

A review of the impact evidence for climate-related disclosures

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Executive Summary

This document's purpose is to summarise the existing literature (to early 2023) on the costs and benefits that may relate to climate disclosure mandates. We focus on categorising the different sources of costs and benefits — both intended and unintended — that may arise from introducing or tightening such mandates, and reviewing the empirical literature on the likely magnitudes of such impacts. This includes discussing potential secondary impacts on retail investors and their attitudes to environmental-financial trade-offs.

Climate-related information disclosures requirements cover different types of interventions, for example they can include disclosures across corporate reporting, disclosures from regulated firms to institutional investors and disclosures from regulated firms to retail investors and consumers. Those different types of intervention will result in different impacts, due to the way the information is conveyed and the parties sending and receiving that information.

This is a complex and rapidly evolving literature, making it difficult to draw unambiguous conclusions. In addition, much of the evidence relates to broader Environmental, Social & Governance (ESG) considerations and/or voluntary disclosures. However, this notwithstanding, in Table 1, we summarise the state of the literature. From the literature, there are robust grounds for thinking that, in some areas, stronger climate disclosure mandates will improve financial market performance. This is specifically the case for better market liquidity, greater accuracy of analysts' earnings forecasts, reduced severe downside market risks, and lower corporate emissions. In other areas, particularly around corporate profitability, retail investors' ability to interpret ever more complex information, and the extent to which green funds reduce societal emissions, the evidence appears more ambiguous. In contrast, higher investment fees, potentially lower expected returns and the burden of compliance are all areas where there may be unintended costs from tightening climate reporting mandates.

This literature review has sought to make best use of the available evidence that may be directly applicable to interventions by a financial regulator, but inevitably there are some differences between the evidence reviewed and specific regulatory requirements introduced in the UK to date. A regulator should independently assess whether the evidence presented here is applicable to future regulatory proposals, paying particular attention to the context of the evidence presented. For example, there are differences between corporate social responsibility (CSR) and climate-only information, and between CSR and investor material information. This is because CSR reporting is directed at a wide range of stakeholders, so it is not restricted to information that is relevant to investors. Some of the content in this literature review may therefore not always be directly relevant to a regulator that focuses on investor material information.

Although this paper has focused on the impacts and dependencies of climate-related information disclosures, we believe a significant proportion of the evidence presented in this paper can also provide valuable insights on the impacts of a wider spectrum of potential climate-related (or wider ESG-related) regulatory interventions.

Table 1: Likely impacts and dependencies from stricter climate reporting policies

Likely net benefit Economically significant	<ul style="list-style-type: none"> · Aggregate corporate CO₂ emissions will be reduced. · Equity market liquidity will, on average and particularly for high emitting firms, improve. · Greater quantity and consistency of reported environmental information. · Analysts earnings forecasts will, on average, be more accurate. · Some corporate ‘win-win’ opportunities will be identified through better benchmarking. · Higher quality climate related risk information will lead to enhanced investment decision making.
Likely net benefit Economically marginal	<ul style="list-style-type: none"> · The equity market response to new mandates will be positive for low emitting stocks. · Corporate options implied volatilities will fall for companies reducing emissions. · Bond yields will fall for companies newly able to issue green bonds.
Unclear	<ul style="list-style-type: none"> · Corporate financial performance may, on average, improve. · “Financial greenwashing” may replace “Green greenwashing”. · The extent to which fund reporting mandates will facilitate further corporate CO₂ emissions reductions. · Investments will flow into ‘green’ funds that may not offer better environmental or financial performance.
Likely net cost Economically marginal	<ul style="list-style-type: none"> · The equity market response to new mandates will be negative for high emitting stocks, and stocks on average. · Concentration on environmental matters deflects investment away from other worthy social causes.
Likely net cost Economically significant	<ul style="list-style-type: none"> · Some corporate ‘win-loss’ opportunities will be invested in because of institutional investor/regulator pressure to “do something”. · Fund fees may increase for retail clients. · Lower costs of capital will drive down expected future returns on average for equities, bonds and funds. · Increased compliance, assurance & regulatory costs. · Some apparent reduction in CO₂ emissions will occur from moving them outside the regulatory reporting envelope (e.g., offshoring).
Unclear dependencies	<ul style="list-style-type: none"> · Retail investors’ literacy levels to interpret and use the combined environmental & financial information. · Retail investors’ willingness, if necessary, to trade off financial for environmental utility, and the protection of minority interests. · The improvement in the quality of environmental reporting and how this can be effectively assured and regulated.

This table summarises what we believe will be the likely impacts and impact dependencies as stronger climate disclosure policies are introduced. Unclear dependencies refer to those factors that may affect outcomes in unclear ways.

1 Introduction

In the UK, climate related disclosure regulatory policies in financial services dovetail into a range of existing environmental reporting requirements under listing rules, prospectus regulations, disclosure guidance & transparency rules, and market abuse regulations. The UK Government is also planning to introduce an economy-wide framework of Sustainability Disclosure Requirements (SDR), as outlined in the 2021 document [Greening Finance: A Roadmap to Sustainable Investing](#).

The approach being taken by the Greening Finance roadmap builds on the Government's ambition to align climate reporting standards in the UK with the work of the [Taskforce on Climate-related Financial Disclosures \(TCFD\)](#), which was created by the [Financial Stability Board \(FSB\)](#) in 2015 with the aim of developing "... recommendations on the types of information that companies should disclose to support investors, lenders, and insurance underwriters in appropriately assessing and pricing a specific set of risks — risks related to climate change." The TCFD lays out four overarching recommendations on governance, strategy, risk management, and metrics & targets, alongside eleven supporting recommendations. Consistent with the wider roadmap, in the UK there is already climate-related [legislation](#) (with accompanying guidance) for publicly quoted and large private companies, [legislation](#) (with accompanying guidance) for pension schemes, and requirements for listed issuers to make TCFD-aligned disclosures or to explain why not ([PS20/17](#) and [PS21/23](#)); commonly referred to as the "comply or explain" approach. As international sustainability reporting standards are developed by the new [International Sustainability Standards Board \(ISSB\)](#), set up by the [IFRS](#) Foundation to build on the TCFD's four pillars, the Greening Finance report makes clear (p.12) that "the government will create a mechanism to adopt and endorse ISSB-issued standards for use in the UK". The ISSB has clearly [set out its aims](#) "...to deliver a comprehensive global baseline of sustainability-related disclosure standards that provide investors and other capital market participants with information about companies' sustainability-related risks and opportunities to help them make informed decisions".

The Greening Finance roadmap forms part of the government's efforts to deliver on its [Green Finance Strategy](#). As the Greening Finance document notes (p.7), this strategy can be interpreted as having three phases: Phase 1 for informing investors and consumers, Phase 2 for acting on the information provided, and Phase 3 for shifting financial flows towards achieving the government's net zero commitments. The current, TCFD-aligned, reporting requirements are framed explicitly as being a strategy for delivering Phase 1 only. Current UK policy guidance can also be interpreted within the context of Phase 1; for example, in Figure 2 of [CP20/3](#): "More comprehensive and consistent disclosures contribute to: informed pricing; efficient capital allocation; a cost of capital for issuers that appropriately reflects how they manage climate-related risks and opportunities".

Yet there is clear desire to move quickly to Phase 3. As the [United Nation's COP26 goals](#) make clear, the mobilisation of private financial flows, "to help turn the billions of public money into trillions of total climate investment", is key to tackling climate change. The UK government aspires to be a leading international player in delivering on this objective by leveraging the massive weight of London financial markets and institutions. The Foreword to the Greening Finance roadmap, written by then Chancellor of the Exchequer Rishi Sunak, hints at Phase 3 effects while concentrating on the Phase 1 benefits:

"Investors and businesses must have the information they need to understand the full range of environmental risks they face and create. That information should be a key component of every investment decision and the strategy of every business. Climate and environmental considerations should be central to the decision-making process of every UK board and every investor's risk and return calculations. The measures set out in this Roadmap [UK Government Roadmap] are a step in that direction. They will put UK businesses in a better position to withstand climate-related risks and further seize the opportunities presented by the transition to net zero".

These Phase 3 benefits clearly fall within the remit of HM Treasury's [Green Book](#) guidance for social cost-benefit analysis (CBA), which expects the analyst to incorporate the impacts of policy changes on wider society.

This review of the evidence frames the CBA of future climate-disclosure mandates within this rapidly evolving external environment. This literature review has sought to make best use of the available evidence that may be directly applicable to interventions by a financial regulator, but there are some differences between the evidence reviewed and specific regulatory requirements introduced in the UK to date. For example, there are differences between CSR and climate-only information, and between CSR and investor information. Typically, estimates have previously been provided for one-off and ongoing

compliance costs for firms to meet the imposed reporting requirements. However, estimating the benefits has been harder and this literature review intends to provide information in this respect, particularly given the move from Phase 1 towards Phase 3. We stress that this is a forward-looking document that considers the evolving landscape, as opposed to a review of CBAs published to date.

This literature review proceeds as follows. Section 2 provides a concise policy-oriented review of the relevant empirical academic evidence concerning many of the Phase 1 related costs and benefits where there is substantial additional information to be added.¹ Section 3 then considers how, under Phase 3, the broader societal benefits of reducing greenhouse gas emissions can be incorporated into the cost-benefit analysis. Sections 4 and 5 then turn respectively to the impact on corporate financial performance and expected asset returns from stricter climate reporting mandates: issues where it is not always straightforward to disentangle Phase 1 and Phase 3 effects. Section 6 then considers the fiduciary duties placed on corporate managers and fund trustees as the economy transitions towards net zero. It particularly focuses on how much weight can legally be given to non-financial considerations if there is some thought that environmental projects might require a level of shareholder value trade-off. Section 7 draws broad conclusions from the reviewed literature. We do, though, caution that writing such a brief review has been a challenge given the very large quantity of work published in this field, the sometimes conflicting evidence that it presents, and the recentness of many of the findings. To offset these difficulties, we direct the reader to recent review papers in relevant places where more detailed information can be obtained, and rely relatively heavily on direct quotations from the referenced papers.² The following, very brief, overview of the findings, provided by Haji et al. (2022), may provide a useful summary on CSR of what is to follow:

“Empirical research on reporting quality effects generally concludes that CSR reporting continues to be ceremonial rather than substantive after the regulations, consistent with corporate legitimization and “greenwashing” views. In contrast, there is growing evidence that shows both positive and negative capital-market and real effects of the regulations. Specifically, evidence shows that CSR reporting regulations lead to (1) a reduction in information asymmetry, (2) an increase in firm value, (3) a decrease in firm profitability, (4) an increase in corporate giving, (5) a reduction in carbon emissions and (6) an increase in CSR ratings of affected firms” (p.3).

2 Phase 1 Effects

2.1 Tail and downside risk

We begin with a very brief discussion of an issue that relates to market integrity; crash and downside financial market risk. There is some academic evidence implying that high carbon intensity stocks might have higher total volatility and tail risk characteristics because of their exposure to regulatory tightening and adverse physical climate impacts, and that mandated climate disclosures might therefore help reduce these risks. Krueger et al. (2021) who consider generalised ESG disclosure and non-financial reporting, conclude that “... the likelihood of stock price crashes decreases by about 2.8pp after mandatory ESG disclosure is introduced (19% of the variable’s unconditional probability).” (p.5) and “...that ESG incidents³ decline not just in numbers, but also in terms of influence or severity, after mandatory disclosure is introduced.” (p.30). There is an emerging stream of literature on options pricing that aims to examine similar risk-related issues. Ilhan et al. (2021) find that the cost of option protection is greater for firms in carbon-intense industries. Cao et al. (2022) confirm and extend these results more generally for ESG firms. It seems likely that further reporting mandates will help reduce these types of risk and improve market integrity, with Christensen et al. (2021) noting that “Illustrating that CSR activities are related to firm risk and the cost of capital, studies find that better CSR performance is negatively associated with idiosyncratic risk (Luo and Bhattacharya 2009), crash risk measured as the negative skewness of stock returns (Kim et al. 2014b), (and) the risk of future stakeholder conflicts (Becchetti et al. 2015)” (p.1201).

¹ This literature review does not expand on certain issues raised in detail elsewhere, such as the direct compliance costs on firms and potential additional costs of assurance & regulation.

² We do not provide bibliographical details for the references in direct quotations. We also caution the reader that a number of the studies that we review are working papers and therefore have not been through a full academic refereeing process.

³ For information on how RepRisk define ESG incidents, see [RepRisk Methodology Overview](#)

2.2 Disclosure quality and market liquidity

If the purpose of stricter climate reporting policies, under a Phase 1 interpretation, is to increase the quantity, quality and consistency of climate-related reporting, then this improved informational environment should enhance the microstructure of the markets and reduce liquidity premia.

2.2.1 Disclosure quality

The extent to which increased CSR reporting, undertaken either voluntarily or as a consequence of a tighter regulatory environment, actually increases reporting quality and the usefulness of the information flow is unclear. For example, in relation to voluntary increased disclosures, Mateo-Marquez et al. (2021) undertake an international study that considers the willingness of firms to participate in the 2015 CDP questionnaire and the quality of their disclosures. They then compare this to the climate regulatory, normative and cultural characteristics of the country where the firm is located. They conclude that: "... countries' climate-related regulation motivates firms to voluntarily participate in the CDP questionnaire, but it is not related to the quality of carbon information reported." (p.1358). In terms of mandated disclosures, the evidence is again mixed. As Haji et al. (2022) note:

"In summary, evidence on the effects of CSR reporting regulations on reporting quality remains weak. Studies find changes in the quantity of CSR disclosures, but disclosure quality remains low after the regulations. Several studies conclude that changes in CSR disclosures reflect symbolic rather than substantive response to CSR reporting regulations (Birkey et al., 2018; Schwartz, 2016; Solomon and Maroun, 2012; Marquis and Qian, 2013; Kansalet al., 2018; Ruiz-Lozano et al., 2022; Mobus, 2005). Specifically, the evidence suggests that firms continue to be selective of their CSR disclosures after the regulations; and employ diverse strategies in their CSR reports ranging from use of self-laudatory tone, boilerplate language, dismissal to concealment." (p.9)

However, while agreeing with this on average, Krueger et al. (2021) suggest that there is considerable heterogeneity in this: "Somewhat surprisingly, mandatory disclosure on average does not increase the quality of the filed ESG reports ... Importantly, these average treatment effects mask substantial heterogeneity across firms. Notably, we demonstrate that firms with lower ESG performance (measured using ESG ratings) are much more likely to file ESG reports after mandatory disclosure is introduced, and such firms also exhibit significant improvements in their ESG reporting quality." (p.3).

Despite the fact that, on average, reporting mandates do not obviously improve disclosure quality, there is evidence that market analysts benefit from increased environmental information. In relation to voluntary disclosures, Bolognesi & Burchi (2022), in their study of 3000 US listed firms, report that since the 2015 Paris agreement, sell-side analysts recognise a value premium for firms most engaged in ESG disclosure and that have the greatest transparency on these matters. For tighter reporting mandates, Krueger et al. (2021) report in relation to Environmental, Social & Governance (ESG) disclosures that "We demonstrate that the accuracy of EPS (earnings per share) forecasts increases, and above all the dispersion of analysts' EPS forecasts declines, after mandatory ESG disclosure is introduced. The effect sizes are meaningful—for example, forecast dispersion decreases by 0.082 after mandatory disclosure is introduced (about 14% of the variable's standard deviation)." (p.4). Haji et al. (2022) agree, noting that "Several studies find CSR reporting regulations improve investment professionals' report informativeness in several countries ... For example, these studies show a decrease in analysts' earnings forecast error and dispersion; (and) an increase in (the number of) analysts following after CSR reporting regulations" (p.11).

Yet, there are reasons to believe that the impact of future disclosure mandates on environmental reporting quality is likely to depend on individual firm characteristics. For example, in a recent study in relation to voluntary disclosure, Basu et al. (2023) find that high levels of foreign institutional ownership contributes to improved corporate climate disclosure quality compared to firms with domestic institutional ownership. This relationship is more obvious for "(1) firms domiciled in stakeholder-orientated countries, (2) firms domiciled in countries that adopt emission trading schemes, and (3) firms with a greater level of information asymmetry" (abstract).

We also note that, in the current absence of strong formal reporting mechanisms, there has been a growth in private sustainability reporting to meet the clear needs of global asset managers and financial institutions. Solomon et al. (2011) reports that "...institutional investors are using the private reporting process to compensate for the acknowledged inadequacies of public climate change reporting". In a UK

context, Semanova (2021) observes that “... qualitative studies have claimed that private sustainability reporting (i.e., private meetings between institutional investors and investees) tends to inform and supplement public sustainability reporting, have a proactive nature, and merge with private financial reporting (Atkins et al., 2015; Solomon et al., 2011)” (p.560). Similarly, Solomon (2021) points to the fact that institutional investors ask more detailed and better-informed questions about climate change risks and risk management in private meetings with their investee companies. Regulators may see a benefit in replacing these informal environmental reporting mechanisms with something more formal through disclosure mandates.

2.2.2 Market liquidity

Consistent with the fact that, while the quality of CSR reporting does not obviously improve following tighter environmental reporting requirements, analysts still find this information useful, such tightening of reporting policies do appear to deliver genuine market liquidity benefits. While Christensen et al. (2021) note that “There is relatively limited evidence on the liquidity consequences of CSR reporting, which is perhaps surprising considering that liquidity tests are well suited to isolate information effects in markets” (p.1200), nevertheless the evidence that they do present points broadly to clear liquidity advantages of CSR reporting mandates. Indeed, they conclude that “This literature suggests that more and better (CSR) information can benefit capital markets through greater liquidity, lower cost of capital, and better capital allocation.” (p.1129).

Consistent with other studies, Luo (2022) finds that low-ESG firms have delivered higher returns in the UK over the interval 2003–2020. He concludes: “...we conjecture that stocks with higher liquidity have higher ESG than stocks with low liquidity. Our results are in line with this expectation. Further, the ESG premium is only significant for low liquidity stocks but is insignificant for high liquidity stocks, which suggests that the effect of ESG on stock returns is associated with liquidity. Results are similar for testing portfolios formed using Env, Soc, and Gov.” (p.20). Similarly, Egginton & McBrayer (2019) report that “...a one standard deviation increase in CSR disclosure scores is associated with a reduction in bid-ask spreads of 5.39%, a reduction in Amihud’s (2002) illiquidity measure of 22.65%, and an improvement in equity market turnover of 7.53%, on average” (p.397). However, as so often in the CSR/ESG stream of literature, the findings are not unanimous. Chang et al. (2018) argue that there is a negative correlation between CSR scores and market liquidity, finding that liquidity considerations place short-term pressures on firms and that this acts against corporate investment in long-term CSR activities. Roy et al. (2022) try to resolve this matter by examining liquidity changes in a quasi natural experiment context after the introduction of mandatory CSR expenditure (minimum of 2% of profits for firms above a certain size) under Section 135 of the Indian Companies Act 2013. Their findings, within this regulatory setting, support the view that better CSR performance is associated with better stock liquidity, although their results are driven more by corporate spending on healthcare and education than environmental and social justice spending.

Velte et al. (2020) provide a meta-analysis of this issue across 73 quantitative empirical studies. They find that “Four empirical studies show that carbon disclosure reduces information asymmetry for shareholders and other stakeholders. Studies on carbon performance do not exist yet. Zhou et al. (2018) used the management expense ratio and total asset turnover as agency cost proxies and found a negative impact of carbon disclosure quality. Krishnamurti and Velayutham (2018) stated that stock price volatility decreases and stock market liquidity increases if carbon disclosure quality is high. Borghei et al. (2018) supported these results, using stock volatility and bid-ask spreads. Schiemann and Sakhel (2018) used climate-related physical risk disclosure as a dummy variable and observed a low bid-ask spread, which was pronounced in firms acting under the EU’s ETS (Emissions Trading Scheme)” (p.15).

But this presents an anomaly. As Haji et al. (2022) observe: “Overall, the lack of evidence supporting improvements in reporting quality after the regulations does raise valid questions as to what is driving the positive capital-market (e.g. reductions in information asymmetry) and societal outcomes observed in the capital-market and real effects research” (p.3). While this remains an unanswered question, our reading of this literature is that new climate-related disclosure mandates will be likely to improve measures of market liquidity, particularly for currently low-ESG stocks.

2.3 Alignment of funds with investor preferences

One of the central purposes of climate related disclosure mandates is (under a Phase 1 interpretation) to provide investors with the information they need to align their portfolios with their financial and environmental preferences. As has been widely reported, there has been a surge in investor demand

for ESG investments, often through ESG/Socially Responsible Investment (SRI) funds managed by professional investors as financial intermediaries.⁴

2.3.1 Are green funds actually green?

Many (but possibly not all) investors in environmental funds place value in contributing towards net zero and they expect their fund managers to act in ways that are consistent with these preferences. This may also be the case for non-ESG funds, such as members of employer pensions schemes, because there is evidence of strong public desire to [invest in the UN's Sustainable Development Goals](#). Yet, because of greenwashing, there is a concern that this may not be the case, and this concern is backed up by recent academic evidence. Raghunandan & Rajgopal (2022, abstract) find that “ESG funds hold stocks that are more likely to voluntarily disclose carbon emissions performance but also stocks with higher carbon emissions per unit of revenue”. They somewhat damningly conclude that “Our findings suggest that socially responsible funds do not appear to follow through on proclamations of concerns for stakeholders.” Kim & Yoon (2022) find similar evidence in relation to signatories of the United Nations Principles for Responsible Investment (PRI), concluding that “a reasonable reader may perceive our findings as consistent with PRI funds’ greenwashing” (abstract). Results from another recent study, Brandon et al. (2022), though, suggest that these findings may be primarily caused by US-based funds: “US-based PRI signatories tend to exhibit at best similar, if not, worse ESG scores than US non-signatory institutions ... (and we) also find no evidence that US-based institutions improve their portfolio ESG scores after signing the PRI relative to non-PRI institutions. In contrast, ... outside of the USA, PRI signatories not only have significantly better portfolio ESG scores than non-PRI institutions, but they also in fact improve these scores after joining the initiative” (p.1407). They also show (Table 3, Panel C) that non-US PRI signatories specifically have better environmental behaviour, although there is only weak improvement in environmental performance after becoming a PRI signatory (Table 4, Panel C). These findings suggest that the US-based literature may understate the ‘greenness’ of UK green funds.

2.3.2 Do green consumers invest in green assets?

That supposedly green funds may not actually be that green may encourage financial regulators to introduce policies to reduce the potential for consumers to be misled about the sustainability of the funds they invest in. Under tighter climate reporting mandates, consumers will have better information to help them identify possible greenwashing by fund managers. But this supposes that members of the public generally, and particularly individuals who have the strongest green preferences, have the time, inclination and financial literacy to respond to the additional information they receive. In a recent study on Swedish households, Anderson & Robinson (2022) raise the following concerns:

“Our central finding is that households with stronger pro-environmental values do not hold greener portfolios. A key reason for this is that households with pro-environmental views are disengaged from financial decisions. Individuals who place a high priority on environmental considerations are around 10% less likely than others to hold stock directly, controlling for demographics. The magnitude of this effect is comparable to that associated with not attending post-secondary education. Not only are they less likely to be direct stock owners, but even in a mandatory-participation retirement plan they show limited signs of engagement: they are more than 20% more likely to never check their pension balances, and they are more likely than others to leave their pension savings in the default fund choice rather than make an active choice. At the same time, they score high on measures of everyday pro-environmental behaviors—they recycle more than their neighbors, and they are willing to pay more for green products. For most individuals, however, this environmental engagement simply does not cross over into the realm of financial engagement. They report that environmental issues are interesting but financial issues are boring.” (p. 1552)

This is largely consistent with the findings of Kaustia & Torstila, (2011) in a Finnish context that politically left-leaning voters tend to shun equities. However, against this, in a French context, Brière & Ramelli (2020) find that when savings plans offer at least one responsible equity fund, then this

⁴ There is some evidence that this may recently be slowing, particularly in the United States. [Bankrate](#) report that “...the growth has been overwhelmingly driven by Europe, with the region accounting for 83 percent of ESG fund assets at the end of 2022 and seeing positive inflows of \$40 billion during the fourth quarter. The U.S., which accounts for 11 percent of ESG fund assets, saw outflows of \$6.2 billion during the final quarter of 2022. The 2022 outflows in the U.S. followed a long stretch of positive growth for ESG funds.”

	SRI Investors	Non-SRI Investors
Much lower	0.9%	6.2%
A bit lower	47.8%	49.9%
The same	34.8%	29.4%
A bit higher	14.8%	14.1%
Much higher	1.7%	0.4%

Table 2: From Riedl & Smeets (2017, Figure 1). The distribution of return expectations of SRI equity funds compared to conventional equity funds for investors with and without an SRI equity fund. The original paper describe these values as “... depict(ing) investor responses to the statement ‘I expect that the returns of socially responsible equity funds compared to conventional equity funds are: 1 = much lower, 2 = a bit lower, 3 = the same, 4 = a bit higher, 5 = much higher.’ The category ‘I don’t know’ is excluded from the figure; it was chosen by 2.5% of socially responsible investors and 10.2% of conventional investors” (Caption to Figure 1).

increases the amount that investors place in equities. They ascribe this effect to the fact that such equity funds appeal to categories of investors who are otherwise equity averse because of social and cultural reasons, rather than because of the risk-return characteristics of these funds. Overall, these findings raise important questions about the way in which better environmental information will be used by those not professionally engaged with financial markets.

2.3.3 Consumer attitudes to environmental-financial trade-offs

If green investors do want to invest in green funds, the questions then arise as to (i) whether they would be willing to make a financial sacrifice for their environmental beliefs, and (ii) whether they expect to make such sacrifices. Note that these are separate questions from (iii) whether or not it would actually be necessary in practice to receive lower expected financial returns for such environmental benefits, and (iv) the ways in which such potential trade-offs are communicated to retail clients. We return to these latter two questions in section 5 and subsection 6.4 respectively.

In reference to the first question, Heeb et al. (2023) conclude that investors care about whether the investment is sustainable or not, but they care little about the magnitude of the impact of their investment: investors’ willingness-to-pay for sustainable investments does not differ substantially between an investment that saves 0.5 tons of CO₂ emissions and an investment that saves 5 tons. The authors’ conclusions were reached in a framed field experiment with a panel of 527 experienced private investors and a unique panel of 125 dedicated high-net worth impact investors. Haber et al. (2022) provide evidence that, at least in terms of stated preferences, investors may be willing to sacrifice financial returns for environmental benefits. They conducted a nationwide survey in August 2022 with 2,470 respondents to understand how American investors view ESG priorities among the companies in their investment portfolio. The attitudes vary across age groups. A third of investors below 41 claim that they are willing to lose more than 10 percent of their retirement savings to allow for social and environmental improvement in a company. The wealthiest young investors were the most supportive for ESG compared to those with less savings. ‘Baby boomers’ investors (aged 58 and older) are unwilling to lose any savings to support ESG. Similarly, Riedl & Smeets (2017, Figure 1) provide evidence that most investors expect SRI funds to do a bit worse, or about the same, as non-SRI funds: see Table 2. Similar results have been reported for the UK in a recent study by the [Cambridge Institute for Sustainable Leadership](#), where people expressed a willingness to sacrifice up to 2.5% in an incentivised experiment.

Yet a [recent survey](#) of UK public support for net zero policies reported that, while 55% of respondents said that they wanted access to sustainable pension funds, this support dropped to 12% if “... it meant you personally may get a smaller return from your pension saving”. There are a number of surveys in both the [UK](#) and [US](#) which indicate that, more generally (for example, through increased energy bills), the public is not, on average, prepared to make significant financial sacrifice to achieve net zero. Again, therefore, there is mixed evidence on this issue.

2.3.4 Agency issues and fund fees

While investment managers will always claim that their climate-friendly funds are supplied to meet their clients’ needs, there is a need to remain mindful to potential agency conflicts. There are two primary

routes through which this might happen. First, fund managers might be looking to increase the fees they receive, either by having fund flows into the investments they manage and/or by increasing the fund management fees as a percentage of funds under their control. Such agency conflicts were discussed in a July 2022 article in [the Economist](#), where both of these concerns were considered plausible. The recent flow of funds towards ESG has been very well documented: for example, the [IFA magazine](#) reported that, in 2020 “Global sustainable fund assets surpassed \$1trn for the first time, and between January and October 47% of all net money which flowed into funds was responsibly invested”, with more recent evidence supporting this being given by [Morningstar](#). In terms of fees, the Economist article stated:

“A study by Morningstar, a fund-tracking firm, said investors in sustainable funds paid a “greenium” compared with those in mainstream funds. Average annual fees for sustainable funds, albeit modest at 0.61%, were almost 50% higher than for traditional ones.”

The academic literature largely support these findings. Hartzmark & Sussman (2019) provide detailed evidence to show that if a fund is categorised as high sustainability then this is linked to strong fund inflows. Liang et al. (2022) find that hedge funds which “... endorse the United Nations Principles for Responsible Investment (PRI) ... attract greater investor flows, accumulate more assets, and harvest greater fee revenues” (abstract). Similarly Raghunandan1 & Rajgopal (2022) also report that ESG funds charge higher fees.

A second route might be that fund managers use consumers’ money to pursue their own social objectives, not aligned to the financial reward of consumers. There is some evidence of this, with the study of Hong & Kostovetsky (2012) being particularly well known in this field. They find that “Strong Democratic managers of non-SRI mutual funds are behaving nearly like SRI funds in their holdings of stocks in politically sensitive industries” (p.3).

3 Reporting mandates and greenhouse gas emissions

3.1 Do reporting mandates lower corporate emissions?

Four recent papers are of particular relevance to the question of whether climate reporting mandates are likely to reduce greenhouse gas emissions.⁵ Two of these consider the impact of the Companies Act 2006 (Strategic Report and Directors’ Report) Regulations 2013 in the UK (Jouvenot & Krueger, 2019; Downer et al., 2021), while two consider the introduction of the Greenhouse Gas Reporting Program in 2010 in the United States (Yang et al., 2021; Tomar, 2022). These papers present a broadly unified conclusion: mandated climate disclosures have reduced carbon emissions and intensity in companies that have been subject to these requirements relative to those that have not. While specific values vary by paper, all authors report the order of magnitude of this effect to be around 10%-15% of emissions. In the UK this is true for Scope 1 and Scope 2 emissions, but not Scope 3 (which fall outside the regulations).⁶ These reductions are greater for firms that have previously been higher emitters than those that had not. This broad conclusion is perhaps unsurprising as there are a number of other areas where changing reporting requirements have improved actual performance. Fiechter et al. (2022), for example, show that the introduction of the European Union Directive 2014/95 non-financial reporting mandate increased CSR activities in the EU and particularly for companies with previously low levels of both CSR reporting and CSR activities. Christensen et al. (2017) show that the introduction of Section 1503 of the Dodd–Frank Act, which mandated reporting of mine safety statistics within the financial reports in the United States, led to reduced mining accidents. Similarly, Gramlisch & Huang (2017) show that pollution activity by affected firms in China dropped following the introduction of mandated environmental reporting standards in 2008.

A number of mechanisms have been suggested for why companies reduce emissions following from the mandate (or in its anticipation). One is that stricter reporting requirements allow firms to benchmark their emissions more accurately against their competitors and identify where they may be underperforming from an emissions perspective. Tomar (2022), in particular, provides evidence on this. Second, Jouvenot & Krueger (2019) present evidence that institutional holdings in high emissions firms drop

⁵ A fifth study, which we believe would be relevant and is frequently cited in the literature, Grewel (2021), is, at the time of writing, temporarily withdrawn from the Journal of Accounting & Economics website. From reviews, we believe this finds results consistent with those reported here.

⁶ Scope 1 emissions are made directly by the firm itself. Scope 2 emissions are made by other companies but specifically on behalf of the firm; for example, by the firm’s energy suppliers. Scope 3 emissions are additional emissions from across the firm’s chain; for example, emitted by a component supplier.

after the introduction of reporting mandates, while climate controversies rise for such firms, both placing institutional pressure on the managers. In support of the former, Yang et al. (2021) note in the US context that plants owned by publicly listed companies decreased their emissions by a greater extent following the mandate. More generally, that better reporting in and of itself can change corporate behaviour reflects the extensive literature in emancipatory accounting. Because accounting is a social and moral practice, it can have transformative impacts on corporate behaviours. The requirement to report makes companies change and transform their activities and strategies. As Atkins & McBryde (2023) note at the end of their chapter, “ESG reporting that is mandatory, but also emancipatory, can lead to changes in corporate behaviour and to the attainment of higher levels of social and environmental accountability action and being seen to be discharged”.

We do, though note five words of caution on this. Some authors, have expressed a concern that companies will be incentivised by disclosure mandates to merely move some or all of their carbon emissions beyond the scope of the reporting requirements. Yang et al. (2021) provide evidence of this happening in the US, where firms transferred emissions from higher emissions plants (which needed to conform) to lower emissions plants (which did not). Moreover, Duchin et al. (2023) conclude that firms divest polluting plants following different environmental risk incidents, but pollution levels do not decline after divesting because the buyers of these plants face weaker environmental pressures. Third, there is some evidence within Downar et al. (2021, Figs. 2-3) that the lower emissions of regulated firms, compared to a non-regulated control group, is transitory for a period of approximately 2-4 years rather than persistent. This may be because regulated companies revert to previous behaviour once the mandate has become business-as-usual. Alternatively, and more positively, non-regulated firms catch-up because of benchmarking effects, meaning the emissions benefits extend beyond the formal regulatory envelope. Fourth, another recent study by Atta-Darkua et al. (2023) raises doubts on whether climate related initiatives by institutional investors help reduce corporate carbon emissions. The authors’ analysis suggests that climate-conscious institutional investors decarbonise their portfolios by simply tilting their holdings towards lower emitting firms. The authors fail to find evidence that the investors seek companies that develop green technologies or that they encourage their portfolio firms to generate a significant fraction of their revenues from green products or services. Thus, as concluded in the paper, the climate-conscious investors are just “greening their portfolios” and pass the responsibility of “greening the planet” to a different group of investors “that might be even less motivated to tackle corporate carbon emissions”. Finally, while there is little empirical evidence on this, there is a possibility that there will be diminishing carbon reduction benefits from subsequent reporting requirement regulations, with the ‘low hanging fruits’ in the UK already captured by the 2013 amendment to the 2006 Companies Act.

3.2 Pricing carbon

In standard social cost-benefit analysis in the UK, as described in HM Treasury’s [Green Book](#), greenhouse gas emissions prices are set in a way that is consistent with [guidance](#) from the Department for Business, Energy & Industrial Strategy (BEIS). These prices can be multiplied by any expected emissions reductions to get a monetised estimate of the societal benefits from stricter climate reporting mandates. Following such guidance would be a natural method for a regulator to take if its broader CBA framework aimed to maximise social welfare. However, CBA must account for any offsetting offshoring of emissions. Section 3.34 of the BEIS guidance states that: “A policy or project that increases or decreases GHG emissions domestically or internationally relative to a ‘business as usual’ scenario is required to quantify the change in emissions. All changes in emissions should be valued by using the carbon values presented in table 3 of the accompanying spreadsheet. This includes emissions captured within trading schemes, such as the UK Emissions Trading Scheme.”

For completeness, we briefly mention three alternative approaches that provide additional information to analysts beyond the Green Book guidance. The first is to use latest evidence from the academic literature. Hänsel et al. (2020), Rennert et al. (2022) and Nesje et al. (2023) use Integrated Assessment Models to calculate the Social Cost of Carbon (SCC). Each derives a values of just under \$200 per ton of CO₂, although Barrage & Nordhaus (2023), using highly similar techniques, estimate a lower value of approximately \$60 per ton. This is largely caused by different choices in discount rates: see, for example, Figure 7 in Barrage & Nordhaus (2023). Richard Tol (2023) has recently provided a review of the latest academic evidence on the Social Cost of Carbon, finding that “In the last 10 years, estimates of the social cost of carbon have increased from \$33/tC to \$146/tC for a high discount rate and from \$446/tC to \$1925/tC for a low discount rate”.⁷ Again, the sensitivity of the value to the discount rate is clear.

⁷ Notice that this is per ton of carbon, not per ton of CO₂. One ton of carbon equals 3.67 tons of carbon dioxide.

475 The second alternative would be to look at international policy guidance. There is a very active stream
of work in the United States on this at present, particularly through the US Environmental Protection
Agency. Its latest interim estimate of \$190 per ton of CO₂, [dated September 2022](#), is currently undergoing
review. If enacted, this will replace a previous estimate of \$51 per ton of CO₂ [published in March 2021](#)
by a White House Interagency Working Group. Yet carbon prices vary hugely internationally; see, for
480 example, Figure 2.8 from the OECD's 2022 publication on [Pricing Greenhouse Gas Emissions](#). Again,
this variation in value can, in part, be traced to very wide discrepancies in the choice of social discount
rate across countries; see, for example, Groom et al. (2022). Finally, the third main alternative would
be to base carbon prices on market values. For example, in early March 2023, UK and EU ETS prices
[were trading](#) at approximately £85 per metric ton of CO₂. It is interesting to note that the Green Book
485 price of £252/tCO₂ is at the upper end of all these estimates.

4 Reporting mandates and corporate financial performance

4.1 Are environmental projects just commercial projects?

Given the evidence presented in the previous section that at least some corporations adjust their operating
activities to reduce emissions following disclosure mandates, it is reasonable to expect that there will
490 be some discernible impact on corporate profitability. We divide these potential profitability effects into
different types, the first two (Types 1A and 1B) resulting from managerial action that is primarily driven
by financial considerations:

- **Type 1A.** This is the increase in the discounted dividends of the firm that result from projects that
have been implemented for mainly financial reasons but, as a byproduct, also give environmental
495 gains. An example might be that a company realises, through better benchmarking, that its current
energy costs are too high because its heating system is out of date. It then decides to replace this
with something more efficient, but with consequential saving of carbon emissions merely being seen
as an incidental and hardly-beneficial side-effect of this commercial investment.
- **Type 1B.** Tighter reporting requirements may encourage a company to think more deeply about
500 its own potential exposure to future climate change. Directors then decide to undertake projects
to better protect the firm from the potential adverse effects of, for example, flooding, drought or
more extreme winds, thus enhancing long-term shareholder value.

Beyond these very narrow profitability-driven effects, firms financial performance is likely to change as
stricter reporting requirements, under Phase 3, lead them to put greater priority on reducing emissions.
505 Now the primary consideration is environmental, but under Type 1C and Type 1D, these are also “win-
win” as they also increase shareholder value:

- **Type 1C.** A firm might tailor its products to better suit an environmentally friendly supply chain
for primarily climate-related reasons. This might include, for example, actively seeking to attract a
larger customer base from clients who are looking for low emissions-embedded products, or working
510 with a premium supplier who prefers to trade with other companies that are environmentally
responsible. This change of supply chain then increases corporate profits because the new products
better meet market demand.
- **Type 1D.** By reducing emissions in response to stricter climate reporting policies, a firm reduces
its exposure to future environmental legislation and/or taxation. Examples would include divesting
515 from assets that may potentially be stranded, or reducing greenhouse gas emissions ahead of the
potential introduction of carbon taxes.

In many ways, the distinction between Types 1A-B and Types 1C-D projects, and whether we
categorise these as Phase 1 or Phase 3 benefits, is semantic as most managers will evaluate both the
commercial and environmental aspects of any new project, with new environmental reporting mandates
520 merely shifting the balance somewhat from the former to the latter. What is important is that all these
Type 1A-D benefits not only reduce emissions but also contribute to the discounted present value of
long-term future cash flows. In this sense, they are not fundamentally different from any other type of
corporate investment. A recent working paper by Edmans (2022) stresses this point, and we quote the
end of the introduction to this paper at length because of its pertinence to the issues at hand:

525 “First, ESG shouldn’t be put on a pedestal compared to other value drivers. Companies
and investors are falling over themselves to demonstrate their commitment to ESG, with
company performance on ESG metrics given a special halo, and investors praised even more
for engaging on ESG issues than productivity, capital allocation, and strategy. In some cases,
530 such as Danone and the very many ESG funds that underperform, this may lead to ESG
being prioritized at the expense of long-term value. Second, practitioners shouldn’t rush
to do something special for ESG factors that they wouldn’t for other drivers of value, such
as demand that every company tie executive pay to them, or reduce complex intangibles
to simple quantitative metrics. Third, many of the controversies surrounding ESG become
535 moot when we view it as a set of long-term value factors. It’s no surprise that ESG ratings
aren’t perfectly correlated, because it’s legitimate to have different views on the quality of
a company’s intangibles. We don’t need to get into angry fights between ESG believers
and deniers, because reasonable people can disagree on how relevant a characteristic is for a
company’s long-term success. It makes no sense to politicize ESG issues, when we’d never
540 politicize other drivers of both shareholder and stakeholder value, such as innovation and
resilience, to anything like the same degree. On the flipside, if ESG is nothing special,
then some practices we’re starting to implement for ESG could be rolled out to other areas of
finance. Regulators are cracking down on ESG funds that are greenwashing – and they should
similarly scrutinize other investors who aren’t doing what they say, such as actively-managed
funds that are closet indexers.”

545 But, as Edmans hints at when he says “...this may lead to ESG being prioritized at the expense of
long-term value”, some changes in corporate activity may be financially detrimental. We refer to such
“win-loss” projects as “Type 2”:

- **Type 2.** Environmental benefits that decrease long-term shareholder value. Managers may pursue
such projects either because they meet the non-financial interests of their shareholders, for benefit
550 to wider society, to satisfy their own ethical tastes, or because they feel pressured into doing so.

Whether corporate financial performance will improve or deteriorate in response to stricter climate
reporting policies will depend on the balance of Type 1 and Type 2 projects that regulated firms undertake
in response to the policy change (and which they would not have undertaken without the policy change).
This, ultimately, is an empirical question, and we turn to it next.

555 4.2 Profitability and other financial statement indicators

There is a vast literature on the relationship between CSR/ESG activity and firm financial performance.⁸
In Figure 1, we reproduce Table 5 from Gillan et al. (2021) that summarises a small part of this literature,
and we refer the reader to this paper for a more substantive review. They conclude:

560 “In general, the corporate finance literature on ESG/CSR and firm value and performance
has produced findings that are somewhat mixed. Many, but not all, papers conclude that a
positive relation exists between a firm’s ESG/CSR performance and firm value or financial
performance. However, even among the papers that draw similar overall conclusions, some do
so from opposite results. For example, researchers have concluded a positive causal effect of
ESG/CSR from results that indicate ESG/CSR produces high values today and low returns
565 going forward. Others conclude a positive effect from results that indicate low values today
and high returns going forward.” (p.13)

But opinions on this vary. For example, in a very large and recent meta-study, Atz et al. (2022), is
altogether more optimistic:

570 “There exists a robust and positive association between sustainability and financial perfor-
mance on the firm level. Twelve of thirteen recent meta-analyses found a positive association
between some aspects of sustainability and corporate financial performance (CFP) covering
the period 1976–2018 (studies = 1,272; effects = 7,132). We estimate that under a broad
definition of sustainability a new study would, with 95% likelihood, find a partial correlation

⁸ Much of this evidence is based broadly around CSR/ESG rather than being specific to climate disclosures, which a
regulator should take into account when reviewing this section.

Primary Variable	Independent/Dependent Variable of Interest	Sign	Citation
Financial constraints	Independent	–	Hong et al. (2012)
Revenue growth	Dependent	0	Di Giuli and Kostovetsky (2014)
ROA	Dependent	–	Di Giuli and Kostovetsky (2014)
	Dependent	+	Gillan et al. (2010)
	Dependent	0	Hsu et al. (2018)
	Dependent	+	Lins et al. (2017)
	Dependent	+	Liang and Renneboog (2017a)
	Dependent	+	Iliev and Roth (2020)
	Independent	+	Borghesi et al. (2014)
Free cash flow	Independent	+	Borghesi et al. (2014)
Long-run returns	Independent	+	Hong et al. (2012)
	Dependent	–	Di Giuli and Kostovetsky (2014)
	Dependent	0	Humphrey et al. (2012)
	Dependent	–	Hong and Kacperczyk (2009)
	Dependent	–	Bolton and Kacperczyk (2020)
	Dependent	+	Dimson et al. (2015)
	Dependent	+	Edmans (2011)
	Dependent	+	Lins et al. (2017)
	Dependent	+	Barko et al. (2018)
	Dependent	+	Statman and Glushkov (2009)
Short-run returns	Dependent	–	Masulis and Reza (2015)
	Dependent	+/-	Krüger (2015)
	Dependent	+	Deng et al. (2013)
	Dependent	+	Tang and Zhang (2020)
	Dependent	+	Flammer (2015)
	Dependent	+	Flammer (2021)
Tobin's q	Dependent	+	Gillan et al. (2010)
	Dependent	–	Buchanan et al. (2018)
	Dependent	0	Hsu et al. (2018)
	Dependent	+	Albuquerque et al. (2019)
	Dependent	+/-	Servaes and Tamayo (2013)
	Dependent	+	Gao and Zhang (2015)
	Dependent	+	Liang and Renneboog (2017a)
	Dependent	+	Ferrell et al. (2016)
Cash value	Dependent	+	Chang et al. (2019)
ROE	Dependent	+	Cornett et al. (2016)
Bond values	Dependent	+	Amiraslani et al. (2017)
Bond returns	Dependent	–	Amiraslani et al. (2017)

Figure 1: Table 5 reproduced from Gillan et al. (2021). This summarises the academic literature which considers the relationship between various measures of firm financial performance and valuations to engagement with CSR/ESG activities.

coefficient between 0.05 and 0.13. The small magnitude itself is harder to interpret because, given noisy data and idiosyncratic context, it is still possible that ESG has a large effect on CFP.” (p.5).

The second-order meta analysis of Busch & Friede (2018) is similarly positive about the CSR-CFP relationship, where they conclude that “the business case for being a good firm is undeniable” (p.584). Against this, survey evidence of S&P 1500 companies’ CEOs and CFOs about the likely short and long term financial implication of ESG engagement reported by Larcker et al. (2022) was somewhat more pessimistic. 51% vs. 28% of respondents thought such activity would have a short-term high or moderate cost rather than high or moderate benefits (20% thought there would be no significant short-term financial effects). For long-term financial performance, the results were broadly evenly mixed: 45% for benefits, 42% for costs and 14% for no significant financial effects. Serafeim (2021) implies that the relationship between ESG and financial performance is likely to be complex: “Sometimes, it pays up to a certain point and sometimes it does not pay at all” (p.8).

But it is important here to distinguish what may be voluntary corporate activity around ESG in general from changes in environmental engagement that may follow from stricter reporting requirements. Downer et al. (2021) provide evidence on this following from the introduction of the Companies Act 2006 (Strategic Report and Directors’ Report) Regulations 2013. They conclude that “... disclosing firms do not experience significant cost or sales increases, on average, and consequently no significant effect on gross margins. As such, our findings provide no support for the concern that GHG disclosure mandates could have a deteriorating effect on financial operating performance.” (p.1166).

Yet, others do not agree with these conclusions. Examining the impact of mandatory CSR reporting requirements in China, Chen et al. (2018) observe that, while the reporting requirements generate positive externalities, this comes at a cost to shareholders. Specifically, they find that firms affected by this mandate “experience a decrease in return on assets (ROA) and return on equity (ROE) subsequent to the mandatory CSR disclosure. In addition, the treatment firms experience a decrease in sales revenue and capital expenditure and an increase in operating costs and impairment charges” (p.170). Haji et al. (2022), in their review of the literature around CSG reporting regulations, also reports conflicting evidence in this area:

“... studies show that firm profitability of affected firms significantly decreases relative to control firms following CSR reporting regulations in several countries (Mukherjee et al., 2018;

Chen et al., 2018; Lu et al., 2021). In contrast, other studies find an increase in profitability of affected firms (Bhagawan and Mukhopadhyay, 2018; Bhattacharyya and Rahman, 2019; Swift et al., 2019). At the same time, other studies find no significant profitability effects of CSR reporting regulations (Kruger, 2015; Bhattacharyya et al., 2021).” (p.11).

By contrast, the review paper of Christensen et al. (2021) conclude that “In sum, most academic studies find that firms tend to expand and adjust CSR activities subject to disclosure requirements. One potential mechanism is benchmarking; firms want to avoid the public backlash associated with looking worse than their peers. They could also learn from their peers. However, the improvements in CSR often come at a cost (i.e., in the form of lower productivity, financial profitability, or market share)” (p.1215). It is, therefore, difficult to draw firm conclusions from this literature review about the likely impact of stricter environmental reporting mandates on firms’ financial performance. This problem is exacerbated by the direction of causality not being clear; it is possible that any positive correlation between ESG and CFP is caused by firms with greater financial stability feeling more able to undertake more voluntary ESG activity.

We also note that there is evidence that some firms with poor underlying financial or environmental performance will choose to engage most actively with the new disclosure requirements as a deflection mechanism. Flugum & Souther (2022) present evidence of higher levels of voluntary disclosure for companies that are under-performing financially. Similarly, there is evidence that the least green firms place greatest weight in reporting their environmental credentials. For example, in a Spanish context, Moreno & Caminero (2022) create a climate disclosure index based on text analysis of the TCFD recommendations and using publicly available corporate reports from 2014 until 2020 from firms that constitute the IBEX 35 stock index. The authors find that oil and energy put more effort in their climate related disclosures compared to the banking sector.

4.3 Equity market reactions

A separate way of considering how corporate financial performance will be affected by new climate disclosure mandates is to examine the immediate market response to previous ESG regulation changes using event study methods. Under the assumption of market efficiency, market prices should quickly reflect the implications of new reporting mandates, with price responses indicating whether these are likely to create or reduce long-term shareholder value. Grewel et al. (2019) is an important study in this field:

“We examine the equity market reaction to events associated with the passage of a directive in the European Union (EU) mandating increased nonfinancial disclosure. These disclosures relate to firms’ environmental, social, and governance (ESG) performance, and would be applicable to firms listed on EU exchanges or with significant operations in the EU. We predict and find (i) an average negative market reaction of -0.79% across all firms, (ii) a less negative market reaction for firms having higher predirective nonfinancial performance, and (iii) a less negative reaction for firms having higher predirective nonfinancial disclosure levels. In addition, results are accentuated for firms having the most material ESG issues, as well as investors anticipating proprietary and political costs as a result of the mandated disclosures. Finally, we find that the negative market reaction is concentrated in firms with weak preregulation ESG performance and disclosure, which exhibit an average return of -1.54% ; in contrast, firms with strong preregulation disclosure and performance exhibit an average positive return of 0.52% . Overall, the results are consistent with the equity market perceiving net costs (benefits) for firms with weak (strong) nonfinancial performance and disclosure around key events surrounding the mandatory disclosure regulation of nonfinancial information”. (Full abstract)

Consistent with this, in their study of the impact of the Companies Act 2006 (Strategic Report and Directors’ Report) Regulations 2013 in the UK, Jouvenot & Krueger (2019) report: “When examining abnormal returns around these disclosure dates, we find that firms with lower emissions than their industry peers exhibit positive abnormal returns. In contrast, firms with higher emissions are subject to negative abnormal returns.” Haji et al. (2022) also present evidence on the event study response to reporting regulation changes:

“... studies show that the US capital-market reacts negatively to events around the passage of CSR disclosure mandates (Hombach and Sellhorn, 2019; Sankara et al., 2019; Healy and

Serafeim, 2020; Elayan et al., 2021). Again, the negative capital-market reactions are confined to a subset of firms, suggesting market reactions depend on pre-existing firm or industry-level factors (Seitz, 2015; Elayan et al., 2021) ... Overall, the event studies almost unanimously document adverse capital-market reactions to events leading up to CSR reporting regulations, suggesting that capital-markets perceive CSR disclosure regulations as costly for firms (Chen et al., 2018; Manchiraju and Rajgopal, 2017; Grewalet al., 2019; Birkey et al., 2018; Hombach and Sellhorn, 2019). However, there is considerable cross-sectional variation in capital-market reactions across firms and industries, consistent with investors taking cues from various firm-specific factors including pre-existing CSR performance and disclosure records of affected firms.” (p.10)

Wang et al. (2022) also provide broadly consistent results. They examine the stock market reaction to the enactment of the ESG Act of 2021 by the US House of Representatives and report a significantly negative average reaction of minus 1.1 percent across all firms, which does not recover until the fifth day. Again, carbon intensive firms are the most vulnerable, in terms of market response, to this legislation. The authors conclude that this result could reflect the anticipation of greater costs of non-financial disclosure which outweigh the benefits of increasing transparency. Overall, these results lead us to conclude that we would expect lowest-ESG stocks to initially react negatively to any new TCFD-aligned reporting requirements, the highest-ESG stocks may respond positively, and the overall short-term market effect is likely to be slightly negative. The literature, as it stands, is not particularly informative about long-term market reactions beyond the short-term event study effects.

5 Reporting mandates and expected asset returns

5.1 Institutional investors’ response to climate risk

We now turn to a related literature which considers the impact of climate disclosure mandates on historic average, and future expected, asset returns. We start by considering how investors allow for climate risks in their portfolio decisions as this will impact on asset prices and hence rates of return. Krueger et al. (2020) address this question through a major survey of senior large international institutional investors. While they find that most investors consider climate risks to have significant financial implications which have already started to materialise, this issue comes fifth in the list of what investors consider to be the most important risks for investment purposes (after financial, operating, governance and social). Over 90% of institutional investors have some approach to dealing with climate risk, but the methods vary quite substantially. Divestment of problematic assets is the least popular approach taken, employed by only 20% of firms, while firm engagement is used by the vast majority. This is consistent with the academic conclusions of Serafeim (2021), who argues in relation to the divestment against engagement debate: “A combination of the two is likely to be a better alternative. This is what the decarbonization advisory panel for the New York Common Retirement Fund suggested in 2019 as the most productive way forward. Setting minimum standards, transparently communicating those to investees, providing an ambitious but realistic time horizon to meet the standards, and existing the investment if the investee does not meet the standards” (p.4). In general, investors think that climate risk is underpriced in the market, but in a way that is relatively small in an economic sense. Stroebe & Wurgler (2021) report the results of another international survey on attitudes to climate finance. Their sample group includes not only investment managers, but also academics, regulators and policy economists. They report that respondents perceive the main short-term climate risk to be from regulatory changes, with this turning to physical risks at horizons of 30 years. There is strong agreement across their sample that climate risk is currently under-priced in the equity market.

Krueger et al. (2020) also present evidence on the motivation for including climate risks within the investment decision. Interestingly, the top three reasons (“Protects our reputation”, “Is a moral/ethical obligation”, “Is a legal obligation/fiduciary duty”) all refer more explicitly to the interests of the investment firm or individual asset manager than the explicit utility of the members. The fourth most important motivation is for beneficial investment returns and we turn to this next.

Finally, Ilhan et al. (2022) conclude from a survey of important decision makers at some of the world’s largest investors “that climate risk disclosure is important: 79% believe climate risk reporting to be at least as important as financial reporting, with almost one-third considering it to be more important.” In the survey, about one-third of the 439 respondents work at the executive level and 11% work for institutions with more than \$100bn in assets under management. “At the same time, the respondents

state that the current disclosures are uninformative and imprecise. Investors that incorporate climate risks into investment decisions because of legal obligations or fiduciary duties, investors from countries with high environmental norms, and very large (and arguably universal) investors attach a greater importance to climate risk disclosure.”

5.2 Historic average returns to green funds

It is not clear *ex-post* that ESG funds actually have delivered superior returns. It is certainly true that there are multiple industry references that point to ESG fund outperformance: for example, in [the Economist](#), [the Financial Times](#), and [the Guardian](#). [Morningstar](#) claimed that “57 of 65 ESG indexes (88%) outperformed for the five years through the end of 2020”. But, as a generalisation, academics are more cautious in their claims. In a major meta-review of well over 1,000 articles published on this topic over the interval 2015–2020, Atz et al. (2022, p.2) argue that “returns from ESG investing — averaged across many portfolio management strategies — are indistinguishable from conventional investing”. Hartzmark & Sussman (2019) find that fund sustainability is not associated with improved financial performance, while Raghunandan & Rajgopal (2022) report that “ESG funds appear to underperform financially relative to other funds” (abstract). Sanjai Bhagat of the University of Colorado provides an excellent, and very brief, summary of these issues in a 2022 [Harvard Business Review](#) blog. His conclusion is blunt: “This evidence seems pretty clear: funds investing in companies that publicly embrace ESG sacrifice financial returns without gaining much, if anything, in terms of actually furthering ESG interests”. In the context of hedge funds, Liang et al. (2022) also find that those which “... endorse the United Nations Principles for Responsible Investment (PRI) underperform other hedge funds” (abstract). The differential in performance is just under 1.5% per year, and is particularly driven by PRI endorsers that nevertheless have low ESG performance: “Low-ESG signatory hedge funds underperform low-ESG nonsignatory hedge funds by 7.72% per year ... Conversely, high-ESG signatory hedge funds only underperform high ESG nonsignatory hedge funds by a risk-adjusted 0.54% per year” (p.1597). That ESG funds may not outperform financially is increasingly being recognised within the financial industry itself with, for example, [Vanguard](#) noting that “...the majority of ESG funds did not produce statistically significant positive or negative gross alpha”, while “higher ESG fund management expenses tend to be associated with lower net alpha”.

5.3 Expected future returns to green funds

While these observed average returns to funds with different levels of ESG engagement are insightful, it is arguably more relevant to consider future, *ex ante*, expected returns and risks from individual companies, and the implications of this for investment funds and climate disclosure mandates. It is well known that historic average performance is generally a poor indicator of future performance with expected returns systematically differing from *ex post* observed average returns under any one of four circumstances:

- If an ESG market bubble has formed, which is a possibility that has been noted by, for example, [Bloomberg](#). If the demand for environmental stocks is growing faster than the supply, then prices may be bid up beyond what could be justified by the fundamentals. This results in a period of strong returns followed by a crash as prices return to their efficient market value. An example of this market behaviour was seen in the dot-com bubble at the turn of the Century and, arguably, index-lined bonds in more recent times as pension funds looked to better asset-liability match.
- If the expected cash flows from environmentally sensitive stocks rose substantially in the previous period, driving returns up through a numerator of the Net Present Value (NPV) equation effect, but that no further increase in expected cash flows occurs in the following period.
- If the required rate of return to either green or dirty stocks is changing. If, for example, investors are increasingly desiring environmental stocks and thus reducing their required rate of return for such assets, then this lowering of *ex ante* returns is observed in higher *ex post* observed returns until the point when the expected rates of return become stable. This is analogous to the observation that falling bond yields result in rising bond prices.⁹
- If, in any period, there is a risk to stocks that does not subsequently materialise. We might, for example, imagine that investors price in a low-probability but severe environmental shock that

⁹ Notice that this point is distinct from saying that stocks with low but stable *ex ante* returns on average deliver low realised returns. The issue here is that falling expected returns generally lead to high realised returns.

would have significant financial implications for brown assets, but which then does not occur over the period in which average returns are measured. The average observed returns to these stocks will then be higher than investors were anticipating. This is sometimes referred to in finance as a ‘peso problem’.

For the first three, historic average returns to green stocks overstate their expected future return while, in the fourth example, it is brown stocks whose average historic returns are above future expectations. To help us understand in more detail how this might play out, we can draw on some results in the literature:

- A sin stock premium. If, as a result of mandated climate disclosures, a company is deemed to be a sin stock that may be excluded from a portfolio, then this is likely to lead to its current market price falling and its expected future return becoming higher. While exclusionary portfolio practice is not that common a practice (see subsection 5.1), the threat of being excluded may prove a powerful motive to corporate managers. Gantchev et al. (2022) find that, “following environmental and social (E&S) incidents, firms with a one-standard-deviation higher E&S-conscious institutional ownership decrease their greenhouse gas emissions by 36.5% and improve their E&S scores by 7.2% more than other firms if their managers receive equity ... Our results suggest that the threats of future exits and divestitures can improve E&S policies if shareholders are E&S-conscious and managers’ compensation is linked to the stock price.” (abstract). When stocks are excluded, both Harrison & Kacperczyk (2009) and Zerbib (2022) report that this is likely to lead to elevated expected returns. The order of magnitude of this effect is likely to be around 2.5% per annum on average.
- A taste premium. Heinkel et al. (2001), Pastor et al. (2021), and Pedersen et al. (2021) all provide theoretical reasons to explain why, ex-ante, we might expect high-ESG stocks to have lower expected rates of return even without portfolio exclusion. If an asset is delivering *both* financial benefits *and* environmental benefits, and at least some investors value both, then its price is driven up compared to an otherwise equivalent asset that delivers only cash flows (provided that investors incorporate ESG considerations into their cash flow estimates when they are directly financially material, otherwise the cash flow estimates will be inaccurate). Further theoretical and empirical perspectives on this are provided by Zerbib (2022). He reports that stocks that are not excluded, but are unlikely to meet the tastes of sustainable investors, have higher expected returns, with the spread between the petroleum and natural gas industry and the electrical equipment industry being over 1% per annum over the period 2013–19.
- A carbon risk premium (numerator). The carbon risk in the numerator of the NPV equation relates to the peso problem mentioned above. There is a risk of a forthcoming financial shock to the cash flows of a brown stock that could be driven by either regulatory or physical phenomena effects. Clarkson et al. (2022, p.2) note that “The empirical literature consistently documents an inverse relation between the volume of carbon emissions and firm value, supporting the interpretation that capital markets assess a latent carbon liability commensurate with the quantity of firm-level carbon emissions”. Bolton & Kacperczyk (2021) provide further empirical evidence that, all else being equal, expected returns are higher for high-emission stocks.¹⁰ They note:

“The carbon premium is economically significant: A one standard-deviation increase in respectively the level and change of scope 1 emissions leads to a 15-bps and 26-bps increase in stock returns, or respectively a 1.8% and 3.1% annualized increase. In addition, a one-standard-deviation increase in the level and change of scope 2 emissions leads to respectively a 24-bps and 18-bps increase in stock returns, or a 2.9% and 2.2% annualized increase. Finally, a corresponding one-standard-deviation increase in the level and change of scope 3 emissions increases stock returns by 33 bps and 31 bps per month, or 4.0% and 3.8% on an annual basis. Importantly, firms with higher emissions generate higher returns, after controlling for size, book-to-market, momentum, other well-recognized variables that predict returns, and firm characteristics, such as the value of property, plant & equipment (PPE), and investment over assets.” (p.519)

¹⁰ We note that the conclusions of Bolton & Kacperczyk (2021) are currently under some debate: see Aswani et al. (2023a, 2023b) and Bolton & Kacperczyk (2023).

Consistent with the conclusion of other studies cited above, they largely discount the idea that this is primarily caused by investors shunning brown stocks. While they present some evidence of exclusionary screening, this is limited to scope 1 emissions in the most highly emitting industries. They therefore think, instead, that investors are pricing in a premium for carbon risk. Atilgan *et al.* (2023) further investigate this carbon premium effect. They find that “We find that carbon emissions have a remarkably similar association with earnings surprises as they do with stock returns. Both the level of and change in carbon emissions are positively related to earnings surprises ... (with) a one standard deviation increase in the level of scope 1, scope 2, or scope 3 emissions is associated with an increase in the one-year earnings surprise that is about twice its sample median and significant at the 1% level ... Taken together, our results suggest that the market is not fully pricing in carbon transition risk, casting doubt on the ability of market forces alone to bring about the shift to a low-carbon economy ... Thus, companies focused entirely on shareholder value may choose not to invest in lowering their emissions, and enjoy higher earnings and stock returns as a result.” (pp. 3–4).

- Changing costs of capital. In subsections 2.1 and 2.2.2, we presented evidence to show that stricter climate reporting policies are likely to reduce the downside & crash risks to assets as well as driving up market liquidity. Both of these effects are likely to reduce the cost of capital, and hence the expected rate of return, of high ESG stocks. In addition to this, stricter climate reporting policies might make a firm alter its emissions profiles (or investors might better recognise these profiles) in a way that leads to a changing of the estimated beta of the asset. However, the magnitude and sign of the ‘climate beta’ — the beta of projects that mitigate against climate change damage — are not clear. Responses to the Stroebel & Wurgler (2021) survey indicate that this is likely to be close to zero (57% of private sector respondents), with the remainder more weighted towards a positive beta (35%) than a negative one (8%). Against this, Albuquerque *et al.* (2018) report a negative correlation between CSR performance and firm beta that is statistically significant but relatively small economically (a 1 standard deviation rise in CSR score reduces beta by less than 0.015). In the field of social discounting, where a macro-level climate beta is of relevance for setting the Social Cost of Carbon, there is again conflicting evidence, with Dietz *et al.* (2018) reporting that the beta is positive, yet Lemoine (2021) finds it is negative. In a 2021 [public consultation submission](#) to the Office of Management & Budget in the United States, we wrote: “Given the current absence of stronger evidence, the most appropriate estimate of the climate beta for policy purposes at present is zero”.
- Bond yields. If stock prices are bid up, and expected returns lower, for high-ESG stocks, then we may expect to see something similar in bond prices and yields. Baker *et al.* (2022) summarise the empirical evidence that supports this view:

“A small but growing literature on green bonds studies ownership and yields of such bonds, which are labeled or certified to fund projects with relatively positive environmental impact. Zerbib (2019) studies the yield differential between green bonds and synthetically constructed conventional equivalents, and finds that green bonds trade at a small but significant premium on average, equivalent to a 2 basis point (bps) reduction in green bond yields. Zerbib (2019) emphasizes the use of a broad variety bonds compliant with a set of Green Bond Principles developed by the International Capital Market Association, and also provides a useful review of related literature. Baker *et al.* (2018) focus primarily on US green municipal bonds, finding a somewhat larger yield differential of 6 bps for green bonds. They also find that ownership of green bonds is more concentrated than ownership of conventional equivalents, which they suggest as evidence that a subset of investors has a preference for green bonds. Both Zerbib (2019) and Baker *et al.* (2018) attribute the green bond premium to nonpecuniary utility among green investors, the theoretical mechanism for which Baker *et al.* (2018) sketch in a simple model along the lines of Fama and French (2007).” (p.1466).

There is, therefore, consistency between the equity and bond market evidence that better ESG performance pushes up asset prices and down future expected rates of returns/yields. More qualitatively, Bebchuk *et al.* (2022) argue against what they call the “win-win illusion”. Perhaps most directly of all, a [Bloomberg article](#) contends that “...the ghastly phrase ‘win-win’ that is endemic in the industry obscures the huge costs of adjusting to climate change.” Because of this, while the evidence remains relatively

weak and mixed, there are reasons to believe that a transition to Phase 3 could potentially entail some trade-off with long-term shareholder value. Given this, we next turn to the legal environment that corporate directors and fund trustees must operate in when facing such potential trade-offs.

6 Fiduciary duty

6.1 Legal responsibilities of corporate directors

Corporate directors have responsibility under the [Companies Act \(2006\) section 172](#) — hereafter CA.s172. Their obligations under this section are summarised by Tsagas (2018) as:

“...requires the promotion of the success of the company not on its own right as a separate legal person, but for the benefit of the shareholder constituency as a default priority, and explicitly requires that regard be had to other constituencies when considering what promotes shareholders’ interests... Consideration of other factors and stakeholders’ interests do not come second to shareholders’ interests, but rather constitute a means to an end of serving shareholders’ interests, ideally long-term wealth creating and non-value destroying sustainable interests.” (p.7).

This leads her to conclude that “Ample evidence suggests that section 172 CA 2006 in its hard law form will not facilitate the goal of promoting the ‘good governance’ of companies that have a high impact on society in terms of enlightened decision-making” (*ibid.*, abstract). She points to the specific case of *R (People & Planet) v HM Treasury, 2009, EWHC 3020*, which is particularly relevant for the matters at hand here. The courts ruled against a case which argued that, because HM Treasury was a majority shareholder in Royal Bank of Scotland (RBS), it was incumbent on HM Treasury to ensure that RBS applied Green Book guidance that is more protective of environmental matters than the corporate codes that the bank had in place. The courts ruled that any such attempt would have conflicted with RBS’s directors’ duties under CA.s172.

Tsagas (2018, p.8) further notes that “According to the guidance to the Companies Act 2006 provided by the Department of Trade and Industry, the term success of the company reflects what the shareholders of the particular company want to collectively achieve, whilst it is accepted that commercial companies will normally equate success with the company’s long-term increase in value.” This is reflected in legal guidance such as that given by [Burgess Salmon](#) who note that “...in the context of a commercial company which is solvent, success is generally understood to mean a ‘long-term increase in value’ ... It is possible for a company’s constitution to be more specific about the appropriate success model for that company but that approach has not been adopted by many companies”. [Arlo’s Clause](#) is an example of how a company’s constitution could be altered to explicitly allow for ESG considerations to be taken into account. However, given the current state of the law, Burgess Salmon advise that “the board should consider which ESG considerations are most relevant to the company, its operations and its long-term success” rather than broader social or environmental considerations.

What is particularly noteworthy is that UK law in this space is starting to diverge from that in the European Union. While, as Ferreira & Sequiera (2018, p.270) note, “... Member States have a ‘variety of solutions as regards corporate and board duties’, which is not surprising, considering the well-known existence of both Member States with Civil Law and Common-law legal frameworks”, in February 2022, the EU issued a proposal for a [Directive on Corporate Sustainability Due Diligence](#) to harmonise the legal framework across the EU:

This Directive establishes a **corporate due diligence duty**. The core elements of this duty are identifying, bringing to an end, preventing, mitigating and accounting for negative human rights and environmental impacts in the company’s own operations, their subsidiaries and their value chains. In addition, certain large companies need to have a plan to ensure that their business strategy is compatible with limiting global warming to 1.5°C in line with the Paris Agreement. Directors are incentivised to contribute to sustainability and climate change mitigation goals.

The extent to which UK corporate law, post-Brexit, will align with this harmonisation of EU law with its broader perspective on director’s responsibilities to deliver wider stakeholder value, is unclear to us. There may be strong political motivation for the UK to remain at the forefront of international action on delivering net zero, with this leading to changes in the relevant sections of the Companies Act.

We believe that how such reforms are made within a rapidly changing international context is crucial in determining the extent to which company directors can legally undertake win-loss environmental projects to achieve Phase 3. Similarly, with the new EU [Corporate Sustainability Reporting Directive](#), there may also be benefits from stronger climate reporting mandates within the context of the UK remaining a global leader on environmental action.

6.2 Legal responsibilities of fund trustees

According to the [Fiduciary Duty in the 21st Century](#) report by the UN Employment Programme Finance Initiative, the relevant duties in the UK are currently set out by the Law Commission's 2014 report [Fiduciary Duties of Investment Intermediaries](#). The appendix to the [summary document](#) is entitled "Is it always about the money?" As with non-financial companies, who can alter their constitutions to make explicit their vision and mission, so any fund's trust deeds can be explicit about its purpose (A.6). Where this lacks detail on the environmental aims of the fund, the Law Commission makes clear that trustees can (A.19) and should (A.20) consider long-term ESG effects in their decision making where this is financially material. However, and in keeping with the views of Edmans (2022), there is nothing special about ESG factors in this regards (A.21-22). Beyond this, non-financial factors can be considered if trustees have good reason to believe it would not risk "significant financial detriment to the fund" and that "scheme members would share the concern" (A.25). This is interpreted to mean that a majority share the concern with the remainder being neutral (A.30). Importantly, "The more difficult question is where a majority think that the disinvestment should take place but a minority disagree strongly. In cases where the issue is clearly controversial, the courts would expect trustees to focus on financial factors rather than becoming embroiled in disagreements between the members" (A.31). The document's interpretive guidance summarises this as follows: "If trustees are faced with compelling evidence that members feel very strongly about the issue, then they may be justified in accepting a risk of some possible detriment, so long as that detriment is not significant. Conversely, if trustees receive clear professional advice that the decision is financially neutral, with some members agreeing and some indifferent, the trustees may still go ahead. The position may be different where only a modest level of agreement is combined with some risk of detriment" (A.37). The document also makes clear that "Trustees may not impose their own ethical views on their beneficiaries. If trustees wish to take account of a non-financial factor, they must have good reason to think that scheme members would share their concern" (A.27).

These questions of fiduciary duty have recently been considered in the context of Net Zero Asset Manager Initiative by Gosling & MacNeil (2022). They conclude that "... asset managers are likely caught between a rock and a hard place. They will either follow through with vigour on the commitments (to limit warming to 1.5°C) that, on a face value basis, they have made, but at the very real risk of being in breach of their fiduciary duties to clients. Or they will act consistently with their fiduciary duties but at the risk of achieving very little in the fight against climate change and so being accused of greenwashing" (p.3).

6.3 Minority interests

In the previous subsection, it was established that, unless this trade-off is made clear in their trust deeds, whatever the views of the majority of shareholders, fund trustees are prohibited from investing in win-loss projects if a minority of members disagree strongly with it. And, indeed, it is becoming increasingly clear that there is something of a minority backlash against the ESG trend. As examples, we point to recent articles in [the Economist](#), [Washington Post](#), and, perhaps most directly, the [Daily Telegraph](#).

The argument that Matthew Lynn advances in the Telegraph article is reminiscent of a seminal New York Times Magazine essay written in 1970 by the Nobel Laureate Milton Friedman to create what has become known as the [Friedman Doctrine](#). In this, he recognises that companies may take ESG actions because they enhance long-term value; what we have described above as Type 1, or "win-win", benefits. He also recognises the role that firms play in contributing to broader society, such as paying taxes which governments can then redistribute for social purpose, and that legislation is imposed on them to manage anti-social business practices such as the emissions of pollutants or poor treatment of workers. Yet, as Alex Edmans notes in an [Oxford Business Law blog](#): "Friedman argues that businesses should focus on profits not because he thinks that social issues are unimportant, but because governments are far better placed to deal with them through taxation and regulation." Indeed, Friedman argues ferociously against any alternative to this (grammar changed slightly):

"... when the corporate executive imposes taxes and spends the proceeds for 'social' purposes

he becomes in effect a public employee, a civil servant, even though he remains in name an employee of private enterprise. On grounds of political principle, it is intolerable that such civil servants—insofar as their actions in the name of social responsibility are real and not just window-dressing—should be selected as they are now. If they are to be civil servants, then they must be selected through a political process. If they are to impose taxes and make expenditures to foster ‘social’ objectives, then political machinery must be set up to guide the assessment of taxes and to determine through a political process the objectives to be served.”

So, more than half a century on, does Lynn still have a defensible case when making arguments that implicitly mirror those of the Friedman Doctrine? This has recently been considered by the [Chicago Booth Review](#). This strongly re-iterates the point made by Friedman himself that, when ESG action is value-maximising, for example by attracting environmentally conscious customers or making a happy workforce also more productive, this is entirely in keeping with the Doctrine’s principles of good corporate governance. However, it also notes that Friedman does not adequately weigh up the possibility that corporate voices distort both government and legal action through lobbying and inadequate fines for breaches of corporate law.

We believe there are other academic interpretations of the Friedman/Lynn case. If it is accepted that society actively welcomes a vibrant for-profit corporate sector because it is seen to meet a societal need, then society must be clear what that need is. As governments almost always promise the electorate growth - albeit sustainable growth - wealth generation is a core social policy objective, and it is corporations that are the primary mechanism to achieve it. When interpreted under the famous Tinbergen Rule, proposed by Nobel Laureate Jan Tinbergen, that for each policy objective there needs to be at least one policy instrument, if businesses are deflected from pure, legal, profit making, then society has no clear tool focused on achieving its social objective of economic growth. When framed in terms of the Fundamental Theorems of Welfare Economics, firms and markets ensure the efficiency of resource use (Theorem 1) while governments ensure the fairness of this resource use (Theorem 2).

6.4 Communicating trade-offs to consumers

Ultimately, if the transition to Phase 3 does require a level of financial-environmental trade-off, and if investors are willing to make such trade-offs (see section 2.3.3) in a way that does not violate the fiduciary responsibilities of corporate directors and fund trustees, then that is an informed consumer choice.¹¹ Yet, in the absence of non-financial objectives being laid out in a company’s constitution or a fund’s trust deeds, then clear and explicit communication might be required to make any such potential trade-off clear to prospective investors. However, as explained in subsection 5.2, there have been multiple claims in the financial press about the strong financial performance of ESG funds in a way that is not supported by the most recent academic evidence. We are unsure how clear regulated firms are being about balancing such claims against the future risk that climate friendly investments give negative alphas.¹²

This brings us to a potential pitfall of stricter climate disclosure policies. Consider directors of a firm with poor environmental investment opportunities who feel pressurised into investing in such projects by stricter reporting mandates that have clear Phase 3 objectives. Because they suspect that this will reduce long-term shareholder value (what we have previously referred to as ‘Type 2’ investments), they have cause to be concerned that they will be deemed to be in breach of their fiduciary duties. They therefore are strongly incentivised to either (i) invest in profitable projects that are not green and then greenwash about their environmental benefits, or (ii) invest in projects that are genuinely green but then overstate their likely financial benefits. We refer to the latter as “financial greenwashing”.¹³ Therefore, tighter greenwashing regulation may wish to consider both the financial and environmental claims that corporations and investment firms make about green investments. Whether members of the public are sufficiently financially literate and engaged to interpret such information remains open to debate.

¹¹ We note that this may have implications for other areas of a regulator’s work; for example, how such sacrificed returns might impact on [prescribed projections](#) and the implications of this for estimated future savings rates amongst the elderly.

¹² In preparing this document, we have found websites of UK financial firms that make claims about both environmental and financial performance. It could be argued that some of these make a definitive promise that the funds offer win-no loss opportunities to potential clients.

¹³ In an unpublished working paper, we lay out the theoretical case for financial greenwashing more formally.

7 Conclusions

As emphasised in the Introduction to this literature review, it is difficult to draw firm conclusions from the academic literature that is of relevance to the analysis of costs and benefits of climate-related disclosure policies. This is because of (1) the vast quantity of literature that is potentially relevant; (2) the fact that so much of this literature is very recent; (3) that different studies present results that appear to be in quite stark contrast to each other; and (4) that existing evidence relates to previous changes in regulation, which may not reflect how future regulation will affect markets. Nevertheless, in Table 1 in the Executive Summary, we have presented our own summary of this work. We stress the subjective nature of this summary, appreciating that other academic colleagues may draw somewhat different conclusions, or place different emphases on the literature, than our own. We hope, though, that the previous sections make clear why we have summarised this literature in Table 1 as we have.

While this report has focused on climate disclosure mandates, we note the increased difficulty of viewing such reporting in isolation from other areas of environmental accounting. For example, the emergence of the [Task Force on Nature-related Financial Disclosures](#) (TNFD) and the [EU Taxonomy for Sustainable Activities](#) point to environmental frameworks that are much wider than the reduction of greenhouse gas emissions alone. There is increasing evidence that there is a need to develop an integrated reporting approach that includes both biodiversity and climate. Rather than being seen as separate fields, they share critical factors and are crucially interlinked (e.g., Atkins & Macpherson, 2022). Considering the additional cost-benefit implications that would arise from such integrated environmental disclosure mandates lies beyond the scope of this report.

References

Albuquerque, R., Y. Koskinen, C. Zhang (2018), “Corporate social responsibility and firm risk: Theory and empirical evidence”, *Management Science*, 65, 4451–4469.

1045 Anderson, A., D.T. Robinson (2022), “Financial literacy in the age of green investment”, *Review of Finance*, 26, 1551–1584.

Aswani, J., A. Raghunandan, S. Rajgopal (2023a), “Are carbon emissions associated with stock returns?”, *Review of Finance*, forthcoming, [Published online](#).

1050 Aswani, J., A. Raghunandan, S. Rajgopal (2023b), “Are carbon emissions associated with stock returns? Reply”, *Review of Finance*, forthcoming, [Published online](#).

1055 Atilgan Y., K.O. Demirtas, A. Edmans, A.D. Gunaydin (2023), “Does the carbon premium reflect risk or mispricing?”, SSRN Working Paper, [Published online](#).

Atkins, J.F., M. Macpherson (Eds.) (2022), “Extinction Governance, Finance & Accounting: Implementing a Species Protection Action Plan for the Financial Markets”, Routledge, UK.

1060 Atkins, J.F., K. McBride (2023), “Paradigm shift or shifting mirage? The rise of social and environmental accountability”, in Carnegie, G., C. Napier, “Handbook of Accounting, Accountability and Governance”, Edward Elgar.

1065 Atta-Darkua, V., S. Glossner, P. Kruegger, P. Matos (2023), “Decarbonizing institutional investor portfolios: Helping to green the planet or just greening your portfolio?”, [SSRN Working Paper 4212568](#).

Atz, U., T. Van Holt, Z.Z. Liu, C.C. Bruno (2022), “Does sustainability generate better financial performance? Review, meta-analysis, and propositions”, *Journal of Sustainable Finance & Investment*, [Published online](#).

1070 Baker, S.D., B. Hollifield, E. Osambela (2022), “Asset prices and portfolios with externalities”, *Review of Finance*, 26, 1433–1468.

1075 Barrage, L., W. Nordhaus (2023), “Policies, projections, and the Social Cost of Carbon: Results from the DICE-2023 Model”, Yale working paper, [Published online](#).

Bose, S., E.K. Lim, K. Minnick, S. Shams (2023), “Do foreign institutional investors influence corporate climate change disclosure quality? International evidence”, *Corporate Governance: An International Review*, 1–26, <https://doi.org/10.1111/corg.12535>.

1080 Bebachuk, L.A., K. Kastiel, R. Tallarita (2022), “Does Enlightened Shareholder Value add value?”, Harvard Law School John M. Olin Center Discussion Paper No. 1077, [Published online](#).

1085 Bolton, P., M. Kacperczyk (2021), “Do investors care about carbon risk?”, *Journal of Financial Economics*, 142, 517–549.

Bolton, P., M. Kacperczyk (2023), “Are carbon emissions associated with stock returns?: Comment”, *Review of Finance*, forthcoming, [Published online](#).

1090 Brandon, R.G., S. Glossner, P. Krueger, P. Matos, T. Steffen (2022), “Do responsible investors invest responsibly?”, *Review of Finance*, 26, 1389–1432.

Brière, M., S. Ramelli (2020), “Personal values, responsible investing and stock allocation”, Netspar Working Paper No. DP01/2020-003, [Published online](#).

1095 Bolognesi, E., A. Burchi (2022), “The impact of the ESG disclosure on sell-side analysts’ target prices: The new era post Paris agreements”, *Research in International Business and Finance*, [Published online](#).

- 1100 Busch, T., G. Friede (2018), “The robustness of the corporate social and financial performance relation: A second-order meta-analysis”, *Corporate Social Responsibility and Environmental Management*, 25, 583–608.
- Cao, J., A. Goyal, X. Zhan, W.E. Zhang (2022), “Unlocking ESG premium from options”, Swiss Finance Institute Research Paper No. 21-39, [Published online](#).
- 1105 Chang, X., W. Tan, E. Yang, W. Zhang (2018), “Stock liquidity and Corporate Social Responsibility”, SSRN Working Paper, [Published online](#).
- 1110 Chen, Y-C., M. Hung, Y. Wang (2018), “The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China”, *Journal of Accounting and Economics*, 65, 169–190.
- Christensen, H., E. Floyd, L.Y. Liu, M. Maffett (2017), “The real effects of mandated information on social responsibility in financial reports: evidence from mine-safety records”, *Journal of Accounting and Economics*, 64, 284–304.
- 1115 Christensen, H.B., L. Hail, C. Leuz (2021), “Mandatory CSR and sustainability reporting: Economic analysis and literature review”, *Review of Accounting Studies*, 26, 1176–1248.
- 1120 Clarkson, P., J. Grewal, G.D. Richardson (2022), “The equity value relevance of carbon emissions”, Forthcoming in *Handbook of Business and Climate Change*, [Published online](#).
- Dietz, S., C. Gollier, L. Kessler, “The climate beta” (2018), *Journal of Environmental Economics and Management*, 87, 258–274.
- 1125 Downar B., J. Ernstberger, S. Reichelstein, S. Schwenen, A. Zaklan (2021), “The impact of carbon disclosure mandates on emissions and financial operating performance”, *Review of Accounting Studies*, 26, 1137–1175.
- 1130 Duchin R., J. Gao, Q. Xu (2022), “Sustainability or greenwashing: Evidence from the asset market for industrial pollution”, SSRN Working Paper, [Published online](#).
- Egginton, J.F., G.A. McBrayer, (2019), “Does it pay to be forthcoming? Evidence from CSR disclosure and equity market liquidity”. *Corporate Social Responsibility and Environmental Management*, 26, 396–407.
- 1135 Edmans, A. (2022), “The end of ESG”, SSRN Working Paper, [Published online](#).
- Ferreira, B., M. Sequiera (2018), “Business judgement rule as a safeguard for ESG minded directors and a warning for others”, in P. Câmara & F. Moraes (Eds.), “The Palgrave Handbook of ESG and Corporate Governance”.
- 1140 Fiechter, P. J-M Hitz, N Lehmann (2022), “Real effects of a widespread CSR reporting mandate: Evidence from the European Union’s CSR Directive”, *Journal of Accounting Research*, [Published online](#).
- 1145 Flugum, R., M. Souther (2022), “Stakeholder value: A convenient excuse for underperforming managers?”, SSRN Working Paper, [Published online](#).
- Gantchev, N., M. Giannetti, R. Li, “Does money talk? Divestitures and corporate environmental and social policies”, *Review of Finance*, 26, 1469–1508.
- 1150 Gillan, S.L., A. Koch, L.T. Starks (2021), “Firms and social responsibility: A review of ESG and CSR research in corporate finance”, *Journal of Corporate Finance*, 66, [Published online](#).
- 1155 Gosling, T., I. MacNeil (2022), “Can investors save the planet? - NZAMI and fiduciary duty”, SSRN Working Paper, [Published online](#).

Gramlich, J., L. Huang (2017), “The effect of mandated CSR disclosure on the pollution levels of publicly-traded Chinese firms”, SSRN Working Paper, [Published online](#).

1160 Grewel, J. (2021), “Real effects of disclosure regulation on voluntary disclosures”, *Review of Accounting and Economics*. Temporarily withdrawn.

Grewal, J., E.J. Riedl, G. Serafeim (2019), “Market reaction to mandatory nonfinancial disclosure”, *Management Science*, 65, 3061–3084.

1165 Groom, B., M.A. Drupp, M.C. Freeman, F. Nesje (2022), “The future, now: A review of social discounting”, *Annual Review of Resource Economics*, 14, 467–491.

1170 Haber, S. H., J. D. Kepler, D. F. Larcker, A. Seru, B. Tayan (2022), “ESG investing: What shareholders do fund managers represent?”, *Stanford Closer Look Series, Corporate Governance Research Initiative*. [Published online](#).

Haji, A.A., P. Coram, I. Troshani (2022), “Consequences of CSR reporting regulations worldwide: A review and research agenda”, *Accounting, Auditing & Accountability Journal*, [Published online](#).

1175 Hänsel M.C. M.A. Drupp, D.J.A. Johansson, F. Nesje, C. Azar, M.C. Freeman, B. Groom, T. Sterner (2020), “Climate economics support for the UN climate targets”, *Nature Climate Change*, 10, 781–789.

1180 Hartzmark, S.M., A.B. Sussman (2019), “Do investors value sustainability? A natural experiment examining ranking and fund flows,” *Journal of Finance*, 74, 2789–2837.

Heinkel, R., A. Kraus, J. Zechner (2001), “The effect of green investment on corporate behavior”, *Journal of Financial and Quantitative Analysis*, 36, 431–449.

1185 Heeb, F., J. F. Kölbel, F. Paetzold, S. Zeisberger (2023), “Do investors care about impact?”, *The Review of Financial Studies*, 36, 1737–1787.

Hong, H., M. Kacperczyk (2009), “The price of sin: The effects of social norms on markets”, *Journal of Financial Economics*, 93, 15–36.

1190 Hong, H., L. Kostovetsky (2012), “Red and blue investing: Values and finance”, *Journal of Financial Economics*, 103, 1–19.

Ilhan, E., Z. Sautner, G. Vilkov (2021), “Carbon tail risk”, *Review of Financial Studies*, 34, 1540–1571.

1195 Ilhan, E., P. Krueger, Z. Sautner, L.T. Starks (2022), “Climate risk disclosure and institutional investors”, *Swiss Finance Institute Research Paper No. 19-66, European Corporate Governance Institute – Finance Working Paper 661/2020*, [Published online](#).

1200 Jouvenot, V., P. Krueger (2019), “Mandatory corporate carbon disclosure: Evidence from a natural experiment”, *SSRN Working Paper*, [Published online](#).

Kaustia, M., S. Torstila (2011), “Stock market aversion? Political preferences and stock market participation”, *Journal of Financial Economics*, 100, 98–112.

1205 Kim, S., A. Yoon (2022), “Analyzing active fund managers’ commitment to ESG: Evidence from the United Nations Principles for Responsible Investment”, *Management Science*, [Published online](#).

1210 Krueger, P., Z. Sautner, L.T. Starks (2020), “The importance of climate risks for institutional investors”, *Review of Financial Studies*, 33, 1067–1111.

Krueger, P., Z. Sautner, D.Y. Tang, R. Zhong (2021), “The effects of mandatory ESG disclosure around the world”, *ECGI finance working paper N° 754/2021*, [Published online](#).

- 1215 Larcker, D.F., B. Tayan, E.M. Watts (2022), “The seven myths of ESG”, *European Financial Management*, 28, 869–882.
- Lemoine, D. (2021), “The climate risk premium: How uncertainty affects the Social Cost of Carbon”, *Journal of the Association of Environmental and Resource Economics*, 8, 27–57.
- 1220 Liang, H., L. Sun, M. Teo (2022), “Responsible hedge funds”, *Review of Finance*, 26, 1585–1633.
- Luo, D. (2022), “ESG, liquidity, and stock returns”, *Journal of International Financial Markets, Institutions and Money*, 78, [Published online](#).
- 1225 Mateo-Marquez, A.J., J.M. Gonzalez-Gonzalez, C. Zamora-Ramirez (2021), “The influence of countries’ climate change-related institutional profile on voluntary environmental disclosures”, *Business Strategy and the Environment*, 30, 1357–1373.
- 1230 Moreno, A-I., T. Caminero (2022), “Application of text mining to the analysis of climate-related disclosures”, *International Review of Financial Analysis*, 83, [Published online](#).
- Nesje, F., M.A. Drupp, M.C. Freeman, B. Groom (2023), “Philosophers and economists agree on climate policy paths but for different reasons”, *Nature Climate Change*, 13, 515–522.
- 1235 Pastor, L., R.F. Stambaugh, L.A. Taylor (2021), “Sustainable investing in equilibrium”, *Journal of Financial Economics*, 142, 550–571.
- Pedersen, L.H., S. Fitzgibbons, L. Pomorski (2021), “Responsible investing: The ESG-efficient frontier”, *Journal of Financial Economics*, 142, 572–597.
- 1240 Raghunandan, A., S. Rajgopal (2022), “Do ESG funds make stakeholder-friendly investments?”, *Review of Accounting Studies*, 27, 822–863.
- 1245 Rennert, K., F. Errickson, B.C. Prest *et al.* (2022), “Comprehensive evidence implies a higher social cost of CO₂”, *Nature*, 610, 687–692.
- Riedl A., P. Smeets (2017), “Why do investors hold socially responsible mutual funds?”, *Journal of Finance*, 72, 2505–2549.
- 1250 Roy, P.P, S. Rao, M. Zhu (2022), “Mandatory CSR expenditure and stock market liquidity”, *Journal of Corporate Finance*, [Published online](#).
- Semenova, N. (2021), “The public effect of private sustainability reporting: Evidence from incident-based engagement strategy”, *Journal of Business Ethics*, 182, 559–572.
- 1255 Serafeim, G. (2021), “ESG: Hyperboles and reality”, Harvard Business School Working Paper 22-031, [Published online](#).
- 1260 Solomon, J.F. (2021), “Corporate Governance and Accountability”, 5th edition, John Wiley & Sons Inc.
- Stroebel, J., J. Wurgler (2021), “What do you think about climate finance?”, *Journal of Financial Economics*, 142, 487–498.
- 1265 Tol, R.S.J. (2023), “Estimates of the social cost of carbon have increased over time”, *Nature Climate Change*, 13, 532–536.
- Tomar S. (2022), “Greenhouse gas disclosure and emissions benchmarking”, ECGI Working Paper Series in Finance Working Paper N° 818/2022, [Published online](#).
- 1270 Tsagas, G. (2018), “Section 172 of the Companies Act 2006: Desperate times call for soft law measures”,

in N. Boeger & C. Villiers (Eds.), “Shaping the Corporate Landscape: Towards Corporate Reform and Enterprise Diversity”. Hart Publishing.

1275 Velte, P., M. Stawinoga, R. Lueg (2020), “Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences”, *Journal of Cleaner Production*, 254, 120063.

1280 Wang J., X. Hu, A. Zhong (2022), “Stock market reaction to mandatory ESG disclosure”, *Finance Research Letters*, [Published online](#).

Yang, L., N.Z. Muller, P.J. Liang (2021), “The real effects of mandatory CSR disclosure on emissions: Evidence from the Greenhouse Gas Reporting Program”, NBER Working Paper 28984, [Published online](#).

1285 Zerbib, O.D. (2022), “A Sustainable Capital Asset Pricing Model (S-CAPM): Evidence from environmental integration and sin stock exclusion”, *Review of Finance*, 26, 1345–1388.