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# The real effects of sustainable & responsible investing?

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## HIGHLIGHTS

- SRI can have a mixed effect on firms' incentives to remove negative externalities.
- SRI screening strategies can incentivize the removal of negative externalities.
- SRI trading strategies may under certain conditions disincentivize it.
- The results explain why few firms cite SRI as a motive for bad externality removal.

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## ABSTRACT

Sustainable and responsible investing (SRI) may have a mixed effect on firms' incentives to remove negative externalities. Whereas SRI screening incentivizes the removal of externalities, SRI trading can disincentivize it when traders disagree on the externality removal's cash flow effects.

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## 1. Introduction

Can sustainable and responsible investing (SRI) incentivize firms to voluntarily remove negative externalities such as pollution related to production processes or employee health issues related to the work environment? Advocates of SRI claim that it not only allows investors to align their investment decisions with their personal values but also incentivizes firms to voluntarily reduce their unintended negative impact on society. Heinkel et al. (2001)[1] provide support for this claim by examining the case of SRI screening, an SRI investment strategy where high externality producing firms are consistently removed from the investment universe. In a risk-averse setting, exclusionary investing ceteris paribus reduces the risk sharing of high externality firms, raises their cost of capital and provides them with a motive to remove the externality provided the cost of doing so does not exceed the alternative of dealing with a higher cost of capital.

Recent estimates from Eurosif and US SIF put the market share of SRI around 20% of assets under management bringing it in the order of what Heinkel et al. (2001) suggested necessary for SRI screening to have a real impact on firm behavior. Empirical evidence on the cost of capital impact of exclusionary investing however is limited (Hong and Kacperczyk, 2009), and despite the growing amount of resources spent by firms to reduce their unintended negative impacts, few firms are citing SRI investors as the primary motive to do so. Through a parsimonious theoretical model, I seek to account for why despite, and in fact why due to, the growing popularity of SRI we may be able to see little empirical evidence of its cost of capital effects.

The model starts from Heinkel et al. (2001) in acknowledging SRI screening's potential to influence the cost of capital but departs in three key ways. First, it assumes that the removal of the externality may potentially influence the firm's future cash flows beyond its publicly observable immediate cost, introducing a link between the firm's environmental and social performance (ESP) and its financial performance (FP). Secondly, these future cash flow effects will be subject to asymmetric information opening the route for private

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[1] See also Dam and Heijdra (2011) for SRI in a general equilibrium setting.

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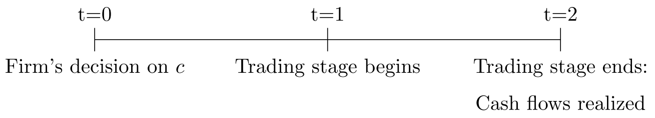

**Fig. 1.** Timeline.

information based SRI trading. However, empirical evidence on the existence of a link between ESP and FP is mixed at best (Orlitzky, 2013) and other research suggests that at present far from all investors and money managers are convinced of the importance of environmental and social information for firm valuation (Dumas and Louche, 2016). In light of this, the model thirdly assumes open disagreement (Aumann, 1976) between investors about whether externality removal affects the firm's future cash flows beyond its immediate cost. It is precisely the combination of asymmetric information and open disagreement on the cash flow effects of SRI removal which generates the overall ambiguous effect of SRI strategies on firm cost of capital and hence possibly the limited evidence thus far for SRI's ability to incentivize firms to reduce their negative societal impact.

## 2. Model

### 2.1. Model set-up

The model is an adaption of a one period Grossman and Stiglitz (1980) economy of trading under asymmetric information. There is a single firm in the economy whose existing assets in place generate a terminal cash flow of $\widetilde{\theta} \sim \mathcal{N}(0, 1/\tau_\theta)$ and whose shares with mass $\Omega > 0$ are traded on the financial market. The strictly positive mass of shares is needed to generate aggregate risk and hence a positive risk premium to hold the firm's shares. In addition, there is a risk-free asset with a gross return normalized to 1.

With its existing assets in place, the firm furthermore generates a negative externality on one or more agents in the economy. For instance, due to lack of waste water treatment the firm could have a negative environmental externality on a local community or due to excessive work pressure have negative health related externalities on its workforce. Before the trading stage in the model takes place however, the firm can decide to spend an amount $c > 0$ to remove the negative externality and this decision is assumed to be publicly observable.

In line with e.g. Konar and Cohen (2001), I then assume that the firm's efforts to remove the externality may affect the value of its intangible assets. These additional end of period cash flow consequences are represented by $\widetilde{\delta} \sim \mathcal{N}(0, 1/\tau_\delta)$, $\widetilde{\delta} \perp \widetilde{\theta}$, implying that the overall financial effects are uncertain and depend on whether the positive impacts to the intangible assets outweigh the negative ones. A positive impact for instance is goodwill created among consumers which increases their brand loyalty, while a negative impact is when key customers or investors fear the firm is loosing focus and neglecting its core business. The firm's actions to remove an externality may also backfire when, as in the case of "Greenwashing", it is viewed as a way to distract attention from more contentious issues. Contrary to the decision and cost of removing the externality, $\widetilde{\delta}$ is assumed to be only privately observable.

Trading takes place after the firm's externality decision, Fig. 1, and traders come in two distinct types: rational traders and noise or liquidity traders. The continuum $[0, 1]$ of rational traders have CARA preferences with absolute risk aversion $1/\gamma$ and are endowed with cash only which is normalized to 0. Noise or liquidity traders have a mass $\rho$ and demand or supply an exogenous number $\widetilde{z} \sim \mathcal{N}(0, 1/\tau_z)$, $\widetilde{z} \perp \widetilde{\theta}, \widetilde{\delta}$ of shares. Liquidity traders prevent the equilibrium price from being fully revealing and hence play an important role in establishing the risk premium of the firm's shares. All rational traders are endowed with a private signal about the firm's cash flow $\widetilde{s}_i = \widetilde{\theta} + \widetilde{\epsilon}_i$, $\widetilde{\epsilon}_i \sim \mathcal{N}(0, 1/\tau_\epsilon)$, $\widetilde{\epsilon}_i \perp \widetilde{\theta}$.

Rational traders are then further subdivided into a proportion $\lambda^T$ of traditional, $T$, investors and a proportion $\lambda^S$ of sustainable and responsible, $S$, investors. $T$ and $S$ investors differ in their preferences and beliefs in two fundamental ways. First, $T$ investors trade the firm's shares regardless of whether the firm has removed the externality or not, while $S$ investors only trade the firm's shares when it has spent $c$ to remove it. Secondly, if the firm has decided to remove the externality, $T$ and $S$ investors openly disagree on the potential future cash flow effects of this decision. $T$ investors believe attempting to remove the externality does not affect the firm's end of period cash flow while $S$ investors believe it does because it increases the value of the firm's intangible assets. The extent to which $S$ investors believe $\widetilde{\delta}$ matters for the firm's financial performance is captured by $\phi$.

Open disagreement is not new in finance (Simsek, 2013) but has thus far seen little application in models of trading especially under asymmetric information. Friedman and Heinle (2016) also apply open disagreement to examine the cost of capital implications of SRI but their model abstracts away from price learning effects under asymmetric information thus their model has a different focus than that of this paper. In my paper open disagreement is added to a standard asymmetric information model and yields novel dynamics because one group of investors will not seek to learn from the actions of the other "disagreeing group". In particular, $T$ investors view $S$ investors as generating movements in the stock price unrelated to the firm's true fundamental value and this additional "noise" from the $T$ investor's perspective may have adverse cost of capital effects and dampen the ability of SRI to make firms internalize their externalities. To summarize the beliefs, $T$ and $S$ investors agree on end of period cash flows being $\widetilde{v}_0 = \widetilde{\theta}$ when the firm does not remove the externality but disagree when it does $\widetilde{v}^T_c = \widetilde{\theta}$ and $\widetilde{v}^S_c = \widetilde{\theta} + \phi\widetilde{\delta}$.

Open disagreement only has real implications in the model however when combined with asymmetric information on $\widetilde{\delta}$ and although for simplicity the information structure is exogenous it could easily be endogenized along the lines of Grossman and Stiglitz (1980). Information about $\widetilde{\delta}$ is also assumed to be perfect when held to avoid the added complication where traders seek to learn from the price about both $\widetilde{\theta}$ and $\widetilde{\delta}$ (Goldstein and Yang, 2015). By virtue of their specialization in SRI, $S$ traders are then all assumed to be informed about $\widetilde{\delta}$, while $T$ investors are subdivided into a proportion $\lambda^{TI}$ of informed $T$ investors who observe $\widetilde{\delta}$ and a proportion $\lambda^{TU} = \lambda^T - \lambda^{TI}$ of uninformed $T$ investors who do not. It is shown below that $T$ investors care about being $\widetilde{\delta}$ informed even though they do not believe in cash flow consequences of externality removal, justifying the set-up with both informed and uninformed $T$ investors.

### 2.2. Model solution

#### 2.2.1. Equilibrium cost of capital

The model is solved through backward induction. When the firm does not remove the externality its shares are only traded by $T$ investors and the equilibrium share price is conjectured to take the following form

$$\widetilde{p} = p_0 + p_1\widetilde{\theta} + p_2\widetilde{z}. \tag{1}$$

In addition to $\widetilde{s}_i$, $T$ investors then have a second signal $\widetilde{s}_p = (\widetilde{p} - p_0)/p_1 = \widetilde{\theta} + (p_2/p_1)\widetilde{z}$, with precision $\tau_p = \left((p_2/p_1)^2\tau_z^{-1}\right)^{-1}$ and $T$ investors will demand $D^T(\widetilde{p}, \widetilde{s}_i) = \gamma\left(E(\widetilde{\theta}|\widetilde{p}, \widetilde{s}_i) - \widetilde{p}\right)/Var(\widetilde{\theta}|\widetilde{p}, \widetilde{s}_i)$ number of shares. Given the normal distribution of all random variables the expressions for the conditional moments are easily obtained using Bayes' rule and are given in Appendix A.1.

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