WORKING PAPERS

N° TSE-457

January 2014

"The "Washing Machine":Investment Strategies and Corporate Behavior with Socially Responsible Investors"

Christian Gollier
Toulouse School of Economics (LERNA-IDEI)
Sébastien Pouget
Toulouse School of Economics (IAE-CRM-IDEI)

INSTITUT D'ECONOMIE INDUSTRIELLE

Toulouse School of Economics

The "Washing Machine": Investment Strategies and Corporate Behavior with Socially Responsible Investors[1]

Christian Gollier
Toulouse School of Economics (LERNA-IDEI)
Sébastien Pouget
Toulouse School of Economics (IAE-CRM-IDEI)

January 7, 2014

[1]We are grateful to Rob Bauer, Milo Bianchi, Jeroen Derwall, Alex Edmans, Alexander Guembel, Nadja Guenster, Silvia Rossetto, Peter Schotman, and Stéphane Villeneuve for helpful comments. This research was supported by the Center on Sustainable Finance and Responsible Investment ("Chaire Finance Durable et Investissement responsable") at IDEI-R, and by the European Research Council under the European Community's Seventh Framework Programme (FP7/2007-2013) Grant Agreement no. 230589.

Abstract

This paper studies shareholder engagement in companies' strategic decisions. Differences of objective among shareholders arise in our model due to the presence of socially responsible investors. These investors take externalities into account when valuing their portfolio while conventional investors do not. Shareholders may affect corporate behavior via two mechanisms. They can vote with their feet: responsible investors may shy away from firms producing negative externalities, thereby raising their cost of capital. Investors can also engage in activism. Our main contribution is to show that a large activist investor can generate positive abnormal returns by investing in non-responsible companies and turning them into responsible. We call this strategy the "Washing Machine" and show that its successful implementation relies on a long-term horizon and a credible pro-social orientation.

Keywords: Asset pricing, corporate social responsibility, socially responsible investments, corporate engagement, shareholder activism.

JEL Classification: G34, H23

1 Introduction

Socially responsible investors constitute an important part of today's financial markets. According to the Social Investment Forum, about 11% of assets under management in the US is managed following this investment style. In Europe, this percentage has been growing at a fast pace to reach 17% of assets under management according to Eurosif. Socially responsible investors base their decisions not only on financial analysis but also on environmental, social, and governance criteria. Indeed, corporations produce positive and negative externalities that they do not usually internalize, because they do not translate into corporations' incomes and costs. Typical positive externalities can be found in the management of human resources (training to acquire skills that can be valued by other employers), or in the investment in R&D (production of non-patentable knowledge). But firms also produce negative externalities (pollution, health hazard,...).

Public institutions recommended by economists, such as Pigouvian taxes for example, have only partially reduced the inefficiencies in the allocation of resources that these externalities have generated in the economy. On the top of these institutions, the objective of socially responsible investors is to offer an appropriate long-run financial performance and to induce corporations to internalize the externalities they exert on Society. This is done by using extra-financial performance indices in the determination of their portfolio allocation.

In this paper, we examine the conditions under which socially responsible investors (hereafter, SR investors) could induce corporations to behave more responsibly. Externalities produced by firms are valued by SR investors in proportion of their investment in these firms. Such investors thus vote with their feet (in spirit of Edmans (2009)).[1] 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 empirical results of Hong and Kacperczyk (2009) who show that vice assets enjoy a higher risk-adjusted return than other as-

[1] 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 analysis 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.

sets. This strategy can be counterbalanced by purely financial investors who shy away from responsible companies which offer lower expected returns. Our model analyzes when socially responsible corporations are more highly valued than non-responsible ones in the financial markets. To better understand the relationship between corporate behavior and investors' strategies, we explicitly consider that investors vote on (or may influence) corporate decisions. This enables us to study how shareholders' engagement affects firm value. In particular, we analyze the optimal strategy and financial performance of an activist investor who is large enough to influence corporate decisions.

Our main finding is that, in presence of socially responsible investors, a credible pro-social orientation and a long-term horizon may increase the purely financial return of an activist shareholder. The activist's strategy, that we name the "Washing Machine" consists in buying a non-responsible firm, turning it into responsible, and selling 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 favor of the non-responsible corporate strategy. As a result a purely financially-motivated activist would not display abnormal returns.

This finding that active shareholder engagement with firms on pro-social issues may be profitable is in line with recent evidence provided by Dimson, Karakas, and Li (2012). They investigate the engagement behavior (mostly done via discussions with firms) 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. These results complement those obtained by Barber (2007) and Becht, Franks, Mayer, and Rossi (2009) on the impact of shareholder activism centered 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.

We identify three conditions for the "Washing Machine" strategy to be successful. First, investors implementing this strategy must be able to acquire a significant influence on target companies. Otherwise, they will not be in a position to impose the necessary changes. The "Washing Machine" strategy is thus well suited for investors that are ready to take large stakes in companies, such as private equity funds, hedge fund, or wealthy individuals. But it is also attainable by a group of investors, such as mutual funds or pension funds, who do not individually hold large blocks. In this case, a successful implementation of engagement relies on a sufficiently coordinated policy of engagement (e.g., voting at general meetings). Second, only investors with a long-term outlook can implement this strategy. Indeed, they must be able to credibly commit to remain involved in the business long enough for its level of CSR to improve. And third, the fund must be able to provide guarantees of credibility with regard to CSR. Otherwise, it will fail to convince the market of the reality of the commitments made by the company: when trying to sell back part of the company, the market will value it as a dirty rather than as a clean one.

Anecdotal evidence suggests that the "Washing Machine" investment strategy is not science fiction. Indeed, a fund is currently being launched by Tau Asset Management with the objective of buying into pretty non-responsible businesses (garment factories in developing countries) and improving social and environmental corporate behaviors in an attempt to best prepare a future listing in financial markets.[2] Only time will say whether or not this new investment venture is going to be successful but its investment philosophy embeds the ingredients for success that we identified for the "Washing Machine" strategy.

The literature on the pricing implications of socially responsible investors starts with the seminal contribution of Heinkel, Kraus, and Zechner (2001). They study an 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. This analysis has been extended in several directions. Barnea, Heinkel, and Kraus (2005) study equilibrium investments in various indus-

[2]Jessica Wohl, *Reuters Ed. US*, NY firm sees investment opportunity in garment factories, September 27th, 2013.

tries according to their level of social responsibility. They show that non-responsible industries receive less capital thereby inducing a lower level of investments in the economy. Baron (2007) models socially responsible activities as donations. He then studies an economy in which not only firms but also individuals can make such donations. In this context, he shows that the cost of CSR is borne by social entrepreneurs, who suffer from the lower valuation of their companies when they take them public, but not by subsequent shareholders who earn the adequate risk-adjusted return. We complement this literature i) by showing how socially responsible investors can affect corporate strategy via voting (or via engagement), and ii) by analyzing how an activist investors can design profitable and socially effective strategies.

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 Model and equilibrium with atomistic investors

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 risk-free rate is normalized 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 $\int_0^1 di = 1$. 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 normalized to 1, so that the market-clearing condition is $\int_0^1 h_i di = 1$. Investor i's final wealth is written $W_i = h_i(r - P)$, 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.

Investors differ upon their socially responsible orientation. When they evaluate the performance of their investment, socially responsible (SR) 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 $s = 0$. Our interpretation is that SR investors are altruistic and internalize the social impact of their investments. Other investors referred to as traditional 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.[3] SR 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 firm's shares and the equilibrium price are a function of investors' expectations about firm's behavior. Let's first consider the simple case where investors expect that the firm will not adopt a pro-social behavior: $s = 0$. 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 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

$$P(s = 0) = \mu - A\sigma^2. \tag{1}$$

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

[3] 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.

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.

Suppose alternatively that investors believe that the firm will adopt the responsible behavior. Investor i's optimization 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:

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

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

$$P\left(s = 1\right) = \mu - A\sigma^2 + \pi e - c. \tag{3}$$

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) 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:

$$h_i\left(s = 1\right) = 1 + \frac{(x_i - \pi)e}{A\sigma^2}, \text{ for all } i. \tag{4}$$

The responsible investors invest more in the responsible firm than non-responsible investors. The absence of full polarization of portfolio structures between responsible and traditional investors comes from risk aversion. 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. This result 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". Equation (4) also tells us that the pro-social behavior 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 behavior of non-altruistic investors dampens the impact SR investors on the cost of capital of responsible firms.

The above pricing and holdings equations suggest that responsible investors can display a higher expected rate of return than no-responsible ones. Indeed, responsible investors invest more in the responsible firm. If we assume that $A\sigma^2 - \pi e$ is positive, responsible firms yield a rate of financial return that is larger than the riskfree rate. Thus, responsible investors select a riskier portfolio yielding a larger expected financial return. But firm's equity return does not compensate enough for the risk. The risk adjusted performance of responsible investors will appear lower. However, responsible investors receive an additional compensation from the social return (the positive externality) generated by the firm.

Our pricing results (1) and (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.[4] Otherwise, the market value of the responsible firm is smaller. This result can explain why extant empirical studies disagree on the impact of CSR on firm value (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 (2007)).

2.2 Voting-with-our-feet equilibrium

In this section, we assume that before selling the firm, the initial owner is able to 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 maximize 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

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

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 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 to cost ratio is large.

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

- *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 traditional 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. This effect has been studied theoretically by Heinkel et al. (2001) and empirically by Hong and Kacperczyk (2009). 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 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%.

2.3 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 modify the timing of the game. The initial owner of the firm cannot irreversibly select s ex ante. This assumption is of interest because it is likely that 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 purchase 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 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 proportion 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.

To restrict the set of equilibria, we define an intuitive 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 traditional investors vote for the purely financial strategy $s = 0$.

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 intuitive 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 favor 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 is 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

$$h_i^* = 1 + \frac{(x_i - \pi)\, e}{A\sigma^2}, \tag{5}$$

and

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

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

$$v^* = \int x_i h_i^* di = \pi \left(1 + \frac{(1-\pi)\, e}{A\sigma^2}\right). \tag{6}$$

Thus, a shareholder-vote equilibrium inducing the firm to behave responsibly exists iff v^* defined by (6) is larger than $1/2$. From equation (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 in spite of the fact that 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 (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 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 Engagement by 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 hold 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 to the raider or at date 1 to the atomistic investors. 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 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 2.3.

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.[5] His level of social responsibility is denoted by $\theta \in [0,1]$, where θ represents the proportion of the externality that he internalizes. 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, $h_i^* \in \arg\max \mathbb{E}U\left((r - P_1^* + s^*(x_i e - c))h_i\right)$;
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* $v_i^* = x_i$.

[5] 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.

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 characterized 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 than in the previous section).[6] 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, contrary to the atomistic non-pivotal voters, 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 traditional 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 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 favor of this strategy only if he experiences enough additional utility or perceived benefits from the increase in social responsibility.

[6] 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.

3.1 Large investor's engagement towards more responsibility: The "Washing Machine" investment strategy

We focus first on the case in which $\pi\left(1+(1-\pi)\, e/A\sigma^2\right) < 0.5$. From Proposition 2, absent raider's intervention, the responsible strategy is not adopted at the intuitive shareholder-vote equilibrium. In this case, the raider may implement what we call the "Washing Machine" strategy: buying a non-responsible strategy, 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:

$$P_0^* = \mu - A\sigma^2. \tag{7}$$

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 at the end of the previous section, 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* $\pi\left(1+(1-\pi)\, e/A\sigma^2\right) < 0.5$ *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 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 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*

$$\mathbb{E}_1 U_R = A\sigma^2 \geq 0. \tag{8}$$

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

$$P_1^* = \mu - (1-\alpha)\, A\sigma^2 + \pi e - c. \tag{9}$$

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

$$1 - \alpha^* = \frac{(\pi - \theta)e}{2A\sigma^2}. \tag{10}$$

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 favor 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 (10) characterizes the optimal holding strategy of the large investor, which implies that the firm always behaves responsibly.

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

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

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

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

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

$$\mathbb{E}_1 U_R = A\sigma^2 + (\theta e - c) + \frac{(\pi - \theta)^2 e^2}{4A\sigma^2} \geq 0. \tag{11}$$

The expected total profit of the large investor is expressed in equation (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 (11) and (8). For the raider, the total benefit from the majority-reversal strategy is thus:

$$(\theta e - c) + \frac{(\pi - \theta)^2 e^2}{4A\sigma^2} \geq 0. \tag{12}$$

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 favor of more corporate social responsibility. They are both positive. It 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 favor 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. [7] On the one hand, if he sells a lot of shares on the market,

[7] 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.

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 $(\pi - \theta)^2 e^2 / 4A\sigma^2$ 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 thus conclude that responsible raiders display a better financial performance than non-responsible ones if θ is larger than c/e.[8] 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 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. The degree of social responsibility should thus be observable by the market in order for the "Washing Machine" investment strategy to generate abnormal returns.

For socially responsible investors and funds, it is plausible to assume that their pro-social orientation is known and credible. But, 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 market capitalization it induces more than compensates the additional financial cost of pursuing socially responsible strategies. This is the case when the cost of

[8] If there were multiple raiders, abnormal profits from the "Washing Machine" 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. Following the logic of Grossman and Stiglitz (1980), would-be raiders would enter only if potential profits cover the cost of implementing the strategy.

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 social orientation between the large investor and the representative responsible investor is large enough.

3.2 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 characterize 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 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*

$$\mathbb{E}_1 U_R = A\sigma^2 - (\pi e - c) \geq 0. \tag{13}$$

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. This occurs when the proportion of responsible investors 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.

4 Conclusion

This paper studies asset pricing and corporate governance when some investors are socially responsible. Socially responsible investors take into account the externalities generated by a firm when making their investment decisions. These externalities are then 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 strategy that is financially profitable for the firm and a strategy (the responsible strategy) which is less financially profitable in the short run 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 responsibility will be favored by the shareholders of the firm. We show that this is the case if the 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. When the cost of the responsible strategy is low enough, the market capitalization 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, an investment strategy that we name the "Washing Machine". It enables to sell back part of the shares at a higher price to socially responsible investors. However, not all the shares can be sold back because the large investor has to be pivotal at the future shareholder meetings. We show that, in addition to such a long-term horizon, the profitability of the strategy crucially depends on the fact that the large investor has a socially responsible orientation.

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 not only to invest with a long-term perspective but also to influence the behavior of non-responsible firms to turn them into more responsible ones. Two factors reduce the effectiveness of the active investment strategy we describe as a tool to improve the overall level of corporate social responsibility in the economy. On the one hand, the strategy requires investing in non-responsible companies before making them more responsible. This includes a reputational risk that some investors, such as large pension funds and mutual funds, are not always willing to bear. The strategy thus appears more appropriate for alternative types of investment funds such as private equity and hedge funds, or for individual raiders. On the other hand, purely financially oriented active investors could also implement the opposite type of investment strategy. They could successfully acquire firms and make them less socially responsible before reselling part of their holdings on the market at a profit. Whether activist investors will lead to more or less corporate social responsibility thus remains an empirical question.

REFERENCES

Barber B., (2007), Monitoring the Monitor: Evaluating CalPERS' Activism, *Journal of Investing*, 66-80.

Barnea A., R. Heinkel, and A. Kraus, (2005), Green Investors and Corporate Investment, *Structural Change and Economic Dynamics*, 332-346.

Baron D. P., (2007), Corporate Social Responsibility and Social Entrepreneurship, *Journal of Economics and Management Strategy*, 683-717.

Bauer R., K. Koedijk, and Otten, (2005), International evidence on ethical mutual fund performance and investment style, *Journal of Banking and Finance*, 29, 1751-1767.

Becht M., J. Franks, C. Mayer, S. Rossi, (2009), Returns to Shareholder Activism: Evidence from a Clinical Study of the Hermes UK Focus Fund, *Review of Financial Studies*, 22, 3093-3129.

Brav A., W. Jiang, F. Partnoy, and R. Thomas, (2008), Hedge Fund Activism, Corporate Governance, and Firm Performance, *Journal of Finance*, 63, 1729-1775.

Dimson E., O. Karakas, and X. Li, (2012), Active Ownership, Working Paper.

Edmans A., (2009), Blockholder Trading, Market Efficiency, and Managerial Myopia, *Journal of Finance*, 64, 2481-2513.

Edmans A., (2011), Does the Stock Market Fully Value Intangibles? Employee Satisfaction and Equity Prices, *Journal of Financial Economics*, 101, 621-640.

Edmans A., V. Fang, and E. Zur, (2012), The Effect of Liquidity on Governance, Working Paper, Wharton School.

Edmans A., and G. Manso, (2011), Governance Through Trading and Intervention: A Theory of Multiple Blockholders, *Review of Financial Studies*, 24, 2395-2428.

Geczy C., R. Stambaugh, and D. Levin, (2005), Investing in Socially Responsible Mutual Funds, Working Paper.

Grossman S. and J. Stiglitz, (1980), On the Impossibility of Informationally Efficient Markets, *American Economic Review*, 70, 393-408.

Guenster N., R. Bauer, J. Derwall, and K. Koedijk, (2010), The Economic Value of Corporate Eco-Efficiency, *European Financial Management*, 17.

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

Hong, H., and M. Kacperczyk, (2009), The price of sin: The effect of social norms on markets, *Journal of Financial Economics*, 93, 15-36.

Landier, A., and V. Nair, (2008), *Investing for change: Profits from responsible investments*, Princeton University Press.

Margolis, J., H. Elfenbein, and J. Walsh, (2007), Does it pay to be good? a meta-analysis and redirection of research on the relationship between corporate social and financial performance, Working paper.

Maug, E., (1998), Large shareholders as monitors: Is there a trade-off between liquidity and control?, *Journal of Finance*, 53, 65-98.

Orlitzky, M., F. Schmidt, and S. Rynes, (2003), Corporate Social and Financial Performance: A Meta-analysis, *Organization Studies*, 24, 403-441.

Parrino R., R. Sias, and L.T. Starks, (2002), Voting with their feet: Institutional ownership changes around forced CEO turnover, *Journal of Financial Economics*.

Stern, N., (2006), *The Economics of Climate Change: The Stern Review*, Cambridge University Press, Cambridge.

Wagner, M., (2001), A review of empirical studies concerning the relationship between environmental and economic performance: What does the evidence tells us?, Working Paper, Center for Sustainability Management.