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Christian Gollier - Sébastien Pouget

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Investment Strategies and Corporate Behaviour with Socially Responsible Investors: A Theory of Active Ownership*

Christian Gollier

University of Toulouse Capitole (Toulouse School of Economics)

Sébastien Pouget

University of Toulouse Capitole

(Toulouse School of Economics and Toulouse School of Management)

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Abstract

Socially responsible investors constitute an important force in today's global financial markets. This paper examines conditions under which socially responsible investors induce companies to behave responsibly. We develop an asset pricing model in which some shareholders are active owners, i.e., they engage companies by voting on strategic decisions. Differences of objective among shareholders arise because socially responsible investors value corporate externalities. In our baseline model, we show that a firm may choose a responsible strategy, even if the majority of investors are not responsible. We also demonstrate that such choice of a responsible strategy might be fragile because it might depend on investors' self-fulfilling beliefs. We then extend our baseline model to analyse the link between divestment and engagement strategies, the case with multiple firms, the role of benefit corporation charters and the impact of a large investor.

Keywords: Asset pricing, voting, corporate social responsibility, responsible investments, externalities.

JEL Classification: G11, G34, H23

1. Introduction

We theoretically study under which conditions active ownership by socially responsible investors induce companies to behave more responsibly. According to the latest Global Sustainable Investment Alliance (GSIA) report, responsible investment amounts to $30.7 trillion in 2018, corresponding to 33% of the global assets under management; this percentage is around 26% for the US and 49% for Europe.[1] Using a stricter definition of responsible investing that excludes Environmental, Social and Governance (ESG) criteria integration in financial analysis, the weight of socially responsible investors still appears significant: around 14% globally, 5% for the US and 32% for Europe.[2]

Socially responsible investors base their decisions not only on financial analysis but also on ESG criteria.[3] Indeed, corporations produce positive and negative externalities that they do not usually internalise, because these do not translate into corporations' incomes and costs. Typical positive externalities can be found in the management of human resources (e.g., training policies that can be useful for other employers), or in the investment in R&D (e.g., production of non-patentable knowledge). But firms also produce negative externalities, such as pollution and health hazards.

Public policies recommended by economists to control externalities are difficult to put

[1]The Global Sustainable Investment Review 2018, released by GSIA, presents the aggregated regional results from the market studies on sustainable investing for Europe, the United States, Canada, Japan, and Australia and New Zealand. The 2018 GSIA report is available at `http://www.gsi-alliance.org/wp-content/uploads/2019/06/GSIR_Review2018F.pdf`. These figures should be taken with a grain of salt because they are based on declarations by financial institutions that might have an interest in showing the importance of responsible investment.

[2]Using a stricter definition of responsible investing appears legitimate given that ESG integration may be driven by pure profit maximisation. Note that, because a fund may combine different strategies, it is not easy to estimate the amount of assets managed with a social orientation. The more moderate percentages highlighted in the main text are in line with the findings of a thorough study by Novethic, a sustainable finance media, on the French market in 2018 showing that socially responsible funds manage €149 billion, corresponding to around 8% of assets under management.

[3]According to GSIA, the three most frequent types of responsible strategies are negative screening (i.e., exclusions based on international norms or specific ESG issues), engagement to improve corporate behaviour on ESG issues (i.e., active ownership via private communications with executives or via voting at general assembly meetings), and positive screening (i.e., best-in-class strategies that select assets based on their ESG performance relative to peers.).

in place (see, e.g., the absence of carbon pricing) or have only partially reduced the inefficiencies (for example because some emitters are exempted from the carbon price signal, or because this price is too low compared to the global emission target). As a complement to these policies, the dual objective of socially responsible investors is to obtain an appropriate, long-run financial performance and to induce corporations to internalise (part of) the externalities they exert on society. This is done, for example, by using extra-financial performance ratings in the determination of their optimal portfolio allocation, as i) in negative screening strategies, ii) in the implementation of prospective financial analyzes, as in ESG integration strategies, and iii) in the design of an active owner policy, as in ESG engagement strategies.

In the model we propose, externalities produced by firms are valued by Socially Responsible (SR) investors in proportion of their investment in these firms.[4] We assume that these investors care about externalities because of impure altruism, in the spirit of Andreoni (1990). This implies that SR investors shy away from non-responsible assets (in spirit of Edmans (2009)).[5] By altering their portfolio allocation towards responsible assets, these investors can decrease the equilibrium cost of capital of responsible firms, thereby inducing firms to behave more responsibly. This is in line with the theoretical analysis of Heinkel, Kraus, and Zechner (2001) and the empirical results of Hong and Kacperczyk (2009), who show that responsible assets enjoy a lower risk-adjusted return than other assets.

Our baseline model features one firm and atomistic investors. To model active ownership, one of the top responsible investment strategies according to GSIA, we explicitly consider that investors engage corporations by voting on strategic decisions during shareholder meet-

[4]Another interpretation of our model is to consider differences of opinion: some investors, the SR ones, believe that the positive externality will transform into larger profits for the firm, while conventional investors believe it will not. All our results hold except the one regarding the lower return obtained by SR investors. Indeed, in a difference of opinion setting they may turn out to be right and obtain a larger return than conventional ones.

[5]Voting-with-your-feet strategies as opposed to monitoring have been theoretically studied by Maug (1998) and Edmans and Manso (2011), and empirically documented by Parrino, Sias, and Starks (2002) and by Edmans, Fang, and Zur (2012). We complement these analyses by considering a setting in which the private benefit of control derives from the fact that some investors value the externalities imposed by firms on society.

ings.[6] This enables us to better understand the relationship between corporate behaviour and investors' strategies. Our model includes three dates. At date 1, shareholders invest in the firm depending on the strategy – responsible or standard – they expect will be chosen. In addition to a financial payoff, the responsible strategy generates a positive externality for society at a financial cost for the firm.[7] The social externality being positive enables us to capture in our baseline model another important strategy used in practice by SR investors, namely the best-in-class strategy that selects assets with the best ESG performance relative to peers in a given sector. At date 2, shareholders' vote to decide on what strategy the firm is going to implement. At date 3, the firm strategy generates its payoff, and externalities materialise. Because shareholders' investment depends on the vote outcome and this outcome depends on the investment of SR and conventional investors, we solve our model by using the rational expectation equilibrium concept.

Our first finding is to show that a firm may choose a responsible strategy, even if the majority of investors are not responsible. This is because SR investors tend to overweight responsible firms compared to conventional investors. As a result, SR investors can secure a majority at shareholder meetings, even if they are less numerous than conventional investors. Our second main finding is that the choice of a responsible strategy may be fragile in the sense that there are cases in which several equilibria coexist. Indeed, investors' shareholdings depend on what they anticipate will be the strategy – responsible or not – chosen by the firm at the general assembly meeting. The outcome of this general assembly meeting depends on investors' holdings. We show that, for some parameter values, the firm may implement at equilibrium a responsible or a non-responsible strategy, depending on the anticipations of investors: if they anticipate that the firm will be responsible, it is indeed responsible; if they

[6] One limitation of our analysis is that it is based on a stylised setup. In practice, shareholder democracy is much more nuanced and complex. For example, McCahery, Sautner and Starks (2016) document the widespread use of behind-the-scenes interventions by which institutional investors aim at influencing corporate decisions.

[7] This is in spirit of the standard definition according to which corporate social responsibility is about "sacrificing profits in the social interest" (Benabou and Tirole, 2010).

anticipate it will not be, it is not. This suggests that in some cases, the fact that a firm is responsible or not depends on self-fulfilling beliefs.

We offer four extensions of our baseline model. As a first extension, we consider that the externality imposed by the firm on society is negative, thereby implying that responsible investors underweight the non-responsible firm. This allows us to model the impact of another dominant SR investment strategy, namely exclusions.[8] As in the baseline setting, the two shareholder-vote equilibria can coexist but we demonstrate that, in the negative externality case, the equilibrium situation is less likely to result in the choice of a responsible corporate strategy. This is due to two effects. On the one hand, the weight of responsible investors in non-responsible firms that emit negative externalities is lower, making it less likely that their votes form a majority. On the other hand, responsible investors should constitute a majority for the firm to choose the standard strategy which is socially desirable, because they invest in this firm with the same intensity as conventional investors who would prefer the firm to be non-responsible.

As a second extension, we consider an economy with two firms instead of one. This enables us to investigate how the willingness to diversify influences the ability of responsible investors to affect corporate strategies. Our analysis suggests that responsible strategies are more likely to be adopted when firms' returns display a lower level of correlation. In this case, when responsible investors increase their holdings in one firm that they expect will be responsible, they also have an interest in increasing their holdings in the other firm for hedging reasons. This gives them more power in this other firm and makes it more likely that the general assembly votes in favour of the responsible corporate strategy.

In the third extension of our baseline model, we study how some governance dispositions could enhance firms' commitment power towards socially responsible strategies. We

[8]Exclusion (or negative screening) underweights companies, sectors, or countries from the permitted investment universe if they are related to certain activities such as the production of non-conventional weapons, tobacco manufacturing, animal testing, coal mining...

consider the case of corporate charters oriented towards social responsibility, such as the benefit corporation, that requires a two-third super-majority vote to be overturned into a standard corporation. We find that this super-majority requirement increases the likelihood for the firm to be responsible and decreases the uncertainty related to the coordination of expectations regarding corporate social responsibility.

Lastly, as the fourth extension, we analyse the optimal strategy and financial performance of a large investor who stands ready to hold large stakes in firms. This allows us to model the behaviour of activist investors who select companies and causes, and use influence strategies to shape corporate decision-making. We introduce in our model date 0, at which such an investor can take over the firm. We show that in presence of socially responsible investors, both credible pro-social orientation and long-term horizon may increase the purely financial return of the activist investor. The activist's strategy consists in buying a non-responsible firm, turning it into responsible, and selling part of it back to the market. The abnormal return derives from the fact that SR investors are ready to pay a premium for holding the shares of socially responsible firms. Such a strategy could not be successfully implemented by a short-term investor, nor by a purely financially-motivated activist. First, a short-term investor could not credibly commit to keep his stake in the company long enough to implement the responsible strategy. Second, a purely financially-motivated activist could not credibly announce that he will support the pro-social corporate strategy over the long run. Indeed, he would always prefer to vote in favour of the non-responsible corporate strategy. As a result, a purely financially-motivated activist would not display abnormal returns.[9]

[9]An example of activist fund is Tau Investment Management that was launched with the objective of buying into non-responsible businesses (garment factories in developing countries) and improving social and environmental corporate behaviours in an attempt to best prepare a future listing on financial markets (see, e.g., Jessica Wohl, *Reuters Ed. US*, NY firm sees investment opportunity in garment factories, September 27th, 2013, and Matthew Bishop, *The Huffington Post*, Move over Zoolander: Here come the fashion entrepreneurs for good, February 17, 2016). A recent example of an ESG-related shareholder activism campaign is offered by the high profile proxy fight by the hedge fund Engine No. 1 that managed to get two of its candidates to be nominated on the board of Exxon Mobil corp. after it criticised the oil company for not taking the energy transition seriously enough in its strategic planning (Mark DesJardines and Tima Bansal, *Corporate Knights*, May 31st, 2021). Recognising the rise in shareholder activism based on ESG

The rest of the paper is organised as follows. Section 2 offers a review of the theoretical and empirical contributions related to the present paper. Section 3 presents our baseline model and equilibrium analysis with competitive investors and voting. Section 4 presents extensions of our baseline model to include a negative externality, several firms, super-majorities, and a large investor. Finally, Section 5 concludes.

2. Related literature

There is a growing interest in understanding how socially responsible investors affect financial market equilibrium and corporate behaviour. In their seminal contribution, Heinkel, Kraus, and Zechner (2001) propose a formal asset pricing model in which some investors exclude non-responsible assets from their investment universe. These non-responsible assets then enjoy a higher risk premium because their risk is borne by fewer investors (see also the related studies by Barnea, Heinkel, and Kraus, 2005 and 2013).This analysis has been extended in several directions that are relevant for our paper.

A first stream of papers adopts a general equilibrium approach and studies the impact of SR investors on capital allocation in the economy and ultimately on social welfare. SR investors can achieve effective impact by investing in firms that produce positive societal impact and that would not have been financed by conventional investors, see Green and Roth (2020), or by imposing pollution constraints on the firms they can finance and focusing on firms that suffer most from financing constraints, see Landier and Lovo (2020). Moisson (2020) further shows that SR investors' impact depends on their ethical motives. These papers assume that a firm is financed either by SR or conventional investors. We complement them by studying the conflicts between various types of investors and their relative influence

issues, Insightia, a data intelligence provider, has issued its first special report on ESG-based activism in 2021 (`https://www.activistinsight.com/esgreport_2021/`) that documents the emergence of a number of activist hedge funds with ESG focus such as Inclusive Capital Partners and Impactive Capital.

on firms' behaviour depending on their strategies.

A second stream of literature takes the number of firms in operations as given and studies the asset pricing implications of the presence of SR investors. These implications depend on their risk and moral preferences. Absent moral considerations, Baker, Hollifield, and Osambela (2020) show that investors who are more sensitive to pollution should invest more in polluting firms to hedge their consumption stream in the face of the risks these firms create. In turn, polluting firms enjoy lower risk-adjusted returns. Their analysis is based on the premise that wealth and pollution are substitutes. Baker et al. (2020) then show that the over-investment result may be reversed if investors have moral preferences, i.e., if they are pure or impure altruists.

Such moral preferences have been modeled in various asset pricing papers as a taste for social responsibility or ESG performance. Pastor, Stambaugh, and Taylor (2020) model a financial market in which investors have a taste for responsibility similar to the one we model in our paper. They derive a two-factor asset pricing model and show that responsible investors i) induce lower risk-adjusted returns for green compared to brown assets and ii) feature lower expected returns and higher volatility compared to standard investors. They show that both standard and responsible investors shy away from the market portfolio: standard investors include less of the responsible assets while responsible investors include more of them. Only investors with the average taste for responsibility hold the market portfolio.

Pedersen, Fitzgibbons, and Pomorski (2020) assume that a firm's ESG performance is good for its economic performance and model financial markets with three types of investors: some are unaware of the fact that ESG matters, some are aware of this, and some are not only aware but also have a taste for high ESG stocks. They show that investors with a taste for ESG can have a larger risk-adjusted performance than unaware investors, because the decrease in diversification induced by the tilt towards high ESG stocks can be more than

compensated by the enhanced performance achieved thanks to ESG information. They also show that high ESG stocks might have a larger expected returns than low ESG stocks if unaware investors are numerous enough, thereby preventing the price from fully revealing ESG information.

Zerbib (2020) models a financial market with three types of mean-variance investors: excluders who exclude some assets based on their characteristics (e.g., sin stocks), integrators who integrate ESG factors in their asset allocation policy (e.g., overweighting green stocks), and regular investors who base their decisions on financial returns only. Zerbib (2020) offers a generalisation of the capital asset pricing model in which taste and exclusion premia arise. He then studies interactions between these premia and test their empirical relevance.

Finally, two related papers by Luo and Subrahmanyam (2019) and by Dreyer, Sharma and Smith (2020) study the impact of impure altruism on asset returns. Both papers show that assets that generate a warm-glow for investors are associated with lower risk-adjusted expected returns. They then offer complementary insights. For example, Luo and Subrahmanyam (2019) study the incentives to acquire information: they find stronger information acquisition incentives for warm-glow assets that translate into higher informational efficiency. We complement this second stream of literature by considering a financial market with SR investors, in which corporate decisions are endogenously determined by investors' vote at general assembly meetings.

A third stream of literature deals with the link between SR investors and firms' management. Morgan and Tumlinson (2019) set up a model in which a firm's shareholders and other citizens are pure altruists: they care not only about consumption but also about the overall level of a public good in the economy. Firm's production depletes a public good. This depletion can be compensated by private contributions to the clean-up effort (by the firm or by individuals). When managers are assigned as objective to maximise shareholder welfare, as called for by Hart and Zingales (2017), Morgan and Tumlinson (2019) show that

the firm makes more contributions than what shareholders would on an individual basis. This is because the firm acts as a technology that enables shareholders to solve part of the collective action problem. Morgan and Tumlinson (2019) further show that firms always choose to produce less than the profit maximising level. Indeed, at this level, the marginal profit is null and lower than the marginal damage induced by production. As a result, shareholders prefer the firm to produce and pollute less.[10] This makes shareholders poorer but happier. Morgan and Tumlinson (2019) finally show that a purely financially motivated raider could not profitably takeover the firm because it already operates in the best interest of shareholders.

Besley and Ghatak (2017) and Chowdhry, Davies, and Waters (2019) focus on the commitment issue faced by firms which engage in socially responsible activities. Besley and Ghatak (2017) study social enterprises by jointly examining organisation and incentive design when firms' social mission and profits are at odd. They show that besides non-profit and for-profit organisations, social enterprises may emerge in which managers have discretion over the priority to be given to the social mission or to the profit of the firm. They also identify an assortative matching between firms' founders and managers in terms of social orientation, and study how this matching interplays with incentives.[11]

Chowdhry, Davies, and Waters (2019) study impact investing. They consider a project that involves multi-tasking and generates both a financial and a social outcome. Chowdhry, Davies, and Waters (2019) analyse its financing by a for-profit investor and a social impact investor. They show that despite the larger cost of the capital provided by the impact investor, the optimal contract allocates this investor an equity stake. This limits the ability of the for-profit investor to renegotiate away the social impact delivered by the project.

[10] Kitzmueller and Shimshack (2012) review the economic literature on corporate social responsibility (CSR) and examine conditions under which CSR may generate higher welfare than other channels of public good provision.

[11] Ghatak (2020) presents a broad overview of the literature on the economics of non-profits, for-profits and social enterprises with an emphasis on the self-selection of agents with different prosocial orientations into organisations with different goals, on the mission-integrity problem, and on their interplay.

Oehmke and Opp (2019) uncovers another source of complementarity between SR and conventional investors. Conventional investors would induce the firm to produce at high scale (and thus high compensation for the manager) with a dirty technology, but at low scale with a clean technology. To avoid the dirty technology, SR investors are willing to invest more in the firm operating at high scale if it adopts the clean technology. As a result, the social welfare might be higher when there are both SR and conventional investors, than when there are only one of these investors.

We complement this stream of work in three dimensions: i) we explicitly model the conflict of interest between various types of shareholders, responsible and conventional, and its resolution via voting at general assemblies, ii) we capture in our model other investment strategies used by SR investors, and iii) we allow for trading of shares. This enables us to derive complementary results on the fragility of corporate social responsibility due to equilibrium multiplicity and on the profitable intervention of a responsible raider engaging in the 'invest and engage strategy' mentioned by Hart and Zingales (2017).

A last stream of literature studies the governance conflict induced by the presence of investors with different levels of prosocial preferences. Broccardo, Hart and Zingales (2020) study the relative effectiveness of divestment and engagement strategies by SR investors. They show that with atomistic agents there could be too much or too little divestment and that investors' engagement by voting is a more effective strategy than divesting. Morgan and Tumlinson (2019) also analyse the case in which SR investors have heterogeneous prosocial preferences. They show that with heterogeneity the level of responsibility is lower than in the case of homogeneous preferences but that at equilibrium, the firm improves social welfare by making a positive contribution to public good provision. Our paper complements this strand of literature by explicitly recognising that SR investors make both an investment and a voting decision, which implies that there may be multiple equilibria and a complementarity between investors' voting impact and divestment strategies.

More generally, our paper speaks to the literature on the private provision of a public good, see, e.g., Bagnoli and Watts (2003), Kotchen (2006) and Besley and Ghatak (2007). Closest to our analysis, Besley and Ghatak (2007) analyse the conditions under which firms are better to deal with public good issues than governments. In their model, some consumers care about the public good and others don't. Profit-maximising firms offer different types of goods at different prices to cater to the different consumer types: neutral products are sold at low prices and responsible products (that generate a public good or a positive externality on society) are sold at higher prices. This induces some public good provision at equilibrium, even if the government decides not to tax and produce the public good because a majority of consumers do not care about it. We extend the logic of Besley and Ghatak (2007) to a situation in which shareholders care about the public good. Two additional effects arise. A first effect is that a shareholder's power in the firm depends on its shareholdings and is thus endogenous. A second effect is that investors' holdings in the firm and thus their political influence inside the firm depends on their self-fulfilling beliefs about firm's strategy.[12]

3. Baseline model and equilibrium

Consider an economy with three dates and one firm. Firm's assets are assumed to already be in place. They initially belong to the owner of the firm who sell them to atomistic investors at date 1. The discount rate is normalised to 0. At date 3, the firm yields a random financial return r per share. The return r is normally distributed with mean Er, and variance σ^2. There is a continuum of investors indexed by $i \in [0,1]$ with a mass of one such that $\int_0^1 di = 1$.

[12]Our paper is related to the literature that explicitly models shares' trading and voting on corporate strategy at shareholder meetings. Dhillon and Rossetto (2015) analyse votes on corporate decisions that involve risk. In their model, investors differ in terms of diversification and thus appetite for corporate risk-taking. Intermediate block holders arise at equilibrium to balance the conflict of interest between small and well-diversified investors and a large and concentrated investor. Levit, Malenko, and Maug (2020) study a corporate governance model that features multiple equilibria similar to ours. They emphasise the fact that delegation of decision-making to a board of directors might improve shareholder welfare and study how the efficiency of decisions made by boards or by shareholders depend on market liquidity.

Investors have a utility function $U(X) = -e^{-AX}$, in which $A > 0$ represents the constant absolute risk aversion parameter. Investors initially hold no cash and no shares. We denote by h_i the number of shares held by investor i after trading at date 1. We assume that short-selling positions are allowed. The number of firm's shares is normalised to 1, so that the market-clearing condition is $\int_0^1 h_i di = 1$. Investor i's final wealth is written $W_i = h_i(r - P)$, where P is the unit price of the firm's shares ex ante.

At date 2, the firm is confronted with a choice between two alternative strategies. Strategy $s = 0$ has no social externality and its expected return is $Er(s = 0) = \mu > 0$. Strategy $s = 1$ generates a social externality which is valued at $e > 0$ units of numeraire per share. The firm's expected (financial) return if the responsible strategy $s = 1$ is adopted is $Er(s = 1) = \mu - c$, in which $c > 0$ represents firm's financial cost of implementing the pro-social activity. Another interpretation is that c is the cost to incur in order to reduce a negative externality by e. We assume that $e > c$ so that the responsible strategy is desirable from a social point of view: in the first-best solution, the firm adopts the responsible strategy because we assume that its cost for the company, c, is lower than the societal benefit it generates, e.

Investors differ in their socially responsible orientation. When they evaluate the performance of their investment, socially responsible (SR) investors internalise both the financial and the extra-financial returns. We model internalisation assuming that the warm-glow felt by investor i from doing good is proportional to the number of shares of the responsible company they hold and to the externality. It should be noted that internalisation of externality by SR investors is reminiscent of the pure altruism (Becker, 1974) type of preferences, while the assumption that SR investors derive the warm-glow utility in proportion to their holdings of responsible firm stems from the impure altruism (Andreoni, 1990). Our model thus combines these two concepts, allowing for a richer analysis. [13]

[13]Modeling the preferences of SR investors based solely on impure or pure altruism preferences will lead to different results. All our results hold if we consider standard impure altruism. To see this, one can simply

Internalisation induces SR investors to evaluate the return per share as $r - c - P + e$ for the responsible firm, and $r - P$ for the firm implementing strategy $s = 0$. Other investors, referred to as conventional investors, do not value the externality. We use the dummy variable x_i to express pro-social values, where x_i takes value 1 if investor i is socially responsible, and 0 otherwise.[14] SR investors make up a proportion π of the investors, which means that $\int x_i di = \pi$.

3.1 Demand and price with and without corporate responsibility

The demand for firm's shares and the equilibrium price are a function of investors' expectations about firm's behaviour. Let's first consider the simple case where investors expect that the firm will not adopt a pro-social behaviour: $s = 0$. Thus, all investors solve the same one-risk-free, one-risky portfolio choice problem, in which we know that the Arrow-Pratt approximation for the certainty equivalent final wealth is exact. Thus, they all select h that maximises the certainty equivalent final wealth, which equals $h_i(\mu - P) - 0.5h_i^2\sigma^2 A$. This yields $h_i^*(s = 0) = (\mu - P)/A\sigma^2$. The market-clearing condition implies that $h_i^* = 1$ for all i, which implies that

$$P(s = 0) = \mu - A\sigma^2. \tag{3.1}$$

Since the firm generates no externalities, the pricing equation reflects only the risk-return tradeoff, and the holding equation shows that all agents hold the same portfolio. We suppose that $\mu - A\sigma^2$ is positive, so that the value of the firm is positive even without investing responsibly.

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replace the externality e by 1 to account for the fact that SR investors would only internalise the warm-glow derived from their holdings in a responsible firm. On the other hand, with pure altruism, only the externality matters in the SR investors' utility function. Since SR investors are not pivotal, their optimal demand does not depend on the externality. This has two consequences. First, the price of the shares of responsible companies only reflects the financial cost of being responsible but not the externality. Second, our result on equilibrium multiplicity would not hold anymore.

[14] We obtain similar results by allowing x_i to belong to interval $[0, 1]$, in which case x_i can be interpreted as an index of altruism.

Suppose, alternatively, that investors believe that the firm will adopt the responsible behaviour. Investor i's optimisation program is:

$$\max_{h_i} \mathbb{E}U((r - c - P + x_i e)h_i) = U((\mu - c - P + x_i e)h_i - 0.5Ah_i^2\sigma^2).$$

It yields the following demand for firm's shares:

$$h_i = \frac{\mu - c + x_i e - P}{A\sigma^2}. \tag{3.2}$$

Market-clearing imposes $\int_0^1 h_i di = 1$. The firm's share price is thus equal to:

$$P\,(s = 1) = \mu - A\sigma^2 + \pi e - c. \tag{3.3}$$

As before, this pricing equation reflects the basic tradeoff between return and risk: the share price equals the expected return corrected for risk (discounted at the risk-free rate of zero). One difference with a classic asset pricing formula is the fact that, due to responsible investors, the share price incorporates part of the firm's externality. Equation (3.3) means that the expected financial return of the firm, $Er(s = 1) - P$, is equal to $A\sigma^2 - \pi e$.

At equilibrium, after-trading holdings are given by:

$$h_i\,(s = 1) = 1 + \frac{(x_i - \pi)e}{A\sigma^2}, \text{ for all } i. \tag{3.4}$$

Responsible investors invest more in the responsible firm than non-responsible investors. Moreover, as long as the firm's expected return is positive and larger than the discount rate (i.e., when $A\sigma^2 > \pi e$), non-responsible investors invest a positive amount in the responsible firm. The absence of full polarisation of portfolio structures between responsible and conventional investors suggests that our analysis based on a unique firm would remain valid if there were more than one firm. We show below that this is indeed the case.

The additional investment in the responsible firm's shares increases with the level of the positive externality and decreases with their level of risk aversion and the level of risk.[15] Equation (3.4) also tells us that the pro-social behaviour of altruistic investors is partially offset by the purely financial investors. Indeed, agents with $x_i = 0$ have a demand for the responsible firm that is smaller than for an irresponsible firm at equilibrium. This is due to the price effect of the reduced demand by altruistic investors. The opportunistic behaviour of non-altruistic investors dampens, but does not eliminate, the impact of SR investors on the cost of capital of responsible firms.

The above pricing and holdings equations suggest that responsible investors' expected return on wealth equaling $(1+\frac{(1-\pi)e}{A\sigma^2})(A\sigma^2-\pi e)$ can be larger than non-responsible investors' expected return equaling $(1-\frac{\pi e}{A\sigma^2})(A\sigma^2-\pi e)$. This is the case if the firm yields an expected return larger than the discount rate, i.e., if $A\sigma^2 - \pi e > 0$: given that responsible investors invest more in the responsible firm, they end up with a higher expected return. However, responsible investors' risk-adjusted return, measured for example by the ratio of expected wealth over the variance of wealth and equal to $\frac{A\sigma^2-\pi e}{\left(1+\frac{(1-\pi)e}{A\sigma^2}\right)\sigma^2}$, is always lower than conventional investors' risk-adjusted return, equal to $\frac{A\sigma^2-\pi e}{\left(1-\frac{(\pi)e}{A\sigma^2}\right)\sigma^2}$.[16] This is because firm's equity return does not compensate enough for the risk. However, responsible investors receive an additional compensation from the social return (the positive externality) generated by the firm.

Our pricing results (3.1) and (3.3) show that the firm's share price is higher when the socially responsible strategy is adopted if and only if $\pi e > c$, that is, if the proportion of responsible investors and the size of the externality are sufficiently high, and if the cost of implementing the pro-social strategy is low enough.[17] Otherwise, the market value of the

[15]The fact that additional investment in the responsible firm's shares increases with the level of the positive externality is in line with the empirical evidence offered by Edmans (2011) showing that socially responsible funds increase their holdings of firms that appear in the list of Fortune's "Best Companies to Work For".

[16]This is in line with the empirical evidence offered by Hong and Kacperczyk (2009), Bauer, Derwall and Hann (2009), Bauer and Hann (2010) and Chava (2014).

[17] If the price adjustment is gradual, socially responsible assets might enjoy a superior performance than non-responsible ones during the adjustment period (see, for example, Guenster, Bauer, Derwall, and Koedijk (2010), Derwall, Koedijk, Horst (2011), and Edmans (2011) for empirical evidence consistent with this idea).

responsible firm is smaller.[18]

3.2 Voting-with-our-feet equilibrium

In this section, we assume that before selling the firm, the initial owner can fix the firm's responsibility status s irreversibly. Once s is selected, the owner sells the firm to atomistic investors who cannot change s. This implies that the initial owner of the firm selects the degree of corporate responsibility to maximise its market value. The owner knows that, if the pro-social investment is not performed, responsible investors will reduce their demand for its shares. This has an adverse effect on its market value and on its cost of capital, which has to be weighted with the cost c to invest more responsibly.

Definition 1. *A voting-with-our-feet equilibrium is defined by a vector* (P^*, s^*, h_i^*) *such that*

1. *Optimal portfolio allocation:* $h_i^* \in \arg\max \mathbb{E}U\left((r - P^* + s^*(x_i e - c))h_i\right)$*;*
2. *Market clearing condition:* $\int_0^1 h_i^* di = 1$*;*
3. *The firm invests responsibly if it increases its market value:* $s^* = 1$ *iff* $P(s = 1) > P(s = 0)$.

We have seen above that the market value of the firm is $\mu - A\sigma^2 + \pi e - c$ and $\mu - A\sigma^2$ respectively if it behaves responsibly or not. Thus, we obtain that $s^* = 1$ if and only if πe is larger than c, or $\pi \geq c/e$. This is the case if the proportion of responsible investors is large, or if the social benefit to cost ratio is large.

Proposition 1. *There are two possible voting-with-our-feet equilibria:*

[18] This result can explain why extant empirical studies disagree on the impact of CSR on firm value and on the performance of SR mutual funds (see, for example, Wagner (2001), Orlitzky, Schmidt, and Rynes (2003), Bauer, Koedijk, and R. Otten (2005), Geczy, Stambaugh, and Levin (2005), and Margolis, Elfenbein, and Walsh (2009), Renneboog, Horst, and Zhang (2008)).

- *The SR equilibrium in which the firm behaves responsibly,* $P^* = \mu - A\sigma^2 + \pi e - c$, *and responsible investors hold more of the firm's equity in their portfolio than the conventional investors.*

- *The non-SR equilibrium in which the firm does not behave responsibly,* $P^* = \mu - A\sigma^2$, *and all investors hold the same portfolio.*

When π *is larger (resp. smaller) than* c/e*, the SR (resp. non-SR) equilibrium exists.*

The underlying incentive mechanism is simple: the credible threat of responsible investors to reduce their investment in the firm if it does not behave responsibly provides an incentive for corporate social responsibility. Indeed, it reduces the market value of irresponsible firms. In other words, it raises their cost of capital.[19] The incentive scheme is made stronger when the proportion of pro-social investors increases on the market. Notice however that the incentive is too weak in the sense that it may be possible that a socially desirable investment ($e > c$) is not implemented because doing so would reduce the market value of the firm ($\pi e < c$).

We can try to give numbers here. In the Stern Review (2006), the damages generated by the emission of greenhouse gases in the business-as-usual scenario are estimated to be equivalent to an immediate and permanent loss of the world GDP by an amount comprised between 5% and 20%. To fix ideas, let us consider the middle $e = 12.5\%$ of this interval. At the same time, Stern estimates that most of these consequences could be eliminated by sacrificing immediately and permanently 1% of the world GDP invested in alternative/new technologies to reduce emissions. Thus, for the application of climate change, we can estimate

[19] This effect has been studied theoretically by Heinkel et al. (2001) and empirically by Hong and Kacperczyk (2009). A recent study by Gantchev, Giannetti, and Li (2020) uses RepRisk news data analysis on firms' environmental and social risks. They show that institutional investors divest firms with negative environmental and social news, both for pecuniary and non-pecuniary motives and that this is associated with subsequent improvements in environmental and social performance. This study suggests that investors vote with their feet and have an impact on corporate behaviour.

the ratio c/e around 8%. This suggests that social efficiency could be obtained in the voting-with-our-feet equilibrium if the proportion of altruistic investors is larger than 8%.

3.3 Equilibria with shareholders' vote

Investors can vote with their feet, but they can also intervene directly through shareholder meetings. To make this possible, let us change the timing of the game. The initial owner of the firm cannot irreversibly select s ex ante. This assumption is of interest because implementing a corporate strategy takes time and should be undertaken on a progressive basis.

We take these effects into account by considering the following timing. At date 1, investors buy the firm's shares at price P. At date 2, the general assembly of the corporation votes on a proposal to invest more or less responsibly based on a one-share-one-vote. At date 3, returns are realised. We denote by v_i the vote of agent i for each share he holds in the firm. $v_i = 1$ corresponds to a vote in favour of $s = 1$ and $v_i = 0$ to a vote in favour of $s = 0$. The aggregate vote in favour of strategy $s = 1$ is defined as $v = \int_0^1 v_i h_i di$. The majority rule implies that, if $v \geq \frac{1}{2}$, the pro-social strategy $s = 1$ is adopted. Otherwise, the firm adopts the purely financial strategy.

Since investors are atomistic, they are never pivotal in the vote on corporate strategy. As a result, any voting outcome can be sustained at equilibrium. But investors have rational expectations and anticipate what the outcome of the vote will be depending on the proportion of the various types of investors in the firm's capital. This enables them to derive their demand for assets.

To restrict the set of equilibria, we define a sincere voting strategy as a voting rule in which investors vote according to their social orientations: responsible investors vote for the pro-social strategy $s = 1$ while conventional investors vote for the purely financial strategy

$s = 0$.[20]

Definition 2. *A shareholder-vote equilibrium is defined by a vector* (P^*, s^*, h_i^*, v_i^*) *such that*

1. *Optimal portfolio allocation: for all* i, $h_i^* \in \arg\max \mathbb{E}U\left((r - P^* + s^*(x_i e - c))h_i\right)$;
2. *Market clearing condition:* $\int_0^1 h_i^* di = 1$;
3. *Corporate strategy of the firm:* $s^* = 1$ *if* $v^* = \int_0^1 v_i^* h_i^* di \geq \frac{1}{2}$, *and* $s^* = 0$ *otherwise, with* $v_i^* = x_i$.

Condition 1 states that the two types of investors are choosing optimal portfolios given the corporate strategy that is expected to be selected at equilibrium. Condition 2 is the market-clearing condition. Condition 3 indicates that we focus on equilibria with sincere voting strategies.

Let us consider first the equilibrium in which it is expected that the proposal to invest more responsibly will be defeated at the general assembly. As we already know, this implies that all investors, socially responsible or not, hold one share $h_i^* = 1$ of the firm, which implies that $P^* = \mu - A\sigma^2$. We now verify under what condition this equilibrium exists. To do so, we need to verify that the condition $v^* < \frac{1}{2}$ holds. Because all investors hold the same number of shares, the proportion of votes in favour of the pro-social strategy is the same as the proportion of socially responsible agents in the economy. Thus, $s^* = 0$ is an equilibrium if and only if π is smaller than $1/2$. The equilibrium in which the firm chooses the purely financial strategy exists if and only if a majority of investors are not responsible.

Let us now consider the alternative equilibrium in which it is expected that the proposal to invest more responsibly will get a majority vote at the general assembly. We know that this implies that

$$h_i^* = 1 + \frac{(x_i - \pi)\, e}{A\sigma^2}, \tag{3.5}$$

[20] If there was a strictly positive probability that an investor is pivotal, sincere voting would dominate. This is because we assume that there is no re-trading between the vote and the final outcome.

and

$$P^* = \mu - A\sigma^2 + \pi e - c.$$

The proportion of votes in favour of social responsibility is thus equal to

$$v^* = \int x_i h_i^* di = \pi \left(1 + \frac{(1-\pi)\, e}{A\sigma^2}\right). \tag{3.6}$$

Thus, a shareholder-vote equilibrium inducing the firm to behave responsibly exists iff v^* defined by (3.6) is larger than 1/2. From equation (3.6), we see that the proportion v^* of shares held by responsible investors is larger than their proportion π on the market, since they hold proportionally more of the responsible asset in their portfolio. Thus, it may be possible that the pro-social proposal succeeds in the general assembly although there is a minority of responsible agents on the market. This is more likely to be the case if $e/A\sigma^2$ is large.

Proposition 2. *The two possible shareholder-vote equilibria are the SR and non-SR equilibrium described in Proposition (1). When v^*, which is defined by (3.6), is smaller than 1/2, only the non-SR equilibrium exists. When π is larger than 1/2, only the SR-equilibrium exists . Finally, when $\pi \leq 1/2 \leq v^*$, the two equilibria exist.*

The condition $\pi \leq 1/2 \leq v^*$ can be rewritten as $\frac{1}{2} - \frac{A\sigma^2}{2e}\left[\left(1 + \frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right] \leq \pi \leq 1/2$. When this condition is satisfied, the two sincere voting equilibria characterised above exist; the prevalence of one equilibrium instead of another depends on whether investors coordinate their anticipations on the responsible strategy being chosen or not.

The threshold $\underline{\pi} = \frac{1}{2} - \frac{A\sigma^2}{2e}\left[\left(1 + \frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right]$ reflects the fact that an equilibrium in which most of investors vote in favour of the responsible strategy depends on the relative importance of the externality perceived by responsible investors and of the risk they bear when they deviate from the portfolio that is optimal from a purely financial point of view.

Indeed, the threshold $\underline{\pi}$ varies positively with the ratio $\frac{A\sigma^2}{e}$. If the externality appears small compared to the risk, $\underline{\pi}$ is high: responsible investors need to be more prevalent for the responsible strategy to be adopted because each of them is less incline to overweight the responsible firm in their portfolio. On the contrary: If the externality appears large compared to the risk, $\underline{\pi}$ is low: the responsible strategy may be adopted even if responsible investors are not very prevalent on the market because each of them is willing to overweight the responsible firm in their portfolio.

4. Extensions

This section proposes four extensions of the baseline model. A first extension considers that the externality imposed by the firm on society is negative. This captures exclusionary-types of strategies by which investors aim at avoiding firms that implement socially harmful activities. We then study the impact on the choice of corporate strategy. A second extension considers the two-firm case. This enables to investigate how the willingness to diversify influences the ability of responsible investors to affect corporate strategies. A third extension studies the effect of super-majority voting rules associated with corporate forms oriented towards corporate social responsibility. The last extension considers the role of a large impact investor to analyse whether such investor could deliver at the same time financial abnormal returns and positive externality for society.

4.1 The negative externality/exclusion case

This subsection considers the same model as before, except that the firm's externality is negative instead of positive. This enables us to model the impact of exclusionary investment strategies. At date 2, when the firm is confronted with a choice between two alternative strategies, strategy $s = 0$ generates a negative externality and its expected return is

$Er\left(s=0\right)=\mu>0$. The externality is $-e>0$ units of numeraire per share. Strategy $s=1$ has no social externality. The firm's expected (financial) return if the responsible strategy $s=1$ is adopted is $Er\left(s=1\right)=\mu-c$, in which $c>0$ represents firm's financial cost of implementing the pro-social activity, i.e., not imposing a negative externality on society. As before, we assume that $e>c$ so that the responsible strategy is desirable from a social point of view.

Let's first consider the case in which investors expect that the firm will adopt the pro-social strategy that emits no negative externality: $s=1$. All investors solve the same one-risk-free, one-risky portfolio choice problem which results in $P(s=1)=\mu-c-A\sigma^2$. Since the firm generates no externality, the pricing equation reflects only the risk-return tradeoff, and the holding equation shows that all agents hold the same portfolio. We suppose that $\mu-c-A\sigma^2$ is positive, so that the value of the firm with the responsible strategy is positive.

Suppose now that investors believe that the firm will adopt the non-responsible behaviour. Investor i's optimisation program is:

$$\max_{h_i}\mathbb{E}U((r-P-x_ie)h_i)=U((\mu-P-x_ie)h_i-0.5Ah_i^2\sigma^2).$$

It yields a demand for firm's shares of $h_i=\frac{\mu-x_ie-P}{A\sigma^2}$. Market-clearing yields a firm's share price equal to $P\left(s=0\right)=\mu-\pi e-A\sigma^2$. As before, the share price incorporates part of the negative externality because responsible investors shed down their demand for the non-responsible firm. At equilibrium, after-trading holdings are given by $h_i\left(s=0\right)=1-\frac{(x_i-\pi)e}{A\sigma^2}$, for all i. As before, responsible investors' holdings are lower when the firm is expected to be non-responsible compared to when it is expected to be responsible. However, different from the positive externality case, responsible investors' holdings are affected when the firm is expected to be non-responsible.

If the initial owner can fix the firm's responsibility status s irreversibly before selling

the firm, he will choose the responsible strategy $s = 1$ if $c < \pi e$, as in the baseline model. When the choice of strategy is made by the general assembly of shareholders after the firm has been sold by the initial owner, the voting equilibrium with a responsible corporate strategy ($s^* = 1$) exists if responsible investors are a majority, i.e., $\pi \geq \frac{1}{2}$. The equilibrium with a non-responsible strategy, $s^* = 0$, exists if $\pi \leq \frac{1}{2} + \frac{A\sigma^2}{2e}\left[\left(1 + \frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right]$. As in the positive-externality case, the two equilibria can co-exist. However, the equilibrium situation is less conducive to the adoption of a responsible corporate strategy for two reasons. First, the existence region of the non-responsible equilibrium, defined by $\pi \in \left[0, \frac{1}{2} + \frac{A\sigma^2}{2e}\left(\left(1 + \frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right)\right]$, is larger than in the positive externality case, $\pi \in \left[0, \frac{1}{2}\right]$. This is because responsible investors shy away from non-responsible firms that emit negative externalities, thus lowering their influence on the voting outcome. Second, the region of parameters for which the responsible equilibrium exists, defined by $\pi \in \left[\frac{1}{2}, 1\right]$ is smaller than in the positive externality case, $\pi \in \left[\frac{1}{2} - \frac{A\sigma^2}{2e}\left(\left(1 + \frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right), 1\right]$. This is because the responsible firm, which is neutral in terms of externalities, is equally attractive for all types of investors. As a result, a responsible corporate strategy prevails only when responsible investors are in majority.

This analysis enables us to assess the influence of different types of socially responsible (SR) investment strategies used in practice. In its 2018 report[21], the European Sustainable Investment Forum defines two types of SR strategies: exclusion and norm-based screening strategies whereby investors underweight (or even completely boycott) firms or sectors that are judged irresponsible, and best-in-class and sustainability themed strategies whereby investors overweight the firms or sectors deemed the most responsible. Our analysis suggests that exclusion and norm-based screening are damageable to the adoption of more responsible practices in the targeted firms or sectors.

[21]The Eurosif 2018 report on European SRI can be accessed at `http://www.eurosif.org/wp-content/uploads/2018/11/European-SRI-2018-Study.pdf`.

4.2 The two-firm case

This subsection extends the baseline model to an economy including two firms indexed by $j \in \{1, 2\}$. Firms' financial returns at date 3 are denoted by r_j per share, with r_1 and r_2 jointly normal with mean Er_j, variance σ_j^2, and correlation coefficient ρ. At date 2, shareholders in both firms vote to decide what strategy s_j is implemented by firm j, with $s_j = 0$ refering to the neutral strategy without externality and $s_j = 1$ to the responsible strategy that emits a societal externality $e_j > 0$, for all j. The expected returns of firm j are $Er\left(s_j = 0\right) = \mu_j$ and $Er\left(s_j = 1\right) = \mu_j - c_j$, depending on the strategy. The parameter $c_j > 0$ represents the financial cost for firm j to implement the responsible strategy. We assume that $e_j > c_j$ so that the responsible strategy is desirable from a social point of view. The transaction prices at date 1 are denoted by P_j. The number of shares is normalised to 1 for both firms.

We solve this extension as the baseline model by proceeding backward. Assume first that investors anticipate that $s_j = 0$, for all j, so that firms are expected to emit no externalities. First-order conditions of investors' maximisation program yield the following holdings for investor i in firm j: $h_i^j(s_1 = 0, s_2 = 0) = \frac{\mu_j - P_j}{A\sigma_j^2} - \frac{\rho\sigma_1\sigma_2}{\sigma_j^2} h_i^k(s_1 = 0, s_2 = 0)$, for all i, j and $k \neq j$. For an investor, holdings of one asset may increase or decrease with holdings of the other asset, depending whether the correlation between asset returns is negative or positive, respectively. This effect reflects the willingness of investors to diversify risk. Market-clearing conditions deliver the following pricing formula: $P_j = \mu_j - A\left(\sigma_j^2 + \rho\sigma_1\sigma_2\right)$, for all j. Equilibrium holdings are $h_i^j\left(s_1 = 0, s_2 = 0\right) = 1$, for all i and j. These formula correspond to the standard Capital Asset Pricing Model: all investors hold the same portfolio of risky assets and asset prices reflect a risk premium that depends on aggregate risk aversion and level of risk. This equilibrium exists if and only if $\pi \leq \frac{1}{2}$ so that responsible investors are in minority in both firms.

Consider now that investors anticipate that $s_1 = 1$ and $s_2 = 0$, so that firm 1 is expected

to be responsible and firm 2 to be neutral. Holdings are $h_i^1(s_1=1,s_2=0)=\frac{\mu_1-c_1+x_ie_1-P_1}{A\sigma_1^2}-\frac{\rho\sigma_1\sigma_2}{\sigma_1^2}h_i^2(s_1=0,s_2=0)$ and $h_i^2(s_1=1,s_2=0)=\frac{\mu_2-P_2}{A\sigma_2^2}-\frac{\rho\sigma_1\sigma_2}{\sigma_2^2}h_i^1(s_1=0,s_2=0)$. Holdings reflect both investors' moral preferences and their willingness to diversify. Unless the correlation between assets' return is null, i.e., unless $\rho=0$, the diversification motive induces the demand for the neutral asset to depend on the externality emitted by the responsible asset. For example, if the correlation between asset returns is negative over-investment in the responsible asset induces more risk for responsible investors who thus over-invest in the neutral asset in order to hedge. There is thus a spillover from the responsible to the neutral asset. Market-clearing yields the following pricing formula: $P_1=\mu_1-c_1+\pi e_1-A\left(\sigma_1^2+\rho\sigma_1\sigma_2\right)$ and $P_2=\mu_2-A\left(\sigma_2^2+\rho\sigma_1\sigma_2\right)$. As before, asset prices include a risk premium to compensate investors for bearing aggregate risk. Moreover, as in the baseline model, the responsible asset price incorporates a responsibility premium that is positive when $\pi e_1>c_1$. Equilibrium holdings are $h_i^1\left(s_1=1,s_2=0\right)=1+\frac{(x_i-\pi)e_1}{A\sigma_1^2(1-\rho^2)}$ and $h_i^2\left(s_1=1,s_2=0\right)=1-\frac{(x_i-\pi)e_1}{A\sigma_1^2(1-\rho^2)}\times\frac{\rho\sigma_1\sigma_2}{\sigma_2^2}$, for all i. Interestingly, holdings of the neutral asset depend on the externality and risk of the responsible asset, both for altruistic and for non-altruistic investors. These effects are due to the presence of the spillover described above.

This equilibrium exists if and only if $\pi\times\left(1+\frac{(1-\pi)e_1}{A\sigma_1^2(1-\rho^2)}\right)\geq\frac{1}{2}$ and $\pi\times\left(1-\frac{(1-\pi)e_1}{A\sigma_1^2(1-\rho^2)}\times\frac{\rho\sigma_1\sigma_2}{\sigma_2^2}\right)<\frac{1}{2}$ so that strategies $s_1=1$ and $s_2=0$ are adopted by firms 1 and 2, respectively. These two conditions are equivalent to $\pi\geq\frac{1}{2}-\frac{A\sigma_1^2(1-\rho^2)}{2e_1}\left[\left(1+\frac{e_1^2}{(A\sigma_1^2(1-\rho^2))^2}\right)^{\frac{1}{2}}-1\right]$ and $\pi<\frac{1}{2}+\frac{A\sigma_1^2(1-\rho^2)}{2e_1}\times\frac{\sigma_2^2}{\rho\sigma_1\sigma_2}\times\left[\left(1+\frac{e_1^2}{(A\sigma_1^2(1-\rho^2))^2}\times\frac{(\rho\sigma_1\sigma_2)^2}{(\sigma_2^2)^2}\right)^{\frac{1}{2}}-1\right]$, respectively.

The two existence conditions cannot be both satisfied if the lower bound on π is larger than the upper bound, i.e., if:

$$\rho<-\frac{\left[\left(1+\frac{e_1^2}{(A\sigma_1^2(1-\rho^2))^2}\times\frac{(\rho\sigma_1\sigma_2)^2}{(\sigma_2^2)^2}\right)^{\frac{1}{2}}-1\right]}{\left[\left(1+\frac{e_1^2}{(A\sigma_1^2(1-\rho^2))^2}\right)^{\frac{1}{2}}-1\right]}\times\frac{\sigma_2^2}{\sigma_1\sigma_2}<0.$$

Indeed, in this case, socially responsible investors overweight the responsible firm, firm 1, and, for hedging motives, want to also overweight the non-responsible firm, firm 2, because returns' correlation is negative. However, if returns' correlation is highly negative, they significantly overweight firm 2 and gain majority in firm 2 that thus does not stay neutral and adopt the responsible strategy.

Finally, consider that investors anticipate that $s_1 = s_2 = 1$ so that both firms are expected to be responsible. Following the same logic as above, prices are $P_j = \mu_j - c_j + \pi e_j - A\left(\sigma_j^2 + \rho\sigma_1\sigma_2\right)$. Equilibrium holdings are $h_i^j\left(s_1 = 1, s_2 = 1\right) = 1 + \frac{(x_i - \pi)}{A\sigma_j^2(1-\rho^2)}\left(e_j - \rho\frac{\sigma_1\sigma_2}{\sigma_k^2}e_k\right)$ for all investors i and firms j and $k \neq j$. These asset prices and holdings correspond again to the standard CAPM, augmented by the impact of pro-social preferences. The voting outcomes correspond to the equilibrium conjecture if and only if $\pi \times \left(1 + \frac{(1-\pi)}{A\sigma_j^2(1-\rho^2)}\left(e_j - \rho\frac{\sigma_1\sigma_2}{\sigma_k^2}e_k\right)\right) \geq \frac{1}{2}$, for all firms j and $k \neq j$, i.e., $\pi \geq \pi_j = \frac{1}{2} - \frac{A\sigma_j^2(1-\rho^2)}{2\left(e_j - \rho\frac{\sigma_1\sigma_2}{\sigma_k^2}e_k\right)}\left[\left(1 + \frac{\left(e_j - \rho\frac{\sigma_1\sigma_2}{\sigma_k^2}e_k\right)^2}{(A\sigma_j^2(1-\rho^2))^2}\right)^{\frac{1}{2}} - 1\right]$.

To see how these thresholds vary with the degree of correlation between the two firms' payoffs, consider the simple case in which $\sigma_1 = \sigma_2 = \sigma$ and $e_1 = e_2 = e$. In this case, the two thresholds are identical and equal to $\frac{1}{2} - \frac{A\sigma^2(1+\rho)}{2e}\left[\left(1 + (\frac{e}{A\sigma^2(1+\rho)})^2\right)^{\frac{1}{2}} - 1\right]$. This threshold increases with the level of correlation ρ between asset returns. The intuition is that the higher the correlation, the higher the level of risk incurred by investors and the less they are willing to deviate from the market portfolio (that includes one unit of each asset). Indeed, equilibrium holdings are $h_i^j\left(s_1 = 1, s_2 = 1\right) = 1 + \frac{(x_i - \pi)}{A\sigma^2(1+\rho)}e$ for all investor i and firm j so that the equilibrium holdings of responsible investors decrease with ρ. We can compare this case with $s_1 = s_2 = 1$ to the single firm case with $s = 1$. The threshold for an equilibrium with responsible firms is higher for the two-firm case than for the single-firm case if $\rho > 0$. Otherwise, it is lower.

This analysis suggests that responsible strategies are more likely when firms' returns are less correlated among each others. This is because when responsible investors increase

holdings in one firm above the level that is optimal in terms of risk-return profile, they have an interest in increasing their holdings in the other firms. This implies that if investors want to maintain a given exposure to an industrial sector or to a country, responsible strategies should be observed more often in sectors and countries in which there is less correlation in firms' returns.

4.3 Alternative corporate charter

In this subsection, we consider that the initial owner of the firm can adopt a corporate statute that enables to set the responsible strategy as the default strategy and to demand a super-majority of two-third to abandon it. In the US, an example of such disposition is the benefit corporation, which displays in its charter a specific purpose aimed at creating public benefit. The benefit corporation statute requires a two-thirds super-majority vote to be overturned into a traditional corporation (Colombo, 2019). We study whether the initial owner would like to adopt such a statute.[22]

If the initial owner adopts the benefit corporation statute and sells the share of the firm at date 1, the choice of strategy is determined at date 2 by super-majority voting among investors. The firm stays responsible at date 2 if the proportion of votes in favour of strategy $s = 1$ is larger than one third: $v^* = 1/3$. This is because, due to the super-majority requirement, conventional investors need to gather support from holders of more than two third of the shares to overturn the responsible strategy. If investors anticipate that the firm will adopt the responsible strategy, the condition that needs to be satisfied for this to be an equilibrium is $v^* = \pi\left(1 + \frac{(1-\pi)e}{A\sigma^2}\right) \geq 1/3$. This condition holds if the proportion of shares held by responsible investors is large enough which, in fine, translates

[22] As in the baseline model, the market value of the firm at date 1 is $\mu - A\sigma^2 + \pi e - c$ or $\mu - A\sigma^2$ if the responsible strategy is chosen at date 2 or not chosen, respectively. If the initial owner is purely financially oriented, he would like the firm to choose the benefit corporation statute and the responsible strategy $s = 1$ if and only if πe is larger than c, or $\pi \geq c/e$. While he is only concerned about social welfare, he would like the firm to choose the benefit corporation statute and the responsible strategy, if $e \geq c$.

into the following condition regarding the proportion of responsible investors on the market: $\pi \geq \underline{\pi}^{BC} = \frac{1}{2} - \frac{A\sigma^2}{2e}\left[\left(1 + \frac{e^2}{(A\sigma^2)^2} + \frac{2}{3}\frac{e}{A\sigma^2}\right)^{\frac{1}{2}} - 1\right]$. If investors anticipate that the firm will adopt the conventional strategy, the condition for an equilibrium in which this is the case is: $\pi < 1/3$.

The impact of the super-majority requirement is thus threefold. First, it reduces the size of the region of existence of the equilibrium with a non-responsible firm: for the firm to adopt the non-responsible strategy, the proportion π of responsible investors needs to be less than 1/3 with the benefit statute, instead of 1/2, absent the benefit statute. Second, it increases the size of the region of existence of equilibrium with a responsible firm: the threshold $\underline{\pi}^{BC}$ is lower $\underline{\pi}$. Third, the region with equilibrium multiplicity is lower when the benefit corporate statute is chosen. Indeed, absent such statute, there is equilibrium multiplicity if π is between $\underline{\pi}$ and 1/2. With the benefit statute, multiplicity arises if π lies within a smaller interval, between $\underline{\pi}^{BC}$ and 1/3. This last effect is less direct than the first two ones and suggests that super-majority requirements embedded in the benefit corporation statute may reduce the uncertainty related to the coordination of expectations regarding corporate social responsibility.

4.4 Engagement by a large investor

This subsection studies what could be the role and financial performance of a large investor, referred to as a raider, who stands ready to hold large stakes in firms.[23]

We introduce a date 0 in our model. We assume that, for exogenous liquidity reasons, the initial owner wants to sell the assets at date 0 to the raider or at date 1 to the atomistic investors. The formal objective of the initial owner of the firm is to maximise the proceeds

[23]Crifo, Durand and Gond (2019) in their study of the socially responsible investment tendencies on an example of the French industry, make an emphasis on the particularly important role that the institutional investors may play in the transition process of corporations toward more sustainable operation. Amongst other complementary driving factors, authors identify the presence of a clear category definition, intermediary organizations, and the role of governments and regulators.

from sales by choosing the date at which the sale occurs. If the sale occurs at date 0, the initial owner gets P_0 from the raider. If the initial owner sells at date 1 directly to investors, the owner gets P_1 (we do not need to introduce any expectation operator since, at equilibrium, P_1 is perfectly anticipated), with P_1 being determined as in the previous section. As before, P_1 depends on whether responsible investors have or not a majority of votes. Dates 1, 2, and 3 proceed as in section 3.3.

At date 0, the risk-neutral raider stands ready to acquire the firm's financial assets. In order to do so, he makes a take-it-or-leave-it offer for the 100% of the shares to the initial owner.[24] His level of social responsibility is denoted by $\theta \in [0, 1]$, where θ represents the proportion of the externality that he internalises. We denote by $1 - \alpha$ the proportion of the firm's shares that the raider resells at date 1 at a price denoted P_1. The remaining α shares are held up to date 3. The α shares entitle the raider to vote on firm's corporate strategy at date 2. His vote is denoted V, with $V = 1$ if the raider votes for the responsible strategy and $V = 0$ otherwise. $\mathbb{E}_t U_R$ represents raider's expected utility conditional on information available at date t. Raider's expected utility at date 2 is $\mathbb{E}_2 U_R = (1 - \alpha) P_1 + \alpha (\mu + s(\theta e - c)) - P_0$: After purchasing the firm at price P_0, he sells a fraction $1 - \alpha$ at price P_1 and retains a fraction α, whose expected return is μ if the firm does not behave responsibly. It it does, the financial return is reduced by c. But the raider also takes into account of a fraction θ of the extra-financial return e of its investment in that case.

Definition 3. *A strategic-raider equilibrium is defined by a vector* $(P_0^*, P_1^*, s^*, \alpha^*, h_i^*, v_i^*, V^*)$ *such that*

1. *Atomistic investors' optimal portfolio allocation:*

   for all i, $h_i^* \in \arg\max \mathbb{E}U\left((r - P_1^* + s^*(x_i e - c))h_i\right)$;

[24] The initial owner not being atomistic alleviates the free-rider problem, analysed by Grossman and Hart (1980), that a raider would face when trying to buy shares from atomistic investors. In order to solve this free-rider problem, we could have instead considered that the raider's offer is conditional on the fact that all shares are tendered.

2. *Market clearing condition:* $\int_0^1 h_i^* di = 1 - \alpha^*$;

3. *Corporate strategy of the firm:* $s^* = 1$ *if* $v^* = \alpha^* V^* + \int_0^1 v_i^* h_i^* di \geq \frac{1}{2}$, *and* $s^* = 0$ *otherwise, with* $v_i^* = x_i$.

4. *Take-it-or-leave-it offer from the raider to the initial owner:* $P_0^* = P^*$, *where* P^* *is the shareholder-vote equilibrium price absent of the raider, as characterised in Proposition 2*;

5. *Large investor's optimal portfolio allocation:* $\alpha^* \in \arg\max \mathbb{E}_1 U_R(s^*)$;

6. *Large investor's voting strategy:* $V^* = 1$ *if* $\mathbb{E}_2 U_R(s^* = 1) \geq \mathbb{E}_2 U_R(s^* = 0)$, *and* $V^* = 0$ *otherwise.*

The first three conditions are interpreted as in the previous section. A difference is that the number of shares available for investors is $1 - \alpha$ instead of 1. This changes the risk premium and the level of investors' holdings in the firm. Condition 4 indicates that the raider proposes the initial owner a price that equals the amount the owner would get if he were to sell shares directly to investors at date 1 (P^* is the same as in the previous section).[25] Condition 5 indicates that the raider chooses at date 1 how many shares he wants to hold up to date 3 such that he maximises his expected utility (anticipating the strategy that is adopted at date 2). Finally, condition 6 indicates that, contrary to the atomistic non-pivotal voters, the raider votes at date 2 for the strategy that maximises his expected utility. We solve for the equilibrium by backward induction.

At date 2, the raider holds α^* shares, responsible investors hold $\int x_i h_i^* di$, and conventional investors hold the remaining shares. Raider's expected utility is $\mathbb{E}_2 U_R = (1 - \alpha^*) P_1^* + \alpha^* (\mu + s^*(\theta e - c)) - P_0^*$. If the raider is pivotal, he votes in favour of the responsible strategy

[25] The take-it or leave-it offer gives all the bargaining power to the raider. Other less extreme bargaining mechanisms would leave some surplus to the initial owner. This issue is not important from a theoretical viewpoint since all the results in this section hold as long as the raider captures some of the surplus.

if and only if:

$$(1-\alpha^*)\,P_1^* + \alpha^*\,(\mu+\theta e-c) - P_0^* \geq (1-\alpha^*)\,P_1^* + \alpha^*\mu - P_0^*,$$

or equivalently, if $\theta e \geq c$, or $\theta \geq c/e$. This inequality suggests that, at the voting stage, the raider votes in favour of the responsible strategy if he is sufficiently responsible and if the social cost to benefit ratio of the responsible investment is sufficiently low. Indeed, since it is financially damaging to implement the socially responsible strategy, the raider votes in favour of this strategy only if he experiences enough additional utility or perceived benefits from the increase in social responsibility.

4.4.1 Large investor's engagement towards more responsibility

We focus first on the case in which $\pi < \frac{1}{2} - \frac{A\sigma^2}{2e}\left[\left(1+\frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right]$. From Proposition 2, absent raider's intervention, the responsible strategy is not adopted at the sincere shareholder-vote equilibrium. In this case, the raider may implement an activist strategy: buying a non-responsible company, turning it into responsible, and reselling (part of) it on the market. This strategy is of interest because the raider can propose to acquire the firm at a pretty low price:

$$P_0^* = \mu - A\sigma^2. \tag{4.7}$$

The initial owner cannot do better than accepting the offer, since $\mu - A\sigma^2$ is the competitive price when the firm does not invest responsibly, in the absence of the large investor.

As a benchmark, we first consider an equilibrium in which the raider purchases the firm but votes against the responsible investment. As shown above, such a strategy is credible if and only if $\theta < c/e$. Because of the risk aversion of atomistic investors, it is an equilibrium that they do not purchase any share from the raider at date 1, which is sustained by price

$P_1^* = \mu$. So, the raider just takes advantage here of its risk-neutrality to purchase at price $\mu - A\sigma^2$ something that it values at μ. This equilibrium is described in the following proposition.

Proposition 3. *Suppose that* $\pi < \frac{1}{2} - \frac{A\sigma^2}{2e}\left[\left(1 + \frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right]$ *and* $\theta < c/e$. *Then, the strategic-raider equilibrium is such that*

- *(date 0) The initial owner sells the firm to the large investor at price* $P_0^* = \mu - A\sigma^2$;
- *(date 1) The large investor does not sell shares at date 1, and the price of shares is* $P_1^* = \mu$. *Atomistic investors do not hold shares of the firm;*
- *(date 2) The large investor does not adopt the socially responsible strategy;*
- *The equilibrium expected profit for the large investor is*

$$\mathbb{E}_1 U_R = A\sigma^2 \geq 0. \tag{4.8}$$

We hereafter examine the more interesting case in which the large investor holds enough shares of the firm and has a large enough social orientation to reverse the majority in favour of investing responsibly. Suppose that all investors anticipate this. As observed above, this equilibrium requires that θe be larger than c, otherwise the large investor will never vote in favor of more responsibility.

Anticipating the majority vote in favour of the responsible investment, the market equilibrium price and holdings at date 1 are given by $h_i^* = 1 - \alpha + (x_i - \pi)\, e/A\sigma^2$, for all i, and

$$P_1^* = \mu - (1 - \alpha)\, A\sigma^2 + \pi e - c. \tag{4.9}$$

At date 1, because the raider expects to be pivotal and change the firm's strategy towards more responsibility, his expected utility is given by $\mathbb{E}_1 U_R = (1 - \alpha)\, P_1^* + \alpha\,(\mu + \theta e - c) - P_0^*$.

In this case, the optimal amount of shares that he keeps after trading at date 1 is the one that maximizes $\mathbb{E}_1 U_R$. Replacing P_1^* by its expression above and solving yields

$$1 - \alpha^* = \frac{(\pi - \theta)e}{2A\sigma^2}. \tag{4.10}$$

When $\theta = \pi$, we obtain that $\alpha^* = 1$. Indeed, this is a situation in which the expected total return of the firm is evaluated in the same way by the two types of SR investors. Because atomistic ones are risk-averse, the only possible equilibrium price is $P_1^* = \mu + \theta e - c$, and atomistic investors have a zero net demand for the firm's shares. The large investor sells some of its shares at date 1 only if its social orientation θ is smaller than the proportion π of responsible agents in the population of atomistic investors. This is a situation in which the relatively lower degree of social orientation of the large investor induces it to sell some of its shares to those who value them more. The risk aversion of atomistic investors limits this transfer of risk from the risk-neutral raider. The larger the difference $\pi - \theta$ or the smaller the risk premium $A\sigma^2$, the smaller is the share α^* of the firm retained by the large investor.

We need to check whether there is a majority in favour of the responsible strategy of the firm at date 2. This is the case if

$$\alpha^* + \int x_i h_i^* di \geq \frac{1}{2}.$$

This inequality may be rewritten as

$$1 - \frac{(\pi - \theta)e}{2A\sigma^2} + \pi \frac{(\pi - \theta)e}{2A\sigma^2} + \pi \frac{(1 - \pi)e}{A\sigma^2} \geq \frac{1}{2}.$$

This is equivalent to

$$-\frac{(1 - \pi)(\pi + \theta)e}{2A\sigma^2} \leq \frac{1}{2},$$

which is always true. Thus, equation (4.10) characterizes the optimal holding strategy of

the large investor, which implies that the firm always behaves responsibly.

Proposition 4. *Suppose that* $\pi < \frac{1}{2} - \frac{A\sigma^2}{2e}\left[\left(1+\frac{e^2}{(A\sigma^2)^2}\right)^{\frac{1}{2}} - 1\right]$ *and* $\pi > \theta \geq c/e$. *Then, the strategic-raider equilibrium is such that*

- *(date 0) The initial owner sells the firm to the large investor at price* $P_0^* = \mu - A\sigma^2$;
- *(date 1) The large investor sells a fraction* $1 - \alpha^* = (\pi - \theta)e/2A\sigma^2$ *of the firm to atomistic investors at price*

$$P_1^* = \mu - c + 0.5(\pi + \theta)e.$$

Atomistic investor i *holds a fraction* $h_i^* = (x_i - 0.5(\pi + \theta))\, e/A\sigma^2$ *of the firm;*

- *(date 2) Responsible atomistic investors and the large investor vote in favour of the proposal to adopt the responsible strategy, which gets the majority;*
- *The equilibrium expected profit for the large investor is*

$$\mathbb{E}_1 U_R = A\sigma^2 + (\theta e - c) + \frac{(\pi - \theta)^2 e^2}{4A\sigma^2} \geq 0. \tag{4.11}$$

The expected total profit of the large investor is expressed in equation (4.11). The first source of profit is the risk premium $A\sigma^2$ that is ripped from the initial take-it-or-leave-it offer, as in the strategic-raider equilibrium without majority reversal. The net benefit of the majority-reversal strategy $V^* = 1$ is thus obtained by comparing this expected profit described by equations (4.11) and (4.8). For the raider, the total benefit from the majority-reversal strategy is thus:

$$(\theta e - c) + \frac{(\pi - \theta)^2 e^2}{4A\sigma^2} \geq 0. \tag{4.12}$$

The first term of the left hand-side of this inequality represents the raider's utility gain from making the firm socially responsible. The second term is the responsibility premium, i.e.,

the capital gain made by the raider when he sells back shares on the market at date 1 given his credible commitment to vote in favour of more corporate social responsibility. They are both positive. The sum of the two terms can be positive even for the case in which θe is smaller than c. However, in this case, the large investor is unable to credibly commit on the strategy to vote in favour of corporate social responsibility. Atomistic responsible investors know this and reduce their demand for the asset at date 1. This eliminates the possibility to extract the responsibility premium.

Observe also that an increase in the social orientation of the large investor may increase its purely financial profit. There is an upward jump in profitability when θ increases from below to above the threshold c/e. If the raider is not sufficiently socially responsible, $\theta < c/e$, he votes for the non-responsible strategy at date 2. This is rationally anticipated by investors at date 1. As a consequence, the price of shares at date 1 is not high enough to induce the raider to sell any of his shares: he keeps his entire holdings up to date 3 and has an expected wealth of $A\sigma^2$. If instead the raider is sufficiently socially responsible, $\theta \geq c/e$, he votes for the responsible strategy at date 2. Anticipating this, investors are ready to pay a high price to buy the shares at date 1. The raider then sells an amount $1 - \alpha^* = (\pi - \theta)e/2A\sigma^2$ at date 1 to benefit from this high price. In general, he cannot sell his entire holdings for two reasons.[26] On the one hand, if he sells a lot of shares on the market, investors have to bear more risk and this reduces the price. On the other hand, if he sells too many shares, he is no more pivotal. The financial performance of the large investor is increased by $(\pi-\theta)^2e^2/4A\sigma^2$ when θ crosses threshold c/e. This is because the large investor is then able to modify the beliefs of atomistic responsible investors about corporate social responsibility.

We show that responsible raiders display a better financial performance than non-responsible

[26]We could have included an additional date of trading after the vote without affecting our conclusions. In this case, the raider sell his remaining stake of the firm at this last date of trading because there are no control issues left. This would occur if investors are ready to pay a price that is high enough, i.e., if their level of social responsibility is high enough to compensate for their risk aversion.

ones if θ is larger than c/e.[27] The underlying economic intuition for this result is that the raider's social responsibility enables him to credibly commit on voting adequately once he has established a controlling position. The non-responsible raider would also like to pretend that he is going to vote adequately in order to resell part of his holdings at an inflated price. However, such a signal by the non-responsible raider would not be credible since, after having pocketed the responsibility premium, voting in favour of the responsible strategy would translate into lower returns for him. Since voting is assumed to occur after the raider has pocketed the responsibility premium, it would be beneficial for him to deviate from his announced voting strategy in order to increase further his profits. This translates into the fact that, unless the non-responsible raider can credibly commit to vote for the costly responsible strategy, he cannot replicate the high financial performance of the responsible raider. The degree of social responsibility should thus be observable by the market in order for the activist investment strategy to generate abnormal returns.

Our finding that active shareholder engagement with firms on pro-social issues may be profitable for investors is in line with recent evidence provided by Dimson, Karakas, and Li (2015) and Barko, Cremers, and Renneboog (2021). Dimson et al. (2015) investigate the engagement of a "large institutional investor with a major commitment to responsible investment". They document a 1.8% annual abnormal return after initial engagement. Successful engagement is associated with a 4.4% abnormal return, with governance and climate change engagements exhibiting the largest positive returns.[28]

Consistently with Dimson et al. (2015), Barko, Cremers, and Renneboog (2021) show

[27] If there were multiple raiders, abnormal profits from the activist investment strategy could derive from the presence of search costs or from informational costs. In the limiting case with perfect entry of raiders, these profits would just compensate the costs: would-be raiders would enter only if potential profits cover the cost of implementing the strategy.

[28] The authors analyse an extensive proprietary database of corporate social responsibility engagements with U.S. public companies from 1999–2009. Their work complements the results previously obtained by Barber (2007) and Becht, Franks, Mayer, and Rossi (2009) on the impact of shareholder activism centred on governance issues. Barber (2007) indicates that Calpers' engagement generated a significant increase in shareholder value. Becht et al. (2009) find that the Hermes UK focus fund generates positive abnormal return thanks to its engagement policy.

that engagement improves extra-financial performance of targeted firms with low ex-ante performance. with a positive abnormal return of 2.7% for targeted firms in the semester after the engagement. This abnormal return is even more pronounced, above 7%, for firms with the lowest ex-ante extra-financial performance.[29]

4.4.2 Large investor's engagement towards less responsibility

The mechanism for corporate change that we described in the previous section can also be directed towards less social responsibility: a raider could take control of a firm to turn its strategy from responsible to non-responsible. We derive in this section the circumstances in which this can happen. The interpretations are symmetric so we restrict here our attention to the condition of existence of such a scenario.

In order to characterise such equilibria, let us focus on the case in which $\pi > 0.5$: absent a raider's intervention, the responsible strategy is adopted at the shareholder-voting equilibrium. In this case, in order to buy shares from the initial owner, the raider proposes a price:

$$P_0^* = \mu - c + \pi e - A\sigma^2.$$

The initial owner cannot do better than accepting the offer.

At date 1, if the raider expects to be pivotal and change the firm's strategy towards less responsibility, his expected utility is given by: $\mathbb{E}_1 U_R = (1-\alpha) P_1^* + \alpha\mu - P_0^*$. The same computations as in the previous section show that $P_1^* = \mu - (1-\alpha) A\sigma^2$. In this case, the optimal amount of shares that he keeps after trading at date 1 is $\alpha^* = \arg\max_\alpha \mathbb{E}_1 U_R = 1$, that is, the raider keeps all the shares. This is because, given his risk neutrality, it would

[29] Barko, Cremers, and Renneboog (2021) study corporate social responsibility activism on a global level from 2005 to 2014. They find that firms with high ex-ante extra-financial performance see their Environmental, Social, and Governance ratings deteriorate after engagement is made public, suggesting that engagement itself revealed information to the market.

not make sense for the raider to sell the risky shares to risk-averse investors. Obviously, this makes him pivotal for the firm's decision. As explained earlier, he votes against more responsibility if θ is smaller than c/e. This equilibrium is sustained by price $P_1^* = \mu$.

Proposition 5. *Suppose that $\pi > 1/2$, $\theta < c/e$ and $A\sigma^2 \geq \pi e - c$. Then, the strategic-raider equilibrium is such that*

- *(date 0) The initial owner sells the firm to the large investor at the low price $P_0^* = \mu + \pi e - c - A\sigma^2$;*
- *(date 1) The large investor does not sell shares at date 1, and the price of shares is $P_1^* = \mu \geq P_0^*$. Atomistic investors do not hold any share of the firm;*
- *(date 2) The large investor does not adopt the socially responsible strategy;*
- *The equilibrium expected profit for the large investor is*

$$\mathbb{E}_1 U_R = A\sigma^2 - (\pi e - c) \geq 0. \tag{4.13}$$

Overall, if the raider is not socially responsible in the sense that $\theta < c/e$, he has an interest in buying and holding the firm's shares, and in voting for the non-responsible strategy. By assuming that $A\sigma^2$ is larger than $\pi e - c$, the equilibrium price $P_0^* = \mu + \pi e - c - A\sigma^2$ in the absence of the large investor is smaller than μ, which is the large investor's valuation of the firm if he could reverse the pro-social strategy of the firm. This is actually done by purchasing and retaining 100% of the firm's shares.

This section shows that firms that are socially responsible might be the targets of takeovers by non-responsible raiders.[30]This occurs when the proportion of responsible in-

[30]Interesting insights related to this can be found in the works of DesJardine and Durand (2020) and DesJardine, Marti and Durand (2020), which develop a theory of how unintended audiences create reaction costs for firms in the context of CSR by focusing on how activist hedge funds react to CSR signals. The authors believe that aggressive hedge funds may interpret corporate social responsibility as a signal that the

vestors and the level of externality are low, and when the cost of corporate social responsibility, investors' risk aversion and the level of risk are high. The idea for purely financial raiders is to profit from the low share price that prevails for responsible firms in this case.

5. Conclusions

This paper studies asset pricing and corporate governance when some investors are socially responsible. Socially responsible investors take into account externalities generated by a firm when making their investment decisions. As result, these externalities are partially incorporated into its share price.When investors differ in their social orientation, there is a conflict of interest between the potential shareholders of the firm over corporate social responsibility. To resolve this conflict, we consider that investors vote between a non-responsible strategy that is financially profitable for the firm and a responsible strategy, which is less financially profitable but is desirable from a social point of view.

We first study a baseline model with atomistic investors. We determine under what circumstances corporate social responsibility will be favoured by shareholders. We show that this is the case if the positive externality and the proportion of responsible investors are large enough, and if investors' risk aversion and the level of risk are low enough. When it is not the case, at equilibrium, the purely financial strategy is adopted after the vote. We find that i) responsible investors can control the firm and choose the responsible strategy even if they are less numerous than conventional investors, and ii) the choice of corporate social responsibility may be fragile because it sometimes depend on self-fulfilling beliefs.

These results reveal some of the limits of responsible investments. Indeed, the responsible strategy may be desirable from a social point of view, because the cost of generating the

company has the intention and ability to act with a long-term vision and consider the interests of different stakeholders. However, unlike other stakeholders, activist hedge funds see intentions and capabilities that prevent firms from maximising shareholder value in the short term as "wasteful" and may target these firms.

externality is lower than its social benefit, but this strategy is not adopted by the firm due to the lack of support from shareholders. This might leave room for the intervention of a benevolent social planner. Whether the social planner garners the support of citizens to do so depends on the proportion of citizens directly affected by the externality and on the level of altruism of the others. Understanding these issues further could be an interesting avenue of future research.

We then examine several extensions of our baseline model to study the interaction between exclusion and engagement strategies, the case of multiple firms, alternative corporate charters and engagement by a large impact investor. These extensions yield several insights.: i) exclusion and norm-based screening strategies are damageable to the adoption of more responsible practices in the targeted firms or sectors; ii) responsible corporate strategies are more likely to be adopted when firms' returns are less correlated among themselves; iii) the super-majority requirement embedded in the benefit corporation statute makes responsible strategies more likely and less subject to multiple equilibria; iv) a large activist socially responsible investors can enjoy a higher performance than non-responsible ones and improve corporate social responsibility.

Our analysis could be extended further to better understand how various types of ethical motives influence investing and voting outcome and how strategic interactions between firms affect the impact of responsible investors and the way they should measure this impact. These avenues of research are left for future inquiries.

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