

Sustainable Finance and Transmission Mechanisms to the Real Economy¹

Abstract

The rapid growth in sustainable finance is in large part driven by the motivation of different types of capital allocators at different scales, all the way from retail investors to large asset owners and banks, who want to make a positive contribution towards the realisation of environmental sustainability. The discourse has so far largely assumed that holding assets that are defined as environmentally sustainable is sufficient to be environmentally sustainable from a financing or investing perspective. This view is fundamental to the recently published EU High Level Sustainable Finance Action Plan and to growth in the green bond market. In this paper we argue that simply holding assets defined as environmentally sustainable is insufficient for a capital allocator, such as an asset owner, asset manager, bank, insurer, or retail investor, to be environmentally sustainable themselves or to take the credit for the environmental benefits of their holdings. While we see contributing to sustainable economic activities, and/or discouraging unsustainable ones, as a necessary criterion, we argue that sustainable finance should ultimately be evaluated on whether it actually affects the real economy through a number of transmission mechanisms, such as: the cost of capital, liquidity, risk management, influence over corporate practices, and/or wider spill-over effects. Though well established in economics literature, these have not received much attention in the context of sustainable finance. For each of these transmission channels, we start with a brief review of the economics and finance literature on the channel's effects, and then analyse the evidence and examples related specifically to sustainable finance. We then assess the potential impact of each transmission mechanism for specific major asset classes, including fixed income (bonds and loans), equities (active and passive), and real assets. We also consider hedge funds. Our findings suggest that loans present the greatest opportunity for impact, and passive public equity strategies, the least. We then present possible 'ideal types' for each asset class to help guide a high-impact strategy. Finally, we suggest how this analysis might be applied to strategic asset allocation by investors with multi-asset portfolios.

Section 1: Introduction

The rapid growth in sustainable finance instruments and strategies is driven in large part by capital allocators at different scales, from retail investors to large asset owners and banks. This growth reflects, at least in part, a greater desire for 'impact' by investors looking to make positive contributions to the realisation of long-term sustainability goals. This paper focuses on 'green' sustainable finance with goals relating to climate change and the environment, although the analysis presented here is also applicable to other areas of sustainability.

With sustainability issues rising up the political and social agenda, there has been growing attention from both governments and financial institutions as to whether and how 'sustainable finance' can

¹ This paper builds upon and expands the argumentation made in an opinion piece published in IPE, Caldecott, B. (2020) *'Investing in green doesn't equal greening the world'*.

contribute to environmental solutions, and ultimately help bring about transformative change in the real economy. In particular, there are ongoing debates about what constitutes a green financial service or product. However, the majority of discourse and policymaking around sustainable finance implicitly assumes that holding assets defined as environmentally sustainable or ‘green’ is sufficient to be sustainable from a finance or investment perspective. This view is fundamental to the approach taken by the European Commission (see Kahlenborn et al. (2017)) and evident in the sustainable finance taxonomy proposed by the High-Level Expert Group on Sustainable Finance (2020) and the EU Sustainable Finance Action Plan.

For financial institutions and their clients to have confidence that their actions are generating impact, much greater rigour in defining impact and delineating impact pathways is needed to drive the growth of sustainable finance worthy of the label. The focus of this approach should be on effecting change in the real economy. Indeed, addressing this potential for greenwashing is a major priority for regulators – see, for instance, Financial Conduct Authority (2019).

Understanding how sustainable finance can affect the ability and willingness of the real economy (including companies, sovereigns and individuals), to efficiently mitigate and adapt to climate and environmental risks requires drawing insights from how finance affects real economy decision-making. The various ways in which the financial sector impacts the real economy are often termed ‘transmission mechanisms’. Their absolute and relative influence under different circumstances is not fully understood within the disciplines of economics and finance generally, and even less so in sustainable finance specifically. It is also important to recognise that the transmission of ‘green’ financial activity to the real economy is not interchangeable with the degree of ‘greenness’ of a given financial asset. Consequently, holding an asset that performs strongly on sustainability or ‘greenness’ benchmarks can still have little or no real economy impact. For instance, if an investor increases its holdings in a sustainable listed equity fund, there is unlikely to be any effect on the investment plans of the companies on the index, or their access to liquid markets, and any effect on corporate behaviour rests on there being an effective engagement strategy in place. For the purposes of this paper, we are agnostic to where the thresholds for ‘green’ and ‘not green’ are set.

There are several possible transmission mechanisms through which finance can influence real economy decisions. First, interest rates on bonds and loans, and required returns on equity, for example, together determine the *cost of capital* for a firm. Second, *liquidity*, defined as the ease and speed at which agents can convert assets into purchasing power, typically cash (Levine, 1997), is another way in which financial markets can affect the operation and decision-making of firms. Third, since its earliest days, one of the main innovations of finance has been to provide ways for real economy actors to *manage and mitigate risk*. Fourth, ever since the advent of stock exchanges where the shares of companies can be publicly listed and traded, finance has dispersed and intermediated corporate ownership, and ownership rights. This means that investors—individual, or, increasingly in recent years, institutional (e.g., asset managers, pension funds, sovereign wealth funds)—have a say over *corporate management and practices*. Finally, beyond these ‘systematic’ transmission mechanisms, financial products and services can generate spill-over effects that can further influence the real economy. Financial sector practices can spur social/political change through opposition to “bad” practices that civil society or politicians endeavour to change, or raise awareness of “good” financial practices of societal relevance. Growing recognition of the financial implications of climate change is perhaps the standout example of this in recent times. Spill-over effects can also have serious negative repercussions in times of financial crisis, including through the “borrower balance-sheet channel” (whereby changes in asset prices affect firms’ and households’ collateral value and therefore their ability to borrow and invest, further depressing asset prices); and the “bank lending channel” (where banks react to liquidity constraints by

reducing lending, thus constraining credit availability to real economy firms) (Antony, 2010). The potential for negative spill-over effects is particularly relevant in the present COVID-19-induced global economic downturn.

In this paper, we interrogate the assumption that holding green assets equals impact by exploring the role of sustainable finance in the real economy, and the transmission mechanisms involved. We assert that while definitional debates over “what” is green are important, they should not be the main source of contention: rather, what counts is “how” financial products make the world greener. To be considered “sustainable”, financial products and services should actively contribute to the transition towards a more sustainable economy. Without this criterion, investors cannot have confidence that their assets and investments are making an impact and cannot reliably distinguish between genuinely sustainable finance and greenwashing.

We argue that the impact of sustainable finance should be judged on two criteria. First, the financial product or service should be encouraging sustainable activity, and/or discouraging unsustainable activity. Second, it should make a clear and measurable difference in one or more of the following ways: (i) reduce (increase) the cost of capital for (un)sustainable activities; (ii) increase (reduce) liquidity for (un)sustainable activities; (iii) support management of environmental-related physical and transition risks; (iv) encourage or enable adoption of sustainable practices by firms; (v) support systemic change through spill-over effects.

This paper begins by outlining transmission mechanisms from the financial to real economy, and their application to sustainable finance (Section 2), as the basis for assessing the theoretical impact of sustainable finance by asset class (Section 3) and positing ideal-type “impactful” sustainable finance strategies for each (Section 4). Section 5 evaluates the implications for portfolios and strategic asset allocation, and Section 6 concludes.

Section 2: Transmission Mechanisms allow Finance to Influence the Real Economy

Investing in, and directly financing, sustainable assets is not a sufficient condition for positive environmental impact where there is no direct link to the real economy: rather, we argue there is only impact when a sustainable investment reaches the real economy through one or more of the ‘transmission mechanisms’ identified previously. These include the *cost of capital* faced by firms when raising debt or equity finance; *liquidity*, the ease of trading, which affects corporate financing; financial products that *manage and mitigate risk*; shareholder rights that give investors a say over *corporate management and practices*; and broader *spill-over effects*.

The following section briefly reviews each transmission mechanism and its applications to sustainable investment. This information is summarised in Table 1.

Table 1: Summary of transmission mechanisms and their applications to sustainable finance

Mechanism	Definition	Applications to sustainable finance with pathways to real economy impact
Cost of capital	The opportunity cost of similar possible uses for capital resources. In theory, a firm	<ul style="list-style-type: none"> • Project finance lending policies driving a wedge between the cost of capital of sustainable and unsustainable projects

	invests in projects where the return exceeds this opportunity cost. Firms typically break it down into the cost of equity capital (based on investor expectations, for listed firms) and cost of debt capital (based on borrowing cost).	<ul style="list-style-type: none"> • Corporate cost of capital being affected by companies' sustainability performance • Sustainable loans and sustainability-linked loans with interest rates tied to sustainability targets • Green and sustainable bond markets pricing debt differently for sustainable versus unsustainable projects or companies • Market perceptions of sustainability and associated risk being reflected in share price trends • Investors' willingness to accept lower returns for, and thus perceive less risk in, sustainable projects as compared to unsustainable ones • Differentiation in hurdle rates for sustainable and unsustainable projects
Liquidity	The ease and speed at which agents can convert assets into purchasing power, typically cash.	<ul style="list-style-type: none"> • Access to liquidity for sustainable versus unsustainable firms and projects, particularly short-term liquidity from banks • Compliance, disclosure and other listing requirements for sustainable and unsustainable products traded on stock exchanges
Risk management	The use of financial markets and products to limit exposure to the costs of unforeseen events, including through diversification, insurance, derivatives and securitisation.	<ul style="list-style-type: none"> • Access to, and pricing of, risk mitigation instruments for sustainable versus unsustainable firms and projects • Entry and exit of risk mitigation product providers from markets and product lines based on updated information sets • Differential pricing of derivatives and securities whose underlying assets have sustainable versus unsustainable characteristics • Reductions in transaction costs of settling environment-related claims through use of smart contracts • Changing perceptions of litigation and reputational risks and impact on fiduciary responsibility
Changing corporate practices	Application of non-price tools, especially shareholder rights and ownership, to persuade a firm to behave differently than it otherwise would have	<ul style="list-style-type: none"> • Shareholder engagement with firms leading to more sustainable activity • Signalling effects of divestment from unsustainable industries
Spill-over effects	Costs or benefits that are borne by actors external to the private parties in a transaction without this being reflected in market prices	<ul style="list-style-type: none"> • Disclosure of environmental risk and impact data leading to adjustment of market prices • Internalisation of positive externalities from sustainable products, services and innovation into market prices • Reduced financial stability risks associated with sustainable economy versus unsustainable, particularly around asset stranding risks • Market signalling leading to behavioural, regulatory or political changes associated with environmental action.

2.1 Cost of Capital

The cost of capital, composed of the cost of equity (shareholder) and debt (borrowing) capital, is influenced by a variety of macroeconomic variables, such as the level of interest rates set by central banks, inflation, the business cycle, and the borrower's creditworthiness (Elton, 1994). The cost of capital can be calculated at the project level or at the corporate level, in the latter case, usually using approaches like the capital asset pricing model (Brotherson et al., 2013; Brounen et al., 2004; Graham & Harvey, 2001).

The implications of these external costs on corporate investment activity are mixed. For large, listed companies, equity cost of capital (stock prices) does not have a strong link to investment activity (Blanchard et al., 1993). Smaller, younger firms, or those in less developed financial markets, are more likely to be limited by the cost of external financing (Kölbel et al., 2019). In addition, many firms use internal finance—that is, retained earnings—to finance projects with no external funding (Allen & Gale, 2000).

At the project level, financial institutions' policies can drive a wedge between the cost of capital for sustainable and unsustainable projects, as has started happening with restrictions relating e.g. to coal, tar sands, or Arctic oil exploration (BankTrack, 2020; Rainforest Action Network et al., 2020). Some financial institutions now require a hurdle rate for new coal projects of 40%, up from 16% for recently completed coal projects, and compared to 10% for wind or solar (Fattouh, 2019).

There are initial indications that corporate-level cost of capital is being impacted by companies' sustainability performance, though this depends on the asset class. In bank lending, the advent and growth of sustainability-linked loans, where the interest rate that banks charge a corporation is tied to pre-agreed thresholds on sustainability metrics, is the clearest example to date (Linklaters, 2019).

For green bonds, the evidence is mixed (Brennan & MacLean, 2018; Shishlov et al., 2016). Some studies show no difference in yield for green bonds compared to conventional ones (OECD, 2017); others show a modest negative premium, giving firms a slightly lower cost of capital (Chiang, 2017; Zerbib, 2019).

In equity markets, the impact of sustainability can be harder to discern. One recent survey does suggest that investors are willing to accept a lower remuneration for investments that are linked to more sustainable economic activities (Alessi, 2019).

2.2 Liquidity

Without liquidity, transaction costs are high, managing cashflow is more difficult, and longer-term projects and investments will be disincentivised (Bencivenga et al., 1995). The presence of liquid markets and banks willing to provide liquidity means firms can access capital to grow and invest and adapt to changing circumstances.

For liquidity to have an impact for sustainable firms, they would need to gain liquidity benefits compared to unsustainable companies. There is currently no robust evidence available to support this. However, in equity markets, growing numbers of stock exchanges are implementing mandatory ESG screening, which places some limits on access to liquidity to firms that cannot demonstrate a minimum

level of sustainability (Grabski & Miller, 2019). In fixed income markets, green bonds are generally considered less liquid than conventional ones, although this matters less because green bond investors are more likely to hold their investments to maturity (Bachelet et al., 2019; Chiang, 2017; Wulandari et al., 2018). Despite banks' crucial role as the main providers of short-term liquidity to the real economy, they have not (yet) practiced much differentiation between sustainable and unsustainable companies or activities.

2.3 Managing and spreading risk

The financial sector has developed many different ways to mitigate and spread risks and uncertainties. As Scholtens (2006) puts it, “well-developed financial systems improve the opportunities of the public to hedge against unforeseen events”.

The oldest and most well-established form of financial risk mitigation is the insurance industry, originating in medieval Italy (Holdsworth, 1917). Today, much of corporations' use of insurance is still to protect from such physical damage and loss, for instance due to weather (storm damage, fire, flooding, etc.). A more recent significant innovation has been the advent of securitisation, which aggregates illiquid assets, like mortgages or bank loans, into tradable, (more) liquid securities (De Haan, 2012). More complex forms of derivatives are another important class of instruments for mitigating risk in the modern global economy.

Among the “unforeseen events” that finance can help hedge and protect against, an increasing number and variety are related to environmental risks. For further greening of the real economy to occur, finance would need to favour selling risk mitigation products to sustainable firms over unsustainable ones.

Changes in insurance provision represent some of the most direct links between finance and more sustainable real economy project decisions, notably regarding European and American insurers' growing reluctance or outright refusal to insure coal projects (Bosshard, 2019; Kollwe, 2019). While sustainable derivatives are in their infancy, sustainable securitisation has made progress: Fannie Mae has become one of the largest issuers of sustainable securitised assets through its green mortgage-backed securities (MBS), backed by loans to houses that fulfil certain energy-efficiency standards (Fannie Mae, 2020).

2.4 Shareholder rights, engagement, and corporate practices

Shareholders' right to have a say in company management are as old as the development of modern joint-stock companies themselves, from the 17th century onwards (Ferguson, 2008). After a post-WWII lull, institutional shareholders started taking more interest in corporate governance issues from the 1980s as their proportion of ownership in US equities rose from 16% in 1965, to 47% by 1987 and then to 80% in 2017 (Cheffins, 2013; McGrath, 2017).

While divestment has a long history as a means for shareholders to express their views on corporate activity (Chow, 2010), the notion of shareholder pressure for ‘good’, and the term “engagement” itself, traces to the more recent idea of corporate social responsibility (CSR) which became a mainstream concept in the 1990s and early 2000s (O'Rourke, 2003).

The ability of investor engagement to encourage and pressure companies to adopt sustainable practices is a transmission mechanism with significant empirical support in the literature, although the strength and nature of the relationship is highly context-specific (Gifford, 2010; Hebb et al., 2012; Kolstad, 2016). In public equity markets, shareholders have pressed management for improved management of sustainability issues and disclosure of sustainability policies (Inderst et al., 2012). The extent to which companies comply with shareholder engagement requests is fairly high, with success rates found by a number of studies ranging from 18% to 60% (Kölbel et al., 2019). Shareholder proposals have also been empirically linked to subsequent increases in the ESG ratings of the firms targeted for engagement (Barko, 2017; Dyck et al., 2019).

2.5 Spill-over Effects, Externalities and Feedback Loops

The financial sector has a major impact on the real economy through externalities and spill-over effects, which can operate in positive and negative directions. For instance, greater financial disclosure and greater information dissemination through news media can generate positive externalities by association with stock prices that are more informative about future earnings (Haw et al., 2012). Conversely, the presence of negative externalities (e.g. increased systemic risk resulting from corporate or financial behaviour) can be exacerbated by positive feedback loops. For instance, negative shocks to financial institutions' balance sheets can cause sharp contractions in short-term credit and liquidity, and result in magnified effects on real economic activity (Basel Committee on Banking Supervision, 2011).

The financing of sustainable projects can generate positive spill-overs. In principle, sustainable finance may be expected to have a higher marginal productivity of capital when non-financial capital is considered, generating positive net impacts on human welfare (Scholtens, 2006). Financing sustainable infrastructure can similarly generate positive spill-overs through increased resilience to physical risks and reduced systemic risk (Brennan & MacLean, 2018).

Sustainable finance may also play a role in reducing negative spill-overs from the financial to the real economy. For instance, it can contribute towards stability by measuring environmental risks associated with the underlying assets in financial products (Bauer & Kleimeier, 2014). Campaigns by financial firms to promote their sustainable offerings could also lead to changing consumer awareness of the environmental relevance of finance and drive broader behavioural change (Baker & Nofsinger, 2012).

Section 3: Maximum Potential Impact Across Asset Classes

Building on this understanding of the transmission mechanisms from the financial economy to the real economy, this section will identify the maximum theoretical impact that each asset class can have on each of these transmission mechanisms. This should help financial institutions better understand their current impact and also devise alternative allocation strategies that can maximise their impact going forward. To do this, we analyse five key asset classes, which make up the majority of the strategic asset allocation (SAA) options available to asset owners: public equity (e.g. listed companies), fixed income (e.g. bonds), private equity (i.e. direct investment in unlisted companies, including venture capital) and real assets (e.g. infrastructure and real estate). We differentiate between active and passive public equity strategies, as they lead to a different relationship with the corporate which can alter the potential impact

and available transmission mechanisms, as well as between loans and bonds within fixed income. We also analyse the role of hedge funds as actors, given their unique role in the financial system.

Below setting out the maximum potential impact available through each asset class, we have given each a ranking of the likely maximum potential impact a financial institution may theoretically have for each transmission mechanism, on a scale of 1 to 5 where 1 is a negligible impact and 5 is a strong impact. Table 1 provides a marksheet and overview of this rating system. Figure 1 outlines the results of this rating by asset class, providing a ‘shades of green’² system for additional clarity. We recognise that the potential impact will depend on a number of different factors, including but not limited to the type and size of the financial institution, the willingness for engagement from the asset/company management, and relevant policies and regulatory structures in local jurisdictions. As such, some asset classes have been allocated a range for potential impact where we see specific examples of impact variation within the asset class.

² Where shades of green are used to designate high impact = av. score of >3.5 – 5, medium impact = av. score of >2-3.5, and low impact = av. score of 1-2.

Table 2. Potential Maximum Impact Rating Marksheet

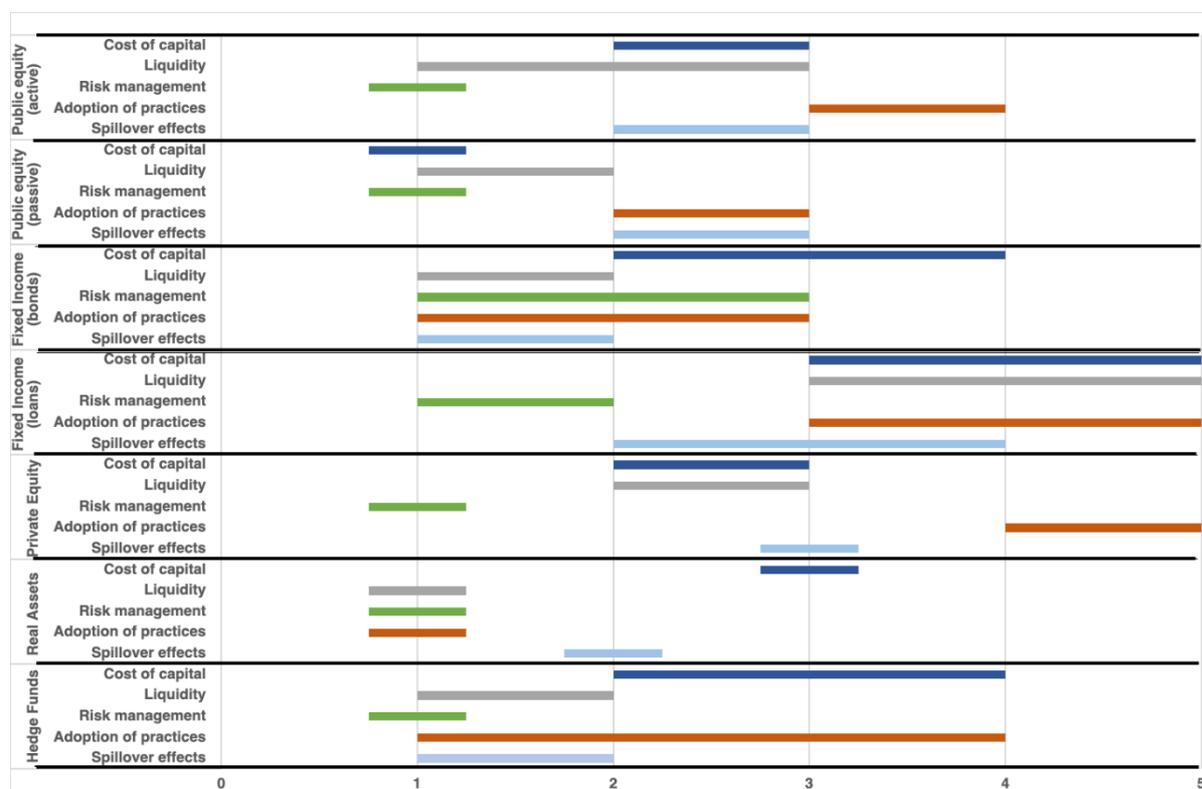
Rating	Descriptor	Example
1	<p>Negligible:</p> <ul style="list-style-type: none"> • Potential for impact: low to none • Likelihood of impact: low to none • Magnitude of impact: small to none • Persistence of impact: very limited, if it occurs 	Real estate investments have a non-existent impact on liquidity, since the assets being traded are highly illiquid.
2	<p>Limited:</p> <ul style="list-style-type: none"> • Potential for impact: possible • Likelihood of impact: low • Magnitude of impact: small • Persistence of impact: weak 	Investors in sustainable/green bonds are unlikely to affect liquidity of primary bond markets directly, although there is a possibility of doing so through engagement with stock exchanges and index providers. Coordinated and systematic action may affect secondary market liquidity, and indirectly raise or lower the liquidity premium for future primary issuances.
3	<p>Moderate:</p> <ul style="list-style-type: none"> • Potential for impact: yes • Likelihood of impact: medium • Magnitude of impact: moderate • Persistence of impact: variable 	Active public equity investors can affect the equity cost of capital (for IPOs, re-issuance or new issuance of stock) through (dis)investment in specific stocks and industries. Dispersed ownership in equity markets means this impact is likely to be small unless there is coordinated investor action, or the sector is more concentrated.
4	<p>Significant:</p> <ul style="list-style-type: none"> • Potential for impact: yes • Likelihood of impact: high • Magnitude of impact: medium • Persistence of impact: strong 	Active public equity investors can generate moderate change in corporate behaviour and/or spill-over effects in markets and policy where they are large shareholders and vocal about the strategy informing their actions, especially in coordination with other investors.
5	<p>Strong:</p> <ul style="list-style-type: none"> • Potential for impact: yes • Likelihood of impact: high • Magnitude of impact: large • Persistence of impact: strong 	Private equity investments resulting in a controlling share in the company or asset have a strong impact on investee/acquired firms' adoption of sustainable practices.

Figure 1. Potential Maximum Impact Rating Scorecard

	Public equity (active)	Public equity (passive)	Fixed Income (bonds)	Fixed Income (loans)	Private Equity	Real Assets	Hedge Funds
Cost of capital	2 - 3	1	2-4	3-5	2-3	3	2-4
Liquidity	1 - 3	1-2	1-2	3-5	2-3	1	1-2
Risk management	1	1	1-3	1-2	1	1	1
Adoption of practices	3 - 4	2-3	1-3	3-5	4-5	1	1-4
Spill-over effects	2-3	1-2	1-2	2-4	3	2	1-2
Average range	1.8-2.8	1.2-1.8	1.2-2.8	2.6-4.2	2.4-3.0	1.6-2.0	1.2-2.6

Our scoring results, visualised by asset class and transmission mechanism in Figure 2, have identified that the most impactful asset class is fixed income loans (with an range of 2.6-4.2 on our 1-5 scale across the five transmission mechanisms) followed by private equity (range of 2.4-3.0), and that the most likely available impact in both cases is via the ‘adoption of practices’ transmission mechanism. The most direct mechanism available to investors is the use of private equity ownership to generate the adoption of climate-related practices. Passive public equity and hedge funds are the least likely to generate impact when considering aggregated potential impact across each transmission mechanism.

Figure 2. Potential Maximum Impact Rating by Asset Class and Transmission Mechanism



Next, we clarify our framing of maximum potential impact for each asset class against this scorecard, before outlining an ‘ideal type’ of investor who sought to maximise impact in each asset class in Section 4 and discussing the implications and limitations of these findings on impact-conscious strategic asset allocation in Section 5.

3.1 Active Public Equity – Maximum Potential Impact

- Active public equity investors have a **limited to moderate (2-3)** impact on *cost of capital*. Investment (divestment) in green (brown) goods and services is likely to have a small impact on cost of capital. Demonstrated demand or removal of this demand for a company through large capital investment can reduce cost of capital for companies. However, due to dispersed ownership impact is likely to be limited. Moderate impact could occur in cases where a) there is a strong market signal from a group of investors (i.e. a blacklisting) or b) when ownership is concentrated so that purchases and sales of equities directly affect the terms of capital, such as during an IPO or a re-issuance.
- Active public equity investors have a **negligible to moderate (1-3)** impact on *liquidity*. As with cost of capital, investors can influence the availability of capital through their investment (divestment) decisions. Unless they are a large shareholder or working in concert with other investors this impact is likely to be negligible given the scale of liquidity available in the financial markets, except in the particular cases of young companies seeking capital through an IPO, or distressed ones seeking equity capital through a rights issue.
- Active public equity investors have a **negligible (1)** impact on *risk management*. Public equity does not provide a risk mitigation benefit per se. Public equity investors may use active ownership to encourage better risk management, but this is almost exclusively through the ‘adoption of practices’ mechanism so is not considered here.

- Active public equity investors have a **moderate to significant (3-4)** impact on *adoption of practices*. Through active ownership, public equity investors can have a moderate impact on adoption of practices. This can be enhanced further through collaborative engagement with other shareholders, and/or if the financial institution owns a large stake in the company.
- Active public equity investors have **limited to moderate (2-3)** impact on *spill-over effects*. If public equity funds are vocal about their climate alignment and are large shareholders in the equity markets, they can act as a signal to both companies and other investors that could create wider spill-over in the markets, especially if working in collaboration with other investors. Some large equity funds also lobby governments and regulators and can influence policy towards a more favourable environment for climate-aligned investment.

3.2 Passive Public Equity – Maximum Potential Impact

- Passive public equity investors have a **negligible (1)** impact on *cost of capital*. A passive investor cannot directly invest or divest from a particular company so is unlikely to influence the cost of capital.
- Passive public equity investors have a **negligible to limited (1-2)** impact on *liquidity*. Broadly, passive equity investment is likely to have negligible impact on liquidity. However, it could be envisaged that a large passive equity investor could have a limited impact by publicly announcing that they will not invest in a sector (i.e. divesting from all fossil fuels and investing only in climate solutions indices) as those companies will now be excluded from possible investment pools, especially if this acts as a market signal and other investors follow suit.
- Passive public equity investors have a **negligible (1)** impact on *risk management*. Public equity does not provide a risk mitigation benefit per se. Public equity investors may use active ownership to encourage better risk management, but this is almost exclusively through the ‘adoption of practices’ mechanism so is not considered here.
- Passive public equity investors have a **limited to moderate (2-3)** impact on *adoption of practices*. Passive investors can still employ active ownership strategies, though the impact of this is likely to be enhanced through collaborative engagement. However, the maximum potential impact is likely to be less impactful than that of active public equity investors, as engagement and voting is not supported by a credible threat of divestment.
- Passive public equity investors have **negligible to limited (1-2)** *spill-over effects*. Large passive equity funds often have limited interaction with the markets. However, there is growing activism whereby large passive funds (or, often, fund managers with both active and passive funds) can be vocal about their climate alignment. In addition, passive fund managers can have an impact through lobbying index compilers to incorporate climate and sustainability criteria in index construction.

3.3 Bond Fixed Income – Maximum Potential Impact:

- Bond investors can have a **limited to significant (2-4)** impact on *cost of capital*. Secondary trading in bonds does not directly affect the cost of capital for the issuer, but it can generate price and demand signals that affect future issuance. Secondary trading in sustainability-linked bonds where the coupon rate is linked to the achievement of KPIs can affect cost of capital of the issuer on an ongoing basis. As such, impact will depend on the instrument used.
- Bond investors can have a **negligible to limited (1-2)** impact on *liquidity*. The majority of bond investors buy and sell on secondary markets, not affecting firm-level liquidity. Moreover, green and sustainable bond issuances do not feature on indices and therefore do not have access

to the highly liquid passive bond markets. Systematic coordination to exclude the worst-performing issuers may raise the liquidity premium on these bonds.

- Bond investors can have a **negligible to moderate (1-3)** impact on *risk management*. While bonds are low-risk investments they are not typically used to manage risks. Sustainability-linked bonds can serve an implicit risk management function by incentivising firms to address physical and transition climate risks to their business model and assets.
- Bond investors have a **negligible to moderate (1-3)** impact on adoption of *sustainable practices*. Since bondholders do not have shareholder privileges their engagement with firms is limited to active ownership and stewardship. Sustainability-linked bonds can present opportunities for more direct impact on firms' practices, especially if bond investors engage with firms on the design of KPIs and bond structure. Engagement is also likely to be more impactful if carried out by larger investors, or by investors who are also shareholders in the company.
- Bond investors have a **negligible to limited (1-2)** impact on *spill-over effects*. Bond investments largely address externalities only indirectly. Bondholders may lobby governments and regulators, both in their home markets and in jurisdictions for which they have high exposure (especially in the case of sovereign bonds) and could influence policy towards a more favourable environment for climate-aligned investment.

3.4 Loans Fixed Income – Maximum Potential Impact:

- Lenders can have a **moderate to strong (3-5)** impact on *cost of capital*. Loans are a crucial source of working capital for all firms, and even more important for smaller firms where they are usually the only source of debt. For bigger firms that can access bond and equity markets, loans are still important but not as crucial. Through the growth of sustainability-linked loans, the cost of capital is increasingly tied directly and dynamically to a firm's achievement of sustainability KPIs.
- Lenders can have a **moderate to strong (3-5)** impact on *liquidity*. Most firms, large and small, rely on loans for working capital, and thus loans play a crucial role in providing firms with liquidity. Some of the pioneering sustainability-linked loans have been revolving credit facilities, the most common form of working capital loan. However, other loans are on a longer-term basis and these have only a moderate impact on liquidity.
- Lenders can have a **negligible to limited (1-2)** impact on *risk management*. Companies can use loans to maintain a level of working capital and hedge against uneven cashflows throughout the year. Sustainability-linked loans can serve an implicit risk management function by incentivising firms to address environmental and sustainability risks to their business model and assets, though typically these loans are structured more as an incentive for firms to improve performance rather than serving a primarily risk management function.
- Lenders have a **moderate to strong (3-5)** impact on adoption of *sustainable practices*. Small firms are deeply reliant on loans, and even large companies depend on them to a significant extent, though they do have other sources of financing. Lenders can and do make lending conditional on project-level characteristics or company characteristics, with some banks pulling back from financing coal projects, for instance. The rise of sustainability-linked loans is another way in which loans are becoming more deeply tied to company practices.
- Lenders have a **limited to significant (2-4)** impact on *spill-over effects*. Lending institutions, especially banks, are large and systemically important. Moreover, for large corporations, only the bigger banks have enough capacity to service their needs. Thus, concerted efforts by banks and lenders to attach more sustainability conditions to their activity would have strong spill-over effects through the corporate sector. Banks can and do lobby governments and regulators intensively and could influence policy towards a more favourable environment for climate-aligned lending and investment.

3.5 Private Equity and Venture Capital - Maximum Potential Impact:

- Private equity and venture capital firms have a **limited to moderate (2-3)** impact on *cost of capital*. For a buyout, the actual loan facility to buy a company depends more on the creditworthiness of the buyer than of the portfolio company. However, for early stage companies relying mainly on equity, not debt, financing, the cost of capital set by a venture-capital firm can be significant. In addition, if a PE/VC firm manages to help a company have better climate-related conversations with bank lenders, this effect may persist and ensure a slightly lower cost of capital even once the PE firm has sold the company.
- Private equity has a **limited to moderate (2-3)** impact on *liquidity*. PE firms certainly can help provide lifesaving liquidity to floundering firms, but this is not the main mechanism through which they have an impact, but rather a side effect of buying a controlling stake in the firm.
- Private equity has a **negligible (1)** impact on *risk management*. Private equity and venture capital are not a means through which a firm can mitigate risks per se, unlike instruments like insurance and derivatives. To the extent that private-equity and venture-capital firms may help the companies they own to have better risk management, this is almost exclusively through adoption of practices.
- Private equity has a significant to **significant to strong (4-5)** impact on *adoption of practices*. Start-ups typically have a few VC firms involved in providing equity finance, and buyout PE firms almost always buy a controlling stake. In both cases, but especially with a buyout, the PE/VC firm(s) can essentially dictate how a company is run and what sort of practices it adopts.
- Private equity has **moderate (3)** *spill-over effects*. The changes private equity or venture capital funds implement at portfolio companies do not typically inspire or motivate similar change at companies not owned by such firms. However, there is some potential for spill-over if large and famous private equity or venture capital funds visibly integrate climate into their considerations, which could peer pressure other funds to do so, too.

3.6 Real Asset Funds – Maximum Potential Impact:

- Real assets funds have a **moderate (3)** impact on *cost of capital*. Real assets investors own a significant portion of all commercial real estate, as well as a portion of residential real estate. The conditions under which they are willing to invest equity or debt capital, especially in greenfield projects, can have a noticeable impact on the cost of capital faced by these projects (though banks have an even greater role in this capacity).
- Real assets funds have a **negligible (1)** impact on *liquidity*. Liquidity is not a major consideration for long-held illiquid assets like real estate and infrastructure.
- Real assets funds have a **negligible (1)** impact on *risk management*. Real assets are not a way for investors to mitigate risks, nor are they a case of corporate risk management—real asset funds typically own the underlying buildings or infrastructure directly, so there is no company involved whose risks could even be managed.
- Real assets funds have a **negligible (1)** impact on *adoption of practices*. While day-to-day operations of some types of assets are sometimes handled by property management companies, these do not, themselves, have an incentive to affect climate risk and instead are concerned with mundane issues like fixing plumbing. Most climate decisions with real assets have to do with

capital expenditure decisions taken by owners, and often at the beginning of the investment relationship (e.g., whether to install flood walls or insulation).

- Real assets funds have **limited (2)** *spill-over effects*. Changes real assets funds implement within their owned assets do not typically motivate similar change at other companies. However, there is some potential for spill-over if large real assets funds visibly integrate climate into their investment considerations, which could peer pressure other real assets fund managers to follow suit and raise industry standards.

3.7 Hedge Funds – Maximum Potential Impact:

- Hedge funds have a **limited to significant (2-4)** impact on *cost of capital*. Hedge funds that trade in shares or derivatives for arbitrage or other purposes do not have a strong effect, but hedge funds that trade in distressed debt of companies that by definition have trouble finding creditors can have a significant impact on the cost of capital they face.
- Hedge funds have **negligible to limited (1-2)** impact on *liquidity*. For most asset types, HF trades are so small that they make no difference to the end company's liquidity position. In distressed debt specifically, hedge funds can have a modest impact, but even here as HFs invariably purchase the debt on the secondary markets, they are not actually providing new funding to the firm in question.
- Hedge funds have a **negligible (1)** impact on *risk management*. Hedge funds are not a means through which a firm can mitigate risks, unlike instruments like insurance and derivatives. (Hedge funds do market themselves as ways for *investors* to mitigate the stock market risks in their portfolios but often end up failing at this, as well.)
- Hedge funds have a **negligible to significant (1-4)** impact on *adoption of practices*, depending on the strategy. Most HF strategies do not affect company practices significantly, but activist hedge funds can use their considerable clout to strongly influence how companies are run, including what sorts of sustainable practices they adopt.
- Hedge funds have **negligible to limited (1-2)** *spill-over effects*. Most HFs try to stay small enough in their respective asset classes to not be a significant share of the market, in order to be able to exploit niche opportunities within it. Hedge funds are also famously secretive and jealously guard their strategies, so hedge fund to hedge fund transmission of practices is also unlikely.

3.8 The Usefulness of an Asset Class Lens

We hope that this analysis can help to initiate a discussion around the potential transmission mechanisms and impact that each asset class can have in the sustainable finance context. Importantly, we have shown that many of these asset classes may have only limited opportunities for impact in the real economy, or that impact is contingent on coordinated action and/or a confluence of factors over which investors in a given asset class have only partial control. This provides theorisation behind our earlier statement that holding 'green' products is insufficient for generating environmental outcomes. It is important to state that the potential for impact for a given investor may vary considerably depending on portfolio composition, and that the potential for overall impact will depend on the relative allocation of capital. We recognise that considering asset classes separately as we do here is an over-simplification, and further research could explore empirical evidence for our assessment and seek to understand the transmission mechanisms of multi-asset portfolios. There are also other cases in which transmission mechanisms may combine in complex ways, such as if a change in company behaviour as a result of engagement leads to spill-over effects from subsequent corporate leadership. However, this can quickly lead into debates as to the extent of additionality of the investor, and although this is an important

question it is out of scope for this paper. In Section 5 we outline key implications of our analysis for the reallocation of capital towards impact, and believe that this cross-asset class analysis may also help to guide targeted engagement among financial, policy and corporate decision-makers to further reduce barriers between financial services and the real economy to extend the potential impact available through each asset class.

Section 4: Sustainable Finance Ideal Types by Asset Class

In this section, we draw on the analysis in the preceding section analysing the maximum theoretical environmental impact for the major asset/investor classes explored in Section 3, to posit ideal type sustainable finance strategies for impact in each asset class.

4.1 Ideal Public Equity Strategy: Active and Passive

The ‘ideal type’ investment strategy for equities differs depending on whether the equity fund in question invests on an active or passive basis. Both types of investor should send strong signals to markets, particularly stock exchanges and index providers, by publicly announcing targets to align with net zero emissions pathways by 2050 or earlier and articulate a transition strategy for meeting this goal. Remuneration and performance targets should be aligned to this strategy. Similarly, both passive and active investors would clearly outline expectations of investee companies, including a time-bound engagement strategy and escalation processes where expectations are not met. This would include voting against management, building coalitions with other investors, and ultimately divestment and public blacklisting of individual companies or activities (e.g. new coal power and oil & gas exploration). Both equity investor types would also engage with investee companies to improve sustainability reporting and increase the ambition of performance targets. This includes both direct engagement and participation in collaborative engagements with other investors and civil society/government stakeholders. Finally, an active investor would work with policy makers and financial regulators to create a supportive environment for sustainable investment, both directly and through collaborative investor initiatives.

Active equity investors specifically should integrate observed and predicted climate and environmental impact data into strategic asset allocations and equity investment decisions. An active investor would also seek out companies that are aligned with sustainable solutions, to increase their access to liquidity and lower their cost of capital. Passive equity investors have less scope to proactively allocate assets but can include sustainability considerations in the index selection process. This may include investment in climate-focused indices (e.g. those screening out high-emitting companies, and/or investing in climate solutions) or adjusting constituent weightings in standard indices to account for climate risk profiles of companies.

4.2 Ideal Fixed Income Strategy

4.2.1 Ideal Bond Strategy

An impact-maximising bond investor should actively promote the use of sustainability-linked bonds, and engage closely with key issuers on bond design, key performance indicators and structure (e.g. relationship between performance and coupon rate). Internally, the ideal bond investor would earmark a minimum percentage of bond portfolio for sustainable and green bonds, with this segment growing over time in line with strategy consistent with net zero emissions by 2050 or sooner. The investor would systematically engage with specific issuers and other investors on (i) sustainable long-term strategy; (ii) mitigation of climate physical and transition-related risks, in order to influence future issuance decisions and pricing. Subject to the results of engagement, it would exclude the worst-performing issuers according to published criteria that would also get more stringent over time, and under/over-weight the remaining portfolio according to performance against sectoral benchmarks. The investor would establish internal hurdle rates for different levels of climate risk to guide bond selection strategy.

Externally, the bond investor would demonstrate to the market, through research, reports and returns, any lower downside risks associated with sustainable bonds and/or reductions in systemic risks associated with sustainable bond investment to lower the cost of capital for sustainable issuers. The investor would also articulate and publish a net zero-compatible active stewardship strategy and communicate it clearly to the market. It would push actively for the creation of sustainability risk-adjusted versions of major indices and facilitate greater inclusion of green and climate-aligned bond issuances in standard indices, particularly for project and infrastructure finance.

Finally, the investor should maximise financing for new sustainable projects, participating in refinancing only where the proceeds either (i) lower the cost of financing sustainable projects; (ii) directly reduce capital costs for issuers specialising in sustainable products or services.

4.2.1 Ideal Loan Strategy

An ideal type impact-maximising loan provider shares many of the characteristics of an equivalent bond investor. Such a lender should earmark a minimum percentage of loan portfolio for sustainable lending, with this segment growing over time in line with a sustainable investment strategy. The lender would promote the use of sustainability-linked loans, and engage closely with borrowers on loan design, key performance indicators and structure (e.g. relationship between performance and interest rate/loan conditions). Lenders would demand larger risk premia from borrowers according to published criteria that would also get more stringent over time, and under/over-weight (then eventually exclude) risk-weighted lending according to performance against sectoral benchmarks, in dialogue with financial supervisors.

Lenders would publicise any research and data showing sustainable lending to exhibit lower default rates risks than the wider loan market (by sector); and/or that sustainable lending strategies reduce risks for all lenders and lower borrowing costs, expanding the addressable market for all lenders in the mid-to long-term. Lenders should articulate and publish sustainable active lending strategies and communicate them clearly to the market. Like bond investors, lenders would establish internal hurdle rates for different levels of climate risk to guide loan approval strategies, and systematically engage with strategically important borrowers on (i) sustainable long-term strategy; (ii) mitigation of climate physical and transition-related risks. They would also engage with participating in interbank loan markets on lending policies and climate risk adjustments.

Finally, as with bond investors, lenders should prioritise finance for new sustainable projects and participate in refinancing only where the proceeds either (i) lower the cost of financing sustainable projects; (ii) directly reduce capital costs for borrowers specialising in sustainable products or services.

4.3 Ideal Private Equity Strategy

Private equity (PE) and venture capital funds play a specific role in the financial system and have much greater scope to shape and engage with investee companies than those in public markets, typically through a controlling stake. An impact-maximising private equity firm should focus its energies on ‘transition turnaround investments’, acquiring stakes in unsustainable firms with high potential for decarbonisation (e.g. steel producers able to switch to clean fuels, manufacturers with scope for much greater efficiency and electric utilities standing to benefit from early retirement of high-emitting assets and heavy investment in renewables). To garner public support for these efforts and minimise hostility from investee company management, the PE fund should partner with governments, academia and/or civil society to research and address the socioeconomic consequences of failing to transition, and have a fallback plan in place for companies that do fail to transition, going bankrupt and leaving workers unemployed.

The PE investor should have a dedicated fund segment focused on green industries, investing in firms and technologies likely to benefit from a rapid, large-scale transition (e.g. renewable energy firms, electric mobility, hydrogen, ammonia, carbon capture). A venture capital fund would invest in early-stage start-ups, while a growth-focused fund would seek out established, rapidly expanding firms.

PE investors also have scope to influence the capital structure and capital-raising practices of investee firms. They should encourage the use of sustainability-linked loans and bond issuance where possible to ensure accountability against green targets and develop internal reporting and monitoring capacity. Similarly, they should work with portfolio companies to integrate the use of granular sustainability data into processes and decision-making, establish firmwide targets for alignment with net zero by 2050 or sooner, and build up internal expertise on climate risks and opportunities, dedicating permanent staff resources to this purpose. Where relevant, PE investors should sign up to industry initiatives and encourage portfolio firms to do so.

4.4 Ideal Real Assets Strategy

Real assets are typically less liquid and less standardised than competing asset classes, presenting investors with greater challenges. Real assets also play a central role in infrastructure investment pathways and reducing carbon lock-in, suggesting they may play a high-impact role in an ideal investment strategy. An impact-maximising real assets investor would therefore approach every new investment through the lens of sustainability risk and opportunity, avoiding investments exposed to excessive physical or transition-related climate risk (e.g. in very low-lying areas near the seashore, or airport or port infrastructure associated with high-emissions transport activity).

The investor would also systematically work to reduce the exposure of its existing assets to climate and environmental impacts, including through efficiency retrofits, insulation, flooding protection, heat exchange, and resilience measures. These measures should be financed, where possible, with sustainability-linked/green loans and bond issuance. The investor should actively partner with local stakeholders to address the exposure of surrounding areas, especially where this enhances portfolio returns by reducing overall localised risks (e.g. flood walls, heat dissipation measures).

These direct engagements would be complemented by the use of sustainability data and metrics to set targets for investee projects (e.g. project finance vehicles for large infrastructure) and firms (e.g. property management companies), and build capacity for reporting sustainability-relevant information.

4.5 Ideal Hedge Fund Strategy

Impact-maximising hedge funds have the potential to generate significant pressure on firms to accelerate or improve their net zero transition strategies. An activist fund should, similarly to private equity, focus on investments in undervalued, unsustainable firms with high decarbonisation potential, and work with other shareholders to pressure firm management to draw up and execute a turnaround strategy. Where shareholder pressure fails, the hedge fund should work to replace company management by building a coalition of activist investors. For distressed debt investment, the fund should leverage its buying power to influence company management and tie loan/bond conditions to sustainability outcomes. Where this strategy fails or has low chances of success, the fund should short-sell firms with insufficient or non-existent sustainability strategies, particularly those with high short-term stranded asset risks, sending negative price signals to other investors to encourage either divestment or transition.

Funds active in commodity markets should expand trading in carbon credits and emissions permits: this should allow the fund to both healthy returns as policies tighten, and also to smooth volatility and promote the maturing and development of these markets. Simultaneously, funds should contribute to sustainability standards and practices in the trading of existing commodities, expand trading in labelled products, and restrict trading in products of uncertain or unsustainable provenance. Those active in bond markets should similarly expand trading in green and sustainability-linked bonds, restricting trading in bonds that are not linked to additional sustainable activity. These activities should be underpinned by the use of sustainability metrics and targets at the fund level, which can also be used to attract further investment by differentiating the fund from the wider market.

Section 5: Implications for Manager Selection and Strategic Asset Allocation

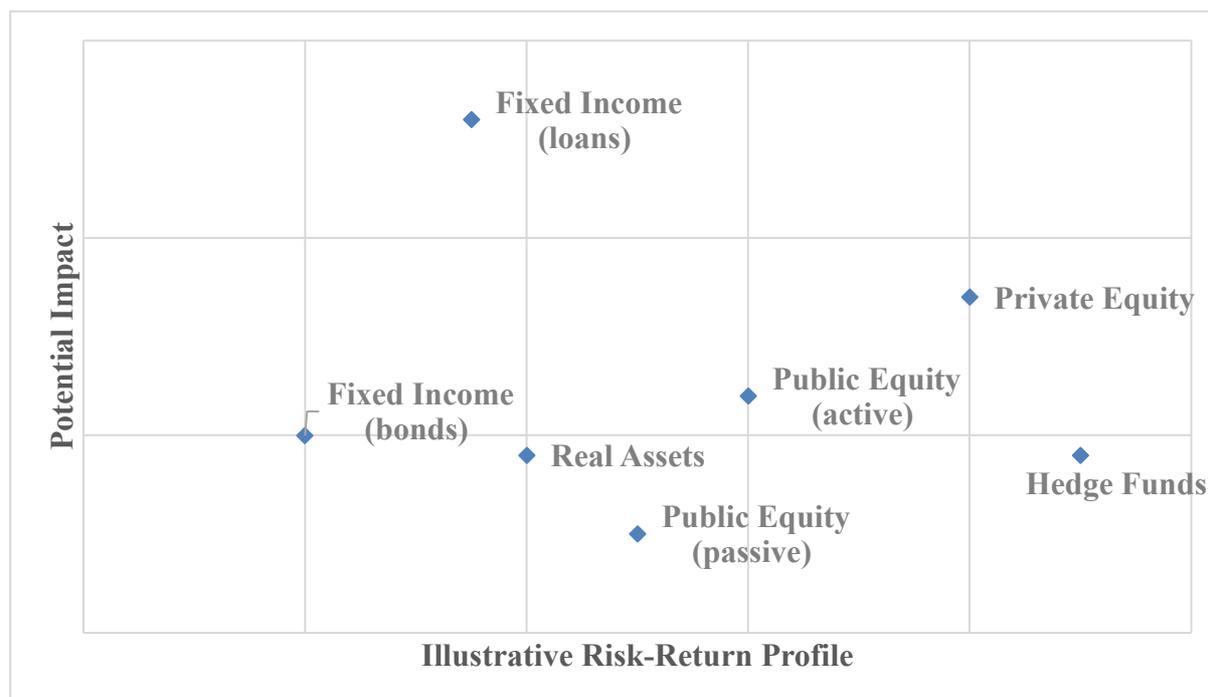
So far, this paper has outlined five transmission mechanisms available to financial institutions that are concerned with generating impact in the real economy relating to environmental sustainability. In particular, we have outlined how the availability and strength of these transmission mechanisms differ across seven asset classes and further expanded a theoretical ‘ideal type’ of action within each asset class to deliver maximum impact. This analysis can therefore support financial institutions who seek to develop impactful strategies across individual and multiple asset classes. In particular, asset owners have at least two ways to implement these findings: in the choice of their asset managers, and in their strategic asset allocation.

Asset owners allocate their funds to either internal or external asset managers. To maximise impact, asset owners can use the above framework to select those asset managers who present strategies and capacities that are most closely aligned with (or have strategies in place to build towards) the ‘ideal type’ of strategy highlighted across different asset classes.

Further, those responsible for impact-driven portfolio construction could use the above analysis to allocate capital towards those asset classes which are most likely to drive impact. Strategic asset allocation (SAA) is the process through which financial institutions periodically set target allocations to various asset classes (Brennan et al. 1997; Campbell et al. 2002). These allocation decisions are usually based on a range of factors such as the investor's risk tolerance, time horizon, and investment objectives. If a key investment objective is to generate sustainability impact, SAA decision-making should consider which asset classes available to the financial institution can drive the most impact and then overweight these in their SAA decision and underweight those asset classes with the lowest potential impact. Based on our analysis in Section 3, an impact-focused SAA should allocate more capital to fixed income (specifically through loans) and private equity, and allocate less capital to public passive equity investments. This is an important finding at a time when there is growing investment in passive listed equity strategies as financial institutions seek lower fees and costs (Mercer, 2019). Such a shift is not

necessarily going to support the drive towards a sustainable financial system, though there are opportunities for passive investors to generate impact whilst also securing lower cost strategies – this is why we believe it useful to have outlined the ‘ideal type’ of investor for each asset class. However, these decisions, as noted above, are often not made with the sole aim of impact, so Figure 3 demonstrates (illustratively) how such an analysis might be considered in alignment with the risk-return profile of each asset class.

Figure 3. Relationship between asset class impact and risk-return profile



This focus on SAA also highlights the fact that, although we have addressed asset classes in isolation throughout this paper, multi-asset class portfolios exist, and this can produce further interesting opportunities for impact. For example, large financial institutions which invest in both equity and fixed income may well own both equity and debt of Company A, and this could strengthen the potential impact across multiple transmission mechanisms as they will have greater capacity to influence company practices through engagement, for example. From our analysis, this is likely to be particularly powerful if the financial institution has the company on their loan books. As such, it is important to recognise that within and between asset classes there is a range of potential impact, and that different SAA decisions will lead to impact and that portfolios with the same risk-return profiles can have different environmental impact. Importantly, our analysis suggests that higher potential impact portfolios do not have to mean lower risk-return expectations.

Section 6: Conclusions

Holding green financial assets is not sufficient for investors to have an impact on the real economy. In this paper, we introduce five possible transmission mechanisms linking the financial and real economies in application to sustainable finance, aiming to launch a more rigorous discussion on how sustainable finance activities can generate impact. We assess the potential impact of each transmission mechanism across major asset classes. Our findings suggest that fixed income loans present the greatest opportunity for impact, and passive public equity strategies, the least. We then present possible ‘ideal types’ for each asset class to help guide a high-impact strategy for each. Finally, we suggest how this analysis might be applied to strategic asset allocation by investors with multi-asset portfolios. Future research in this area could consider the implications in more detail; and seek to develop empirical methods for testing and quantifying the impact of the different transmission mechanisms discussed here.

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