings worldwide. Fulfilling such an array of obligations with the integrity our clients expect requires extensive resources and expertise, including inputs from third-party providers (figure 1).

Multiple insights and informed decisions

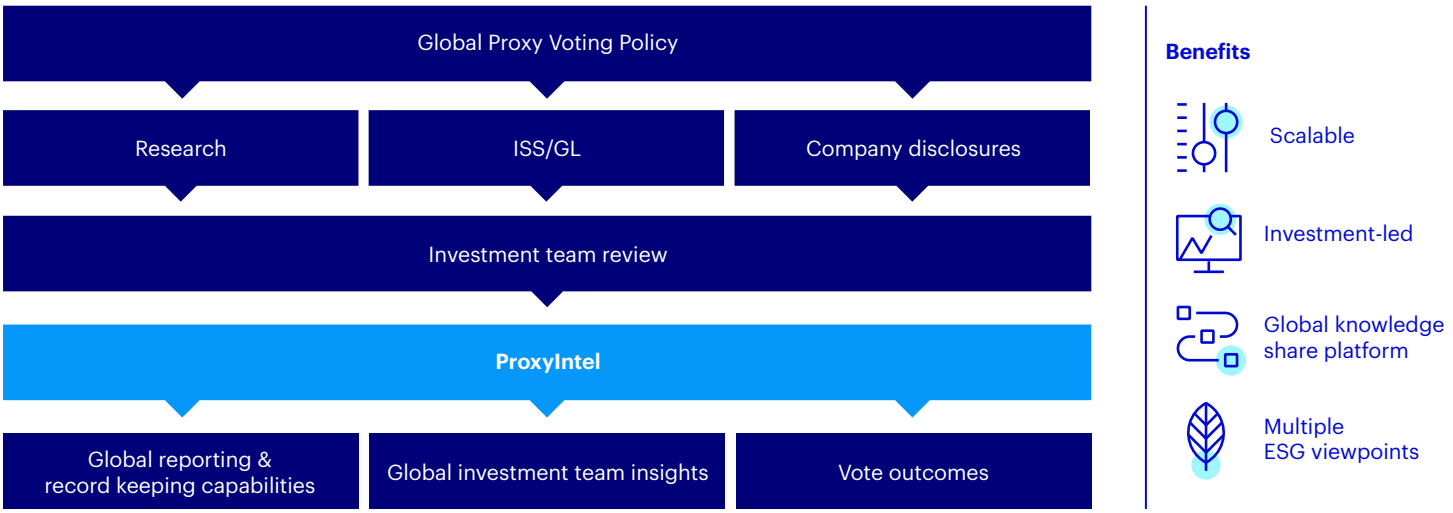
At the core of our approach is our proprietary platform for proxy voting, PROXYintel. Launched in 2014 and continuously enhanced since then, it allows our investment managers to reach informed decisions with the support of both third-party research and in-house expertise, provided first and foremost by our Global ESG team. Located in three regions – North America, Asia-Pacific and EMEA – our Global ESG team acts as a center of excellence for Invesco's ESG capabilities and assists investment teams' efforts across the responsible investing space, including integration and engagement. Moreover, PROXYintel enables our investment teams to share

Figure 2
Overview of how vote instructions may travel through the global proxy voting chain



Source: Invesco. For illustratives purposes only.

Figure 3
Proxyintel – a proprietary platform for Invesco's investment teams to vote with confidence



Source: Invesco. For illustratives purposes only.

Our investment-led approach aims to scale active stewardship by using passive strategies as a 'force multiplier'.

with one another their detailed views on individual resolutions and votes and tracks voting decisions in real time.

Equally important is our Global Proxy Voting Policy. It was developed by our investment teams in collaboration with the Global ESG team. Crucially, as well as supplying guidelines on what good governance looks like, it outlines how we evaluate ESG-related shareholder proposals.[7]

None of this should be seen as prescriptive. Investment managers have the freedom to override any guidance at their discretion, provided they have a rationale for doing so. But we have found that encouraging the sharing of information and insights across the firm tends to engender consensus rather than disagreement. Indeed, sharing the wealth of information and acumen of our various investment teams usually results in the emergence of an optimal voting stance. This means we are able to explore competing ideas, subject each of them to critical scrutiny and gradually identify which are superior.

As with a centralized decision-making process, this reduces the likelihood of split voting. The difference is that, while a centralized system avoids split voting by effectively discouraging diversity of thought, reducing split voting is a corollary of the diversity of thought at Invesco. We do not specifically prohibit split voting, but in practice it seldom occurs.

Harnessing the power of proxy votes from passive strategies

Imagine that, on the strength of blind adherence to a third-party specialist's voting recommendation, an asset manager throws the very sizeable weight of its passive holdings behind a resolution. Then imagine that it does so in utter defiance of such a recommendation. Either course of action would likely have a major impact on the outcome of a vote. Yet precisely this may occur without a full comprehension of all the available information, including the many useful insights that active investment managers and analysts obtain through close engagement with investee companies.

With such issues in mind, our investment-led approach aims to scale active stewardship by using passive strategies as a 'force multiplier'. We leverage the in-depth knowledge of our active managers to shape the voting decisions of our ETFs, bringing them in line with those of our active equity strategies. This means that the full might of our voting capacity can be channeled in whichever direction we believe will lead to the best financial and non-financial outcomes for our clients. It also means that every vote is fully informed and that none is wasted. And it means that we effectively aggregate our passive holdings to give our active equity investors more clout – through both voting and engagement.

We see this as a notable innovation at a time when ESG should be uppermost on corporate and investor agendas. By applying one of the hallmarks of long-term ownership across our portfolios, we are better able to reap benefit for our clients. To illustrate how this works, here are two recent examples:

1) Supporting indigenous rights

In 2021, Invesco sought evidence from an Australian utilities company of sufficient engagement with indigenous communities living in proximity to sites managed by the company, as well as alignment of its capital expenditures with Paris Agreement objectives. The company gave seemingly contradictory accounts about the due diligence process undertaken to engage with Traditional Owners of land used for exploration activities.

At the company's AGM, several shareholder resolutions were filed relating to these issues. We supported the shareholder proposals that requested more transparency around the engagement process with Native Title Holders, that requested the company conduct negotiations in line with the UN's Principle of Free, Prior, and Informed Consent (FPIC), and two climate-related shareholder proposals. All our investment teams voted this way.

While none of the shareholder proposals received a majority, the company requested a follow-up meeting to better understand the reasoning behind Invesco's voting decisions. We explained our voting rationales, in particular our support for the UN's FPIC. The company indicated they would take the feedback on board.

2) Demanding independence and diversity at board level

In 2020, amid pressure from institutional investors, a North American bank appointed a new Lead Independent Director to its board. We met with management to express concerns about this move, noting that the appointee had already been a board member for 17 years.

The following year, at the bank's AGM, our investment teams unanimously supported a shareholder proposal to separate the roles of Chair and CEO, arguing that this would improve independent oversight of management. The proposal gained significant approval.

Going forward, we plan to continue engaging with the bank's management to press for more independence and diversity at board level. The proposal to split the roles of Chair and CEO is set to be back on the agenda during the 2022 proxy voting season.

Conclusion

Proxy voting is a potent means of making investors' voices heard and improving not only the businesses themselves but the communities and societies in which they operate. The power of active stewardship would be hugely diminished in its absence. Recognizing this, we use a proprietary platform and an investment-led focus to ensure that our proxy voting activities are in the best interests of clients. This also acknowledges the growing importance attached to the wider notion of 'expression of wish' – the idea that clients should reasonably expect their own preferences to be reflected in voting. Our methodology is supported by the expertise of our active investment managers and supplemented by the weight of our passive products.

Looking ahead, we anticipate a continued push for greater clarity and transparency around proxy voting and other phases of the journey, from engagement to outcomes. This pressure is likely to come not just from regulators or policymakers but from investors themselves. We welcome these developments. Ultimately, they should serve to reinforce proxy voting's standing as a powerful mechanism for reducing risks, enhancing returns and delivering both long-term shareholder value and broader positive impact.

Notes

1 See Ang et al. (2009).
2 E.g., Fama and French (1992), Jegadeesh and Titman (1993) and Novy-Marx (2013).
3 We consider beta-neutral factor portfolios with unit leverage (USD 1 long, USD 1 short).
4 These factor scores are standard-normalized scores based on industry-neutral ranks; see: "Factor Investing: An Introduction", Risk & Reward 2016 Q4.
5 We perform a multivariate regression. The basic factor portfolios are beta neutral.
6 Active weights are differences between two sets of portfolios, e.g., the original MOM and ESG-enhanced MOM factor portfolios.
7 For example, maximizing ESG exposures subject to a minimal decrease in factor exposures.
8 Other weighting schemes are certainly possible, e.g., risk-parity, minimum-variance or maximum diversification.
9 Our portfolio construction methodology stipulates that, after we combine the factors through the specified factor weights, we 'reweight' so that the resulting model portfolio is unit leverage and beta neutral.
10 A simple two-sample t-test gives a t-statistic of 3.32, rejecting the null hypothesis that the two have equal time series means.

About the authors

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“We’re really getting the best of both worlds – and so are our clients”

Interview with Matthew Tagliani

Matthew Tagliani
Head of ETF Product and Sales Strategy, EMEA, Invesco

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Passive investing is basically a question of scale.

Risk & Reward spoke to Matthew Tagliani, Head of ETF Product and Sales Strategy for EMEA at Invesco, about harnessing the power of passive strategies’ proxy votes to drive ESG objectives.

Risk & Reward
Is it fair to say that passive investors are often misconstrued as passive owners?

Matthew Tagliani
Yes, that’s a common misconception. There are important differences between passive and active strategies, but the fiduciary responsibility that comes with ownership isn’t one of them. When choosing investments, managers of passive funds have very little discretion. This also applies to ESG considerations – though we can certainly integrate ESG selection criteria into the benchmark itself. When it comes to ownership, however, there’s no fundamental difference whatsoever. We aim to vote every share, and we can vote on every resolution – and that translates into a massive responsibility.

Risk & Reward
Why is it massive?

Matthew Tagliani
It’s massive because passive investing is basically a question of scale. We’re replicating broad benchmarks with large pools of assets – multiple hundreds of billions of dollars’ worth in our case. So right from the start, we need a different perspective from an active manager with a portfolio of, say, 30, 60 or a hundred names. We have to find an intelligent way of exercising the responsibility that comes with holding thousands of securities to maximize the benefit for our clients. We own large portions of many companies, and we want to use that strength in the best interests of our funds’ investors.

Risk & Reward
How does the expertise of your active management colleagues help?

Matthew Tagliani
Imagine that the same small-cap business is owned by one of our passive strategies and one of our active strategies. Now imagine that the passive strategy holds 3,000 companies and the active strategy holds only a few dozen. There’s no way we could know as much about that small-cap company as an active manager does. So we take advantage of the active manager’s knowledge when voting our shares, because their job is to know the company inside out. That’s how we effectively leverage the active portion of the business. And we can use this model for companies of all sizes in all regions.

Risk & Reward
How would you sum up the advantages of this approach?

Matthew Tagliani
We’re making maximum use of active managers’ in-depth knowledge of investee companies while also making maximum use of our voting power – bringing a bigger carrot or a bigger stick to the table, depending on how we want to engage. We’re really getting the best of both worlds, and so are our clients.

Risk & Reward
That’s a powerful prospect. Thank you very much for your time.

“Leveraging the power of passive investments while benefiting from the informed decisions of active managers is a promising solution”

Interview with Oğuzhan Karakaş, Ph.D.

Oğuzhan Karakaş
Associate Professor of Finance
Cambridge University

Risk & Reward spoke to Dr. Oğuzhan Karakaş, Associate Professor of Finance at the University of Cambridge’s Judge Business School, Co-Director of the Centre for Endowment Asset Management and co-author of “Active Ownership”, widely acknowledged as the first study to explore shareholder activism’s impact on ESG-related issues.[1] In this interview, he discusses the growing importance of engaging with investee companies in the age of ESG and the crucial role of proxy voting.

Risk & Reward
How has the rise of ESG affected institutional investors’ engagement with investee companies?

Oğuzhan Karakaş
Institutional investors own a significant proportion of the equities in the market, leaving them highly exposed to risks from corporate externalities. Their engagements started mainly with governance considerations, but responsible investing has obviously introduced an extra dimension. Today, institutional investors are increasingly engaging with investee companies on all kinds of ESG topics, and the filing of ESG-related shareholder resolutions is growing in tandem. The way universal owners – as we might call them because of their substantial, diversified and ultra-long-term holdings – are seeking to influence how businesses are managed is very much a reflection of their ESG concerns. Active ownership is no longer focused on shareholders’ interests only. Nowadays, engagement encompasses a broader range of stakeholders, including employees, customers, communities and society as a whole. This is also highlighted by Business Roundtable in its 2019 “Statement on the Purpose of a Corporation”.[2]

Risk & Reward
Several years ago, in your study “Active Ownership”, you and your colleagues shed new light on the wider impact of this kind of engagement. What were the key findings?

Oğuzhan Karakaş
Very broadly, we found successful engagement with investee companies is likely to have positive effects on a number of factors. These include positive abnormal returns, lower stock volatility and improved operating performance, profitability, efficiency and governance. We also found that success with regard to E and S issues is more likely if the engagement is coordinated. In other words, collaboration among asset managers and other stakeholders is key to driving positive change. In a follow-up paper, “Coordinated Engagements”, we further analyzed collaboration among PRI [Principles for Responsible Investment] signatories.[3] In this context, it was observed that a two-tier engagement strategy, combining lead investors with supporting investors, is effective and followed by improved performance. Success rates are elevated when lead investors are located in the same country as the investee company.

Risk & Reward
Is proxy voting the ultimate vehicle for this sort of collaboration?

Oğuzhan Karakaş
Proxy voting is the bedrock and the ultimate means of exercising ownership rights. If we think of engagement as a process of escalation – an increasingly determined effort to influence a business’s behavior – then disciplinary proxy voting is usually the final recourse when all else fails. It’s the diametric opposite of gentle persuasion, and it is obviously strengthened with the implicit threat of exercising voting rights. Corporate votes are valuable. In another paper, “The Market Value of Corporate Votes”, we find the average annualized value of voting rights is about 1.5% of the share price for US public firms.[4] The value of votes can dramatically increase if control of the firm is contested, particularly in contentious settings such as shareholder meetings with close vote outcomes, instances of hostile hedge fund activism or M&A deals. Collaboration among universal owners for ESG engagements is particularly useful for aggregating the collective voting power of diversified investors. In turn, this increases investors’ credibility and power of persuasion in their engagements. In “Coordinated Engagements”, an average collaborative engagement is seen to include 26 investors participating in the dialogue.

Risk & Reward
What about divestment?

Oğuzhan Karakaş
More than 50 years ago, renowned German economist Albert Hirschmann wrote a book entitled "Exit, Voice and Loyalty".[5] He examines the choices an organization's members face when its quality deteriorates. The first option is simply to withdraw, while the second is to try to repair or improve the situation through communication. The degree of loyalty towards the organization is likely to determine which path is taken, with communication being the favored option. This construct can clearly be applied to active ownership, with divestment representing 'exit' and engagement representing 'voice'. Exit might look like the easier and more obvious of the two, but the reality is that it may entail major consequences, some of them unintended. For one thing, exiting the shares relinquishes the voting rights – and hence the voice over the firm's policies. Second, exiting means there are buyers, who may be less concerned about ESG issues. Third, research shows 'sin' stocks – businesses that are involved in sectors such as alcohol, tobacco and gambling – may deliver attractive returns.[6] Divestment is one reason for this outperformance, as it depresses a stock's price, which in turn can lead to higher returns. This suggests that divesting may reward the investors that are less ESG-conscious, which could itself be seen as rendering divestment counterproductive.

Divesting may reward the investors that are less ESG-conscious.

Risk & Reward
So, is engagement invariably preferable to divestment?

Oğuzhan Karakaş
There are still instances in which investors feel 'exit' is the only, or the better, option. But the bottom line is: 'voice' at least maintains the capacity to make a difference. Divestment is in many ways an abandonment of hope, whereas engagement keeps the flame alive. This is why proxy voting decisions should be fully informed, reflect investors' wishes and take full account of ESG considerations. It's essentially a case of doing everything possible to help shape businesses for the better.

Risk & Reward
What are your thoughts about Invesco's approach to harnessing the power of passive strategies' proxy votes?

Oğuzhan Karakaş
Referring again to the idea of 'exit' and 'voice', the interesting thing is that passive investors' scope to exit is limited. But this is not necessarily a bad thing, because it can incentivize them to use their voice more. A fundamental problem in shareholder engagements is the relatively small voting power of active investors, who naturally tend to diversify their investments. A variety of ideas has been implemented to address this issue in practice, such as collaborating with other investors and publicizing engagement to gather support among other shareholders. Leveraging the power of passive investments while benefiting from the informed decisions of active managers, as Invesco does it, is a promising solution.

Risk & Reward
Thank you for your insight.

Notes
1 Dimson, E., O. Karakaş and X. Li (2015).
2 E.g., Business Roundtable (2019).
3 Dimson, E., O. Karakaş and X. Li (2021).
4 Kalay, A., O. Karakaş and S. Pant (2014).
5 Hirschman, A. (1970).
6 Hong, H., and M. Kacperczyk (2009).

References

American Council for Capital Formation (2018): The Realities of Robo-Voting

Axe, L. (1942): Corporate Proxies

Business Roundtable (2019): Business Roundtable redefines the purpose of a corporation to promote "an economy that serves all Americans", 19 August 2019

Copland, J., D. Larcker and B. Tayan (2018): Proxy Advisory Firms: Empirical Evidence and the Case for Reform

Dimson, E., O. Karakaş and X. Li (2015): Active Ownership

Dimson, E., O. Karakaş and X. Li (2021): Coordinated Engagements

Financial Times (2018): Big two proxy advisers face glare of SEC scrutiny, 11 November 2018

Glassman, J., and H. Pierce (2014): How Proxy Advisory Services Became So Powerful

Hirschman, A. (1970): Exit, Voice and Loyalty: Responses to Decline in Firms, Organizations and States

Hong, H., and M. Kacperczyk (2009): The Price of Sin: The Effects of Social Norms on Markets

Invesco (2021a): 2020 ESG Stewardship Report

Invesco (2021b): Invesco's Policy Statement on Global Corporate Governance and Proxy Voting, January 2021

Kalay, A., O. Karakaş and S. Pant (2014): The Market Value of Corporate Votes: Theory and Evidence from Option Prices

Rose, P. (2019): Robovoting and Proxy Vote Disclosure

ShareAction (2021): Voting Matters 2021: Are Asset Managers Using Their Proxy Votes for Action on Environmental and Social Issues?

Shu, C. (2022): The Proxy Advisory Industry: Influencing and Being Influenced

Taskforce on Pension Scheme Voting Implementation (2021): Report of the Taskforce on Pension Scheme Voting Implementation: Recommendations to Government, Regulators and Industry

ESG portfolio management and factor implications in equities and fixed income

By Marcus Axthelm, Erhard Radatz, Jay Raol, Ph.D., and Carsten Rother

ESG has been found to impact security characteristics less in equities than in fixed income. At the same time, different ESG data sources and methodologies can create uncertainty when it comes to ESG measurement. We explore these topics using existing ESG fund holdings and we find that ESG does indeed impact the risk and return characteristics of both fixed income and equity portfolios. In addition, the potential for incoherent ESG portfolios due to disagreements between equity and fixed income managers is quite high in multi-asset portfolios. We recommend investors be mindful of potential pitfalls when it comes to achieving ESG exposures and building their multi-asset portfolios.

Managing portfolios in light of environmental, social and governance (ESG) considerations is on everyone's mind. However, in their rush to implement ESG, could investors be taking unwanted risks? According to the 2021 Invesco Global Factor Study, most large institutional factor investors found ESG-induced biases, and many reported attempts to mitigate them.

One major hurdle for efficient ESG integration is the divergence of ESG ratings across vendors.[1] ESG is not consistently defined – neither among rating providers nor among asset owners and managers. This becomes evident in the wide range of ESG integration techniques in terms of data sources, portfolio construction methodology and impact measurement.

Most academic studies have focused on the effect of ESG on equity portfolios. There is wide consensus on the positive effects of ESG on company performance.[2] For instance, Blitz and Swinkels (2019) find positive impact of ESG through active ownership of equity investors. However, the evidence for a connection between ESG and expected returns is mixed. Alessandrini and Jondeau (2020, 2021) showed that ESG considerations do not alter an equity portfolio's risk-return characteristics. This is also confirmed in a meta study from Atz et al. (2021), who reviewed over 1000 peer-reviewed research papers covering a variety of different ESG metrics from 2005-2020 and found mixed results for ESG impact – showing no strong connection between expected returns, factor exposures and ESG. Despite the divergence of ESG ratings, the lack of ESG/return connection is robust to different ESG metrics, indicating that any one provider with reasonably good universe coverage can be chosen for further impact analysis, as in our study.

For fixed income, on the other hand, a number of studies have found a relationship between stronger ESG characteristics of issuers and lower option-adjusted spreads (OAS), which serve as a proxy for expected returns.[3] The particular ESG measure analyzed appears secondary, as the ESG/spread relationship has been confirmed with both established commercial vendor ESG ratings and proprietary measures, by academics and practitioners alike.

At first sight, it seems contradictory that ESG has little impact on risk and return in equities but a measurable one in fixed income. However, equities are characterized by ex-ante uncertainty about future payouts, and therefore the "fair value" of securities, which is less of an issue in fixed income.

Consequently, any equity return estimate comes with a large standard error. There might well be an ESG impact on expected returns, but the return distributions would be almost indistinguishable, and any statistical significance test would require impracticably long data series to conclude anything meaningful. One important implication is that, in equity portfolio construction, bad ESG actors can easily be substituted with good ones while keeping ex-ante risk and return expectations unchanged.

In fixed income, on the other hand, there is a visible relationship between ESG and expected return given the lower ex-ante uncertainty on payouts. If strong ESG credentials improve company financials, for example through lower risk of stranded assets, more accurate estimates of future liabilities etc., we can expect less volatile bond returns and decreasing spreads. But if ESG is "good", why wouldn't those bonds outperform? In simple terms, we argue that "good ESG" means: more is known – which translates into less frequent information shocks causing unexpected price swings (both upside and downside). In other words, good ESG can be interpreted as higher pricing efficiency.

For fixed income asset managers, the implication of the ESG/spread relationship is clear. If better ESG characteristics are a stated portfolio objective, the resulting lower spreads are either accepted or mitigated through other exposure biases, e.g., loading up on riskier bonds with reasonably good ESG characteristics.

We now analyze the effect of ESG on expected returns across asset classes. Additionally, we'll take a closer look at how ESG is implemented amongst European asset managers, whom we find often have different preferences when it comes to ESG implementation. This could have a detrimental effect on a multi-asset portfolio.

ESG portfolio management and factor implications

ESG in equities

ESG has changed the traditional view of risk and return used to build mean-variance-efficient portfolios. With the addition of more vague and less quantifiable ESG considerations, investors are modifying their utility functions: While many care about both their portfolio's ESG profile and an attractive risk-return profile,[4] others are more explicit in their ESG preferences, putting a greater focus on measurable ESG impact. Pedersen et al. (2021) analyze how these different preferences lead to different efficient frontiers for the investor's expected portfolio return. Because the future payout on individual securities and portfolios is unknown, factor exposures can serve as proxies for expected returns, as they can explain the variation in stock and managers' returns.[5]

Our analysis of equity funds focuses on the Morningstar European Equity peer group. Europe has higher ESG disclosure standards, making any ESG effects more clearly visible. At the same time, the peer group contains a reasonably broad universe of funds, for each of which we pull individual holdings data from Bloomberg, where available, and join the securities' ESG

> "ESG has little impact on risk and return in equities but a measurable one in fixed income.

scores from MSCI (including underlying E, S and G pillar scores) as well as factor exposures from Invesco Quantitative Strategies' (IQS) factor model. As an additional quantified data point widely used to assess the environmental impact of fund holdings, we also add carbon intensity figures of security holdings (Scope 1 and 2, sourced from MSCI). Lastly, holdings-level ESG, carbon and factor exposures are re-aggregated back to fund level, resulting in a dataset of funds with their ESG and factor scores.

We resort to MSCI ESG scores as proxies for ESG exposure for the following reasons: First, while ratings diverge, ESG impact in both equities and fixed income are robust to different metrics. Second, MSCI scores are readily available, with good universe coverage, and conveniently transfer into fixed income. For factor exposures, we utilize readily available data from IQS for academically established factors quality, momentum and value (QMV). Each factor is defined by a diversified set of indicators from our multi-factor model for equities, which is utilized in live strategies. For simplicity, we use the arithmetic average of fund-level factor scores for quality, momentum and value as one combined QMV factor score.

To understand the impact of ESG on equity portfolio management, we run cross-sectional regressions of the equity universe of QMV factor scores against ESG scores, and then against ESG pillar scores and carbon intensity. We do this for both individual securities of the funds (table 1) and at fund level with the Morningstar European Equity peer group (table 2).

For the equity universe, we see a positive relationship between ESG scores and QMV. The regression coefficient is positive and significant. If we break down the combined ESG scores into their component parts, the main driving source of the positive relationship is the governance score. This is as expected given that academic research has found governance and especially quality to be intertwined (Chan et al. (2020)).

When aggregating across asset managers, however, we observe that the ESG effect is washed out. And, although the managers have positive aggregate factor exposures alongside E, S and G exposures, the positive correlation between governance and factors is diminished.

Table 1
Regressions on individual securities in the developed markets global universe

	QMV factor scores against MSCI ESG Score		**QMV factor scores against MSCI pillar scores and CO_2 intensity**	
Intercept	-0.0396**	*(0.0153)*	-0.1382***	*(0.0287)*
MSCI ESG Score	0.0122***	*(0.0029)*		
MSCI E Score			0.0024	*(0.0030)*
MSCI S Score			0.0133**	*(0.0042)*
MSCI G Score			0.0170***	*(0.0042)*
CO_2			0.0000***	*(0.0000)*
Observations	7,844		7,844	
R-squared	0.0021		0.0047	

*** denotes significance at the 99.9% confidence level, ** at the 99% level and * at the 95% level. The respective standard errors are displayed in brackets.
Source: Invesco. Data as of March 31, 2021.

Table 2
Regressions on the Morningstar European Equity peer group funds

	QMV factor scores against MSCI ESG Score		**QMV factor scores against MSCI pillar scores and CO_2 intensity**	
Intercept	0.1956	*(0.1701)*	0.5745	*(0.3004)*
MSCI ESG Score	-0.0203	*(0.0229)*		
MSCI E Score			-0.0145	*(0.0302)*
MSCI S Score			-0.0014	*(0.0394)*
MSCI G Score			-0.0859*	*(0.0378)*
CO_2			0.0003*	*(0.0001)*
Observations	182		182	
R-squared	0.0044		0.0527	

*** denotes significance at the 99.9% confidence level, ** at the 99% level and * at the 95% level. The respective standard errors are displayed in brackets.
Source: Invesco. Data as of March 31, 2021.

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ESG integration in fixed income ultimately results in an asset allocation decision.

ESG in fixed income

Unlike equities, fixed income comes equipped with a predictor of future returns: the bond yield itself.[6] To extract company-specific effects, we use option-adjusted spreads (OAS). Multiple studies conclude that improvements in ESG characteristics lead to better credit quality, which subsequently reduces the OAS and therefore leads to lower expected returns.[7]

To confirm, we regressed the OAS of the individual holdings of the Morningstar EUR Investment Grade (IG) universe against the MSCI ESG industry-adjusted rating, which also forms the basis of the letter rating (table 3). The regression shows that a one-point increase of the ESG score relates to a decrease in spread by close to 20 basis points (first regression). Even when controlling for duration, rating and sector, the expected return shrinks by 5 basis points for every one-point score increase in ESG. To identify whether this is resulting from only one ESG pillar, we ran a multi-variate regression against the underlying E, S and G pillar scores. Increases in all pillars reduce spreads, but the governance pillar has the most significant effect.

Similar to the equity case, we also ran regressions at fund level – this time, however, for total ESG score only, using the traditional OLS method as well as the more robust MM estimation (table 4). The regressions identify a similar loading of the OAS on the ESG score for the peer group as for their individual securities.

Obviously, the sustainability-induced biases in the investment universe are preserved in the portfolios. Active managers might therefore be incentivized to take on additional credit risk to mitigate those biases, for example by increasing allocations to high yield or carry bonds.[8]

Thus, ESG integration in fixed income ultimately results in an asset allocation decision. Both accepting ESG biases and naïve mitigation approaches could produce changes to the credit beta, with a resultant change in asset allocation. In a multi-asset context, this behavior is undesirable given that the allocation decisions are usually intended to be from the top down.

ESG implementation in portfolios

Divergence in ESG scores has been studied by several authors.[9] To provide an additional perspective, we group the funds in our

Table 3
Regressions on individual securities in the global corporate and high yield universe

	OAS against MSCI ESG Score		OAS against MSCI ESG Score, duration, rating and sector		OAS against MSCI pillar scores, duration, rating and sector	
Intercept	221***	*(2.9)*	786***	*(6.7)*	817***	*(6.7)*
MSCI ESG Score	-19.6***	*(0.51)*	-4.6***	*(0.12)*		
Duration			4.8***	*(0.12)*	4.8***	*(0.2)*
Rating			-31.7***	*(0.23)*	-31.9***	*(0.2)*
Sector			23***	*(7.1)*	23***	*(7.1)*
MSCI E Score					-1.6	*(0.3)*
MSCI S Score					-2.2	*(0.4)*
MSCI G Score					-7,1	*(0.4)*
Observations	15,492		15,492		15,492	
R-squared	0.09		0.65		0.65	

*** denotes significance at the 99.9% confidence level, ** at the 99% level and * at the 95% level. The respective standard errors are displayed in brackets.
Source: Invesco. Data as of March 31, 2021.

Table 4
Regressions for the Morningstar EUR Investment Grade peer group funds

	OAS against MSCI ESG Score, duration and rating (OLS)		OAS against MSCI ESG Score, duration and rating (MM)	
Intercept	806***	*(37)*	621***	*(34)*
MSCI ESG Score	-4.5	*(2.3)*	-5.6**	*(1.8)*
Duration	9***	*(1.1)*	12.3***	*(1.2)*
Rating	-32***	*(1.73)*	-24.65***	*(1.6)*
Observations	132		132	
R-squared	0.76		0.56	

*** denotes significance at the 99.9% confidence level, ** at the 99% level and * at the 95% level. The respective standard errors are displayed in brackets.
Source: Invesco. Data as of March 31, 2021.

datasets by their Morningstar-assigned ESG label. Do funds get their exposures equally from E, S and G? We first normalize scores of ESG funds by subtracting the corresponding mean value of non-ESG managers. The normalized scores therefore serve as a quantifiable proxy for a fund's active ESG preference over the average non-ESG fund. Table 5 illustrates this with an example: This particular fund's combined ESG score is 7.46 – exceeding that of the average non-ESG fund by 0.13. However, the fund's ESG preference is mostly determined by S and G preferences, while the E component lags that of non-ESG funds by a considerable margin of 0.42.

Figure 1 plots the cumulative distribution of the normalized pillar scores for each manager in equities and fixed income. Within equities, the example fund is not an outlier. Roughly 20% of all equity funds have E, S or G scores below their non-ESG peers. Moreover, in both fixed income and equities we observe a wide range of normalized scores across funds.

We now regress the overall normalized ESG score against the normalized pillar scores in both equities and fixed income to assess the average importance of each factor preference. Strong positive coefficients indicate that the respective pillar score has strong explanatory power for the overall ESG preference of managers.

Within equities, G and E scores are most relevant for explaining overall ESG score deviations from non-ESG managers. However, within fixed income, G is most relevant, with E bearing little influence over ESG preferences.

This presents investors with a potential problem since there are several sources of disagreement.[10] First, there are scope difference where investors are measuring different attributes. Second, there are measurement differences where, for the same attribute, there is a difference of opinion on the value. Finally, there are weight differences where investors place different relative importance on different attributes. From our perspective, differences driven by scope or measurement can be a good thing. Much as with the dispersion of analyst's earnings forecasts, the disagreement can provide useful additional information. However, disagreement due to mere weighting difference is counterproductive. It could result in portfolios where, due to weighting differences, investors find themselves long a company in one part of the capital structure but short in another – which would not be testament to a consistent ESG approach.

To illustrate this, consider an equity fund with a G and S preference, paired with a fixed income manager with the opposite preference, prioritizing active positive E exposure compared to non-ESG funds (table 7). Meanwhile, the positive overall ESG preference masks the incoherent combination of approaches underneath.

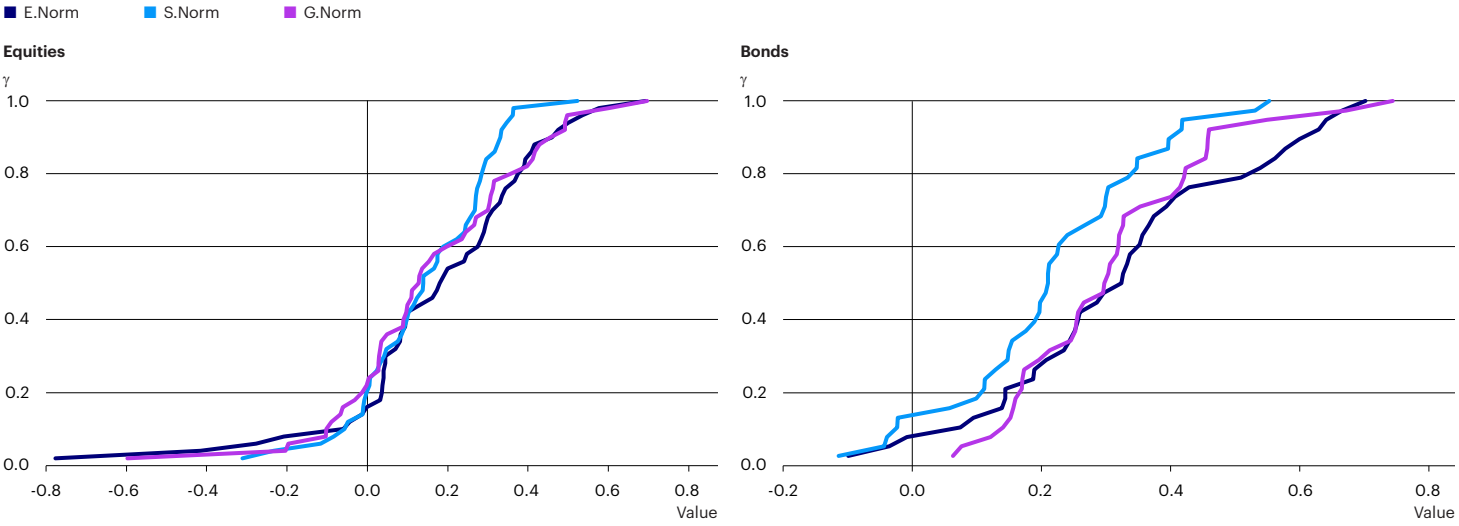
> “
>
> Within equities, G and E scores are most relevant within fixed income, G is most relevant, with E bearing little influence.

Table 5
Normalization example

	ESG	E	S	G
Raw	7.46	6.19	5.69	5.54
Normalized	0.13	-0.42	0.10	0.13

Source: Invesco. For illustrative purposes only.

Figure 1
Cumulative distribution of normalized pillar scores at fund level



Source: Invesco. Data as of March 31, 2021.

Table 6
Which pillar scores dominate the overall ESG score?

	Equities		Bonds	
Intercept	-2.488	*(1.44)*	0.5898	*(1.74)*
E	0.4981***	*(0.11)*	-0.0516	*(0.16)*
S	0.3679*	*(0.17)*	0.5945*	*(0.23)*
G	0.8392***	*(0.12)*	0.7367**	*(0.22)*
Observations	50		38	
R-squared (adj.)	0.6023		0.4723	

*** denotes significance at the 99.9% confidence level, ** at the 99% level and * at the 95% level. The respective standard errors are displayed in brackets.
Source: Invesco. Data as of March 31, 2021.

Table 7
Two funds from our peer groups

	ESG	E	S	G
Equity fund	0.13	-0.42	0.10	0.13
Fixed income fund	0.40	0.63	0.10	0.06

Source: Invesco. For illustrative purposes only.

> There is a >25% chance investors could pick two funds with opposite weighting preferences.

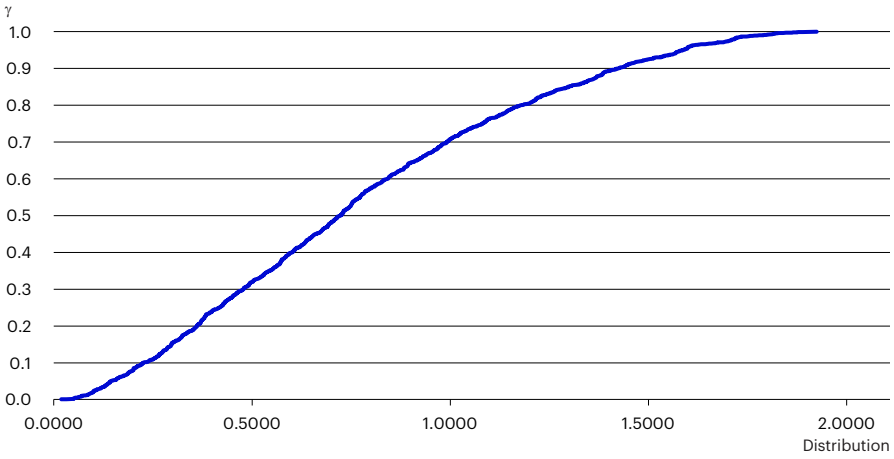
To quantify the risk of allocating to funds with potential weighting disagreements, we define a measure of disagreement and look at all possible combinations of fixed income and equity funds from our dataset in potential multi-asset portfolios (132 fixed income funds x 182 equity funds = 24,024 combinations). We define our disagreement measure as the normalized Euclidean distance. Using this metric, a value close to zero implies funds are similarly aligned across E, S and G weights. A value of 1 would indicate that the weights are orthogonal to each other. Finally, a distance value greater than 1 indicates that the two funds' managers disagree. In our example above, the distance between the two funds is 1.93.

Figure 2 shows the cumulative distribution of distance between all fund combinations. We find that there is only a 30% chance of aligned ESG preferences between fixed income and equity funds' managers (Euclidean distance <0.5). This is not surprising given that our regression results indicated ESG preferences are quite divergent on average. In addition, there is a >25% chance investors could pick two funds with opposite weighting preferences (Euclidean distance >1). This is a situation where a portfolio could be long an issuer in one part of the capital structure but short in another part due to ESG weighting differences.

Conclusion

ESG characteristics have different implications in terms of securities' expected returns. While in equities there is rare evidence of a systematic factor exposure tilt through ESG integration, fixed income securities show a bias toward lower expected returns for favorable ESG ratings.

Figure 2
Cumulative distribution of distance of all equity and fixed income funds in our Morningstar peer groups



Morningstar peer groups: European Equities and EUR Investment Grade.
Source: Invesco. Data as of March 31, 2021.

This relationship is preserved within funds. Investors should be conscious of this fact and look for potential mitigation techniques from their managers, as this might tilt the portfolio and exacerbate undesired risks.

As multi-asset portfolios are usually constructed using a combination of equity and fixed income funds, investors should be aware that a similar ESG outcome can mask underlying differences in manager preferences, e.g., combining an E-focused fund with a fund emphasizing the G pillar. Given that the aim of systematic ESG integration is to re-allocate capital from less sustainable names to ESG leaders, such a portfolio is at risk of failing this task, as different ESG re-weightings within the capital structure could cancel each other out.

The solution could be an integrated ESG solution across asset classes: applying the same ESG criteria in the fixed income and equity sleeves of a portfolio. Moreover, explicitly controlling for factor tilts helps to balance out unintended ESG-induced biases in the portfolio and create a consistent investment experience – from both the financial as well as the non-financial perspective.

Notes
1 Berg et al. (2022).
2 Friede, Busch and Bassen (2015).
3 E.g., Reznick et al. (2019); Slimane et al. (2019).
4 Krueger et al. (2020).
5 Ang et al. (2009).
6 Leibowitz et al. (2014).
7 E.g., Reznick et al (2019); Slimane et al. (2020); Razak et al. (2020); Barth et al. (2021).
8 The results are confirmed by segmenting fixed income ESG managers according to their duration-times-spread relative to the benchmark and allocation to lower credit quality; see Raol et al. (2021).
9 Berg et al. (2022).
10 As discussed in Berg et al. (2022).

References

Alessandrini, F., and E. Jondeau (2020): ESG investing: From sin stocks to smart beta; Journal of Portfolio Management 46(3), 75-94.

Alessandrini, F., and E. Jondeau (2021): Optimal Strategies for ESG Portfolios; Journal of Portfolio Management 47(6), 114-138.

Ang, A., W. N. Goetzmann and S. Schaefer (2009): Evaluation of Active Management of the Norwegian Government Pension Fund – Global.

Atz, U., T. van Holt, Z. Liu and C. Bruno (2021): Does Sustainability Generate Better Financial Performance? Review, Meta-analysis, and Propositions; available at SSRN: 3708495

Barth, F., Hubel, B. and Scholz, H. (2021): ESG and Corporate Credit Spreads; available at SSRN: 3179468

Berg, F., J. F. Kölbel and R. Rigobon (2022): Aggregate Confusion: The Divergence of ESG Ratings; available at SSRN: 3438533

Blitz, D., and L. Swinkels (2019): Is Exclusion Effective?; available at SSRN: 3337779

Chan, Y., K. Hogan, K. Schwaiger and A. Ang (2020): ESG in Factors; The Journal of Impact and ESG Investing 1(1), 26-45

Friede, G., T. Busch and A. Bassen (2015): ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies; available at SSRN: 2699610

Krueger, P., Z. Sautner and L. T. Starks (2020): importance of climate risks for institutional investors; Review of Financial Studies 33(3), 1067-1111

Pedersen, L. H., S. Fitzgibbons and L. Pomorski (2021): Responsible investing: The ESG-efficient frontier; Journal of Financial Economics (forthcoming)

Raol, J., N. Razzouk, B. Chambers and M. Axthelm (2021): The Influence of ESG on Fixed Income Portfolio Management Behavior", Invesco

Razak, L., M. Ibrahim and A. Ng (2020): Which Sustainability Dimensions Affect Credit Risk? Evidence from Corporate and Country-Level Measures; Journal of Risk and Financial Management 13 (12), 316

Reznick, M., and M. Viehs (2019): Pricing ESG Risk in Credit Markets: Reinforcing Our Conviction; Hermes Investment Management

Ben Slimane, M., E. Brard, T. Le Guenedal, T. Roncali and T. Skeine (2019): ESG Investing and Fixed Income: It's Time to Cross the Rubicon; available at SSRN: 3683477

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ESG impact: managing ESG exposure through performance attribution in factor portfolios

By Tim Herzig, Viorel Roscovan, Ph.D., and Carsten Rother

As more and more investors incorporate ESG in their portfolios, there is a need to make the impact on risk and return more transparent. Using a returns-based attribution framework, we find that a generic multi-factor index with ESG objectives delivers no significant exposure to ESG – irrespective of the chosen ESG benchmark. We propose a novel approach that allows for better control of ESG tilts and more accurate performance attribution.

When it comes to investment strategies with multiple objectives, including ESG, performance attribution can be a complex matter.

There are at least three reasons why ESG factors should be included in performance attribution: First, it helps identify how ESG interacts with other investments objectives. Second, it improves risk budgeting since different ESG tilts can have very different impacts on overall portfolio risk. And third, it helps avoid greenwashing – the practice of selling a product as 'greener' than it actually is. These three considerations can result in higher portfolio ESG scores.

When it comes to investment strategies with multiple objectives, including ESG, performance attribution can be a complex matter – especially when interactions between ESG and other objectives are non-trivial. To illustrate, we look at a generic strategy that incorporates both ESG and factor premium objectives via the MSCI World Multiple-Factor ESG Target Index.[1] Launched in 2015, this index aims to systematically integrate ESG in factor investing by seeking exposures to factors (such as value, momentum, quality, low-volatility, low-size and yield) with a superior ESG profile. Table 1 shows that the index indeed has a better overall ESG score than its benchmark, the MSCI World. But, whereas its S and G scores are higher, the E score is actually slightly lower – a somewhat surprising result. On the other hand, the overall ESG score is in line with those of the dedicated MSCI ESG indices.

To measure the impact of ESG on returns, we employ a traditional returns-based style regression analysis of the MSCI World Multiple-Factor ESG Target Index return stream:

$$(1)\ R^{\square}_{mf,\,ESG}(t) = \alpha + \beta_{MKT} \times R_{MKT}(t) + \beta_{SIZE} \times R^{e}_{EW}(t) + \beta_{VAL} \times R^{e}_{ENHVAL}(t) + \beta_{MOM} \times R^{e}_{MOM}(t) + \beta_{QUAL} \times R^{e}_{QUAL}(t) + \beta_{MINVOL} \times R^{e}_{MINVOL}(t) + \beta_{ESG} \times R^{e}_{ESG}(t) + \varepsilon(t)$$

where R_{MKT} is the gross return of the MSCI World Index (market beta), $R^{e}_{EW}(t)$, $R^{e}_{ENHVAL}(t)$, $R^{e}_{MOM}(t)$, $R^{e}_{QUAL}(t)$ and $R^{e}_{MINVOL}(t)$ are the excess returns of the MSCI Equal-Weighted, Enhanced Value, Momentum, Quality and Minimum Volatility indices (factor betas), and $R^{e}_{ESG}(t)$ s the excess return of a given ESG index (ESG beta). In this context, $\varepsilon(t)$ is an assumed i.i.d. error term.

By estimating equation (1), we seek to understand the impact of ESG tilts in the MSCI World Multiple-Factor ESG Target Index. While we keep an eye on the factor betas, our main focus is on the ESG beta that summarizes the Multiple-Factor index' exposure to the corresponding ESG index.

The results can be taken from table 2.

The model explains a significant share of the variation in the Multiple-Factor Index returns, as evidenced by an R-squared

Table 1
ESG characteristics: MSCI World Multiple-Factor Target Index in comparison*

	MSCI World Multiple-Factor ESG Target Index	MSCI World Index	Dedicated MSCI ESG indices			
			MSCI World ESG Leaders Index	MSCI World ESG Enhanced Focus Index	MSCI World ESG Focus Index	MSCI World ESG Screened Index
ESG score	7.6	6.5	7.5	7.8	7.6	6.5
E score	6.3	6.6	7.1	7.1	7.0	6.7
S score	5.8	5.1	5.5	5.8	5.7	5.2
G score	5.7	5.1	5.3	5.4	5.3	5.1

* MSCI ESG and E, S and G industry-adjusted company ratings. Scores range from 0-10, with 10 assigned to companies with the most attractive and 0 to those with the least attractive E, S and G characteristics.
Source: Invesco, MSCI ESG Research. Index characteristics as of January 31, 2022.

Table 2
Returns-based style analysis for the MSCI World Multi-Factor ESG Target Index

	MSCI World ESG Leaders Index		MSCI World ESG Enhanced Focus Index		MSCI World ESG Focus Index		MSCI World ESG Screenend Index	
Alpha p.a.	0.090%	*(1.339)*	0.066%	*(0.724)*	0.088%	*(1.322)*	0.068%	*(0.784)*
Market beta	1.00	*(46.55)*	0.99	*(31.50)*	1.00	*(47.04)*	0.98	*(32.43)*
Equal-weighted (factor beta)	0.31	*(3.464)*	0.35	*(2.241)*	0.32	*(3.508)*	0.36	*(2.460)*
Value (factor beta)	0.16	*(2.629)*	0.18	*(2.177)*	0.16	*(2.646)*	0.18	*(2.201)*
Momentum (factor beta)	0.17	*(4.088)*	0.18	*(2.473)*	0.17	*(4.169)*	0.18	*(2.476)*
Quality (factor beta)	0.18	*(2.312)*	0.20	*(1.723)*	0.16	*(1.968)*	0.21	*(1.905)*
Minimum Volatility (factor beta)	-0.04	*(-0.792)*	-0.03	*(-0.474)*	-0.01	*(-0.191)*	-0.04	*(-0.587)*
Given ESG beta	0.25	*(1.206)*	0.16	*(0.307)*	0.59	*(1.870)*	-0.08	*(-0.115)*
R-squared	97.5%		95.8%		97.6%		95.8%	

Note: Regression value with the t-stat in brackets.
Source: Invesco, based on data from MSCI. Sample period runs from January 31, 2008 to March 31, 2021. Returns are in USD and gross of dividends and fees.

A plain vanilla approach of simply adding ESG to an existing attribution framework might deliver a blurry picture.

above 95.0%. It also shows positive and statistically significant exposures to equal-weight, value, momentum and quality. Strikingly, however, we find statistically insignificant or even negative exposures to the ESG indices, irrespective of the ESG proxy employed. The only specification with a significant positive exposure uses the ESG Focus Index – but even here the estimated significance is rather low, at 10%.

While ESG is clearly part of the MSCI World Multiple-Factor ESG Target Index strategy (see table 1), a simple return-based style analysis obviously provides rather noisy estimates that could lead to erroneous conclusions. More specifically, a plain vanilla approach of simply adding ESG to an existing attribution framework might deliver a blurry picture given the interaction between the explaining variables. Significant portions of the returns are explained by other factors, and adding ESG achieves very little added value. To overcome this issue, we develop a more sophisticated portfolio construction technique in the next section.

ESG attribution with advanced portfolio construction

We propose a framework that disentangles the different investment objectives of actively managed factor exposures on the one hand while incorporating ESG elements on the other. To this end, we construct a portfolio with both targets in two distinct steps.

The first step is to set up the portfolio's ESG profile. The goal is to establish an overall ESG score above that of the MSCI World benchmark with minimal tracking error. We construct portfolios with roughly a 10%, a 20% and a 30% enhancement – again with only so much tracking error as necessary.

In the second step, exposure to quality, momentum and value (and possibly other factors) is established in a risk-controlled framework. With this approach, we can unambiguously distinguish between the contribution to risk and return of the ESG tilt and the subsequent factor overlay.

Table 3 shows the ESG characteristics of the three sample portfolios. Compared to the MSCI World Index, the overall ESG scores are, as intended, roughly 10%, 20% and 30% above the MSCI World.

After completing the two-step portfolio construction process, we revisit the returns-based attribution analysis. In place of the MSCI World Multi-Factor ESG Target Index, we now run the 30% ESG enhancement portfolio against the same set of MSCI market and factor indices, as well as ESG indices as before. Table 4 shows the results.

The advantages of this approach are evident: While the targeted factor exposures, as before, are positive and significant, the estimated ESG exposure are now positive in all specifications.

Table 3
ESG characteristics of our three portfolios in comparison

	MSCI World Index	+10%	+20%	+30%
ESG score	6.5	7.0	7.5	8.0
E score	6.6	6.4	6.7	6.9
S score	5.1	5.3	5.5	5.8
G score	5.1	5.4	5.5	5.6

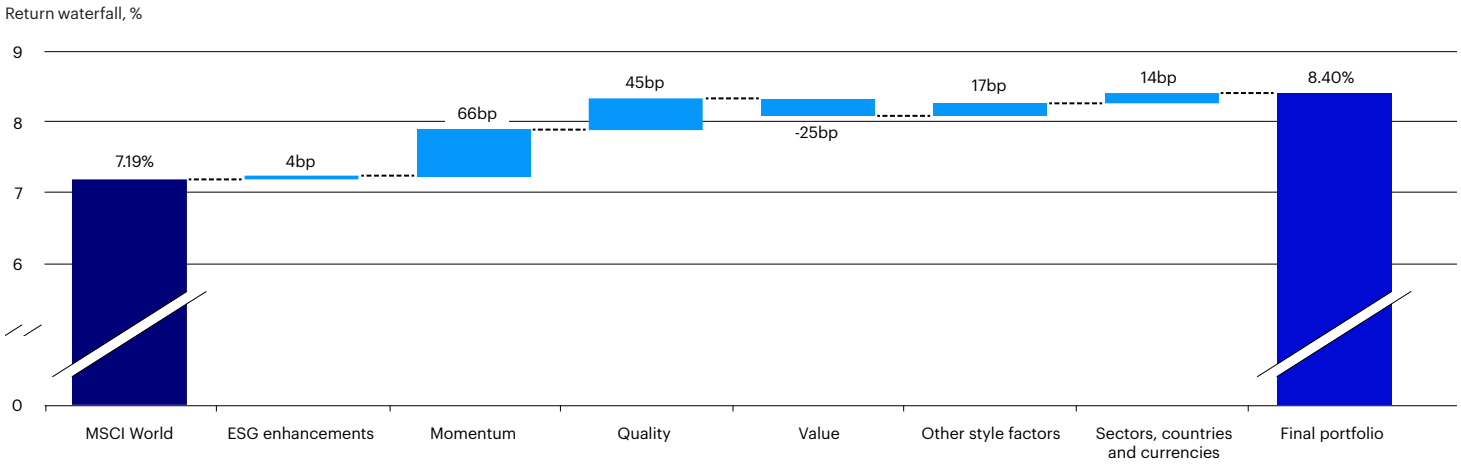
Source: Invesco, MSCI ESG Research. Portfolio characteristics as of January 31, 2021.

Table 4
Returns-based style analysis for the hypothetical 30% ESG enhancement portfolio

	MSCI World ESG Leaders Index		MSCI World ESG Enhanced Focus Index		MSCI World ESG Focus Index		MSCI World ESG Screenend Index	
Alpha p.a.	0.081%	*(1.663)*	0.026%	*(0.426)*	0.078%	*(1.640)*	0.028%	*(0.482)*
Market beta	0.98	*(63.26)*	1.01	*(48.01)*	0.98	*(64.45)*	1.01	*(49.39)*
Equal-weighted (factor beta)	0.02	*(0.322)*	0.06	*(0.564)*	0.02	*(0.341)*	0.08	*(0.825)*
Value (factor beta)	0.07	*(1.614)*	0.12	*(2.138)*	0.07	*(1.564)*	0.12	*(2.198)*
Momentum (factor beta)	0.07	*(2.183)*	0.11	*(2.352)*	0.07	*(2.304)*	0.10	*(2.033)*
Quality (factor beta)	0.10	*(1.775)*	0.06	*(0.706)*	0.08	*(1.368)*	0.07	*(0.975)*
Minimum Volatility (factor beta)	-0.03	*(-0.909)*	0.01	*(0.239)*	-0.01	*(-0.311)*	0.02	*(0.344)*
Given ESG beta	0.16	*(1.075)*	0.48	*(1.363)*	0.55	*(2.438)*	0.52	*(1.117)*
R-squared	98.6%		98.1%		98.6%		98.1%	

Note: Regression value with the t-stat in brackets.
Results for the +10% and +20% portfolios are similar, although estimated ESG exposures are smaller.
Source: Invesco, based on IQS Research Database and data from MSCI. Sample period runs from January 31, 2008 to March 31, 2021. Returns are in USD and gross of dividends and fees.

Figure 1
Two-step attribution for the hypothetical 30% ESG enhancement portfolio



Source : Invesco, based on IQS Research. Sample period runs from January 31, 2008 to March 31, 2021.

In other words, irrespective of the ESG index used as a proxy, the impact of ESG is now clearly measurable.

In addition, returns can also be decomposed along the lines of the portfolio construction steps: Whereas the first step represents a pure-play ESG effect, the second step brings in the effects of the factor overlay. This includes the standard style factors, while risk factors such as industries, countries and others are tightly constrained (figure 1).

As expected, the effect of ESG on the overall return is muted as we build the ESG anchor portfolio with minimal tracking error.[2] ESG inclusion (i.e., step one), yields only 4bp of additional return. The second step actively manages factor exposures, and we can decompose the additional return here according to our traditional factors. We tightly control "Other style factors" as well as "Sectors, countries and FX" and see only a limited effect from those. Our return factors: quality (45bp), momentum (66bp) and value (-25bp) accounted for the lion's share of the active return. The ESG profile was not changed in the second step, so that the contribution of the first step remains intact.

Summary and conclusions

We have shown that a traditional attribution framework applied to a portfolio with multiple objectives – one of which being ESG – can fail to clearly disentangle the ESG effect from the other investment objectives. Employing a two-step optimization, ESG tilts and their associated risks can be better managed and attribution becomes more transparent. Therefore, disentangling the objectives of ESG and exposure to style factors can lead to significant improvements as evidenced by high and statistically significant ESG exposures.

> Disentangling the objectives of ESG and exposure to style factors can lead to significant improvements.

Notes
1 While our results extend to other regions, our analysis focuses on the global developed universe only.
2 This is in line with the ongoing debate about whether ESG carries any return potential and the generally mixed results thereof.

References

Allesandrini, Fabio, and Eric Jondeau (2020): ESG Investing: From Sin stocks to Smart Beta, Journal of Portfolio Management Vol. 46(3), pp. 75-94.

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Opportunity out of complexity: a quantitative approach to individualized tax-aware investing

By Tarun Gupta, Ph.D., Nikunj Agarwal, Chris Daily and Timur Sahin

Traditionally, investment performance is reported before taxes, with the impact of taxation obscured from view – even though it is often substantial. The real experience of the (taxable) investor, however, is after-tax performance. We quantify the impact of taxes on investment performance for a representative US large-cap benchmark, S&P 500. Further, we describe the levers to generate tax alpha using tax optimization. For the S&P 500, we illustrate how tax-aware investing can improve performance for different investment vehicles by 1 to 2 percentage points annually.

Despite the complexity of the tax code, we can think of investment taxes as falling into a structured framework.

Seasoned investors have long recognized the mutual fund structure as tax inefficient. But, as we will show, even exchange-traded funds (ETFs), which are held up as fairly tax efficient, leave money on the table. Indeed, many investors would likely be surprised at exactly how significantly taxation can undermine their investment returns and, consequently, their ability to accumulate wealth.

This leakage of returns is made even worse by compounding. We often think of taxes as a fixed percentage taken off the top of returns each year.[1] In table 1, which presents the value of 1 USD investment in an index fund tracking the S&P 500 from the end of 2011 with the same tax rate every year (50%). However, the difference between wealth with and without taxes becomes progressively larger, rising to 2.39 USD at the end of 2021. Thus, it's not enough to say that taxes consume a certain portion of returns: Taxes inhibit the impact of compounding – the very phenomenon that equity investors expect to benefit from!

The best alpha is after-tax alpha

Despite the complexity of the tax code, we can think of investment taxes as falling into a structured framework (figure 1). They can be broken down into income and capital gains taxes (ongoing taxes) as well as liquidation taxes. In addition, there are costs and fees that also need to be considered.

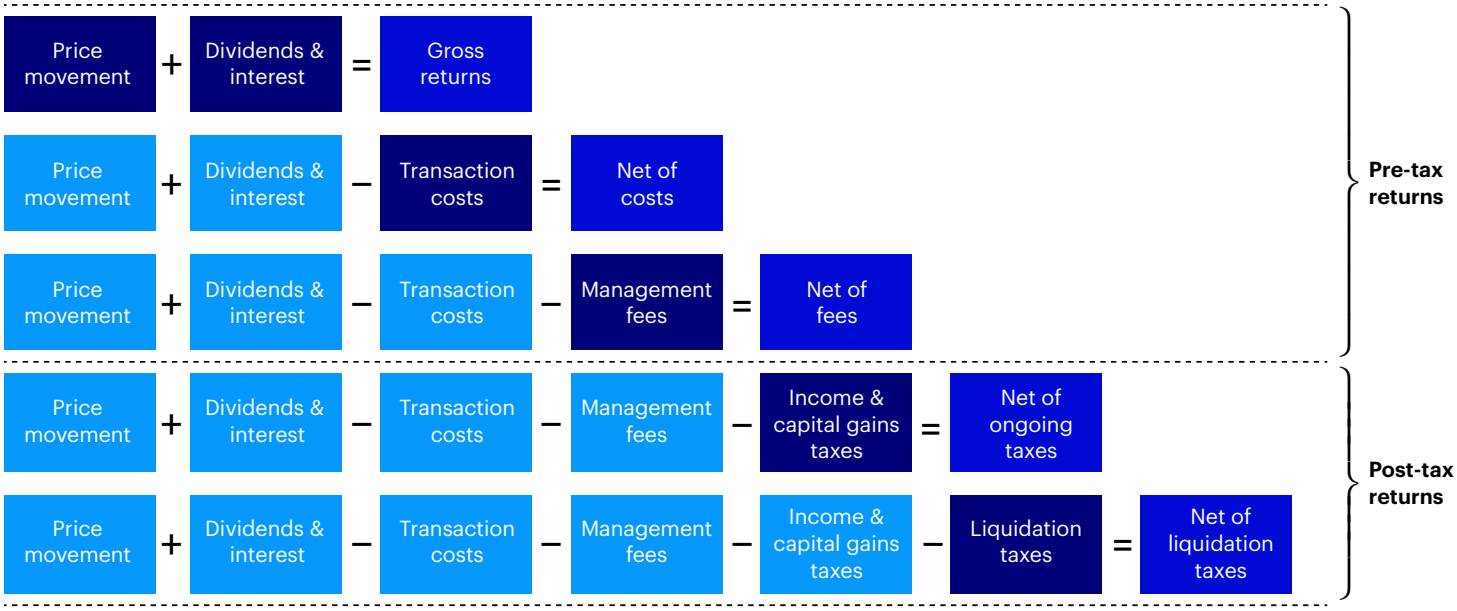
The focus of any tax-aware strategy should be the after-tax alpha, consisting of the

Table 1
Compounding the tax problem: how a static tax rate gets worse over time

Time	Year	Pre-tax return, %	Post-tax return, %	Wealth realized (post-tax returns, USD)	Wealth deferred (pre-tax returns, USD)	Difference (USD)
0	2011			1.00	1.00	0.00
1	2012	16.0	8.0	1.08	1.16	0.08
2	2013	32.4	16.2	1.25	1.54	0.29
3	2014	13.7	6.8	1.34	1.75	0.41
4	2015	1.4	0.7	1.35	1.77	0.42
5	2016	12.0	6.0	1.43	1.98	0.55
6	2017	21.8	10.9	1.59	2.41	0.82
7	2018	-4.4	-2.2	1.55	2.31	0.76
8	2019	31.5	15.7	1.80	3.04	1.24
9	2020	18.4	9.2	1.96	3.59	1.63
10	2021	28.7	14.4	2.24	4.63	2.39

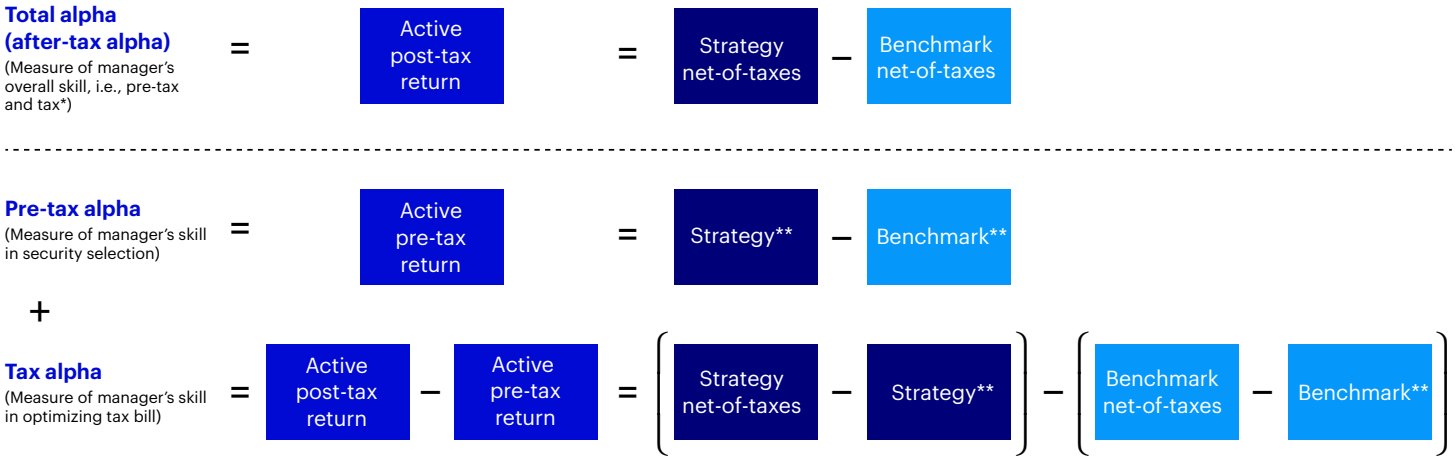
Assumptions: S&P 500 Index returns, 50% tax rate.
Source: Invesco.

Figure 1
Breakdown of the sources of returns, costs, and taxes



Source: Invesco. For illustrative purposes only.

Figure 2
Breakdown of sources of alpha



* Total economic benefit received by taxable investor; ** can be net-of-fees, but gross of taxes.
Source: Invesco. For illustrative purposes only.

traditional strategy alpha (pre-tax alpha), which measures the fund manager's success in security selection, and tax alpha, measuring his or her ability to manage the impact of taxes (figure 2).

We will outline how tax alpha can be achieved without sacrificing pre-tax alpha. Tax alpha is achievable for a range of equity strategies that may include passive, factor-based and concentrated active strategies. However, in this study we focus on a passive equity strategy using active tax optimization to generate tax alpha.

Three levers of tax alpha

There are three main levers for achieving tax alpha: (1) active tax-loss harvesting to shield gains, (2) managing the character of earnings and (3) delaying the realization of gains.

Active tax-loss harvesting

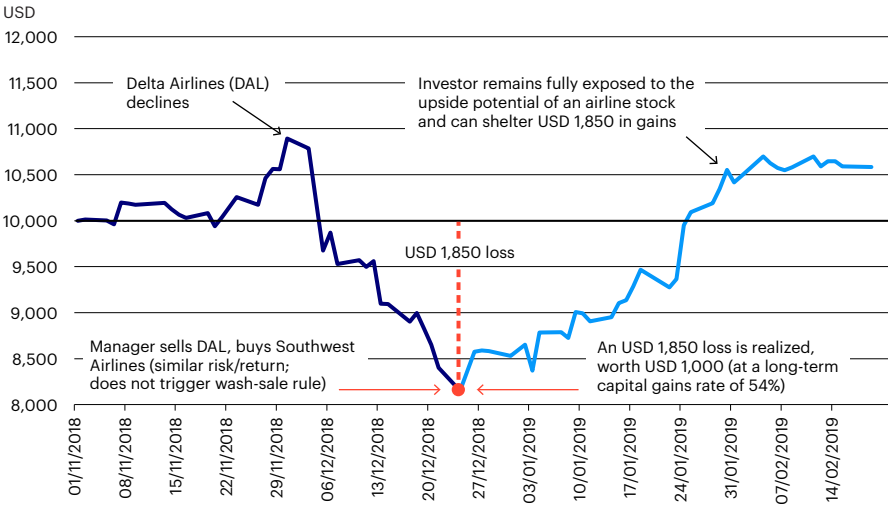
In the US tax code, an investment loss is an asset that may be used to offset, or 'shelter', any gain realized by an investor anywhere in the investor's portfolio.

'Tax-loss harvesting' is commonly understood in the context of year-end tax management, when the year's realized losses are tallied and credited against realized gains. Active tax-loss harvesting refers to something different: the active process of taking advantage of the temporary losses every equity strategy experiences during the course of ownership by harvesting (realizing) those losses while maintaining full investment exposure.

In any equity portfolio over time, individual stocks will experience losses that aren't realized. For the skilled tax-aware investment manager, such unrealized losses may present an opportunity. For the tax loss to be profitably harvested, a few criteria must be met: (1) The value of the loss to the investor must be worth more than the transaction costs; (2) the stock must also

For the skilled tax-aware investment manager, such unrealized losses may present an opportunity.

Figure 3
Tax-loss harvesting



Source: Invesco. For illustrative purposes only.

be replaceable by another security that is similar in its risk/return profile to maintain but not so close as to trigger the wash-sale rule,[2] which would negate the offset. This produces an asset in the form of a tax loss, and yet the investor remains fully invested, as illustrated in figure 3.

Managing the character of earnings

This refers to the management of the nature of earnings to favor lower tax rates that can contribute to tax alpha. Investment returns can take the form of capital gains (which, for US tax purposes, can be long-term or short-term) and dividend income (which can be qualified or non-qualified). Short-term tax rates are typically higher than long-term rates, so a preference for realizing losses in the short term and gains in the long term is beneficial to an investor's tax bill. Similarly, a preference for qualified over unqualified dividends benefits an investor's tax bill as well.

Delaying gain realization

The third lever seeks to postpone the realization of gains to allow compounded growth of a greater sum of money. Such deferral of gains realization is economically equivalent to an interest-free loan used to earn additional wealth, through compounding.

> Such deferral of gains realization is economically equivalent to an interest-free loan.

Investors may not view a long-term holding that has grown considerably over time as a form of tax deferral, but that is nonetheless exactly what it is. Taxes will be owed on those gains at some future point when the holding is sold. Until then, the investor is using what may someday be paid out as taxes to earn compound returns.

Figure 4 demonstrates the significant impact of delaying realization of gains.

While delaying gain realization is straightforward in principle, it is complex in its details. The cumulative gains of any portfolio at any particular time are made up of many gains within the portfolio, in tens to hundreds of individual positions, large and modest, short-term and long-term.

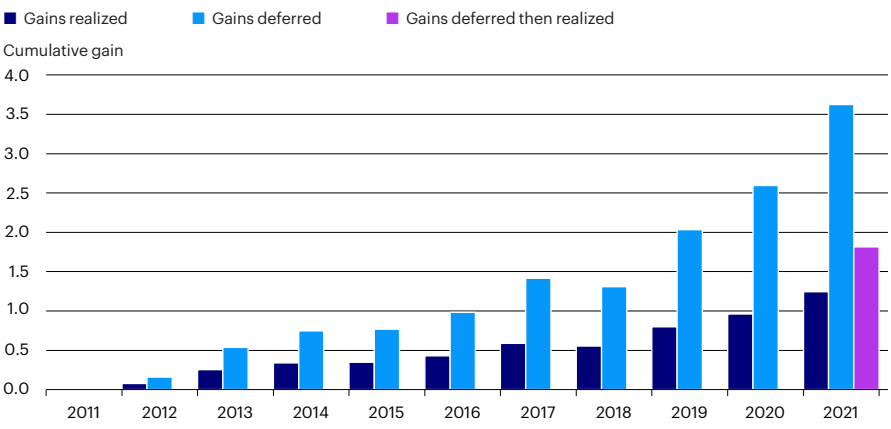
Not as easy as it looks

As we have seen, there is tremendous opportunity to produce tax alpha, which is very meaningful to investors and can be accomplished by deferring gains using active tax optimization. However, the complexity lies in the implementation. A critical aspect of managing a tax-aware portfolio is 'tax lot accounting'. Simply computing the tax due from each sale of a security turns out to be somewhat complicated. We need to take every sale of the security and trace it back to a specific buy, compute the return of the stock over that time and apply the appropriate tax rate. For this to be possible, we must keep track of every transaction of each security, how many shares we bought or sold and the price of the security at the time of each transaction. The record of each lot traded allows managers to keep track of a given transaction's cost basis – the value we use to determine whether and to what extent a transaction realizes a gain or loss. To calculate the tax also requires the length of holding periods and the application of tax rules. From a computational standpoint, this added dimension of time and time-derived quantities dramatically increases decision-making complexity over traditional, tax-unaware management.

The implications of lot accounting on tax liabilities are significant. Because each lot corresponds to a different purchase price and holding period, the tax rates for each lot may be different. There are three basic approaches, followed by our preferred approach:

- **FIFO (First In, First Out)**: first lot purchased is the first lot closed out
- **LIFO (Last In, First Out)**: last lot purchased is the first lot closed out
- **HIFO (Highest In, First Out)**: lots with the highest cost basis closed out first (least tax burden today)
- **Tax-Optimal**: targeted lots closed out to minimize tax liability

Figure 4
Illustration of gains (tax) deferral



Source: Invesco. For illustrative purposes only.

Tax outcomes can vary considerably depending on which method is used. Although none of the three simple methods (FIFO, LIFO, HIFO) is always superior, the most tax-naïve approach (FIFO) is typically the worst at conserving long-term gains, while HIFO is often the best. Most tax efficient, but also most complicated in terms of implementation, is the fourth approach: tax optimal – i.e., complete customization to achieve the smallest tax liability.

Another level of complexity is added by active tax-loss harvesting: complying with the wash-sale rule while remaining invested. Finally, the ongoing portfolio management and generation of tax alpha must be scalable. To be economically viable, the strategy must be implemented correctly across thousands of individual accounts, at an additional management cost (if any) that is more than made up for by the gains from tax management. Historically, this has been a tall order. But recent developments, particularly in computing power, have made tax alpha more achievable.

The complexity of effective tax optimization can be achieved using a systematic, quantitative process.

Simplifying tax alpha

We believe the complexity of effective tax optimization can be achieved using a systematic, quantitative process. Relevant data needs to be captured and the designed algorithms should be sufficiently sophisticated to quantify tax impact and make relevant investment trade-offs.

Our approach rests on two pillars:

1. **Technological**: To tackle the inherent complexity of tax management, we employ scalable technology designed for the computational performance required for the higher dimensionality of tax lot accounting. We automate at the scale required for thousands of separately managed accounts.

2. **Quantitative**: We use a systematic, quantitative, research-driven process informed by rigorous analysis, based on economic theory and back-testing. This is supplemented with tax-aware research capabilities. Built into this process is a menu of customization capabilities that can quantify trade-offs.

We think of this as an overlay that maximizes realized losses, manages the character of gains and defers gains, all coded into a systematic process. The objective function for our process is straightforward:

$$\max_{w} \overbrace{w\mu\alpha}^{\text{Alpha}} - \overbrace{\theta T}^{\text{Tax}} - \overbrace{\lambda(w-b)^{T}\Sigma(w-b)}^{\text{Risk}}$$

where $T = t_{LT}g_{LT} + t_{ST}g_{ST}$ (net tax gains = long-term tax rate × net long-term gains + short-term tax rate × net short-term gains) and w is the vector of asset weights to be optimized, α the vector of asset expected returns, b the benchmark weights, θ the tax sensitivity coefficient, λ the risk sensitivity coefficient and μ the alpha sensitivity coefficient.

The above function maximizes realized losses, subject to any active risk. It includes a tax sensitivity coefficient that expresses the importance of reducing tax liability. This variable rewards the realization of losses and penalizes the realization of gains – short-term losses are rewarded more than long-term losses and short-term gains are penalized more than long-term gains.

Tax awareness (sensitivity) can be turned off by setting the tax coefficient to zero. The risk coefficient (λ) in the objective function may also be set to zero if we have a separate risk constraint in the optimization. The function accommodates passive and active strategies using another variable that assumes no alpha when set to zero. Note that setting pre-tax alpha above zero leads to a different set of trade-offs that are not addressed in this paper.

The overall goal of the function is to maintain pre-tax characteristics while improving the post-tax character of returns (before liquidation).

Case study

To illustrate this approach, we backtest two strategies against two types of S&P 500 Index-based benchmarks.

The first strategy is a long-only portfolio (LO), the second is a relaxed-constraint portfolio (RC) that can short up to 30% of total holdings. We expect the RC portfolio to enable more effective loss harvesting, and therefore achieve better tax efficiency, due to short selling.

The first benchmark is a full replication (FR) index with monthly rebalancing to index weights. This may be compared to a mutual fund construction. Typically, these use tax-inefficient FIFO accounting, but we use HIFO to set a higher bar for our comparison. Such a benchmark realizes capital gains and has a tax-inefficient structure. The second benchmark is an ETF construction, a low-expense buy-and-hold index that is more tax efficient than the full-replication benchmark. It doesn't realize capital gains but doesn't actively harvest tax losses either. Nevertheless, it has the most tax-efficient structure of all tax-unaware vehicles.

In our tax-optimization objective function, pre-tax alpha is set to zero while the tax sensitivity coefficient is set to a positive value. The backtest period is September 1, 1989 to December 31, 2021. Transaction costs are included while management fees, for clarity, are assumed to be zero. The portfolios are rebalanced monthly with the set objective function subject to risk constraints. Table 2 shows the results.

Pre-tax, both the LO portfolio and the RC portfolio perform closely in line with both benchmarks. However, the after-tax analysis is striking: The LO strategy earns

Table 2
Simulated results for an S&P 500 tax-aware portfolio

	Total portfolio		Benchmark portfolio		Active long-only		Active relaxed-constraint	
	LO	RC	FR	ETF	vs FR	vs ETF	vs FR	vs ETF
Capital gains (%)	8.8	8.6	8.6	8.6	0.2	0.2	0.0	0.0
Dividends (%)	2.2	2.1	2.1	2.1	0.0	0.0	0.0	0.0
Gross-of-cost (%)	**11.0**	**10.7**	**10.8**	**10.7**	**0.2**	**0.3**	**0.0**	**0.0**
Costs (%)	-0.1	-0.2	0.0	0.0	-0.1	-0.1	-0.2	-0.2
Net-of-cost (%)	**10.9**	**10.5**	**10.8**	**10.7**	**0.2**	**0.2**	**-0.2**	**-0.2**
Income tax (%)	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1
Dividend tax – unqualified (%)	-0.1	0.2	0.0	0.0	-0.1	-0.1	0.2	0.2
Dividend tax – qualified (%)	-0.7	-0.9	-0.8	-0.8	0.0	0.0	-0.1	-0.1
Capital gains tax – short term (%)	1.4	2.8	0.0	0.0	1.4	1.4	2.8	2.8
Capital gains tax – long term (%)	-0.6	-0.9	-0.3	0.0	-0.3	-0.6	-0.6	-0.9
Other tax (%)	0.1	0.2	-0.1	-0.1	0.2	0.1	0.3	0.2
Total tax (%)	0.0	1.5	-1.2	-0.9	1.2	0.8	2.7	2.3
Net-of-taxes (%)	**10.9**	**12.0**	**9.6**	**9.9**	**1.3**	**1.0**	**2.4**	**2.1**
Turnover (%)	74	229	12	2				
Ex-ante vol & TE (%)	15	15	15	0	1		1	
Ex-post vol & TE (%)	14	14	14	14	1	1	1	1
Ex-ante beta	1.0	1.0	1.0	1.0	0.0		0.0	
Ex-post beta	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0

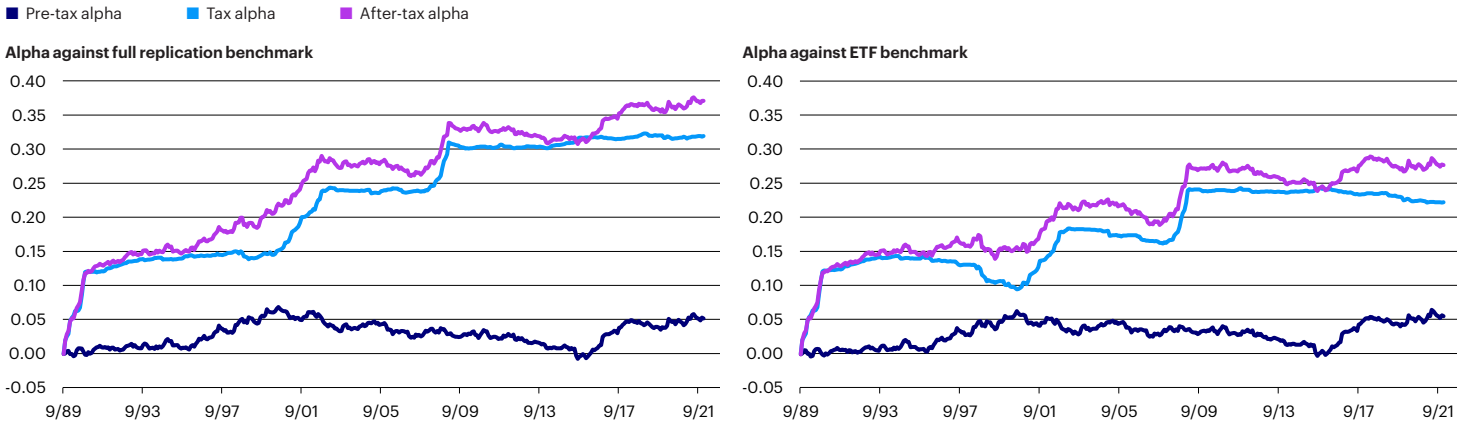
LO = long only; RC = relaxed constraint; FR = full replication; Active = tax-aware portfolio - relevant benchmark.
Source: Invesco.

a tax alpha of 1.2 percentage points over the FR benchmark, and 0.8 percentage points over the ETF. Almost all the improvement over the FR benchmark is in short-term capital gains, where the strategy earns 1.4 percentage points. It has a smaller edge over the ETF benchmark, which typically does not incur capital gains taxes.

The RC strategy significantly outperforms the LO strategy, aided by more powerful, more diversified sources of after-tax outperformance. Its short-term capital gains credit makes the highest proportional contribution to after-tax returns, at 2.8 percentage points. But it also produces credits from income tax, unqualified dividend taxes and other taxes. All in all, the RC strategy earns a tax alpha of 2.7 percentage points over the FR benchmark. The takeaway is clear: Relaxing shorting constraints can provide substantially greater reward potential to investors willing to assume the additional risk.

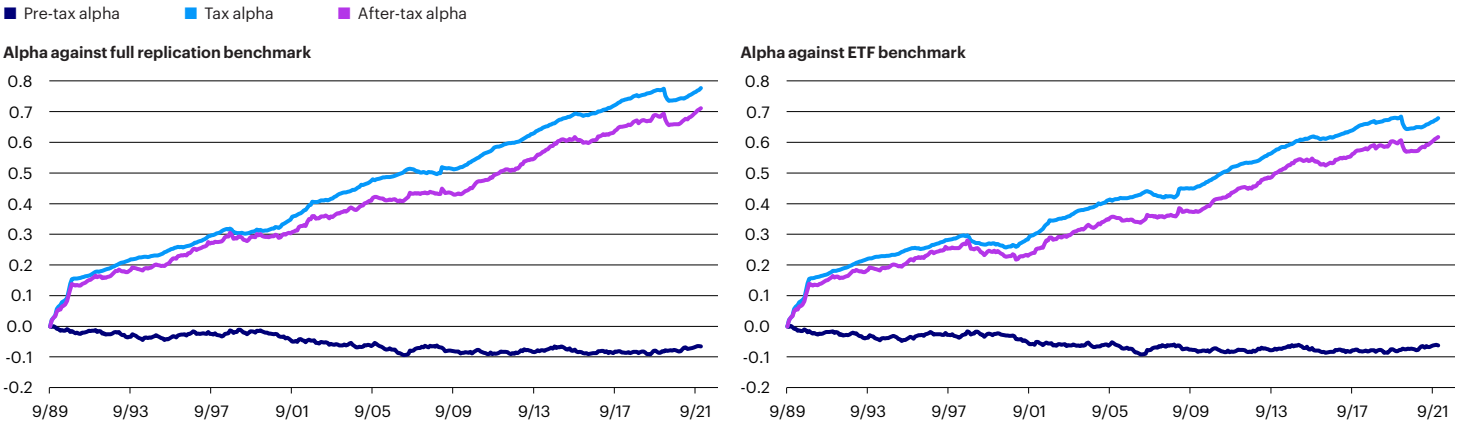
Next, we visually compare pre-tax alpha, tax alpha and after-tax alpha for the LO strategy (figure 5). There are two periods where tax alpha rises abruptly – during the market crashes of 2000 and 2008, during which opportunities for harvesting tax losses were abundant. We also see a period of little to no additional tax alpha after the

Figure 5
Simulated alpha for an S&P 500 long-only tax-aware portfolio



Source: Invesco. Data as of December 31, 2021.

Figure 6
Simulated alpha for an S&P 500 relaxed constraint tax-aware portfolio



Source: Invesco. Data as of December 31, 2021.

2008 crisis, as the portfolios' lots are locked with gains and there are fewer opportunities for active loss harvesting. With respect to the two different benchmarks, the results are very similar. Nevertheless, the after-tax alpha improvement is somewhat lower against the ETF benchmark because of the ETF's greater efficiency regarding capital gains.

Figure 6 shows the same visual analysis for the RC strategy, and it looks quite different. We can observe the more-diversified opportunities for harvesting losses in the smoothness of the curves. Whereas the LO portfolio's after-tax alpha is lumpy, the bulk of it occurring during market upheavals, the RC's alpha is more consistent because shorting provides continual opportunities to harvest losses.

Summary and implications

Taxes, if not managed well, clearly have a significant impact on overall portfolio returns and wealth over time. They can chip away at the reward investors earn for taking on risk. Further, by eroding portfolio value, they blunt the compounding effect that investors expect when investing in equities.

As our case study shows, a long-only tax-aware strategy can outperform the S&P 500 Index post-tax by as much as 1 percentage point, and a long/short strategy by almost 3 percentage points. For investors willing to take on additional risk, relaxing shorting constraints can provide substantially greater reward potential. The value of harvested realized losses goes beyond their intrinsic dollar value in sheltering gains.

Tax losses are fungible. They can be applied almost anywhere in an individual's portfolio – within the tax-aware investment itself or outside of it, to equity or fixed-income gains, for past, present and anticipated future gains. Skilled managers can strategically apply harvested tax losses where they have the best impact for the client. This will vary widely, from easing out of concentrated stock positions to helping transition portfolios to new strategies, be they factor-based or ESG-oriented.

Tax alpha is also durable. As we have shown, it varies depending on the investment market, purchase and liquidation timing and the investor's tax situation. But compared to other sources of market outperformance, the structural, laws-based nature of active tax management makes tax alpha uniquely persistent. By taking advantage of the separately managed account structure, tax-aware investing can be delivered to investors with greater levels of customization. This may include myriad investor preferences such as specific exclusions, ESG considerations as well as factor tilts.

Managed in a tax-aware fashion, through a systematic, quantitative process, the separately managed account can be thought of as a next step in the evolution of financial structures that began with hedge funds, led to mutual funds and, two decades ago, to ETFs. We see separately managed tax-aware accounts as the structure that will define the coming decades as investors themselves become more tax-aware – and focused on keeping more of what they have earned.

> A long-only tax-aware strategy can outperform the S&P 500 Index post-tax by as much as 1 percentage point, and a long/short strategy by almost 3 percentage points.

Notes

1 "Pre-tax returns," "earnings before taxes," and similar terms refer to gains made before liquidation and other taxes incurred when gains are realized. Nothing in this document should be construed as encouraging or seeking unlawful tax avoidance. Note that all examples and strategies described in this paper are based on the US tax code.

2 A wash sale occurs when an investor sells or trades securities at a loss and within 30 days before or after the sale that same investor 1) buys substantially identical securities, 2) acquires substantially identical securities in a fully taxable trade, or 3) acquires a contract or option to buy substantially identical securities. (Source: SEC https://www.investor.gov/introduction-investing/investing-basics/glossary/wash-sales)

References

Berkin, A.L., and J.Ye. (2003): Tax Management, Loss Harvesting, and HIFO Accounting; Financial Analysts Journal 59 (4), pp. 91-102.

Goldberg, L.R., P. Hand and T. Cai (2019): Tax-Managed Factor Strategies; Financial Analysts Journal 75 (2), pp. 79-90.

Israel, R., J. Liberman, N. Sosner and L. Wang (2019): Should Taxable Investors Shun Dividends? Journal of Wealth Management 22 (3), pp. 49-69.

Jeffery, R.H., and R.D. Arnott (1993): Is You're alpha Big Enough to Cover Its Taxes?; Journal of Portfolio Management 19 (3), pp. 15-25.

Sosner, N., T. Pyne and S. Chandra (2019): Understanding the Tax Efficiency of Relaxed-Constraint Equity Strategies; Working Paper, AQR Capital Management.

Vadlamudi, H., and P. Bouchey (2014): Is Smart Beta Still Smart after Taxes?; Journal of Portfolio Management 40 (4), pp. 123-134.

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Diversifying US core bond portfolios with non-US bonds

By Jay Raol, Ph.D., and James Ong

For many US investors, European and Japanese government bonds, given their low or even negative yields, seem an odd place to invest. But when hedged into US dollars, they offer returns similar to those of US Treasuries. Moreover, due to their divergent risks, they can meaningfully improve the risk-return profile of a US core bond portfolio.

Typical US fixed income investors invest 80% of their portfolios in US securities, even though they make up only 30% of the global investment grade debt market.

Conventional wisdom dictates that low or even negatively yielding European and Japanese government bonds not only hold out extremely low returns for US investors, but also come with unrewarded currency risks.[1] Hence the massive home bias of many US portfolios.

Using the Morningstar Core Bond category as a proxy, we find that typical US fixed income investors invest 80% of their portfolios in US securities, even though they make up only 30% of the global investment grade debt market (figure 1).

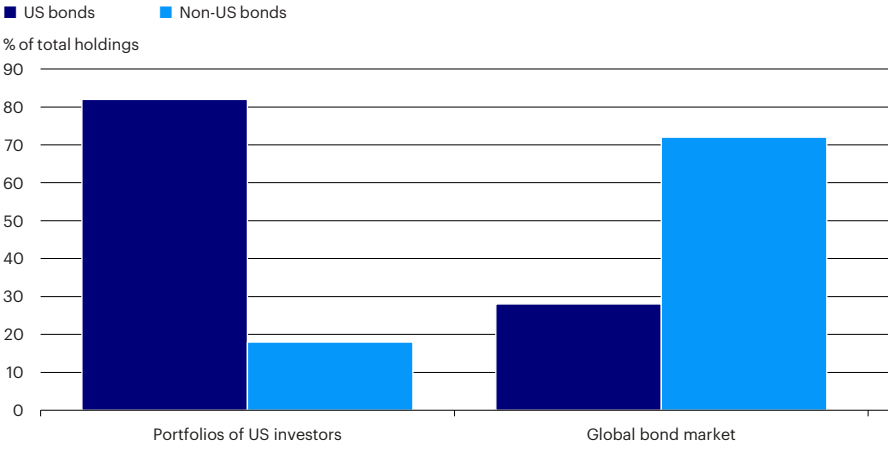
But when comparing the returns of US Treasuries to hedged non-US government bonds, we see that their returns have been similar in the past – in addition, non-US bonds have been less volatile, as figure 2 shows.

To break down these results, we examine the risk and return drivers of non-US government bonds from a US perspective. We focus on the largest, most liquid investment grade markets (according to the major rating agencies), i.e., Australia, New Zealand, Norway, Sweden, Germany (as a proxy for the eurozone), the United Kingdom, Japan and Canada. Our dataset covers the monthly returns and risks of bonds issued from January 1, 2000 to December 31, 2021. For all months and markets, we identified bonds with nine to 11 years of maturity. For these, we computed the local currency returns as well as the hedged returns using currency spot and forward exchange rates.

Hedged returns of non-US government bonds are similar to US Treasury returns

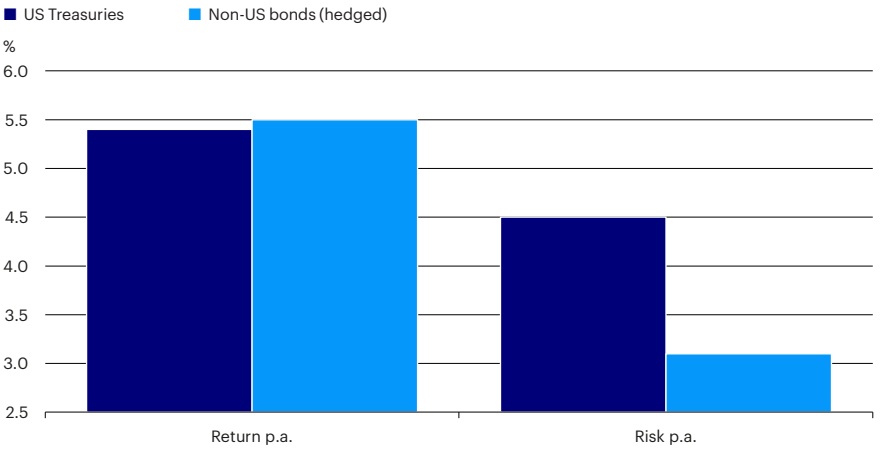
Figure 3 shows the hedged total returns of government bonds from different countries along with the contribution from the local return and hedging returns, from a US perspective. We see that the hedged total returns are remarkably

Figure 1
Market weight of US and non-US fixed income securities



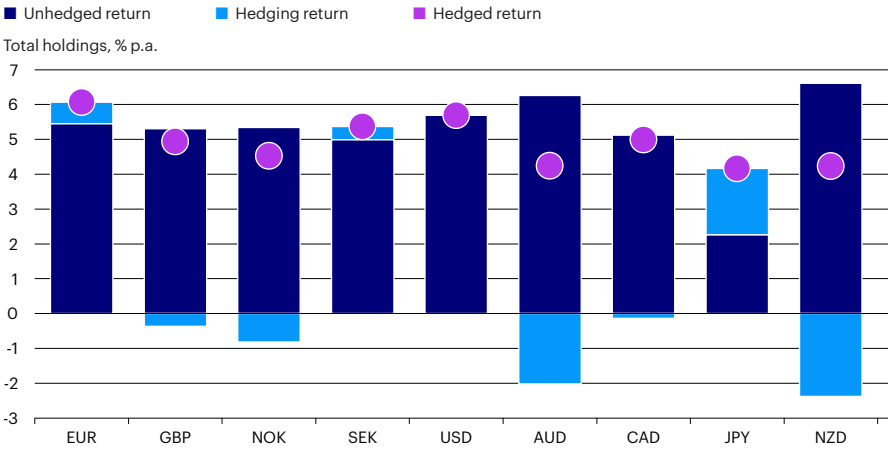
Source: Morningstar, Bloomberg L.P., Invesco calculations as of March 1, 2022. "Portfolios of US investors" proxied by the Morningstar Core Bond peer group. "Global bond market" proxied by the Bloomberg Global Aggregate Index.

Figure 2
Risk and return of US Treasuries and hedged non-US government bonds



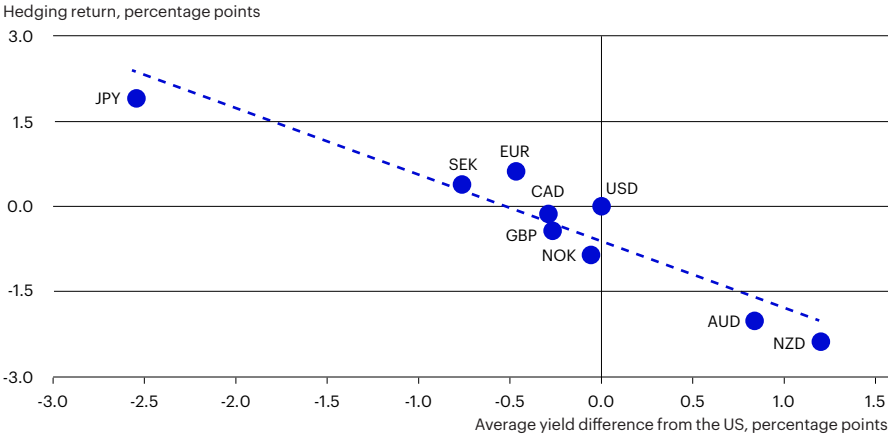
Source: Bloomberg L.P., Invesco calculations. Data from January 1, 1987 to December 31, 2022. Non-US government bonds proxied by the Bloomberg Global Treasury ex-US USD Hedged Index. US Treasuries proxied by the Bloomberg US Treasury Index. The duration of the Bloomberg Global Treasury ex-US Index has been scaled to match the duration of the US Treasury Index.

Figure 3
Breakdown of hedged returns from a US perspective



Source: Bloomberg L.P., Invesco calculations. Data from January 1, 2000 to December 31, 2021.

Figure 4
The relationship between yield differentials and hedging returns



Source: Bloomberg L.P., Invesco calculations. Data from January 1, 2000 to December 31, 2021.

similar, though the sources of return vary. For example, Japanese government bonds had yields much lower than US Treasuries over the sample period, but the hedge-adjusted returns were in line with US Treasuries.

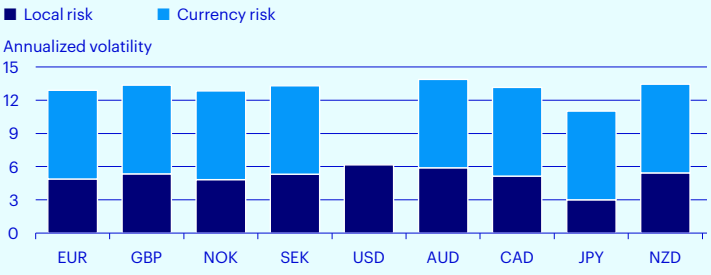
How do hedging returns and yield differentials interact empirically?

Figure 4 plots the yield differentials between non-US and US government bond yields versus the hedging returns. The results align with the mechanics of currency

Currency risk in non-US government bonds

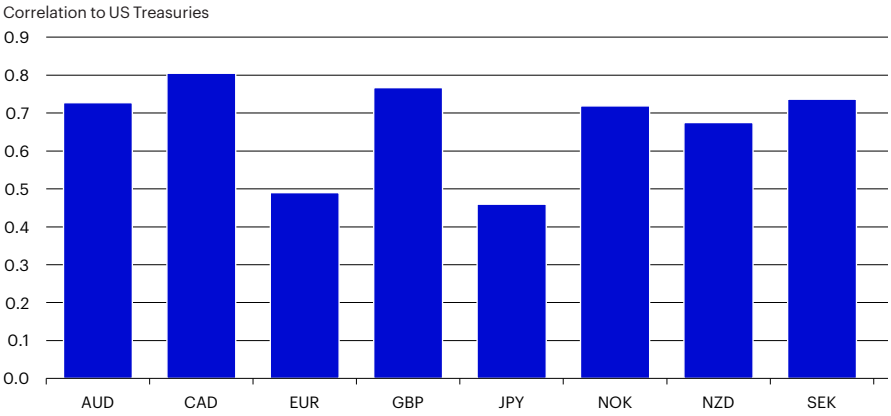
To examine the role of currency risk in non-US government bonds, we decompose their unhedged total return volatility into currency volatility and volatility from movements in local yields. As we can see, from a US perspective, the risk of non-US bonds relative to US bonds is primarily from currency, while the risk attributable to yield movements is at or below the level for US Treasuries. We conclude that hedging the currency exposure in non-US bonds may make sense for US investors.

Volatility of interest rate and currency returns of non-US government bonds



Source: Bloomberg L.P., Invesco calculations. Data from January 1, 2000 to December 31, 2021.

Figure 5
Diversification benefits of non-US government bonds



Source: Bloomberg, Invesco calculations. Data from January 1, 2000 to December 31, 2021. Spearman correlation coefficient of returns of hedged non-US bonds to US Treasury returns.

Table 1
Return, risk and correlation of a non-US government bond portfolio

	Non-US bonds (equal weight, hedged)	US Treasuries	Active
Return p.a.	7.11	5.53	1.58 (excess return)
Risk p.a.	6.17	6.18	3.23 (tracking error)
Correlation to US Treasuries	0.86	1.00	-0.26 (correlation of excess return to US Treasury return)

Source: Bloomberg L.P., Invesco calculations. Data from January 1, 2000 to December 31, 2021.

hedging: markets with higher yields tend to have negative hedging returns, while markets with lower yields tend to have positive hedging returns.

Non-US government bonds have low correlation to US Treasuries

We have seen how the long-term returns of hedged non-US government bonds are very similar to the returns of US Treasuries. But what about diversification? Figure 5 shows the return correlation of different non-US markets to US Treasuries, ranging from 0.46 to 0.80. We see that all eight non-US markets offer potential diversification benefits for US investors.

Non-US government bonds can provide a diversified source of excess return for US core portfolios

Since hedged non-US government bonds offer a return potential similar to US Treasuries – with the added benefit of diversification potential – we construct a simple, equal-weight portfolio of hedged non-US government bonds with a risk similar to that of US Treasuries. As table 1 shows, this portfolio provides an additional return of 1.58 percentage points over US Treasuries.

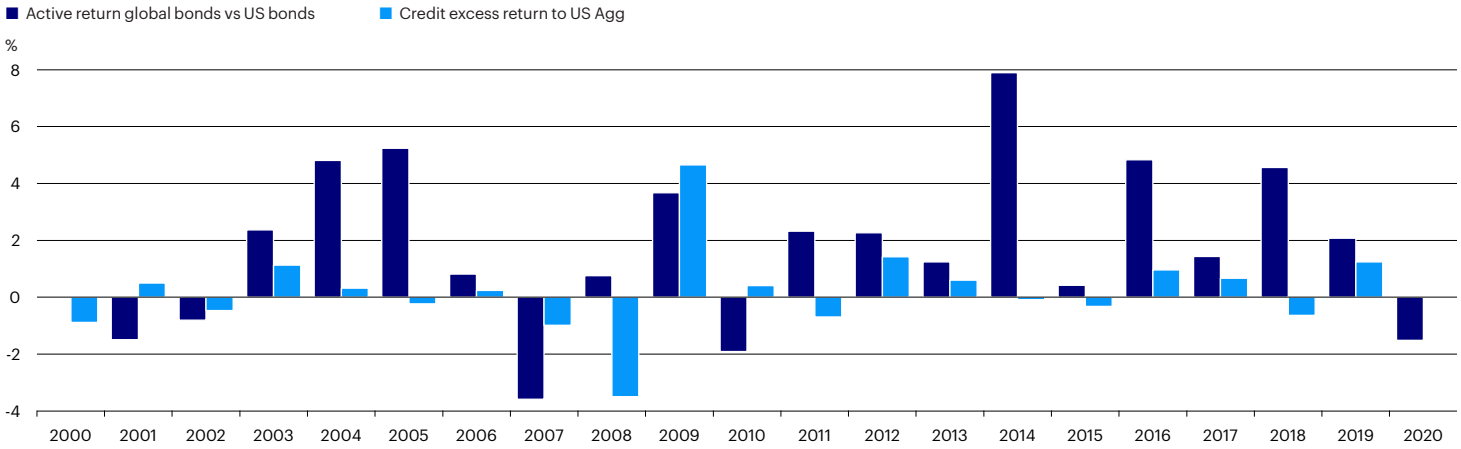
The volatility of the portfolio is similar, but the tracking error is 3.23% – indicating a strong diversification potential since

How does currency hedging impact the returns of non-US securities?

The cost of hedging an asset's currency risk is driven primarily by the difference between the two countries' short-term lending rates. This is because it is possible to borrow at the lower of the two short-term lending rates and invest the borrowed funds in assets with the higher lending rate. This strategy can be turned into riskless profit by using currency hedges to eliminate the currency risk until the price of the currency hedge equals the interest rate differential. Thus, if arbitrageurs observe a currency hedge cost that is out of line with short-term lending rates, they execute trades until the prices have moved back in line.

The relationship between currency hedging costs and short-term lending rates means bonds from low or even negatively yielding markets can result in positive yields even after including the cost of hedging the currency risk. For example, on 29 March 2022, a 3-month German Bubill (Bundesschatzanweisung) had a yield of -0.75%. A short euro/long US dollar contract expiring in one month earned 1.15%, leading to a hedge-adjusted yield of 0.4% – very close to the US Treasury bill yield of 0.39%.

Figure 6
Active return of hedged non-US government bonds and US investment grade credit



Source: Bloomberg L.P., Invesco calculations. Data from January 1, 2000 to December 31, 2021. Active return of hedged non-US government bonds over US Treasuries. Active return of US investment grade credit over US Treasuries proxied by the duration-hedged active return of the US Aggregate Index over US Treasuries.

> Hedged non-US government bonds not only provide yields similar to those of US Treasuries, they also offer considerable diversification benefits.

the tracking error is nearly half the overall volatility of non-US government bonds and and US Treasuries. This diversification benefit has strong implications for investors concerned with rising rate volatility. Table 1 shows that non-US government bonds have only a 0.86 correlation to US Treasuries. That means, during rising rate environments, they are expected to outperform US Treasuries.

Finally, we consider a core bond portfolio, which typically has a large allocation to corporate credit. Figure 6 shows the active returns of hedged non-US government bonds and US investment grade credit over US Treasuries. With the correlation between these two active returns being only 0.22%, hedged non-US government bonds can apparently diversify the typical credit overweight often found in US core bond portfolios.

Conclusion

Non-US government bonds are often shunned by US investors. But, according to our analysis, they can play a useful role in US core portfolios provided currency risks are hedged. Hedged non-US government bonds not only provide yields similar to those of US Treasuries, they also offer considerable diversification benefits. There is therefore no reason for US investors to be scared away by the low or negative headline yields of many European and Japanese bonds. On the contrary, they can be a useful portfolio enhancement.

Note
1 Pojarliev, Momtchil (2018): Some like it hedged, CFA Research Foundation Briefs.

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