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CORPORATE SOCIAL RESPONSIBILITY

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ABSTRACT

Is shareholder interest in corporate social responsibility driven by pecuniary motives (abnormal rates of return) or non-pecuniary ones (willingness to sacrifice returns to address various firm externalities)? To answer this question, we categorize the literature into seven tests: (1) costs of capital, (2) performance of portfolios, (3) ownership by types of institutions, (4) surveys and experiments, (5) managerial motives, (6) shareholder proposals, and (7) firm inclusion in responsibility indices. These tests and the most recent proposals data predominantly indicate that shareholders are driven by non-pecuniary motives. To stimulate further research on welfare implications for global warming, we assess whether estimates of the returns shareholders are willing to sacrifice (or, ‘greeniums’), along with the increasing amounts of assets pledged to firms that become sustainable, are consistent with the growth of aggregate investments in the decarbonization sector.

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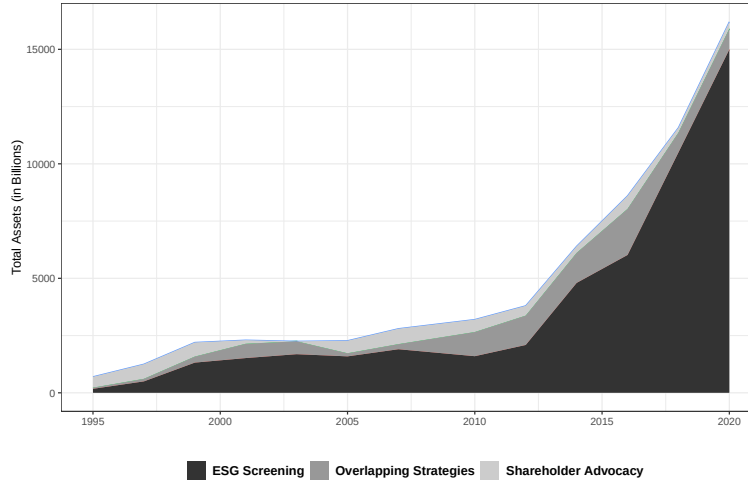


Figure 1: Trend of scale of Sustainable Investing in the United States. Data is from US SIF’s 2020 report. The majority of the increase in Environmental, Social and Governance (ESG) investing has come through ESG incorporation, or screening.

1 Introduction

Shareholder interest in corporate social responsibility has dramatically increased over the last decade. Between 2012 and 2020, assets under management that account for a firm’s environmental and social impact roughly tripled (Figure 1). Responsible investment mandates are commonly implemented as screens whereby firms need to meet standards in order to qualify to be held in these restricted portfolios. There has also been an increase in shareholder proposals related to firm responsibility that have earned a majority of votes (Figure 2). Before 2015, only a few percent of such proposals passed, whereas around 20% of proposals now do. In contrast, roughly 30% of proposals aimed at improving governance passed before 2015, whereas less than 20% now do. While the trends captured in Figures 1 and 2 are no doubt correlated with rising societal concerns regarding global warming, inequality, and a host of other societal issues over this period, it is unclear what, if any, are the implications for shareholder returns.

There are two competing views of corporate social responsibility. The first is that shareholder interest in corporate social responsibility is driven by pecuniary motives. Under this telling, switching to renewable energy or employing a diverse workforce is profit maximizing

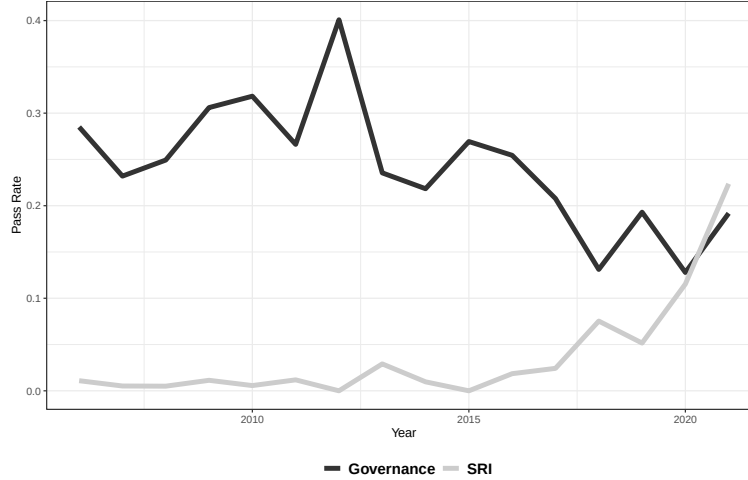


Figure 2: Trend of the pass rate of Governance and SRI proposals that went to a vote over time. We use data from the ISS database (formerly known as Riskmetrics) on voting analytics of shareholder proposals to construct this figure. Specifically, we compute the number of passing proposals in a year, and divide that number by the number of proposals that went to a vote in that year, broken down by ‘SRI’ and ‘Governance’ labels. The proposals are labelled as either SRI or Governance by ISS.

in the long-run. But the corporate sector is either short-termist or managers might for behavioral considerations undervalue such costly expenditures.¹ Regardless of the particular rationale, firms are not maximizing shareholder value by ignoring responsibility. Alternatively, capital markets might simply be inefficient and not price in the risks of global warming, the possibility of carbon taxes or other forms of regulation in the future². Hence, shareholders by tilting their portfolios or actively pushing for responsible investments are motivated by earnings growth and risk-adjusted returns.

The other view is that shareholder interests are primarily driven by non-pecuniary motives. That is, shareholders care not only about firm profits but are willing to sacrifice returns to mitigate firm externalities, the benefits of which accrue to society. Under this view, responsible or sustainable finance is meant to address the global-warming externalities or other

¹For models and discussion of short-termism, see Stein (1989) and Stein (2003). However, it should be noted that short-termism arguments for why the corporate sector has largely shunned sustainability up until now are not straight forward. As Bolton, Scheinkman, and Xiong (2006) show, short-termist managers can also easily over-invest in castles-in-the-sky projects as they did during the Dot-Com Bubble. For discussion of behavioral considerations, see Allcott, Mullainathan, and Taubinsky (2014) in the context of household choice of renewables versus non-renewables.

²For instance, Hong, Li, and Xu (2019) find that global food companies’ stock prices underreact to drought trends that significantly impact profitability.

societal concerns by influencing firms’ costs of capital, thereby incentivizing value-maximizing firms to reform. These initiatives are an extension of socially responsible investing practices from an earlier generation that were rooted in religious or ethical considerations. That is, brown stocks are the new sin stocks (Hong and Kacperczyk (2009)) that investors shun despite being highly profitable enterprises. These non-pecuniary motives might emanate from household pro-social preferences (Bénabou and Tirole (2010)). Or more likely, they are regulatory in nature, with examples being the Glasgow Financial Alliance for Net-Zero for asset managers and the Network for Greening of the Financial System for banks³. Regardless, shareholder interest in corporate social responsibility is meant to incentivize the private provision of public goods.

The pecuniary view is associated with the marketing of ESG (environmental, social and governance) for equities such as by the largest asset management company Blackrock. The non-pecuniary view is associated with the issuance of green bonds, where the term *greenium* refers to the pricing benefits based on investors’ willingness to pay extra or accept lower yields in exchange for sustainable impact.⁴ One of our interests is in assessing the extent to which there is a responsible firm premium more generally for the weighted average cost of capital (WACC) of firms.

Fortunately, there has also been a surge in academic research among financial economists on this central issue in recent years. Through a search on Google Scholar, we select papers that have been published in top journals or working papers that have garnered significant citations. We categorize studies in the literature into different types of tests⁵. Much of our categorization is guided by equilibrium models of value-maximizing firms and shareholders who for non-pecuniary reasons restrict their portfolios to only hold firms that meet certain social responsibility criteria (i.e. sustainable finance mandates). When stocks are imperfect

³For instance, many papers have shown that ‘country-of-origin’ and ‘internationalization’ of firms matter for CSR. For example, Liang and Renneboog (2017) find that firms in countries with legal systems more friendly to stakeholders as opposed to outside shareholders have higher responsibility scores. Cai, Pan, and Statman (2016) find a similar result. Boubakri et al. (2016) show that CSR increases after cross-listing.

⁴For an early book on the rise of ESG, see Landier and Nair (2009).

⁵For other recent reviews on investor interest in corporate social responsibility, see Heal (2005), Matos (2020) and Gillan, Koch, and Starks (2021).

substitutes, investor demand for stocks with responsible attributes would naturally drive up the prices of those stocks and hence drive down their required rates of return.⁶ But to understand equilibrium outcomes, we need to factor in the response of value-maximizing firms (Heinkel, Kraus, and Zechner (2001)).

Since responsible firms get higher share prices, this will motivate non-responsible firms to pay mitigation or adaptation costs so as to qualify to be held by investors who are restricted to responsible firms. For instance, utilities can sell off their coal businesses and hence qualify to be held by green portfolios just as hotels can sell off their casinos to qualify for ethical portfolios.

In a dynamic stochastic general equilibrium model with costly adjustment of capital and optimal firm choice over time of whether to be responsible or not, the difference in the required rates of return for responsible versus irresponsible firms (assuming similar firm productivity and risks) is given by (Hong, Wang, and Yang (2021)):

$$r^S - r^U = -m/q, \tag{1}$$

where r^S is the required rate of return for responsible or sustainable firms, r^U is the required rate of return for the irresponsible or unsustainable firms, m is the firm spending on mitigating externalities (as a fraction of firm capital) in order to qualify to be held by responsible investors, and q is Tobin's q or price of firm capital.

Tobin's q is equalized across responsible and irresponsible firms precisely because value-maximizing firms have to be indifferent between being responsible or not in equilibrium. m can be investments in decarbonization capital like renewables, direct air capture projects (e.g. plants, start-ups) or other types of flow spending to mitigate other firm externalities. The difference in the costs of capital in Equation (1) can be given an interpretation of the dividend yield that investors in responsible firms are sacrificing in order to incentivize firms to be responsible. In contrast, under a pecuniary view, we expect there to be no cost of capital

⁶All else equal, non-pecuniary tastes lead to negative risk-adjusted expected returns in a CAPM setting (or negative alphas) (Pástor, Stambaugh, and Taylor (2021)), though there are potentially off-setting factors depending on assumptions about informational efficiency (Pedersen, Fitzgibbons, and Pomorski (2021)).

difference or for this difference to be positive since proponents of responsible investing often argue that responsible firms ought to outperform irresponsible firms.

Beyond being helpful to organize the empirical literature, we frame our review around sustainable finance mandates because they can lead to outcomes close to the planner’s first-best solution, depending on the fraction of shareholders that are responsible and their willingness to sacrifice returns (Hong, Wang, and Yang (2021)).⁷ Below, we summarize this cost-of-capital test along with six other tests.

1. Costs of capital: A responsible firm’s cost of capital (or required rate of return) is lower than that of its irresponsible counterpart.
2. Performance of portfolios: Responsible shareholders’ portfolios under-perform those of irresponsible shareholders.
3. Ownership by types of institution: norm-constrained institutions, like endowments, are more likely to invest in responsible stocks compared to unconstrained institutions like hedge funds.
4. Surveys and experiments: responsible investors are motivated not just by profits but also philanthropic, ethical or other non-pecuniary motivations.
5. Managerial motives: Managers or insiders with non-pecuniary motives do good with other people’s money.
6. Shareholder proposals: goals expressed in governance and responsibility proposals are in conflict.
7. Inclusion in responsible stocks indices: no effects if markets anticipate firms have to spend to mitigate externalities in order to get into and stay in the indices.

⁷However, Broccardo, Hart, and Zingales (2020) show that under certain circumstances activist voting policies are welfare-improving relative to implementing screening mandates. Contracting frictions between shareholders and executives could also limit the effectiveness of shareholder responsibility mandates (Davies and Van Wesep (2018)). Moreover, there are a number of other theories exploring how complementarities, externalities, and contracting frictions can make corporate social responsibility arrangements socially optimal (Besley and Ghatak (2007), Magill, Quinzii, and Rochet (2015), Chowdhry, Davies, and Waters (2019), Oehmke and Opp (2022))). But they do not directly address the accumulation of decarbonization capital that is the central focus of recent shareholder net-zero emissions mandates.

Tests 1 through 4 follow from the discussion of Equation 1. Test 5 pertains to whether managerial non-pecuniary motives might lead to an over-investment in CSR that comes at the expense of shareholder welfare (Friedman (1970)). Test 6 relates to concerns on the possible conflicts between governance and corporate social responsibility (Tirole (2001)). Test 7 on inclusion of firms into responsible indices highlights the competing effects that offset each other when a firm gets included: (1) a decrease in dividend yield due to firm spending on mitigation of externalities and (2) a decrease in the firm’s cost of capital.

Empirical analyses based on these tests typically measure firm responsibility using data from commercial providers such as MSCI-KLD. This data often includes measures of a firm’s governance (i.e. whether the practices of the firm are friendly to shareholders) that were developed during the early 2000s as part of the Enron debacles and governance crisis in corporate America.

As we detail below, there are of course identification concerns with each of these tests when it comes to estimating the implications of firm responsibility for shareholder returns. For instance, responsible stocks tend to be growth stocks as opposed to value stocks, which needs to be accounted for.⁸ Indeed, virtually all studies use a variety of factor models such as Fama and French 1992, which Bansal, Kiku, and Ochoa 2019 argues pick up long-run risks related to climate change. Nonetheless, concerns about omitted risk factors are always present since firms that are financially healthy and viable are more likely to be socially responsible in the first place (Hong, Kubik, and Scheinkman (2012)). Moreover, responsibility ratings of firms can differ across data vendors,⁹ leading to concerns of measurement errors. Furthermore, there are good profit reasons for firm responsibility¹⁰ but the question is whether shareholder interest in corporate social responsibility on the margin is motivated by pecuniary or non-

⁸The following papers show that Tobin’s q is correlated with corporate social responsibility attributes: Servaes and Tamayo (2013), Albuquerque, Koskinen, and Zhang (2019), Jiao (2010), and Bhandari and Javakhadze (2017).

⁹For instance, studies generally find that there is more consistency in ratings for environmental performance than social performance (Chatterji et al. (2016), Berg, Kölbel, and Rigobon (2019)).

¹⁰For instance, companies strategically use philanthropy for lobbying (Bertrand et al. 2020) and non-wage benefits like maternal leave to attract talented female workers (Liu et al. (2022)). Hong et al. (2019) show that corporate social responsibility is valuable for firms when they get in trouble with regulators using violations of the Foreign Corrupt Practices Act. Family firms that provide implicit unemployment insurance outperform (Sraer and Thesmar (2007), Ellul, Pagano, and Schivardi (2018)).

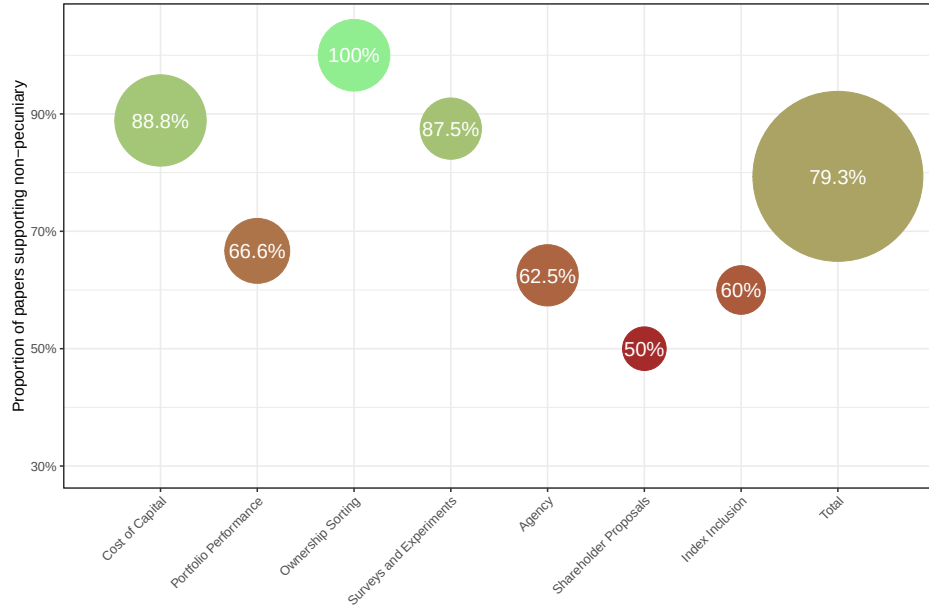


Figure 3: This bubble plot shows the proportion of papers that we review that support the non-pecuniary view. The proportion is represented numerically and along a color scale (brown to green). The size of the bubble corresponds to the number of papers included in calculating the percentage. The papers we include in this plot are all those presented in Tables 1 to 7 in Section 2. In those tables, we present papers as either confirming or rejecting a key positive question related to pecuniary vs. non-pecuniary benefits. If a paper is ‘unclear’ on the answer to that question, then we assign this as a rejection of that question. In total there are 60 unique papers that go into the production of this plot.

pecuniary reasons.

Despite these issues and the studies being from different periods and using different types of data to measure firm responsibility, we find that studies generally support the non-pecuniary view. For the most part, the reasoning for this conclusion is straightforward: it is based on the fraction of studies in each test that support either the non-pecuniary or pecuniary view (see our bubble plot in Figure 3). For five of the seven tests, the majority of the papers support non-pecuniary view. Overall, 79.3% of the papers come to a non-pecuniary view.

There are two aspects of our conclusions worth mentioning. Test 6 on shareholder proposals is unsettled. As we demonstrated in Figure 2, responsibility proposals are much more likely to pass after 2015. But much of the data after 2015 are not in the literature. Hence, we conduct an empirical analysis with these recent proposals and factor in these results in

judging that responsible finance is driven primarily by non-pecuniary motives.

Regarding Test 7 on inclusion of firms into responsible indices, the most recent studies with the largest samples typically find zero effects of inclusion, consistent with the competing effects that offset each other when a firm gets included. So overall, we conclude that these seven tests predominantly support the non-pecuniary view.

In the last part of our review, we attempt to stimulate further research into the welfare implications of corporate social responsibility for global warming. We tabulate the distribution of estimates of the returns shareholders are willing to sacrifice — one pooled across all mandates and one for just green mandate (i.e. greeniums). The means of these distributions are economically large though they both have sizeable standard deviations. Through the lens of Hong, Wang, and Yang (2021), we assess whether the estimates of the greenium and the growing amounts of assets pledged to green firms (derived from Figure 1) are consistent with the growth of aggregate investments in the decarbonization sector.

2 Categorizing Literature into Seven Tests

2.1 Costs of Capital

The first test is on whether socially responsible firms have a lower cost of capital (i.e. a lower required rate of return) compared to irresponsible firms. Studies typically compare the risk-adjusted stock returns of responsible to irresponsible firms¹¹. Under the non-pecuniary view, socially responsible firms have a lower required rate of return since shareholders are willing to pay higher prices for such firms because they mitigate.

In Table 1, we summarize the leading recent studies that test Equation (1). We sort these studies into stock versus bond markets. There are two types of dependent variables for stock markets. The first is where the realized return of a stock is used as a proxy for a firm’s expected return. The second is the implied cost of capital, which is the required rate of

¹¹Several papers also assess the cost of capital indirectly: Cheng, Ioannou, and Serafeim (2014) test whether KZ capital constraint scores (Kaplan and Zingales (1997)) move with CSR; Jiraporn et al. (2014) assess the impact of CSR on the credit ratings of firms; and Houston and Shan (2022) show that banks are more likely to grant loans to borrowers with similar ESG profiles.

Paper	Dependent Variable	Regressor	Coverage	Years of Data	Cost Differential
<i>Stocks</i>					
Hong and Kacperczyk (2009)	Monthly Returns	Sin stock dummy (α)	NYSE, Amex, and Nasdaq stocks 2,809 US firms	1926-2006	-3.5%
El Ghoul et al. (2011)	Expected Returns/Implied Cost of Capital	MSCI/KLD Scores		1992-2007	-0.1%
Chava (2014)	Expected Returns/Implied Cost of Capital	MSCI Environment Scores	S&P 500 & Russell 2000	1992-2007	-0.7% to -1.4%
Oestreich and Tsiakas (2015)	Portfolio Alpha	'Dirty vs. Clean' by carbon emissions	65 German firms	2003-2009	-1.4%
Bolton and Kacperczyk (2020)	Monthly Returns	Carbon Emissions	14,400 firms, 77 countries	2005-2018	-2.3% to -4.5%
Görge et al. (2020)	Yearly Returns	Constructed 'Brown-Green Score'	26,664 US stocks	2010-2017	-6.8%
Bolton and Kacperczyk (2021)	Monthly Returns	Carbon Emissions	3,421 US Companies	2005-2017	-1.5% to -3.6%
Hsu, Li, and Tsou (2022)	Monthly Returns	Carbon Emission Intensity	379 US firms	1991-2016	-4.4%
Pástor, Stambaugh, and Taylor (2022)	Monthly Returns	MSCI Environment Scores & Climate News Shocks	MSCI/KLD Universe (2,000 US firms)	2012-2020	-1.4%
Zhang (2022)	Monthly Returns	Carbon Emission Intensity	11,683 Global Firms	2010-2022	-1.3% to -2.6%
Avramov et al. (2022)	Monthly Returns	MSCI/KLD Scores interacted with Low ESG Uncertainty	NYSE/AMEX/Nasdaq common stocks with share codes 10 or 11	2002-2019	-2.0% to -3.8%
Khan, Serafeim, and Yoon (2016)	Monthly Returns	MSCI/KLD Scores interacted with SASB 'materiality' scores	2,396 US firms	1991-2013	4.8% to 6.5%
<i>Bonds and Banks</i>					
Goss and Roberts (2011)	Bank loan spreads	MSCI/KLD Scores	3,996 loans to US firms	1991-2006	-0.07% to -0.18%
Baker et al. (2018)	Green bond yield spread to conventional bonds	CBI certified green bond indicator	2,083 green bonds	2010-2016	-0.06%
Zerbib (2019)	Green bond premium to otherwise identical conventional bond	Bond liquidity differential	110 green bond-conventional bond pairs	2013-2017	-0.02%
Huynh and Xia (2021)	Future Bond Excess Returns (Risk-Free)	WSJ Climate Change News Index	8,231 US bonds	2002-2016	-0.06%
Seltzer, Starks, and Zhu (2022)	Bond yield spread	Sustainalytics Environmental Scores & Carbon Emissions	4,235 bonds	2009-2017	-0.13%
Larcker and Watts (2020)	Green bond spread to otherwise identical conventional bond	Bloomberg certified green bond indicator	640 green bond-conventional bond pairs	2010-2016	0%

Table 1: Do responsible firms have a lower cost of capital? Here we collect recent papers that estimate differences in cost of capital for responsible versus non-responsible firms using both stocks and bonds. We include the key dependent variable and regressor, the coverage, the years of the data, and the size of the average annual cost-of-capital differential of 'responsible' firms compared to 'non-responsible' firms. Note that this means that a negative number implies a lower cost of capital for responsible firms, consistent with Equation 1. If the regressor is not binary, we indicate the cost-of-capital wedge for a one standard deviation in the regressor. If the regressor is binary, we simply report the coefficient. In some cases, several estimates are offered in the paper. In those cases, we offer the range reported.

return inferred using a model of earnings and comparing the present value of these predicted earnings with the stock price. For bond markets, there are also two types of dependent variables: excess returns or bond yield spread.

These various dependent variables are regressed on measures of firm responsibility. These measures of responsibility can include controversial businesses, scores of a firm's responsibility or firm carbon emissions. The main identification concern is that irresponsible firms are riskier than responsible firms. There are a number of ways to address this concern, including using risk factor models or controlling for various firm characteristics. Studies also generally try to control for other firm observables, i.e. purge out as much heterogeneity as possible so as to test Equation 1. One crucial issue with measuring expected returns in contrast to volatility

is the critical need for large sample size in the time dimension (Merton (1980)).

Many studies are limited by the history of responsibility scores, which only become available starting in 1990. Nonetheless, almost all studies generally find a coefficient consistent with Equation 1 and the non-pecuniary motive. The longest sample is Hong and Kacperczyk (2009) study of sin stocks from 1926 to 2006. Adjusting for risk factors including size, value and momentum, a portfolio of sin stocks out-performs its industry comparables by around 3% annually. The most recent study on green stocks from Pástor, Stambaugh, and Taylor (2022), measured with MSCI environmental scores and using implied cost of capital method, find a cost of capital wedge between green versus brown stocks equal to -1.5%.¹² Khan, Serafeim, and Yoon (2016) is the exception among the papers in finding a large positive risk-adjusted returns for sustainable firms, which the authors attribute to selecting components of ESG scores that investors care about using auxiliary data from SASB. However, a number of studies on carbon emissions, which is arguably the one component of ESG scores that most institutional investors care about, all consistently find negative risk-adjusted returns for sustainable firms.

Finally, it is worth noting that studies using bonds also typically find a responsibility premium, consistent with investor willingness to pay to address externalities. Concerns about omitted risk factors that pervade equity studies are arguably less of an issue for debt by virtue of the finite duration of the cash flows of bonds.

2.2 Performance of Portfolios

Under the non-pecuniary motive, responsible portfolios under-perform irresponsible portfolios. The reason is that shareholders of responsible firms are giving up extra dividend yield in order to finance mitigation externalities.¹³ Under the pecuniary motive, responsible portfo-

¹²There are also a number of studies that examine how the performance of these two groups of stocks vary over time, such as with the business cycle (Bansal, Wu, and Yaron (2022)), market crises (Nofsinger and Varma (2014), Buchanan, Cao, and Chen (2018), Lins, Servaes, and Tamayo (2017)), COVID-19 (Bae et al. (2021), Ding et al. (2021), Albuquerque et al. (2020), Broadstock et al. (2021)), and weather episodes (Choi, Gao, and Jiang (2020)). It is difficult however to draw key inferences regarding our central question since business cycles can encompass different types of underlying shocks.

¹³Hong, Wang, and Yang (2021) show that there is an equivalence between having a representative household restrict a fraction of its wealth to firms that meet responsibility mandates and having some households be

Paper	Dependent Variable	Portfolio Type	Coverage	Years of Data	Annual Return Equivalent
Hong and Kostovetsky (2012)	Fund returns and Portfolio Alpha	Mutual Funds	2,100 managers	1992-2006	-1.3%
Hartzmark and Sussman (2019)	Excess Returns	SRI Mutual Funds	>20,000 Mutual Funds	2016-2017	-5.9%
Barber, Morse, and Yasuda (2021)	Internal Rate of Return	Dual-objective VC Funds	159 Impact Funds	1995-2014	-4.7%
Geczy, Stambaugh, and Levin (2021)	Certainty Equivalence Loss from Optimal Portfolios	SRI Mutual Fund	894 Mutual Funds	1992-2007	-3.6%
Hwang, Titman, and Wang (2021)	Future Returns	SRI Ownership revelation	3,100 US firms	2003-2016	-4.4%
Liang, Sun, and Teo (2021)	Portfolio Alpha	Hedge Fund PRI signatories	307 hedge fund companies	2006-2019	-2.45%
Deng, Kang, and Low (2013)	Cumulative Abnormal Returns	High CSR Acquisitions	1,556 mergers by 801 US firms	1992-2007	3.6%
Dimson, Karakas, and Li (2015)	Abnormal Returns	CSR Engagements	613 US firms	1999-2009	1.8%
Verheyden, Eccles, and Feiner (2016)	Portfolio Alpha	'Global All' ESG Screened	~85% of Global Equities	2010-2015	0.3%

Table 2: How do responsible investors perform relative to non-responsible investors? Here we collect recent papers that look at the performance of high CSR/low CSR portfolios. We include the key dependent variable, the portfolio type, the coverage, the years of the data, and the annual return equivalent of the portfolio where possible. Note that a negative return implies that responsible portfolios under-perform relative to non-responsible portfolios.

lios should out-perform irresponsible portfolios. Table 2 reports the results from studies that conduct such a test. The dependent variable is typically portfolio alpha, i.e. risk-adjusted returns¹⁴. The literature has considered a variety of related dependent variables. The concerns regarding the length of the time series and identification that we stated for cost of capital wedge tests apply to portfolio performance test.

These caveats notwithstanding, studies generally find that responsible portfolios under-perform irresponsible portfolios, consistent with the non-pecuniary motive. Barber, Morse, and Yasuda (2021) find that venture capital funds with dual objectives of profit and impact under-perform other funds. Hartzmark and Sussman (2019) find socially responsible funds underperform using a novel natural experiment with Morningstar ratings. Hwang, Titman, and Wang (2021) find that stocks with concentrated ownership among ESG funds under-perform.

One of the exceptions in the literature that finds out-performance is Dimson, Karakas, and Li (2015), who study a sample of activist funds. One explanation for this difference, proposed

responsible investors and others irresponsible investors. Ultimately, socially responsible investors sacrifice consumption in order to fund mitigation on behalf of society. Hence, such a responsible mandate can be stable over time assuming responsible households' willingness-to-pay does fall over time.

¹⁴Some papers assess alternative measures of performance: Auer and Schuhmacher (2016) look at the Sharpe Ratios of high-vs-low ESG portfolios and find evidence for a negative premium, especially in the United States, and Hoepner et al. (2021) look at the effect of CSR engagements by investors on portfolio downside risk, finding that engagements are associated with subsequent reductions in downside risk.

by Gollier and Pouget (2014), is that activist funds earn excess returns by reforming brown firms with low valuations to green firms with high valuations and selling them to the market¹⁵. As we noted in Figure 1, activist funds tend to be the minority in the responsible investment landscape. Moreover, the sample of activist funds might be selected since only activist funds with good performance might report their results. Hence, we conclude from Table 2 that the typical responsible portfolios generally under-perform irresponsible ones.

2.3 Ownership by Types of Institutions

Paper	CSR Rating	Coverage	Years of Data	Investor	Yes/No
Hong and Kacperczyk (2009)	Sin stock dummy (α)	NYSE, Amex, and Nasdaq stocks	1926-2006	Banks/Insurance/Pension Funds/Mutual Funds/Hedge Funds	Yes
Fernando, Sharfman, and Uysal (2017)	MSCI/KLD Scores	KLD Universe	1997-2007	Hedge Funds, Pension Funds, College Funds	Yes
Starks, Venkat, and Zhu (2017)	MSCI/KLD Scores	166,185 obs	2000-2018	Long-term/Short-term	Yes
Boubakri et al. (2019)	ASSET4 ESG Scores	18,816 obs, 41 countries	2002-2014	State Ownership	Yes
Dyck et al. (2019)	ASSET4 ESG Scores	3,277 firms, 44 countries	2004-2013	Hedge Funds and Pension Funds	Yes
Gloßner (2019)	MSCI/KLD Scores	5,302 US firms	1991-2013	Long-term/Short-term	Yes
Nofsinger, Sulaeman, and Varma (2019)	MSCI/KLD Scores	Russell 1000	2001-2013	Long-term/Short-term	Yes
Chen, Dong, and Lin (2020)	MSCI/KLD Scores	1,632 obs	2003-2006	Pension Funds/College	Yes
Hsu, Liang, and Matos (2021)	ASSET4 ESG Scores	3,902 firms, 44 countries	2004-2017	State Ownership	Yes
Dai, Liang, and Ng (2021)	ASSET4 ESG Scores	34,117 unique customer-supplier pairs, 50 countries	1991-2006	SR Customer	Yes
Avramov et al. (2022)	MSCI/KLD Scores	NYSE/AMEX/Nasdaq common stocks with share codes 10 or 11	2002-2019	Norm-constrained investors	Yes

Table 3: Is there positive sorting of norm-constrained institutions into responsible stocks?

Here we collect recent papers that look at how investor type influences portfolio construction. We include the CSR rating employed, the coverage, the years of the data, the investor type, and whether the paper shows that norm-constrained investors tilt towards responsible stocks (Yes) or not (No).

Under the non-pecuniary view, certain types of institutions such as pension plans and universities are more sensitive to social norms compared with hedge funds that are largely pecuniary motivated. Table 3 reports studies that have directly conducted this test¹⁶. Hong and Kacperczyk (2009) find pension plans and university endowments are more likely to screen out sin stocks from their portfolio than mutual funds or hedge funds. These findings have been shown out of sample — for instance, Dyck et al. (2019) find that hedge funds are

¹⁵Results of a similar vein in which firm acquisitions based on CSR similarity is value enhancing.

¹⁶Several papers identify that ‘long-term’ investors gravitate towards high CSR stocks. The definition of ‘long-term’ is typically related to the churn of stock ownership, and is a feature tightly associated with pension funds/college endowments in particular (Gloßner (2019)). As such, we label these results as consistent with more direct measures of ‘norm-constrained’ ownership sorting.

much more likely to own brown stocks. Similarly, stocks with state ownership are more likely to be in higher ESG stocks.¹⁷

2.4 Surveys and Experiments

Panel A: Surveys					
Paper	Topic	Respondent Profile	Respondent Number	Years of Data	Yes/No
Bauer, Ruof, and Smeets (2021)	Willingness to pay (binary) for sustainable investing	Pension Funds	~4,800 respondents	2018	Yes
Rangan, Chase, and Karim (2015)	Purpose of CSR Programs	Firm Managers	142 managers	2011-2015	Yes
Amel-Zadeh and Serafeim (2018)	Why and how investors use ESG	Institutional Investors	652 respondents	2016	Yes
Krueger, Sautner, and Starks (2020)	Attitudes to Climate Change and Risk	Institutional Investors	439 respondents	2017-2018	Yes
Stroebe and Wurgler (2021)	Climate Finance & Risks	Academics, Professionals, Public Sector Workers	861 respondents	2021	Unclear
Panel B: Experiments					
Paper	Dependent Variable	Participants	Coverage	Years of Data	Yes/No
Riedl and Smeets (2017)	Expectation of Returns for SRI funds	Private Investors	3,254 Respondents	2011	Yes
Heeb et al. (2022)	Willingness to pay for sustainable investing	Private Investors	527 investors	2020	Yes
Elliott et al. (2013)	Firm Valuation and CSR Info	Business School Students	88 Participants	2010	Yes

Table 4: Are moral, ethical, or environmental considerations a top three factor in portfolio decisions? Here we collect recent papers that employ surveys and experiments to uncover investor motivations for holding socially responsible investments. For the surveys, we include the survey ‘topic’, the respondent profile, the number of respondents, the years in which the surveys were conducted, and whether they find that investors are motivated by moral, ethical, or environmental considerations (Yes) or not (No). For the experimental evidence, we include the key dependent variable, the participant type, the coverage, the years of the data, and whether they find that participants are motivated by moral, ethical, or environmental considerations (Yes) or not (No).

The fourth set of studies use surveys and experiments to solicit shareholder willingness to pay for corporate mitigation of externalities. One important point these papers make is that the response of subjects depends on how the surveys and experiments are framed. Papers generally find that non-pecuniary factors are important determinants of investor behavior. In their survey of institutional investors, Krueger, Sautner, and Starks (2020) find that the highest level of support is split across three motives: the protection of the investors’ reputations, their moral/ethical considerations, and their legal/fiduciary duties. Bauer, Ruof, and Smeets (2021) collect two field surveys of members of a pension fund and find that two-thirds are willing to expand the funds engagements with companies based on their sustainable development goals, even when they expect that engagement to harm financial performance.

¹⁷In the US, values related to climate change often sort on political dimensions. Hong and Kostovetsky (2012) find that fund managers that donate to Democratic political candidates in Federal elections have much more responsible portfolios than fund managers who donate to Republican candidates in these elections.

A couple of papers have sought to establish investor preference more directly. Riedl and Smeets (2017) conduct an incentivized experiment to establish social preferences in investors, then link the responses to administrative data on portfolio holdings. They find that ‘social preferences’ and ‘social signalling’ explain SRI decisions, with financial motives being less important. Heeb et al. (2022) perform a framed field experiment on investors to estimate the willingness-to-pay (WTP) for sustainable investments. They find that the average WTP for the sustainable investment is 4.57% (€45.67 on a €1,000 investment).

2.5 Managerial Motives

Paper	CSR Measure	Agency Feature	Coverage	Years of Data	Yes/No
Cheng, Hong, and Shue (2013)	MSCI/KLD Scores	Dividend Tax Cut	S&P 500	1991-2006	Yes
Borghesi, Houston, and Naranjo (2014)	MSCI/KLD Scores	Media Attention on firm/CEO	11,711 obs, US firms	1992-2006	Yes
Di Giuli and Kostovetsky (2014)	MSCI/KLD Scores	Democratic vs. Republican Founders/CEOs/Directors	Russell 3000	2003-2009	Yes
Masulis and Reza (2015)	Corporate Giving	Dividend Tax Cut	Fortune 500	1996-2006	Yes
Cronqvist and Yu (2017)	MSCI/KLD Scores	CEO has Daughters	S&P 500	1992-2012	Yes
Jiraporn and Chintrakarn (2013)	MSCI/KLD Scores	CEO Power (CEO Pay Slice)	1,370 US firms	1995-2007	Unclear
El Ghoul et al. (2016)	ASSET4 ESG Scores	Family Control Dummy	335 firms, 94 Family firms, 9 countries	2002-2011	Unclear
Ferrell, Liang, and Renneboog (2016)	MSCI/KLD Scores	Agency Concern Proxies	91,373 observations, 59 countries	1999-2011	No

Table 5: Are managers doing good with other people’s money? Here we collect recent papers that look at whether agency concerns explain CSR performance. We include the CSR measure, the agency feature, the coverage, the years of data, and whether the paper finds that the agency feature explains (Yes) or doesn’t explain (No) the CSR performance. We also indicate if the papers findings are mixed (Unclear).

The fifth set of tests correlate firm responsibility characteristics with agency problems in the firm. Under the non-pecuniary view, responsibility emanates from agency problems with insiders (Friedman (1970)). Under the pecuniary view, firms with less agency problems should be more responsible. Studies here generally support the non-pecuniary view though the results are less unanimous compared to earlier tests. For instance, Di Giuli and Kostovetsky (2014) find that firms with Democratic CEOs are more likely to implement CSR, and that these policies lead to lower returns. However, Ferrell, Liang, and Renneboog (2016) find using standard proxies for agency concerns that firms with less agency concerns have higher responsibility scores. To address identification issues with cross-sectional comparisons, Cheng, Hong, and Shue (2013) use the 2003 Dividend Tax Cut, which increased after-tax insider ownership, to find evidence in favor of the marginal dollar of CSR spending being

related to agency problems. Masulis and Reza (2015) has a similar finding for philanthropic spending in particular.

2.6 Shareholder Proposals

Paper	Dependent Variable	Proposal Type	Coverage	Years of Data	Yes/No
Cheng, Hong, and Shue (2013)	MSCI/KLD Scores	Governance	1,062 Governance Proposals	1991-2006	No
Grewal, Serafeim, and Yoon (2016)	Tobin's Q	SRI Proposals	2,665 ES Proposals	1999-2013	Unclear
Flammer (2015)	Cumulative Abnormal Returns	SRI Proposals	61-122 'Just-pass' Proposals	1997-2012	Yes
Cao, Liang, and Zhan (2019)	Cumulative Abnormal Returns	SRI Proposals	'Just-pass' number not reported	1997-2011	Yes

Table 6: Do shareholder CSR proposals create firm value? Here we collect recent papers that look at the impact of shareholder proposals, both 'governance' and 'SRI' proposals. We include the key dependent variable, the proposal type, the coverage, the years of data, and whether they find that proposals increase (Yes) or decrease (No) firm value.

The literature has also examined the effects of the passage of these proposals for various firm outcomes, which are summarized in Table 6¹⁸. This shareholder proposals test is unsettled. Flammer (2015) finds, using a regression discontinuity design for votes around the 50% or majority threshold, that passage of responsibility proposals leads to higher firm value, which is consistent with the pecuniary view. Using a similar regression discontinuity design, Cheng, Hong, and Shue (2013) find that passage of governance proposals has a negative effect on firm responsibility scores. Their sample overlaps with Cuñat, Giné, and Guadalupe (2016) who previously used the design to show that passage of governance votes leads to higher firm value. These findings are consistent with the non-pecuniary view of firm responsibility.

There are three important reasons why there are differing results. The first is that regression discontinuity strategies require lots of data around thresholds. In the early sample, there are not many close votes when it comes to responsibility as opposed to governance proposals. The second is that returns are noisy, which is compounded by a lack of close responsibility ones. As we documented in Figure 2, the probability of proposals aimed at improving

¹⁸Other recent papers have also explored how firm or investor status influences behavior around shareholder proposals. For example, Chen, Dong, and Lin (2020) show that firms included in Russell 1000 index reconstitutions subsequently face more CSR proposals, a result they argue is driven by an influx of institutional investors. Similarly, Dikolli et al. (2022) show that Mutual Funds with 'SRI' status are more likely to vote in support of ESG Shareholder Proposals. However, as in the rest of this paper, the focus of this section will be on whether these proposals result in pecuniary or non-pecuniary firm outcomes.

governance has fallen over time while the probability of proposals aimed at improving firm responsibility has increased over time. This recent sample is outside of most studies. Hence, it would be valuable to see how these aforementioned results hold up once we update the datasets in Section 3.

2.7 Responsible Stocks Index Inclusion Tests and other event studies

Paper	Measure of Firm Value	Index	Coverage	Years of Data	Yes/No
Hawn, Chatterji, and Mitchell (2018)	Cumulative Abnormal Returns	DJSI World Index	408 additions, 272 deletions, 27 countries	1999-2015	No
Durand, Paugam, and Stolowy (2019)	Cumulative Abnormal Returns	DJSI World Index	205 additions, 171 deletions, 28 countries	2005-2018	No
Berk and Binsbergen (2021)	Monthly Returns	FTSE4Good USA	411 additions, 385 deletions	2002-2022	No
Robinson, Kleffner, and Bertels (2011)	Cumulative Abnormal Returns	DJSI World Index	48 additions, 43 deletions, North America	2003-2007	Yes
Edmans (2011)	Portfolio alpha	‘100 best companies’ Index	US stock market	1984-2009	Yes

Table 7: Does inclusion in a socially responsible index increase firm value? here we collect recent papers that look at inclusion to socially responsible indices as an identification strategy. We include the measure of firm value, the ‘index’ in question, the coverage, the years of data, and whether they find that the inclusion improved (Yes) or decreased (No) firm value.

There have been a fair number of studies of the stock price effects of firm inclusion into stock market indices based on a firm’s responsibility scores. These are summarized in Table 7. Though some early studies with limited inclusion events find positive effects of inclusion, recent studies with the largest sample of inclusion events generally find no effect consistent with the stock market is expecting the firm to have to engage in costly mitigation spending in order to stay in the index. There are related tests in the literature connected to news about a firm’s responsibility ratings¹⁹ and disclosure requirements²⁰ The results also tend to be mixed and in this broad sense consistent with the index inclusion results and that there are competing cashflow and discount rate effects from being sustainable.

¹⁹News tests include Krüger (2015), Grewal, Riedl, and Serafeim (2019), Capelle-Blancard and Petit (2019), Flammer (2013), Tang and Zhang (2020), and Flammer (2021).

²⁰Disclosure tests include Flammer, Toffel, and Viswanathan (2021), Xie et al. (2019), Dhaliwal et al. (2011), and Cahan et al. (2016).

3 Recent Sample Shareholder Proposals

As noted in the introduction, since 2015 there has been a notable upward trend in the proportion of SRI proposals that have passed shareholder votes. However, much of this data has not been covered in the literature. To address this problem, we examine a recent sample of shareholder proposals and test whether the passage of SRI proposals impact firm value, and whether Governance proposals impact CSR performance.

3.1 Data

We obtain data on shareholder proposals from 2006-2021 from ISS, formerly known as Riskmetrics. ISS covers all S&P 1500 firms, plus an additional 400-500 widely held companies. The database includes information on proposal type, content, vote share, and sponsor, the date of the annual meeting, and firm identifiers. Crucially, ISS denotes whether a proposal was an ‘SRI’ proposal, or a ‘Governance’ proposal. We match this data with three additional databases: CRSP for stock returns data, Compustat for firm-level fundamentals, and MSCI/KLD for firm-level ‘ESG’ scores. We use the sum of ESG strengths minus the sum of ESG concerns as our measure of ESG. In our final sample, we have 13,343 proposals from 1,393 unique firms. Of those proposals, 8,072 are Governance proposals, and 5,271 are SRI proposals.

3.2 CSR Proposals and Firm Value

To test the impact of SRI proposals on firm value, we implement a regression discontinuity design. We first compare the abnormal returns on the day of the vote of firms that just passed SRI proposals vs. the abnormal returns of firms that just failed to pass SRI proposals²¹. We calculate the abnormal returns using a Carhart (1997) four-factor model. To implement the RDD design, we restrict attention to thresholds around the pass requirement of a given

²¹ As Lee (2008) shows, as long as there is a random component to the vote, even if that component is small, then the assignment to treatment and control groups is random around the threshold. Listokin (2008) shows that vote shares of management sponsored proposals may be manipulated, but suggest that the vote shares of shareholder sponsored proposals (i.e. the proposals we implement in our design) are not subject to the same manipulation

proposal; here we mirror Flammer (2015) by looking at 10%, 5%, 2.5%, and 1.5% thresholds. An estimate for the impact of passing the shareholder proposal is then established by running the following regression on the restricted set of observations within the threshold, where we test for differences in the means either side of the cutoff:

$$AR_{i,t} = \beta_0 + \beta_1 pass_{i,t} + \epsilon_{i,t} \quad (2)$$

where $AR_{i,t}$ is the abnormal returns of firm i on day t , and $pass_{i,t}$ is a dummy variable taking a value of 1 if the firm faced an SRI proposal that passed in that day's meeting. If β_1 is statistically greater than 0 then we conclude that the passing of the SRI proposal had a positive effect on firm value, at least at the local level.

Whilst this procedure is consistent, it leads to the elimination of a significant number of observations, and hence suffers from potential loss of efficiency. To address this problem, we implement a strategy based on Lee and Lemieux (2010) and allow for polynomials on either side of the cutoff:

$$AR_{i,t} = \alpha_y + \phi_s + \beta_0 + \beta_1 pass_{i,t} + P_l(v_{i,t}, \gamma_l) + P_r(v_{i,t}, \gamma_r) + \epsilon_{i,t} \quad (3)$$

where α_y is a year fixed effect, ϕ_s is an industry fixed effect, $v_{i,t}$ is the vote share of the proposal, and $P_j(v_{i,t}, \gamma_j)$ is a polynomial to the left ($j = l$) or right ($j = r$) of the cutoff. The introduction of two polynomials is in effect an attempt to approximate the continuous relationship between abnormal returns and vote share, with β_1 then capturing any discontinuous jump around the cutoff. We report results for polynomials of order 2, 3, and 4. In both cases, we cluster standard errors by firm, and control for a number of firm-level variables (Return on Assets, Return on Equity, Tobin's Q, Market Value, Employee Productivity, and Net Profit Margin).

Table 8 shows the results. We fail to find a positive effect of just passing an SRI proposal on abnormal returns across the 8 specifications, with some evidence that the effect is negative

Dependent Variable: Threshold/Polynomial: Model:	All votes (1)	$\pm 10\%$ (2)	$\pm 5\%$ (3)	Abnormal Returns $\pm 2.5\%$ $\pm 1.5\%$ (4) (5)		Quadratic (6)	Cubic (7)	Quartic (8)
<i>Variables</i>								
Pass	0.0004 (0.0028)	-0.0021 (0.0052)	0.0049 (0.0088)	-0.0016 (0.0084)	0.0031 (0.0100)	-0.0226* (0.0134)	0.0796 (0.0498)	0.3113 (0.2454)
<i>Year</i>						Yes	Yes	Yes
<i>Industry</i>						Yes	Yes	Yes
<i>Firm Controls</i>						Yes	Yes	Yes
<i>Fit statistics</i>								
Observations	2,320	166	61	30	15	2,198	2,198	2,198
R ²	1.28×10^{-5}	0.00057	0.00476	0.00126	0.00731	0.17500	0.17799	0.17850
Within R ²						0.00903	0.01262	0.01324

Clustered (Firm) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 8: This table presents regressions of abnormal returns on the day of the proposal vote, calculated using a Carhart (1997) four-factor model, on a dummy variable, *Pass*, that takes a value of 1 if the proposal is passed, and 0 otherwise. The proposals considered are those ISS labels as ‘SRI’ that went to a vote. Column (1) estimates the specification in Equation 2, applied to the entire sample. Columns (2)-(5) also estimates the specification in Equation 2, but restricted to observations within 10%, 5%, 2.5%, and 1.5% of the cutoff respectively. Columns (6)-(8) estimate the specification in Equation 3, and implements a quadratic, cubic, and quartic polynomial respectively. Standard errors are reported in brackets, clustered at the firm-level.

in the quadratic polynomial case²².

Our results differ from those in Flammer (2015) and Cao, Liang, and Zhan (2019). There are at least two reasons why this might be the case. First, we focus on larger firms by restricting to the ISS database²³. Second, we look at a different sample period: 2006-2021 rather than 1997-2012. This choice is motivated by the increase in the number of passing SRI proposals in the years since 2012. Looking exclusively at ISS data, we find 71 SRI proposals that pass between 2006 and 2021, and 17 between 1997-2011. Regardless of the reason, the lack of a return effect of the passage of a CSR proposal can be given a similar interpretation as the null result when a stock gets added to a responsible stocks index — the numerator effect (costly implementation of proposals) and the denominator effect (lower costs of capital as a result) off-set each other.

²²In an extension, we also construct a plot of victory margin of SRI proposals and abnormal returns on the day of the vote as a sense check. We collect proposals at 2% bins on victory margin and take the arithmetic mean of abnormal returns within that bin. We fit two polynomials of order 3 around the cutoff. Again, we fail to find evidence of a positive effect of just passing an SRI proposal on abnormal returns.

²³In Flammer (2015) and Cao, Liang, and Zhan (2019), they also include data from Factset’s ‘Sharkrepellent’ database that covers 4,000 firms in the Russell 3000 from 2005 to 2012.

3.3 Governance Proposals and MSCI/KLD

To test whether governance proposals reduce ESG scores as found in Cheng, Hong, and Shue (2013), we implement the same methodology as above, substituting the change in ESG score in the year subsequent to the passing of the proposal for abnormal returns ($\Delta ESG_{t+1} = ESG_{t+1} - ESG_t$), and focusing on governance rather than SRI proposals. As in the analysis of SRI proposals on abnormal returns, we also control for a number of firm-level variables when we implement the polynomial method as in Lee and Lemieux (2010). Results can be found in Table 9. We find evidence that governance proposals lower ESG scores, with the polynomial method yielding statistically and economically significant results for the change in ESG ratings. Recall that our score measures the net of strengths and concerns: just passing a Governance proposal lowers MSCI/KLD net scores by as much as 1.5. This corresponds to a 0.77 standard deviation drop in the overall score. In other words, the adverse impact of governance proposals on ESG scores found by Cheng, Hong, and Shue (2013) using data on governance proposals from 1997-2011 hold up even as if update the sample to 2021.

4 Greeniums, Investments in Decarbonization and Future Research

Finally, we assess the range of estimates of greeniums as captured by differences (risk-adjusted) costs of capital for green versus brown firms. In Figure 4, we construct a binned kernel density of the difference in the Weighted Average Cost of Capital for green minus brown firms based on the estimates from papers in Tables 1 and Table 2 that focused on firm environmental impact. The mean of the distribution is -1.36% with a standard deviation of 0.82%.

We also include the distribution of the estimates for the returns shareholders are willing to sacrifice for all sustainable finance mandates, i.e. all papers covered in 1 and Table 2. The means of the two distributions are comparable though the standard deviation of the overall responsible distribution is larger than the green distribution.

Dependent Variable:	ΔESG_{t+1}							
Threshold/Polynomial:	All votes	$\pm 10\%$	$\pm 5\%$	$\pm 2.5\%$	$\pm 1.5\%$	Quadratic	Cubic	Quartic
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Variables</i>								
Pass	-0.0922** (0.0405)	-0.1180* (0.0709)	-0.0676 (0.1053)	-0.1604 (0.1490)	-0.1130 (0.1984)	-1.522** (0.6549)	-1.484*** (0.4649)	-1.340*** (0.4588)
<i>Fixed-effects</i>								
Year						Yes	Yes	Yes
Industry						Yes	Yes	Yes
Firm Controls						Yes	Yes	Yes
<i>Fit statistics</i>								
Observations	4,869	1,203	567	316	207	4,377	4,377	4,377
R ²	0.00131	0.00254	0.00082	0.00480	0.00253	0.16270	0.16283	0.16292
Within R ²						0.00796	0.00812	0.00822

Clustered (firm) standard-errors in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 9: This table presents regressions of the change in the ESG score in the year subsequent to the proposal vote on a dummy variable, *Pass*, that takes a value of 1 if the proposal is passed, and 0 otherwise. The ESG score is calculated as the sum of the ESG strengths minus the sum of ESG concerns as reported by MSCI. The proposals considered are those ISS labels as ‘GOV’ that went to a vote. Column (1) estimates the specification in Equation 2, applied to the entire sample. Columns (2)-(5) also estimates the specification in Equation 2, but restricted to observations within 10%, 5%, 2.5%, and 1.5% of the cutoff respectively. Columns (6)-(8) estimate the specification in Equation 3, and implement a quadratic, cubic, and quartic polynomial respectively. We also control for firm and year fixed effects in columns (6)-(8). Standard errors are reported in brackets, clustered at the firm-level (by PERMNO).

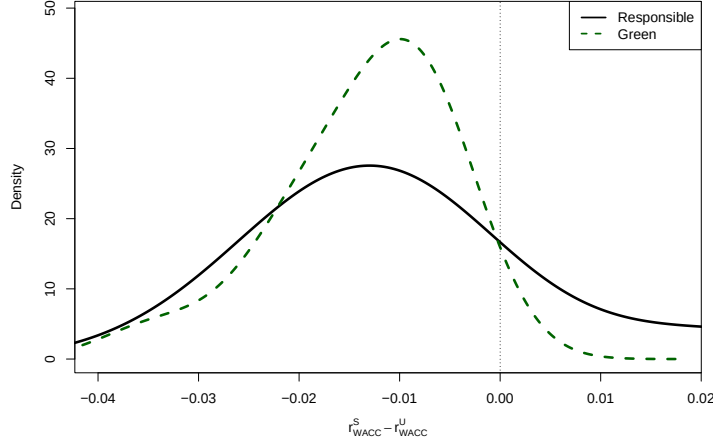


Figure 4: This figure shows a binned kernel density estimate of the size of the weighted average cost of capital (WACC) premium achieved by ‘sustainable’ vs. ‘unsustainable’ firms, i.e. $r^S - r^U$ as in Equation 1. We calculate the WACC premium using the equity return premia estimates provided in the papers documented in Tables 1 and 2, and the median bond/bank premium in Table 1 of -6 basis points. We use a debt-to-equity ratio of 1, consistent with data from Statista on the ratio of total debt to equity in the United States. To account for the debt tax shield, we use the pre-2017 corporate tax rate of 35%, as this is the rate in place across the vast majority of the samples. We also show the distribution of a subset of equity premia that deal directly with the ‘greenium’. The methods used to identify all these premia vary, though typically involve estimating some risk-adjusted return difference.

Using Hong, Wang, and Yang (2021), we can confront the estimates of the greenium to the growth of green mandates and investments in the decarbonization sector. Since we observe Tobin’s q , we can map these estimates using Equation 1 to back out how much each firm spends as a fraction of capital m on investments in decarbonization capital. Using Figure 1, we can back out the fraction of assets restricted to green firms in that year, α_t . Aggregate investment in decarbonization in each year t is m multiplied by α_t .

In Figure 5, we plot from 2004 to 2020 α_t , the predicted aggregate investment each year based on equating the greenium with the cost of capital difference in Figure 4. We show the predicted path of aggregate investments for the median from the distribution of greenium estimates, which is -1.19%. We can see that this estimate generates a path that is too large relative to actual investments in decarbonization.

There are at least five potential reasons for why the predicted decarbonization path is too large and each is worth future research. First, as we have already discussed in the Introduction, firms that are financially healthy are greener. And financial health may be



Figure 5: Using the model described in Hong, Wang, and Yang (2021), and the median WACC greenium shown in Figure 4, we construct predicted US decarbonization investment spending (solid line). We compare these predictions to actual data on spending (dotted line). These two series are plotted on the left vertical axis. The data for the actual spend comes from BloombergNEF’s Energy Transition Investment Trends 2022 Report, and the data for the US capital stock comes from FRED. We also plot the actual proportion of US investors restricted to green stocks (the dashed line) on the right vertical axis. We construct this value by calculating the sum of the assets-under-management (AUM) restricted to green activities in the US divided by the market capitalization of the US stock market. The data for the AUM restricted to green activities comes from US SIF’s 2020 report, and the data for the market cap of the US stock market comes from Sibilis Research.

difficult to measure properly. Hence, better identification strategies are needed to refine the willingness-to-pay of households.

Second, the Bloomberg NEF data does not necessarily capture all corporate investments into the decarbonization space. Hence, it would be valuable to develop better measures of these investments, be it at the firm level or aggregate level.

Third, there can potentially be greenwashing. Investors might not fully understand what they are getting. To this end, recent passage of European disclosure laws and potential SEC regulations would offer researchers opportunities to investigate the impact of greenwashing on these estimates.

Fourth, Equation (1) from Hong, Wang, and Yang (2021) assumes that all firms are identical, i.e. there is no idiosyncratic risk. As Broccardo, Hart, and Zingales (2020) point out (also in Heinkel, Kraus, and Zechner (2001)), idiosyncratic risk can lead to a less than one for one mapping from willingness-to-pay to actual investments. It would be interesting to quantify this leakage.

Fifth, investors might derive utility in the form of warm glow, emphasized in Pástor, Stambaugh, and Taylor 2021, as opposed to purely consequential aims. Hence the spending on actual climate change mitigation is a lower bound on what the firm spends to maximize investors' warm glow. Other types of spending such as advertising or other forms of signalling ought to then be included in m .

Hence, our exercise points to the need to corroborate future research on measuring greeniums with data on levels of actual mitigation spending for firms to qualify as green, as in recent papers²⁴. These same comments apply to estimating responsibility premiums related to other types of firm externalities or concerns beyond carbon emissions.

An emphasis on the real effects of net-zero mandates, particularly in the power sector,

²⁴For example, Naaraayanan, Sachdeva, and Sharma (2020) show that environmental activist investors reduce plant-level chemical emissions through increased capital expenditures on new abatement initiatives, Chu and Zhao (2019) find that hedge fund activism also reduces plant-level emissions through investments in pollution-reducing technologies, and Choi et al. (2022) show that high emission firms invest more in green patents, suggesting that these firms invest in projects that make them more environmentally friendly. By contrast, Akey and Appel (2019) show that hedge fund activism reduces pollution, but argue that this is achieved through reduced production, not abatements.

would contribute significantly to the emerging field of climate finance (Hong, Karolyi, and Scheinkman (2020), Giglio, Kelly, and Stroebe (2021)) since much of it is still focused on hedging and pricing of climate risks as opposed to how financial markets contribute to the mitigation of climate risks.

5 Conclusion

Is the recent and dramatic rise in shareholder interest in corporate social responsibility driven by non-pecuniary motives, i.e. shareholders seeking to do good, or by the usual pecuniary of return maximization? Based on equilibrium models featuring firm choice to be responsible or not, we categorize the recent financial literature into seven tests that make use of an array of capital markets and corporate financial data. We also extend the literature by including recent data on shareholder proposals regarding firm responsibility. We find that the literature generally points to shareholders being driven by non-pecuniary motives. Confronting literature estimates of firm responsibility premiums or greeniums in the context of global warming, we point to the need for future research that incorporate measures of corporate investments in the decarbonization sector.

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