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Shareholder activism and socially responsible investors: Equilibrium changes in asset prices and corporate behavior[1]

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Abstract

We examine the functioning of financial markets when firms can invest in socially responsible activities that produce an externality at a cost. We examine a model in which some investors are altruistic in the sense that they internalize the assets' extra-financial performance when they value their portfolio. There are two mechanisms by which these pro-social investors can influence firm's decisions. They can vote with their feet, thereby raising the cost of capital of non-responsible firms. They can also try to get the majority of shares to impose their view to the management. We also examine a model in which there exists a large investor who can act strategically to influence the beliefs of atomistic investors about his vote. We show that an increase in the degree of pro-social motivation of the large investor may raise its purely financial profit.

Keywords: Corporate social responsibility, socially responsible investment, shareholder activism, asset pricing.

JEL Classification: G34, H23

1 Introduction

In this paper, we examine the conditions under which the presence of altruistic investors could induce corporations to behave more responsibly. Responsible behaviors are generating positive externalities (or less negative externalities than their peers). These externalities are valued by altruistic investors in proportion of their investment in the responsible firms. By altering their portfolio allocation towards responsible assets, altruistic investors can decrease the equilibrium cost of capital of responsible firms, thereby inducing them to behave more responsibly. However, this strategy can be counterbalanced by other investors, who will rebalance their portfolio in favor of "vice assets" because of their relative increase in expected return. To better understand the relationship between corporate behavior and investors' strategies, we explicitly consider that investors vote on corporate decisions. This enables us to study how shareholders' activism affects firm value.

We first derive the conditions under which socially responsible companies have a higher market capitalization than non-responsible ones. Responsible firms are more valued than non-responsible ones if socially responsible strategies are not too costly for firms, and if the externality and the proportion of altruistic investors are high enough. This shows that, in some circumstances, there is a corporate social responsability (CSR) premium associated with the fact that a company increases its level of CSR. The risk-adjusted return of socially responsible assets however appears to be always lower than the one of non-responsible assets. This is in line with the empirical results of Hong and Kacperczyk (2008) who show that vice assets enjoy a higher risk-adjusted return than other assets.

We then proceed to study under what conditions socially responsible investors can display a higher financial performance than non-responsible ones. When the number of socially responsible investors and the externality are high enough, and when responsible investors' risk aversion and undiversifiable risk are low enough, socially responsible strategies are naturally adopted by firms.[1] This is because socially responsible investors hold a majority of firms' capital which enables them to control shareholders' meetings. However, when socially responsible investors do not hold a majority of firms' shares,

[1]The size of the externality can also be interpreted as the strength of the consensus around the CSR issues under consideration, in line with discussions in Landier and Nair (2008).

socially responsible behaviors are not adopted. This can be avoided thanks to the intervention of a large socially responsible raider. This raider can buy and hold non-responsible firms' shares in an attemp to build a majority in favor of the socially responsible strategy. If he is not too risk averse, the raider will succeed in acquiring a controlling block. The socially responsible strategy is thus adopted at equilibrium. This can be associated with a positive abnormal return for the socially responsible raider if he is able to sell back part of the socially responsible firm and to pocket the CSR premium. This will indeed be the case when the cost of implementing the socially responsible strategy is low enough, and when the proportion of responsible investors and the level of the positive externality are high enough. Such a strategy could not be successfully implemented by a pure financial raider. Indeed, this raider would like to announce that he will vote in favor of the socially responsible strategy in order to pocket in the CSR premium. Since this announce is not credible if he is a pure financial player, socially responsible investors are not ready to pay a premium in order to buy firms' share and the raider does not display abnormal returns.

Overall, what is crucial in our framework for a socially responsible investor to be able to generate positive abnormal returns is: i) investing in non-responsible firms, ii) acquiring enough shares to be pivotal during shareholders' meetings, iii) being sufficiently enclined towards social responsability so that commitments to vote for costly increases in CSR are credible. These ingredients are consistent with anecdotal evidence from the field. The acquisition of TXU, a large Texas utility company, by two private equity firms, KKR and TPG, was made possible thanks to the promise not to launch new coal plants that would have dramatically increased the firm's CO2 emissions. This promise was made credible thanks to the endorsement of two environment protection institutes, EDF and NRDC, that were closely associated with the deal. The endorsement by the two institutes can be interpreted as a way for KKR and TPG to credibly commit to favor CSR.

One problem with the type of strategy we describe here is that it requires to invest in non-responsible companies before making them more responsible. This includes a reputational risk that some responsible investors, such as large pension funds, are not always ready to take. We also show that purely financial raiders can successfully acquire firms and make them less socially responsible when the cost of CSR is high and when the proportion of socially responsible investors and the level of the externality are low.

The rest of the paper is organized as follows. Section 2 presents our baseline model and equilibrium concept with competitive investors. Section 3 studies the impact of a large raider. Finally, Section 4 concludes.

2 Asset pricing and corporate behaviors with altruistic agents

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 is going to sell them to atomistic investors. The risk-free rate is normalized to 0. 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 with a mass of one such that $\int_0^1 di = 1$. 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. The number of firm's shares is normalized to 1, so that the market-clearing condition is $\int_0^1 h_i di = 1$. Investor i's final wealth is written $W_i = h_i(r - P)$.

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 $Er(s = 1) = \mu - c > 0$, 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.[2]

Investors differ upon their level of altruism. When they evaluate the performance of their investment, responsible investors internalize both the financial and the extra-financial returns. This means that they evaluate the return per share as $\mu - c - P + e$ for the responsible firm, and $\mu - P$ for the firm implementing strategy $s = 0$. The remaining investors referred to as standard investors do not value the externality. We use the dummy

[2]This is a crucial assumption. Socially responsible investment should require an acurate cost-benefit analysis of the actions that are recommended by shareholder activists.

variable x_i to express pro-social values, where x_i takes value 1 if investor i is atruistic, and 0 otherwise. Responsible investors constitute a proportion π of the investors, which means that $\int x_i di = \pi$.

2.1 Demand and price with and without corporate responsibility

The demand for the firm's shares and the equilibrium price is a function of the investors' expectations about the firm's behaviour.

Let's first consider the simple case where investors expect that the firm will not implement a pro-social behaviour: $s = 0$. Thus, all investors solve the same one-riskfree-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 maximizes $h(\mu - P) - 0.5h^2\sigma^2 A$. This yields $h_i^*(s = 0) = (\mu - P)/\sigma^2 A$. The market-clearing condition implies that $h_i^* = 1$ for all i, which implies that

$$P(s = 0) = \mu - A\sigma^2.$$

Since the firm generates no externality, the pricing equation reflects only the risk-return tradeoff, and the holding equation indicates that all agents hold the same portfolio.

Suppose alternatively that investors believe that the firm will implement the responsible behaviour. Investor i's optimization program is:

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

It yields the following demand for firm's shares:

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

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

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

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.

At equilibrium, after-trading holdings are given by:

$$h_i\left(s=1\right)=1+\frac{(x_i-\pi)e}{A\sigma^2}, foralli.$$

The responsible investors invest more in the responsible firm than non-responsible investors. Their additional investment increases with the level of the positive externality and decreases with their level of risk aversion and the level of risk.

The above pricing and holdings equations suggest that responsible investors can display a higher expected rate of return than no-responsible ones. Indeed, the expected financial performance of the firm is $Er(s=1)-P$, which is equal to $A\sigma^2-\pi e$. If this is positive, responsible investors invest more in the responsible firm which offers a higher expected rate of return than the risk free asset. But the reality is that the firm's equity return does not compensate enough for the risk. Responsible investors receive an additional compensation from the social return of the firm.

Our pricing results 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. Otherwise, the share price of the firm if it responsible is lower. This result can explain why extant empirical studies (see, for example, Wagner, 2001) disagree on the impact of CSR on firm value.

2.2 Voting-with-our-feet equilibrium

In this section, we assume that before selling the firm, the initial owner is able to fix s irreversibly. Once s is selected, the owner sell 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 maximize its market value. The owner knows that if the socially desirable investment is not performed, responsible investors will reduce their demand for its shares. That will have an adverse effect on its market value and on its cost of capital, which will have 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.*

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 invests 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-cost ratio is large.

Proposition 1 *There are two possible voting-with-our-feet equilibria. When* π *is smaller than* c/e*, the firm does not behave responsibly,* $P^* = \mu - A\sigma^2$*, and all investors hold the same portfolio. Otherwise, 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 standard investors.*

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. 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 (2007), the damage generated by the emission of greenhouse gases in the business-as-usual scenario is estimated to be equivalent to an immediate and permanent loss of the world GDP by an amount comprised between 5% and 20%. 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 the ratio c/e to somewhere between

5% and 20%. This suggests that social efficiency could be obtained in the voting-with-our-feet equilibrium if the proportion of altruistic investors is larger than this threshold around, say, 10%.

2.3 Equilibria with shareholder activism

Investors can vote with their feet. They can also intervene directly through shareholder activism. To make this possible, let us modify the timing of the game. At date 1, investors purchase the firm's shares at price P. At date 2, the general assembly of the corporation votes on a proposal to invest more responsibly on the basis of one-share-one-vote. At date 3, returns are realized. 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 favor of $s = 1$ and $v_i = 0$ to a vote in favor of $s = 0$. The aggregate vote in favor 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. However, investors have rational expectations and anticipate what the outcome of the vote will be depending on the share of the various types of investors in the firm's capital. This enables them to derive their demand for assets. We assume that, at equilibrium, investors coordinate on the same equilibrium.

We define an intuitive voting strategy as a voting rule in which investors vote according to their preferences: responsible investors vote for the pro-social strategy $s = 1$ while standard investors vote for the purely financial strategy $s = 0$.

Definition 2 *A shareholder-activism 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 intuitive voting strategies.

Let us consider first the equilibrium in which it is expected that the activist's proposal to invest more responsibly will be defeated at the general assembly. As we already know, this implies that all investors, altruistic or not, invest one unit $h_i^* = 1$ in 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 favor of the pro-social strategy is the same as the proportion of altruistic 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 is not responsible.

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

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

and

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

We now verify under which condition this equilibrium exists. To do so, we need to find the condition under which $s^* = 1$ is actually chosen at the voting stage, that is, the condition under which $v^* = \int x_i h_i^* di \geq \frac{1}{2}$. Given equation (1), this is true iff

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

From this equation, we see that the proportion v^* of shares hold by pro-social 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 activists' proposal succeeds in the general assembly in spite of the fact that there is a minority of altruistic agents on the market. This is more likely to be the case if $e/A\sigma^2$ is large.

Proposition 2 *There are two possible shareholder-activism equilibria. When v^*, which is defined by (2), is smaller than $1/2$, the firm does not behave responsibly, $P^* = \mu - A\sigma^2$, and all investors hold the same portfolio. When π is larger than $1/2$, 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 standard investors. When $\pi \leq 1/2 \leq v^*$, the two equilibria coexists.*

When $\pi \in \left[\frac{1}{2}\left(1 + \frac{(1-\pi)e}{A\sigma^2}\right)^{-1}, \frac{1}{2}\right]$, the two intuitive equilibria characterized 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.

3 Activism of a large investor

This section studies what could be the role and financial performance of a large investor, referred to as a raider, who stands ready to trade large stakes in firms.

We introduce a date 0 in our model. We assume that the initial owner wants to sell the assets for exogenous liquidity reasons at date 0 or 1. The formal objective of the initial owner of the firm is to maximize the proceeds from sales by choosing the date at which the sale occurs. If the sale occurs at date 0, the initial owner gets P_0. 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 2.3.

At date 0, a 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 to the initial owner.[3] His level of social responsability is denoted by $\theta \in [0, 1]$, where θ represents the proportion of the externality that he internalizes. We denote

[3]The initial owner not being atomistic alleviates the free-rider problem, analyzed 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.

by α the proportion of the firm's shares that the raider does not sell at date 1. If the raider buys firm's shares, he thus resells a proportion $1-\alpha$ at date 1 at a price denoted P_1. The remaining α shares are held. 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 *An 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, $h_i^* \in \arg\max \mathbb{E}U\left((r - P^* + s^*(x_i e - c))h_i\right)$;
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:* $P_0^* \geq P_1^*$;
5. *Large investor's optimal portfolio allocation:* $\alpha^* \in \arg\max \mathbb{E}_1 U_R\left(s^*\right)$;
6. *Large investor's voting strategy:* $V^* = 1$ *if* $\mathbb{E}_2 U_R\left(s^* = 1\right) \geq \mathbb{E}_2 U_R\left(s^* = 0\right)$, *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 requires that the raider proposes the initial owner a price that is at least higher than what the owner would get if he were to sell

shares directly to investors at date 1.[4] Condition 5 indicates that the raider chooses at date 1 how many shares he wants to hold up to date 3 such that he maximizes his expected utility (anticipating the strategy that is adopted at date 2). Finally, condition 6 indicates that the raider votes at date 2 for the strategy that maximizes his expected utility. We solve for the intuitive equilibrium by backward induction.

At date 2, the raider holds α^* shares, responsible investors hold $\int x_i h_i^* di$, and standard 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 favor of the responsible strategy 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 favor of the responsible strategy if he is sufficiently responsible and if the cost-benefit ratio of the responsible investment is sufficiently favorable. This is the case because, since it is financially damageable to implement the socially responsible strategy, the raider votes in favor of this strategy only if he experiences enough additional utility from the increase in social responsability.

3.1 Large investor's activism towards more responsibility

We focus first on the case in which $\pi < 0.5 \left(1 + (1-\pi) e / A\sigma^2\right)^{-1}$: absent raider's intervention, the responsible strategy is not adopted at the intuitive equilibrium. In this case, the raider proposes a price:

$$P_0^* = \mu - A\sigma^2. \tag{3}$$

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. We hereafter examine an equilibrium in which the large investor holds enough shares of the firm and is altruistic enough to

[4] 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.

reverse the majority in favour of investing responsibly. To do this 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 favour of more responsiobility.

Because the raider only releases $1-\alpha^*$ shares on the market, after-trading holdings are given by $h_i^* = 1 - \alpha^* + (x_i - \pi)\, e/A\sigma^2$, for all i. The same computations as in section 2.1 shows the market-clearing condition $\int_0^1 h_i^* di = 1 - \alpha$ holds if

$$P_1^* = \mu + \pi e - c - (1 - \alpha)\, A\sigma^2. \tag{4}$$

At date 1, if the raider expects to be pivotal and change the firm's strategy towards more responsability, 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

$$\alpha^* = 1 - \frac{(\pi - \theta)e}{2A\sigma^2}. \tag{5}$$

Is it enough to hold a majority in favour of the responsible strategy at date 2? That is, is the following condition

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

satisfied? 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 (5) characterizes the optimal holding strategy of the large investor, which implies that the firm always behaves responsibly. 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 non-standard 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 degree of altruism θ is smaller than the proportion π of altruistic agents in the population of atomistic investors. This is a situation in which the relatively lower degree of altruism of the large investor is compensated by its smaller degree of risk aversion to characterize the equilibrium transaction of shares at date 1. 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.

Proposition 3 *Suppose that* $\pi < 0.5\left(1 + (1-\pi)\, e/A\sigma^2\right)^{-1}$ *and* $\theta \geq c/e$. *Then, the intuitive equilibrium is such that*

- *(date 0) the initial owner sells the firm to the large investor at the low 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*

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

  Atomistic investor i *holds a fraction* $h_i^* = 1 - \alpha^* + (x_i - \pi)\, e/A\sigma^2$ *of the firm;*

- *(date 2) Altruistic atomistic investors and the large investor vote in favor of the proposal to invest more reponsibly, which gets the majority;*
- *the equilibrium expected profit for the large investor is*

$$\mathbb{E}_1 U_R = A\sigma^2 + \frac{(\pi - \theta)^2 e^2}{4A\sigma^2} + (\theta e - c) \geq 0. \tag{6}$$

The expected total profit of the large investor is expressed in equation (6). The first source of profit is the risk premium $A\sigma^2$ that is ripped from the initial take-it-or-leave-it offer. The second source comes from the trading of shares with atomistic investors who have a degree of altruism that is different from the large investor's degree of altruism. We refer to this term as the "responsibility premium". The third source is the extra-financial performance $\theta e - c$.

It may be useful to examine the benefit of this strategy compared to the one in which the large investor would instead vote against the responsible investment. If he intends to vote for the non-responsible strategy, his expected

utility is $\mathbb{E}_2 U_R = (1-\alpha) P_1^* + \alpha\mu - P_0^*$. In this case, $P_1^* = \mu - (1-\alpha) A\sigma^2$, and $\alpha^* = \arg\max_\alpha \mathbb{E}_2 U_R = 1$. It yields $\mathbb{E}_1 U_R = A\sigma^2$. This equilibrium is described in the following proposition

Proposition 4 *Suppose that* $\pi < 0.5\left(1 + (1-\pi)\, e/A\sigma^2\right)^{-1}$ *and* $\theta < c/e$. *Then, the intuitive equilibrium is such that*

- *(date 0) the initial owner sells the firm to the large investor at the low 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 investor* i *holds a fraction* $h_i^* = (x_i - \pi)\, e/A\sigma^2$ *of the firm;*
- *(date 2) The large investor does not implement the responsible investment;*
- *the equilibrium expected profit for the large investor is*

$$\mathbb{E}_1 U_R = A\sigma^2 \geq 0. \tag{7}$$

The net benefit of strategy $V^* = 1$ is thus obtained by comparing this expected profit described by equations (6) and (7). It yields a total benefit of corporate social responsibility

$$(\theta e - c) + \frac{(\pi - \theta)^2 e^2}{4A\sigma^2} \geq 0. \tag{8}$$

The first term of the left hand-side of this inequality represents the utility gain from the social responsability of the firm. 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 favor of more corporate social responsibility. They are both positive. It can be positive even when θe is smaller than c. However, the large investor is unable to credibly commit on the strategy to vote in favor of corporate social responsibility. Atomistic altruistic investors know that, which induces them to reduce their demand for the asset at date 1. This eliminates the possibility to extract the capital gain expressed by the second term in the LHS of equation (8).

Observe also that an increase in the degree of altruism of the large investor may increase its purely-financial profit. There is an upward jump in profitability when θ increases from below to above threeshold c/e. If the raider is not sufficently socially responsible, $\theta < \frac{c}{e}$, he votes for the non-responsible strategy at date 2, this is rationnally 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, $\theta \geq \frac{c}{e}$, 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. 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 optimal financial performance of the large investor is increased by $(\pi-\theta)^2e^2/4A\sigma^2$ when θ crosses thresold c/e. This is because the large investor is then able to modify the beliefs of altruistic small investors about corporate social responsibility.

We thus conclude that responsible raiders display a better financial performance than non-responsible ones if θ is larger than c/e. The underlying economic intuition for this result is that the raider's social responsability 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 favor 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. As discussed in the introduction, the alliance between private equity funds, such as KKR and TPG, with environment protection institutes, such as EDF and NRDC, can be explained by the willingness of financially oriented funds to enhance the credibility of their socially responsible commitments. Such an increase in

socially responsible credibility can be beneficial when the higher firm market capitalization it induces more than compensates the additional financial cost of pursuing socially responsible strategies. This is the case when the cost of implementing the socially responsible strategy, investors' risk aversion, and the level of risk are low enough, when the level of the externality are high enough, or when the discrepancy of the intensity of altruism between the large investor and the representative small investor is large enough.

3.2 Large investor's activism towards less responsibility

The mechanism for corporate change that we describe in the previous section can also be directed towards less social responsability: 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.

We now focus on the case in which $\pi > \frac{1}{2}$: absent a raider's intervention, the responsible strategy is adopted at the intuitive 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 responsability, 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 shows 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 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 intuitive 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 single shareholder votes against the proposal to invest more reponsibly;*
- *the equilibrium expected profit for the large investor is*

$$\mathbb{E}_1 U_R = A\sigma^2 - (\pi e - c) \geq 0. \tag{9}$$

Overall, if the raider is not socially responsible in the sense that $\theta < \frac{c}{e}$, 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. This occurs when the proportion of responsible investors and the level of externality are low, and when the cost of corporate social responsability, 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.

4 Conclusion

This paper studies asset pricing and corporate governance when some investors have altruistic preferences. In this case, the externalities generated by a firm are partially incorporated into its share price. When investors differ in their degree of altruism, there is a conflict of interest between the potential shareholders of the firm over corporate social responsability. To resolve this conflict, we consider that investors vote between a strategy that is financially profitable for the firm and a strategy (the responsible strategy) which is less financially profitable but is desirable from a social point of view.

We first study a situation in which investors are atomistic. We determine under what circumstances corporate social responsability will be favored by the shareholders of the firm. We show that this is the case if the externality and the proportion of altruistic 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. When the cost of the responsible strategy is low enough, the market capitalisation of the firm is higher if it is socially responsible.

We focus on this case and study the impact of a large investor who stands ready to acquire a pivotal stake in the firm. This large investor may acquire the company when it is non-responsible and turn it into responsible. This enables him to sell back part of his holdings at a higher price to socially responsible investors. He may not sell all his shares because he has to be pivotal at the future shareholder meetings. The profitability of this raid crucially depends on the fact that the large investor is himself or herself socially responsible.

This paper offers some theoretical support to the claim that socially responsible investors can enjoy a higher stock market performance than non-responsible investors. We show that this higher performance requires to not only invest in but also take control of non-responsible firms to turn them into responsible ones. Our theory predicts that the higher risk-adjusted stock market returns go along with a decrease in the firm financial performance but an increase in its social performance.

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