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**Towards a Theory of Responsible Investing:
On the Economic Foundations of Corporate Social Responsibility**

ABSTRACT

Studies that link corporate social and financial performance usually find a positive association between the two. However, the literature does not establish a significant impact of socially responsible investing on stock market returns. We develop a coherent economic framework of responsible investing to address this paradox. The framework offers theoretical underpinnings for all research on responsible investment as it provides the theoretical underpinnings for the actual behavior of market participants. We associate corporate social performance with key financial accounting ratios like the market-to-book ratio (market value of the firm in relation to accounting value), return on assets, and stock market return. We conclude that there is a strong theoretical foundation for a positive relationship between corporate social responsibility and financial performance, though the relation is conditional on which financial performance measure is considered. We illustrate that the empirical literature about responsible investing is well in line with our model's propositions.

1 Introduction

Margolis and Walsh (2001, 2003) provide a thorough review of the literature connecting corporate social performance with financial performance. Based on more than 100 studies, they conclude that there is a positive association between social and financial performance and little evidence of a negative association (see also Orlitzky et al., 2003). In contrast, the literature about stock market returns in relation to corporate social responsibility does arrive at a somewhat different conclusion: Many researchers (e.g. Bauer et al., 2005; Bello, 2005; Renneboog et al., 2008) find that socially responsible investments yield returns that are not significantly different from those on conventional investments. Others (e.g. Gezcy et al., 2003; Hong & Kacperczyk, 2009) even find that socially responsible stocks are overpriced. Thus, it appears that there is a paradox: Social performance of firms seems to be valued differently, depending upon the perspective taken, which is the supply-side or the demand-side of social responsibility.

In this paper, we provide a coherent theoretical framework for responsible investing. We build on a coherent economic framework from which we can logically derive propositions about the relationship between social and financial performance. We come up with a model that is based on the models of Heinkel et al. (2001) and Mackey et al. (2007). We integrate two of the model's extensions as suggested by Mackey et al. (2007), namely that firms vary in their responsible performance and that investor preferences are heterogeneous. As such, we explicitly link the supply and demand side for corporate social responsibility. Furthermore, we explore specifically what the consequences are of the choice of firms to meet investor's demand for corporate socially responsible behavior on three popular financial ratios.

The key ingredients of our model are that socially responsible investors take account of external effects of production, which we label "social damage", and as a consequence accept a lower financial return on a responsible stock compared to an irresponsible stock. The way we model this is by endowing consumers with a preference for "more responsible" firms. Formally, consumers receive a *warm-glow*, as in the seminal paper by Andreoni (1990), if they own shares of firms that produce more responsibly (i.e. their production is to be associated with less social damage). So in a way, consumers are purely egoistic in the setting; they do not actually care whether, for example, the firm pollutes or not, as they do not value the environment directly. They only care if they have shares of the firms that pollute. We do not consider where the preferences for socially responsible production come from; in this paper we are only interested in the consequences for firms' financial performance due to the demand for socially responsible production. To be clear, in the narrative of the paper, we often refer to "pollution" as the unwanted side-

effect of production, but we do not model the standard external effect of pollution. The model's assumption that firms generate social damage as a byproduct also suits problems such as child-labor or poor health and safety standards in working conditions. For these two examples it is perhaps even more clear that consumers are not directly affected by variation in the standards of production. Hence, it is important to realize that we do not consider the standard (environmental) externality framework in this paper but only the warm glow effect. Furthermore, regarding the supply side of the economy, socially responsible entrepreneurs may meet the interest in the demand for socially responsible production. This results in less input of capital and a higher return on assets because of decreasing marginal returns to production. The implication from the demand side assumption is that responsible firms are characterized by higher market-to-book ratios than irresponsible firms. The implication from the supply side assumption is that more responsible firms are characterized by a higher return on assets. Combining the two in the equilibrium situation regarding stock market returns shows that the overall effect is conditional on the parameters of the model: stock market returns can both be higher or lower for responsible firms compared to those of irresponsible firms. Intuitively, this ultimately depends upon the relative strength of how much investors and firms respectively value the internalization of irresponsibility or social damage.

The structure of the remainder of this paper is as follows. Section 2 briefly reviews socially responsible investing. Section 3 discusses the models from which we derive our propositions regarding the relationship between social and financial performance. Section 4 discusses the propositions of our model. Section 5 is an illustration of our model as it reorganizes the literature covered by Margolis and Walsh (2001, 2003) by linking this literature to the propositions. Section 6 concludes.

2. Socially responsible investing

The most common definition of socially responsible investment is: “[...] *ethical investments, responsible investments, sustainable investments, and any other investment process that combines investors' financial objectives with their concerns about environmental, social and governance (ESG) issues*” (Eurosif 2008, page 6). Different authors and organizations use heterogeneous vocabulary when referring to investments that are motivated by concerns beyond the strictly financial ones (see Sandberg et al. 2009). In this article, we will use the term SRI to cover investments that take into account environmental, social and governance (ESG) factors.

What may be the impact on firm behavior because of socially responsible investing? Johnsen (2003) argues that the size of socially responsible investment funds usually is much too small for the fund's portfolio decisions to have an impact on firm behavior. Therefore, Johnsen argues, socially responsible funds should become active owners. However, the prospects of this policy are limited too. First, there are institutional and legal constraints, as in many countries mutual funds have to face restrictions for the ownership of a substantial part of corporations. Second is that the share of co-operating socially responsible investors would have to be quite substantial. Heinkel et al. (2001) show that exclusionary ethical investing leads to polluting firms being held by fewer investors since green investors eschew polluting firms' stock. This lack of risk sharing among non-green investors leads to lower stock prices for polluting firms, thus raising their cost of capital. If the higher cost of capital more than overcomes the cost of reforming (i.e. a polluting firm cleaning up its activities), then polluting firms will become socially responsible because of exclusionary ethical investing. A key determinant of the incentive for polluting firms to reform is the fraction of funds controlled by green investors. In their model, Heinkel et al. find that at least 20% green investors are required to induce any polluting firms to reform. Third, shareholder activism is seen as a factor that might impact on the direction of the business strategy. It consists of various elements: proxy voting, resolutions, and dialogue. Shareholder activism is a process by which the shareholders of a listed company, under the provisioning of securities legislation in various jurisdictions, can request their members to meet and vote on specific resolutions. However, the major problem with shareholder activism is that we do not have systematic surveys of the *de facto* impact of these efforts on firms' policies and performance (see Bauer et al., 2010). The evidence so far is rather anecdotal. Given the nature of the process, it also is very difficult to empirically verify whether shareholder activism has an impact at all.

Evaluating corporate governance, environmental, social, and economic factors allows investors to manage their funds in a way that is consistent with the investor's mission and values. The investor can make a trade-off between the performance and policies of the firm with respect to these factors and its financial performance (i.e. risk and return). Different studies of socially responsible investing suggest that ethical screening of companies is likely to affect the characteristics of the assets included in the portfolio. As such, screening for social responsibility might impact on the portfolio, in particular on portfolio diversification and portfolio performance (see Grossman and Sharpe, 1986; Diltz, 1995; Galema et al., 2008; Renneboog et al., 2008). Skipping funds from the list of investable objects reduces the investment universe from which the investors can make a choice. As such, screening reduces the scope for optimizing the trade-offs between financial risk and return. Several empirical studies of the financial performance of socially responsible investment funds have appeared in the recent past (for a critical review see Capelle-

Blancard and Monjon, 2012). The general findings of these studies are that there is not a significant difference in the returns on the socially responsible investment funds compared to those of conventional funds. Financial risk also is of the same order of magnitude for the two types. Therefore, screening does not seem to have a significant impact on the risk and return characteristics of the two types of investing. Also, and relatedly, stock market indices that are made up of firms that are included in socially responsible investment funds do correlate highly with indices that are composed of conventional funds (Statman, 2005). So, it appears that socially responsible investors do not forego a lot of opportunities, but they also do not financially benefit from their screening activities.

The linkages between finance and sustainability or responsibility that are being investigated center on the role of shareholders. While shares and shareholder rights indeed can be an important instrument to impact upon the direction of the firm, they are not the only means. Private capital and bank credit are very important financial instruments too if it comes to providing external finance to the firm. However, these types of financing are much more opaque than financing via the market for stocks or bonds (see Boot and Thakor, 1997). Nevertheless, their impact is at least of equivalent importance. The channel through which the impact of the financier is transmitted, however, is quite different from that of the stock market, where we have shareholders with ownership and dividend rights. Especially, banks' screening and monitoring of projects and firms may affect the social responsible behavior and performance of the firm. As such, it will impact upon the actual operations of the firm that is being financed. Assessing non-financial attributes of firms is a very common way to do business by banks and other financial institutions. They often regard qualitative attributes of the firm and the entrepreneurs as proxies for the viability of their project or firm (Saunders and Allen, 2002). They select firms and projects on the basis of their performance with respect to such non-financial characteristics. As such, the screening of firms is a very important instrument for financial intermediaries to direct their funds. The screening literally gives direction to the way in which the funds are being put to use. This is because the financial intermediary as a lender not only provides finance, but also is involved in project design, monitoring, and implementation (Jappelli and Pagano, 2002).

Another issue is that in analyzing the connection between social and financial performance, it is implicitly assumed that financial performance measures can be used interchangeably (Margolis and Walsh, 2001 & 2003; Orlitzky et al., 2003). This would indeed be the case without the existence of unwanted side-effects in production. In an imperfect environment, prices will not reflect all relevant economic information. Therefore, we explicitly ask what would be the economic impact of social responsibility. It appears that the taking into account the demand for socially responsible production will have a negative effect on accounting profits (see also Gregory et al., 2014). Lower profits will have a negative effect on the stock market value. However, if the mitigation of unwanted side effects is valued by socially responsible

stockholders, there also is a positive effect on the stock market value from this internalization. Consequently, accounting profit and stock price need not change in the same way. Furthermore, partial equilibrium analysis cannot reveal the overall impact of the two opposing effects. Therefore, we need an economic model that links socially responsible investment and corporate social responsibility in a more general theoretical framework. Our model illustrates that in case non-monetary effects of production are internalized, different financial performance measures capture different economic effects.

To this extent, we depart from the work done by Merton (1987), Heinkel et al. (2001), and Mackey et al. (2007). Mackey et al. (2007) present a simple stock market model in which a fraction of the consumers is socially conscious. This model is in line with the “green screening” model of Heinkel et al. (2001) and the “incomplete information” model of Merton (1987), in which there is a similar distinction between two groups of investors. However, in the model of Mackey et al. (2007), utility is linear and there is no uncertainty, in contrast to Heinkel et al. (2001) and Merton (1987). The starting point of our model is quite similar to these three approaches. We also present a stock market model with socially responsible investors and uncertainty so that stock value is affected by corporate social responsibility. However, we are able to generalize these models in a number of ways. First, as suggested by Mackey et al. (2007), we allow for *heterogeneity* among investors with respect to their attitude towards social responsibility. Second, we also let firms vary in their *ability* to make socially responsible investments. Third, we specifically model how the *choice* of the firm to behave either socially responsible or socially irresponsible affects financial performance in equilibrium. The choice to behave socially responsible or not is exogenous to our model, but by considering both cases we can compare the outcomes of the decisions. As such, we do not only model the demand for social responsibility (through socially responsible investment) but also the supply of corporate social responsibility. Finally, our analysis does not focus on a single financial performance measure, which usually is stock market value in most of the literature above, but we discuss the implications for three different classes of commonly used financial performance measures. The key result is that by considering external effects in equilibrium, the classes of financial performance measures need no longer have the same interpretation. This offers a solution to the seemingly paradoxical empirical findings in the social and financial performance literature and those on socially responsible investing and financial performance.

Next, we develop a model that links SRI and CSR in a more general economic equilibrium framework. This model shows that in case externalities are made internal to household (i.e. firms, lenders/investors) decisions, different financial performance measures capture different economic effects. Then, we use the model’s propositions to assess the empirical literature about the link between corporate social and financial performance.

3. Model

The basic set-up of our model is in line with the stock market model of Diamond (1967). However, we add an externality in production, namely social damage, as defined in the introduction of this study. This damage can relate to environmental pollution, social harm, breaches of trust, etc. We define consumer preferences over these social damages.

Production technology and financing structure

We consider n firms. We assume that the production $f_i(k_i)$ by firm i is Cobb-Douglas with parameter $0 < \alpha_i < 1$ and a function of capital intensity k_i ,

$$f_i(k_i) = k_i^{\alpha_i}. \quad (1)$$

Firm i also generates an economic “bad”, labeled social damage D_i , which we may think of as environmental pollution. For simplicity, but without losing the general argument, we assume it is proportional to $f(\cdot)$:

$$D_i = \eta_i f_i(k_i). \quad (2)$$

Note that D_i is total social damage and η_i is social damage proportional to production. This way social damage will be proportional to both total output and capital intensity, which is a common assumption (see e.g. Dam, 2011). We assume that each firm produces the same good and the same bad.

We assume that the firm finances the production factors by issuing bonds at a risk-free rate r . We can thus use the capital stock and total debt of the firm interchangeably. This may seem a very restrictive way to finance real investments, but as we will show later, the value of the firm will only depend on output and not on the financing structure. Since the firm uses all the funds raised via bonds to buy capital k_i , this amount is also equal to the book value of the firm and the value of outstanding shareholdings is equal to zero as long as capital is not employed in production. However, we assume that as soon as bonds are issued to buy capital, investment opportunities arise in the form of the production technology. These opportunities create potential (uncertain) profits by employing capital in production, which may increase the value of the

outstanding shares. Via this simple mechanism we provide the potential for a difference between market values and (historical) book values in a static model.

Profits, R_i for the shareholders of firm i are given by:

$$R_i = g_i(\theta)f_i(k_i) - rk_i. \quad (3)$$

where $g_i(\theta)$ is the price at which output is sold. Uncertain demand for output is reflected by a random vector θ . Consequently, only the price for the output, $g_i(\theta)$, depends on demand shocks, so that output and damage do not depend on the state of nature θ . We assume $g_i(\theta) \sim N(1, \sigma_i^2)$ and we consider the simple case where covariances between the $g_i(\theta)$'s equal zero. The effects of covariances on prices and portfolio selection are well known. Generally, covariances play an important role in asset pricing, but for our purpose we only require a risk premium since we focus on the effect of social preferences on asset prices. Incorporating covariances between the demand shocks would yield higher systematic risk, but qualitatively they do not influence the pricing equations (see Cochrane, 2001).

Expected profits and the variance of profits are:

$$\mu_i = E[R_i] = f_i(k_i) - rk_i, \quad (4)$$

$$\sigma_{R_i}^2 = Var[R_i] = \sigma_i^2 f_i(k_i)^2. \quad (5)$$

Consumer preferences

There are m consumers and consumer j has individual preferences for the good and the bad which are represented by a consumer-specific utility function $U^j(c_j, d_j)$, which we assume to exhibit constant absolute risk aversion (CARA):

$$U^j(c_j, d_j) = -\exp(-\delta[c_j - \lambda_j d_j]) \quad (6)$$

where c_j is consumption, λ_j is the subjective marginal rate of substitution between social damage and consumption, and d_j is an index of the social damage caused by firms the consumer holds shares in. The social preferences are modeled in line with Dam (2011) and Dam and Heijdra (2011): The consumers experience a “warm glow” from not contributing to total social damages, as argued in Andreoni (1990).

Therefore, we model social responsible investment by assuming that the consumer feels responsible for a part of the social damage produced by the firms in which she holds shares, and does so simply relative to the total share-weighted damage levels implied by her portfolio of assets, i.e.:

$$d_j = \sum_{i=1}^n \omega_{ij} D_i,$$

where ω_{ij} is the number of shares consumer j holds in firm i . Furthermore, we assume that consumers want to maximize their expected utility:

$$V^j = E[U^j(c_j, d_j)]. \quad (7)$$

As equation (6) shows, we assume all consumers exhibit the same level of absolute risk aversion, $-\frac{E[U_{cc}^j]}{E[U_c^j]} = \delta$, for all j . However, they differ in their social preferences, $-\frac{E[U_{cd}^j]}{E[U_c^j]} = \lambda_j$, where λ_j is the implicit subjective conversion price, or the subjective marginal rate of substitution, of social damage to consumer j 's consumption. If $\lambda_j = 0$, the consumer does not care about social damage at all.

Demand: Portfolio selection

Consumer j has initial wealth W_j , which consists of initial shareholdings and production factors. Assets are indexed by $i = 1, \dots, n$ and generate payoffs R_i and damage D_i . The consumers receive these cash and social damage flows in proportion to their shareholdings in firm i . Asset i can be bought at price p_i . Consumers can also buy bonds and the price of a bond is used as the numeraire. One unit of a bond is a commitment to pay a fixed amount of r units of consumption. As such, this asset is risk-free and non-polluting. Let b_j be the total amount of bonds of consumer j . Then, an investor chooses a portfolio to maximize expected utility:

$$\max_{\omega_{ij}} E[U^j(c_j, d_j)] \quad (8)$$

subject to

$$c_j = rb_j + \sum_{i=1}^n \omega_{ij} R_i, \quad (9)$$

$$d_j = \sum_{i=1}^n \omega_{ij} D_i, \quad (10)$$

$$W_j = b_j + \sum_{i=1}^n \omega_{ij} p_i, \quad (11)$$

where ω_{ij} is the number of shares consumer j holds in firm i , and the last equation is the budget constraint. With normally distributed payoffs, the solution satisfies the pricing equation:

$$p_i = \frac{E[R_i]}{r} - \frac{1}{r} (\delta \text{cov}[c_j, R_i] + \lambda_j D_i), \quad (12)$$

With CARA preferences and a constant marginal rate of substitution between consumption and damage, the pricing equation for consumer j becomes:

$$p_i = \frac{1}{r} [\mu_i - \delta \omega_{ij} \sigma_{R_i}^2 - \lambda_j D_i], \quad (13)$$

which can be inverted into a demand function for shares:

$$\omega_{ij} = [\mu_i - p_i r - \lambda_j D_i] \frac{1}{\sigma_{R_i}^2 \delta}. \quad (14)$$

Eq. (10) shows that a consumer with a stronger preference for responsibility (i.e. stronger aversion of social damage, implying a high λ_j) will hold less of the share if the firm is engaged with more social damage from its production. Furthermore, greater risk will lower the demand proportional to the risk aversion of investors. Then, define $\bar{\lambda} = (1/m) \sum_{j=1}^m \lambda_j$ as the average rate of substitution between consumption and social damage of all consumers, and without loss of generality we normalize the number of shares¹ and consumers to one. In equilibrium the stock market value M_i of firm i will be:

$$M_i = p_i = \frac{1}{r} [\mu_i - \delta \sigma_{R_i}^2 - \bar{\lambda} D_i]. \quad (15)$$

¹ The total number of shares is irrelevant as long as this number is constant. We can always redefine the price per share, in the end it is the total value of the firm that is relevant to the investor. A similar argument can be made for the number of consumers; aggregate consumption is relevant, not the consumption per capita.

In our model, all the firm's actions are perfectly observable and we do not restrict shortselling, but mechanically this result is related to the partial equilibrium models of Heinkel et al. (2001) and Mackey et al. (2007), and to Merton (1987) in the case of no shortselling. If shortselling is not allowed, the demand for shares cannot become negative. For firms with a lot of social damage related to their production (i.e. high D_i), Eq. (14) is a binding constraint. Then, screening for social damage (i.e. environmental, social or governance issues) takes place since some stocks are omitted from the portfolio. If shortselling is not allowed and we have a dichotomous distribution of consumers' preferences (consumers with either a high λ_j or with $\lambda_j = 0$), we get the model with screening of Heinkel et al. (2001). Similarly, we arrive at the Merton model of incomplete information if we interpret damage D_i as the "shadow cost of not knowing about security i " (Merton, 1987, p.491). Both screening and asymmetric information lower the market value of polluting (less responsible) and "unknown" firms. Hence, we infer that socially responsible investors will require a lower financial return on their investment when the firms they invest in will try to internalize social damage associated with production. These investors value both financial returns and the mitigation of social damage. More demand for responsible stocks implies that their market return is below that on ordinary stock. Here, the main driver is that responsible investors are prepared to accept a lower financial return. Most studies after socially responsible investment take this perspective (for example Heinkel et al., 2001; Bauer et al., 2005; Bello, 2005; Beltratti, 2005; Mackey et al., 2007). However, they appear to neglect the supply side of corporate social responsibility, i.e. corporate conduct, to which we turn next.

Supply: Corporate conduct

We define the market value of the firm as the market value of equity plus the book value, which is simply the capital stock, so the market value of the firm is equal to $M_i + k_i$. Using Eq. (2), Eq. (4)-(5), and Eq. (15), we find the value of the firm in equilibrium as:

$$\begin{aligned} M_i + k_i &= \frac{1}{r} [f_i(k_i) - rk_i - \delta\sigma_i^2 f_i^2(k_i) - \bar{\lambda} \eta_i f_i(k_i)] + k_i \\ &= \frac{1}{r} [f_i(k_i) - \delta\sigma_i^2 f_i^2(k_i) - \bar{\lambda} \eta_i f_i(k_i)]. \end{aligned} \quad (16)$$

Without agency problems, taxes, and transaction costs, the value of the firm only depends on output and not on the financing structure (cf. Modigliani and Miller, 1958). The value of the firm is equal

to its output, $f_i(k_i)$, discounted by $\frac{r}{1 - \delta\sigma_i^2 f_i(k_i) - \bar{\lambda}\eta_i}$. The discount factor includes not only the risk free rate, r , but also the usual risk premium, $\delta\sigma_i^2 f_i(k_i)$, which is the risk aversion times the volatility of cash flows, and a premium for social damage, $\bar{\lambda}\eta_i$, which is equal to the average shadow cost of social damage times social damage per output. .

To keep the analysis simple, we focus on extreme cases only and consider two types of corporate behavior. The first type of behavior is taking into account the concerns of investors about the production of social damage, and we label this as socially responsible behavior. The second type of behavior is pure profit maximization without taking into account investor's concerns about social damage. We call this irresponsible behavior. This distinction is in line with Heal's (2005, 2008) definition of corporate social responsibility.

A socially responsible firm (SR) sets its capital intensity k^{SR} such that

$$f'^{SR}(k^{SR}) = \frac{r}{1 - \delta\sigma_{R_{SR}}^2 - \bar{\lambda}\eta_{SR}}, \quad (17)$$

in effect, maximizing market value as in Mackey et al. (2007), because it turns out that the socially optimal solution is attained by maximizing firm value, not by maximizing profits (See the Appendix A for a derivation). This result corresponds to the argument made by Michael Jensen: "value is created when a firm produces an output or set of outputs that are valued by its customers at more than the value of the inputs it consumes (as valued by their suppliers) in such production" (Jensen, 2002, p. 239). Naturally, an economy without frictions will optimally allocate resources when the firm maximizes its market value.

An irresponsible firm (IR), maximizes pure profits and sets its capital intensity k^{IR} such that:

$$f'^{IR}(k^{IR}) = \frac{r}{1 - \delta\sigma_{R_{IR}}^2}, \quad (18)$$

where $\sigma_{R_{SR}}^2 := \sigma_{SR}^2 f^{SR}(k^{SR})^2$ and $\sigma_{R_{IR}}^2 := \sigma_{IR}^2 f^{IR}(k^{IR})^2$ See Lemma 1 of the appendix for the derivation of these results.

We see that the social damage due to production generates a distinction between value maximization and profit maximization. The difference between the two expressions is that the irresponsible

firm does not consider the shadow cost of the social damage $\bar{\lambda} \eta_{IR}$ per output. The irresponsible firm uses a cost of capital that is too low from a social viewpoint, i.e. it takes into account the risk-free rate plus a risk premium, but not the social damage premium.

Note that the choice of being socially responsible or socially irresponsible is exogenous to our model. In our model, there is no economic mechanism that forces firms to be socially responsible (see also Heal, 2008). Incorporating the motivation for this choice explicitly is beyond the purpose of this paper, and potentially requires more complex modelling (see also Bénabou and Tirole, 2010). For example, if shareholders disagree with the policy of a firm, they can either sell the stocks (Exit) or try to influence firm policy at shareholder meetings (Voice), however for this latter option we would have to rely on voting theory, which makes the analysis unnecessarily complex. Besides these direct links between shareholders and corporate policy, there are various potential agency problems between shareholders and management of the firm that may occur, which we acknowledge, but do not model here either.

4. Propositions

We present three equilibrium results showing that for comparison purposes between socially responsible and irresponsible firms it matters what kind of financial performance measure is being used. We discuss the properties of three measures that are widely used in the empirical literature. These three are market-to-book (or Tobin's Q), return on assets (i.e. accounting profit ratios), and stock market returns.

Proposition 1

Define the market-to-book ratio as total market value divided by installed capital, $(M + k)/k$.

Then:

- 1. the market-to-book ratio of a socially responsible firm is always larger than the market-to-book ratio of an irresponsible firm with the same degree of homogeneity, irrespective of the level of damage per output;*
- 2. the market-to-book ratio of socially responsible firms is constant with respect to damage per output.*

Note that the result even holds if firm risk levels differ, since the market value is determined by the appropriate discount rate. A responsible firm is maximizing market value, so it will install capital until the unique optimal market-to-book value is obtained.

Proof of Proposition 1

First note that $\frac{f'_i(k_i)k_i}{f_i(k_i)} = \alpha$. Substituting Eq. (17) in Eq. (16) we find that the total market value of a socially responsible firm is equal to $M^{SR} + k^{SR} = k^{SR}\alpha^{-1}$, so the market-to-book ratio is equal to $(M^{SR} + k^{SR})/k^{SR} = \alpha^{-1}$ which does not depend on the level of social damage. Substituting Eq. (18) in Eq. (16), we find that the total market value of the irresponsible firm is equal to

$$(M^{IR} + k^{IR})/k^{IR} = \alpha^{-1} \left(1 - \frac{\bar{\lambda}}{r} f'(k) \eta_{IR} \right) < \alpha^{-1} = (M^{SR} + k^{SR})/k^{SR}. \quad (19)$$

Proposition 2

Define the return on assets (ROA) ratio as profits divided by installed capital, π / k . To make a fair comparison, we need to adjust for risk levels, so we compare two types of firms for which $\sigma_{R_{SR}}^2 = \sigma_{R_{IR}}^2 = \sigma^2$. Then:

1. the ROA of a socially responsible firm is always larger than the ROA of an irresponsible firm with the same degree of homogeneity;
2. the ROA of irresponsible firms is constant with respect to damage per output η_i , but for socially responsible firms it is increasing in damage per output η_i .

Since, in general, there is a risk-return trade-off, we compare two firms with the same risk. Otherwise, a difference in ROA could simply be due to risk and not to social responsibility of the firm. The alternative would be to look at firms with the same expected return and to compare their risk. If each firm is assumed to have the same corporate goal, namely to maximize profits, then observing a higher ROA would indeed imply superior financial performance. However, socially responsible firms do not maximize profits and based on a simple comparison of ROA we would label irresponsible firms as inefficient. According to conventional microeconomic theory, relatively higher *average* profits should induce additional investments, since maximum profits have not yet been attained. With social damage, however,

socially responsible investors appreciate the internalization of this social damage. In their utility function, this alternative corporate goal compensates for pure profit maximization.

Proof of Proposition 2

Again, note that $\frac{f_i'(k_i)k_i}{f_i(k_i)} = \alpha$. Using the definition of profits we have $ROA = \mu_i/k_i = f_i(k_i)/k_i - rk_i/k_i = f_i'(k_i)/\alpha - r$. Substituting for $f_i'(k_i)$ using Eq. (1) we see that for the irresponsible firm

$$ROA^{IR} = \frac{r}{\alpha(1 - \delta\sigma_{R_{IR}}^2)} - r \quad (20)$$

which does not depend on damage per output η_i . For socially responsible firms we substitute for $f_i'(k_i)$ and find that

$$ROA^{SR} = \frac{r}{\alpha(1 - \delta\sigma_{R_{SR}}^2 - \bar{\lambda}\eta_{SR})} - r \quad (21)$$

which is increasing in damage per output η_{SR} . Looking at the difference we see that

$$ROA^{SR} - ROA^{IR} = \frac{r}{\alpha(1 - \delta\sigma_{R_{SR}}^2 - \bar{\lambda}\eta_{SR})} - \frac{r}{\alpha(1 - \delta\sigma_{R_{IR}}^2)} > 0 \quad (22)$$

given that risk is identical $\sigma_{R_{SR}}^2 = \sigma_{R_{IR}}^2 = \sigma^2$.

Proposition 3

Define stock market returns as μ/M . To make a fair comparison, we adjust for risk levels, so we compare two types of firms for which $\sigma_{R_{SR}}^2 = \sigma_{R_{IR}}^2 = \sigma^2$. Then:

1. whether the risk-adjusted stock market returns are higher for socially responsible firms or irresponsible firms is ambiguous;
2. socially responsible firms have lower stock market returns compared to irresponsible firms with the same damage per output.

A set of firms that have the same social damage per output can be seen as an industry. As with ROA, otherwise a difference in stock market return could simply be due to risk and not to social responsibility of the firm. Therefore, we find that socially responsible firms have lower stock market returns compared to irresponsible firms that are in the same industry. If we compare socially responsible firms to irresponsible firms at an aggregate level, i.e. we do not correct for industry type, then it is ambiguous whether stock market returns are higher or lower for socially responsible firms. The intuition behind this proposition is that corporate social responsibility relates to the internalization of social damage of production, not just to the extent to which it creates social damage (Heal, 2008). Thus, for example, a more polluting industry has to compensate more for its pollution if it wants to be labeled socially responsible. Unless we identify what drives firms to engage in corporate social responsibility - e.g. polluting industries are relatively more involved in pursuing social responsibility - we are unable to make precise statements concerning the stock market return of socially responsible firms (see Bénabou and Tirole, 2010).

Proof of Proposition 3

First we observe that $\mu/M = \frac{\mu/k}{M/k} = \frac{ROA}{Market-to-Book-1}$. We look at firms for which risk levels are identical $\sigma_{SR}^2 = \sigma_{IR}^2 = \sigma^2$. Using the expression for ROA and market-to-book, we can express the stock market returns of the socially responsible firm as

$$\frac{\mu^{SR}}{M^{SR}} = \frac{A + r\alpha\bar{\lambda}\eta_{SR}}{B - (1-\alpha)\bar{\lambda}\eta_{SR}}, \quad (23)$$

and the stock market returns of the irresponsible firm as

$$\frac{\mu^{IR}}{M^{IR}} = \frac{A}{B - \bar{\lambda}\eta_{IR}}, \quad (24)$$

with $A = r(1 - \alpha(1 - \delta\sigma^2))$ and $B = (1 - \alpha)(1 - \delta\sigma^2)$. Note that both are increasing in social damage per unit of output. A higher share of social responsible investors implies a higher $\bar{\lambda}$, which also increases stock returns. If risk aversion δ increases, investors also require a higher rate of return. When the output elasticity of capital α is higher it means that the marginal product of capital will be higher resulting in higher stock market returns.

The sign of the difference of these two equations – (23) and (24) – depends on the combination of η_{SR} and η_{IR} . Stock market returns of the irresponsible (IR) and responsible (SR) firm are identical if:

$$\eta_{SR} = \eta_{IR} \frac{1 - \alpha(1 - \delta\sigma^2)}{1 - \alpha(1 + \bar{\lambda}\eta_{IR})}. \quad (25)$$

If η_{SR} exceeds the right-hand side of this equation, the socially responsible firm has a higher stock market return, otherwise it will be lower. We see that if $\eta_{SR} = \eta_{IR}$, that is, if we compare within a single industry, stock market returns are lower for socially responsible firms. *Ceteris paribus*, socially responsible investors are willing to accept a lower rate of return on their investment.

Thus, on the basis of our theoretical framework, we are able to assess the relationship between (indicators of) financial performance and social responsibility. From the demand side, that is the investors, social responsibility is to be associated with higher market-to-book ratios (higher market value in relation to the book value of the assets of the firm). This is because they are priced above conventional or irresponsible firms for whose stock there is less demand. From the supply side, we find that more responsible firms have a higher return on their assets. This is rooted in decreasing marginal returns to production. Combining the demand and supply side leads to an undetermined overall result regarding the profits per share of responsible vis-à-vis irresponsible firms. This is because both the market-to-book ratio and the return of assets of responsible firms are higher than those of irresponsible firms. Then, the overall impact of social responsibility on the profits per market value (stock), i.e. the ratio between the two, is ambiguous. As a result, the stock market return of responsible firms depends on the relative size of the demand and supply side effects. This ambiguity is driven by differences in social damage per output, which does not play much of a role when comparing ROA or market-to-book. However, for the same level of social damage per output, we find the conventional result that the socially responsible firms have a lower stock market return than the irresponsible firms.

In all, on the basis of this ‘general’ equilibrium framework, we predict that socially responsible firms have a higher market-to-book ratio than irresponsible firms. Furthermore, we predict they have a higher return on assets than irresponsible firms. However, the stock market return of responsible firms can be either higher or lower than that of irresponsible firms.

In the next section of this paper, purely for illustrative reasons, we link the empirical evidence as analyzed in Margolis and Walsh (2001, 2003) to our three propositions.

5. Illustration

Several studies find a positive association between social and financial performance. However, socially responsible investing does not seem to earn positive abnormal stock market returns (see section 2). We argue that different financial performance measures capture different economic effects. In this section, we relate our propositions to the findings in the empirical literature; in particular paying attention to what type of performance measure is being used. For this purpose, we consulted the widely cited surveys on the link between corporate social responsibility and corporate financial performance of Margolis and Walsh (2001, 2003). We classify the studies discussed in these reviews according to the financial performance measure used. We relate the empirical findings to our three propositions. Therefore, we will only look into studies that use market-to-book, return on assets, or stock market returns. As such, we examine more than 60 studies. Table 1 provides a summary of the results.

[Insert Table 1 about here]

Market-to-Book

Table 1 shows that all five studies that use the market-to-book ratio find a strong and positive relationship between corporate social responsibility and market-to-book (the details of the studies can be found in Appendix B. This is precisely what Proposition 1 predicts, namely that market-to-book is relatively lower for irresponsible firms. Heal (2005: 402) also derives this conclusion: *“One robust result seems to be that superior environmental performance is correlated with high values for Tobin’s Q.”*

Return on Assets

Table 1 shows that 36 studies use return on assets or a comparable accounting profit measure. First note that not one study finds a negative relationship between social and financial performance. Furthermore, 17 out of the 18 studies that are classified as presenting either strong or moderate evidence find a positive relationship, which is in line with Proposition 2. Overall, 27 out of 36 studies find a positive relationship. The studies that are classified as presenting weak evidence find no relationship. Details about these 36 studies are in Appendix C.

There is additional evidence that supports Proposition 2. Spencer and Taylor (1987) note that the relationship is valid at the industry level. This indicates that differences in ROA are not solely due to differences in damaging technologies. This evidence is supported by Griffin and Mahon (1997), who look at a single industry and find a positive relationship between ROA and corporate social responsibility, and

also by Dooley and Lerner (1994), who use a firm's ROA relative to the industry average ROA as an indicator and find the predicted positive relationship.

Stock market returns

Table 1 also shows that 27 studies investigate stock market returns as a financial performance measure. In Appendix D, we grouped these studies into comparative studies and event studies. For the comparative studies (panel A in Appendix D) the findings differ considerably and so at first sight these studies indicate mixed effects (or no effect) on the relation between differences in social responsibility and stock market returns, which is in line with Proposition 3. Event studies (panel B in Appendix D) present a less conflicting picture. However, the problem with event studies is that it may be unclear whether or not the "event" is really providing new value-relevant information to investors (MacKinlay, 1997). If this is not the case, the event will not significantly affect the stock market return. In line with Proposition 3, most event studies find the expected negative relationship. However, three studies find a positive relationship, two of which are on the withdrawal of international firms from South-Africa in the 1980s.

In all, Table 1 clearly shows that the alleged paradoxical empirical findings are fully in line with the propositions of our theoretical framework of responsible investing. Therefore, these findings can be interpreted as strong evidence for a positive association between social responsibility and financial performance. Our investigation of the sixty studies provides results that are very well aligned with the predictions we made on the basis of our equilibrium framework. It appears that socially responsible firms have a higher market-to-book ratio than irresponsible firms. Furthermore, socially responsible firms have a higher return on assets than irresponsible firms. However, the stock market return of socially responsible firms can be either higher or lower than that of irresponsible firms.

6. Conclusion

A large number of studies investigate the connection between corporate social and financial performance and try to find out if firms do good by doing well. The general conclusion is that there is a positive association between the two. However, most empirical studies after socially responsible investing find no statistically significant impact of corporate social responsibility on stock market returns and hence cannot corroborate the findings on the basis of accounting data. There is widespread disagreement about how to interpret these seemingly conflicting observations.

We offer a coherent theoretical framework of responsible investing from which we can logically derive propositions about the relationship between social and financial performance. Key assumptions are that socially responsible investors value taking account of social damage associated with production. As a result, they accept a lower financial return on responsible stock compared to irresponsible stock. Furthermore, regarding the supply side of the economy, we assume that socially responsible entrepreneurs try to internalize the social damage of their production. This results in less input of capital and a higher return on assets. The implication from the demand side assumption is that responsible firms are characterized by higher market-to-book ratios than irresponsible firms. The implication from the supply side assumption is that more responsible firms are characterized by a higher return on assets. In the equilibrium situation, we arrive at an ambiguous result for the impact of social responsibility on stock market returns: It is not clear beforehand whether stock market returns are higher for responsible than for irresponsible firms. This ultimately depends upon the relative strength of how investors and firms respectively value the internalization of external effects. As a consequence, our framework is able to solve the paradox in the literature on social and financial performance.

We conclude that when firms announce social responsibility, this may lead to lower stock market returns, but not necessarily to lower firm value. From the investor perspective, social responsibility is to be associated with a higher market value in relation to the book value of the assets of the firm. This is because these assets are priced above conventional or irresponsible firms for whose stock there is less demand. From the corporate perspective, we show that more responsible firms have a higher return on their assets. Irresponsible firms refrain from incorporating the effect of social damage (i.e. effects that may result from environmental, social and governance issues) and use a cost of capital that is too low from a social viewpoint. Responsible entrepreneurs do account for social damage and end up with a higher cost of capital. Then, their investment of capital will be lower but given decreasing marginal returns, the reduction in revenues is smaller than the reduction in capital. Combining the demand and supply side leads to an undetermined overall result regarding the profits per share of responsible vis-à-vis irresponsible firms as both the market-to-book ratio and the return of assets of responsible firms are higher than those of irresponsible firms. The stock market return of responsible firms depends on the relative strength of the demand and supply side effects. This ambiguity is driven by differences in damage per output, which does not play much of a role when comparing ROA or market-to-book. Three issues are at stake: the relative amount of responsible investors, the coefficient of absolute risk aversion, and the output elasticity of capital. We derive that *ceteris paribus* a higher share of responsible investors among the investors increases stock market returns. This also is the case when the risk aversion of investors increases. Furthermore, stock

market returns are higher when the output elasticity of capital becomes higher at it implies that the marginal product of capital increases.

A limitation of our approach is that we do not explicitly model the choice of the firm with respect to being socially responsible or irresponsible. However, we derive that in equilibrium social responsibility does arise endogenously if firms choose to maximize their value. This works through the changes in the cost of capital due to firms' preferences regarding social damage. Another limitations is that in achieving lower social damage in our setting, the firm simply changes its capital intensity, whereas in practice additional costs may have to be incurred. We could explicitly include another production factor, such as clean capital or clean labor. In this case, the total expenses of clean firms would also be higher given the same output, simply because the firms are choosing again allocations that are "inefficient" from a pure profits perspective. We speculate that the qualitative results would not change substantially in this case, though of course until such an alternative model is investigated one cannot say for sure. To us, this would be a natural extension of our model in future research.

REFERENCES

- Abbott, W.F., Monsen, R.J., 1979. On the measurement of corporate social responsibility: Self-reported disclosures as a method of measuring corporate social involvement. *Academy of Management Journal* 22, 501-515.
- Alexander, G.J., Buchholz, R.A., 1978. Corporate social responsibility and stock market performance. *Academy of Management Journal* 21, 479-486.
- Anderson, J.C., Frankle, A.W., 1979. Voluntary social reporting, An iso-beta portfolio analysis. *Accounting Review* 55, 467-479.
- Andreoni, J., 1990. Impure altruism and donations to public goods: A theory of warm-glow giving. *Economic Journal* 100, 464-477
- Aupperle, K.E., Carroll, A.B., Hatfield, J.D., 1985. An empirical examination of the relationship between corporate social responsibility and profitability. *Academy of Management Journal* 28, 446-463.
- Bauer, R., Braun, R., Viehs, M., 2010. Industry Competition, Ownership Structure and Shareholder Activism. European Centre for Corporate Engagement Working Paper (<http://ssrn.com/abstract=1633536>).
- Bauer, R., Koedijk, K., Otten, R., 2005. International evidence on ethical mutual fund performance and investment style. *Journal of Banking and Finance* 29, 1751-1767.
- Belkaoui, A., 1976. The impact of the disclosure of the environmental effects of organizational behavior on the market. *Financial Management* 5 (4), 26-31.
- Bello, Z.Y., 2005. Socially responsible investing and portfolio diversification. *Journal of Financial Research* 28, 41-57.
- Beltratti, A., 2005. Capital market equilibrium with externalities, production and heterogeneous agents. *Journal of Banking Finance* 29, 3061-3073.
- Bénabou, R., Tirole, J., 2010. Individual and corporate social responsibility, *Economica* 77, 1-19.
- Bengtsson, E., 2008a. Socially responsible investing in Scandinavia – a comparative analysis. *Sustainable Development* 16, 155-168.
- Bengtsson, E., 2008b. A history of Scandinavian socially responsible investing. *Journal of Business Ethics* 82, 969–983.
- Berman, S.L., Wicks, A.C., Kotha, S. Jones, T.M., 1999. Does stakeholder orientation matter? The relationship between stakeholder management models and firm financial performance. *Academy of Management Journal* 42, 488-506.
- Blacconiere, W.G., Northcut, W.D., 1997. Environmental information and market reactions to environmental legislation. *Journal of Accounting, Auditing and Finance* 12, 149-178.

- Blacconiere, W.G., Patten, D.M., 1994. Environmental disclosures, regulatory costs, and changes in firm value. *Journal of Accounting and Economics* 18, 357-377.
- Boot, A.W.A., Thakor, A.V., 1997. Financial system architecture, *Review of Financial Studies* 10, 693-733.
- Bowman, E.H., 1978. Strategy, annual reports, and alchemy. *California Management Review* 20, 64-71.
- Boyle, E.J., Higgins, M.M., Rhee, S.G., 1997. Stock market reaction to ethical initiatives of defense contractors. Theory and evidence. *Critical Perspectives on Accounting* 8, 541-561.
- Bragdon, J.H., Jr., Marlin, J.A.T., 1972. Is pollution profitable? *Risk Management* 19, 9-18.
- Brown, B., 1997. Stock market valuation of reputation for corporate social performance. *Corporate Reputation Review* 1, 76-80.
- Brown, B., 1998. Do stock market investors reward reputation for corporate social performance? *Corporate Reputation Review* 1, 271-282.
- Brown, B., Perry, S., 1994. Removing the financial performance halo from Fortune's 'most admired' companies. *Academy of Management Journal* 37, 1347-1359.
- Capelle-Blancard, G., Monjon, S., 2012. Trends in the literature on socially responsible investment: Looking for the keys under the lamppost. *Business Ethics: A European Review* 21, 239-250.
- Chen, K.H., Metcalf, R.W., 1980. The relationship between pollution control record and financial indicators revisited. *Accounting Review* 55, 168-177.
- Cochran, P.L., Wood, R.A., 1984. Corporate social responsibility and financial performance. *Academy of Management Journal* 27, 42-56.
- Cochrane, J.H., 2001. *Asset Pricing*. Princeton N.J., Princeton University Press.
- Dam, L., 2011. Socially responsible investment in an environmental overlapping generations model. *Resource and Energy Economics* 33(3), 1015-1027.
- Dam, L., Heijdra, B.J., 2011. The environmental and macroeconomic effects of socially responsible investment. *Journal of Economic Dynamics and Control* 35, 1424-1434
- Davidson, W.N. III, Worrell, D.L., 1992. Research notes and communications, The effect of product recall announcements on shareholder wealth. *Strategic Management Journal* 13, 67-84.
- Diamond, P.A., 1967. The role of the stock market in a general equilibrium model with technological uncertainty. *American Economic Review* 57, 759-776.
- Diltz, D.J., 1995. The private cost of socially responsible investing. *Applied Financial Economics* 5, 69-77.
- Dooley, R.S., Lerner, L.D., 1994. Pollution, profits, and stakeholders, The constraining effect of economic performance on CEO concern with stakeholder expectations. *Journal of Business Ethics* 13, 701-711.

- Dowell, G., Hart, S., Yeung, B., 2000. Do corporate global environmental standards create or destroy market value? *Management Science* 46, 1059-1074.
- Eurosif, 2008. European SRI study 2008. Retrieved July 22nd, 2009, from: http://www.eurosif.org/publications/sri_studies.
- Fombrun, C., Shanley, M., 1990. What's in a name? Reputation building and corporate strategy. *Academy of Management Journal* 33, 233-258.
- Freedman, M., Jaggi, B. 1982. Pollution disclosures, pollution performance and economic performance. *Omega* 10, 167-176.
- Freedman, M., Stagliano, A.J., 1991. Differences in social-cost disclosures, A market test of investor reactions. *Accounting, Auditing and Accountability Journal* 4, 68-83.
- Galema R., Plantinga A., Scholtens, B., 2008. The stocks at stake: Return and risk in socially responsible investment. *Journal of Banking and Finance* 32, 2646-2654.
- Geczy, C.C., Stambaugh, R.F., D. Levin, D., 2003. Investing in socially responsible mutual funds. SSRN Working Paper, No. 416380.
- Graves, S.B., Waddock, S.A., 1994. Institutional owners and corporate social performance. *Academy of Management Journal* 37, 1034-1046.
- Graves, S.B., Waddock, S.A., 2000. Beyond built to last . . . Stakeholder relations in 'built-to-last' companies. *Business and Society Review* 105, 393-418.
- Greening, D.W., 1995. Conservation strategies, firm performance, and corporate reputation in the U.S. electric utility industry. *Research in Corporate Social Performance and Policy*, Supplement 1, 345-368.
- Gregory, A., Tharyan, R., Whittaker, J., 2014. Corporate social responsibility and firm value: disaggregating the effects on cash flow, risk and growth. *Journal of Business Ethics* 124, 633-657
- Griffin, J.J., Mahon, J.F., 1997. The corporate social performance and corporate financial performance debate, Twentyfive years of incomparable research. *Business and Society* 36, 5-31.
- Grossman, B.R., Sharpe, W.F., 1986, Financial implications of South African divestment, *Financial Analysts Journal* 42, 542-555.
- Guerard, J.B., Jr., 1997a. Is there a cost to being socially responsible in investing? *Journal of Investing* 6, 11-18.
- Guerard, J.B., Jr., 1997b. Additional evidence on the cost of being socially responsible in investing. *Journal of Investing* 6, 31-36.
- Hart, S.L., Ahuja, G., 1996. Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment* 5, 30-37.

- Heal, G.M., 2005. Corporate Social Responsibility? An Economic and Financial Framework, Geneva Papers on Risk and Insurance, Issues and Practice 30, 387-409.
- Heal, G.M., 2008. When principles pay. Corporate social responsibility and the bottom line. New York, Columbia Business School.
- Heinkel, R., Kraus, A. Zechner, J., 2001. The effect of green investment on corporate behavior. Journal of Financial and Quantitative Analysis 36, 431-449.
- Heinze, D.C., 1976. Financial correlates of a social involvement measure. Akron Business and Economic Review 7, 48-51.
- Herremans, I.M., Akathaporn, P., McInnes, M., 1993. An investigation of corporate social responsibility reputation and economic performance. Accounting, Organizations and Society 18, 587-604.
- Hong, H., Kacperczyk, M., 2009. The price of sin, the effects of social norms on markets. Journal of Financial Economics 93, 15-36.
- Ingram, R.W., 1978. An investigation of the information content of certain) social responsibility disclosures. Journal of Accounting Research 16, 270-285.
- Ingram, R.W., Frazier, K.B., 1983. Narrative disclosures in annual reports. Journal of Business Research 11, 49-60.
- Jappelli, T., Pagano, M., 2002, Information sharing, lending and defaults, Cross-country evidence, Journal of Banking and Finance 26, 2017-2045.
- Jensen, M.C., 2002. Value maximization, stakeholder theory, and the corporate objective function. Business Ethics Quarterly 12, 235-256.
- Johnsen, D.B., 2003, Socially responsible investing, A critical appraisal, Journal of Business Ethics 43, 219-222.
- Johnson, R.A., Greening, D.W., 1999. The effects of corporate governance and institutional ownership types on corporate social performance. Academy of Management Journal 42, 564-576.
- Judge, W.Q., Jr., Douglas, T.J., 1998. Performance implications of incorporating natural environmental issues into the strategic planning process, An empirical assessment. Journal of Management Studies 35, 241-262.
- Klassen, R.D., McLaughlin, C.P., 1996. The impact of environmental management on firm performance. Management Science 42, 1199-1214.
- King, A.A., Lenox, M.J., 2001. Does it really pay to be green? An empirical study of firm environmental and financial performance. Journal of Industrial Ecology 5, 105-116.
- Mackey, A., Mackey, T.B., Barney, J.B., 2007. Corporate social responsibility and firm performance, Investor preferences and corporate strategies. Academy of Management Review 32, 817-835.

- MacKinlay, A.C. 1997. Event studies in economics and finance. *Journal of Economic Literature* 35, 13-39.
- Marcus, A.A., Goodman, R.S., 1986. Compliance and performance, Toward a contingency theory. *Research in Corporate Social Performance and Policy* 8, 193-221.
- Margolis, J.D., Walsh, J.P., 2001. People and profits? The search for a link between a company's social and financial performance. Mahwah, N.J., Lawrence Erlbaum.
- Margolis, J.D., Walsh, J.P., 2003. Misery loves companies, Rethinking social initiatives by business. *Administrative Science Quarterly* 48, 268-305.
- McGuire, J.B., Sundgren, A., Schneeweis, T., 1988. Corporate social responsibility and firm financial performance. *Academy of Management Journal* 31, 854-872.
- McWilliams, A., Siegel, D., 2001. Corporate social responsibility, A theory of the firm perspective. *Academy of Management Review* 26, 117-127.
- Merton, R.C., 1987. A simple model of capital market equilibrium with incomplete information. *Journal of Finance* 42, 483-510.
- Meznar, M.B., Nigh, A., Kwok, C.C.Y., 1994. Effect of announcements of withdrawal from South Africa on stockholder wealth. *Academy of Management Journal* 37, 1633-1648.
- Modigliani, F., Miller, M.H., 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review* 48, 261-297.
- Newgren, K.E., Rasher, A.A., LaRoe, M.E., Szabo, M.R., 1985. Environmental assessment and corporate performance, A longitudinal analysis using a market-determined performance measure. *Research in Corporate Social Performance and Policy* 7, 153-164.
- O'Neill, H.M., Saunders, C.B., McCarthy, A.D., 1989. Board members, corporate social responsiveness and profitability, Are tradeoffs necessary? *Journal of Business Ethics* 8, 353-357.
- Orlitzky, M., Schmidt, F. L., Rynes, S. L., 2003. Corporate social and financial performance, A meta-analysis. *Organization Studies* 24, 403-441.
- Parke, I.R., Eilbirt, H., 1975. Social responsibility, The underlying factors. *Business Horizons* 18, 5-10.
- Patten, D.M., 1990. The market reaction to social responsibility disclosures, The case of the Sullivan principles signings. *Accounting, Organizations and Society* 15, 575-587.
- Patten, D.M., 1991. Exposure, legitimacy, and social disclosure. *Journal of Accounting and Public Policy* 10, 297-308.
- Pava, M.L., Krausz, J., 1996. The association between corporate social-responsibility and financial performance, The paradox of social cost. *Journal of Business Ethics* 15, 321-357.
- Posnikoff, J.F., 1997. Disinvestment from South Africa, They did well by doing good. *Contemporary Economic Policy* 15, 76-86.

- Preston, L.E., 1978. Analyzing corporate social performance, Methods and results. *Journal of Contemporary Business* 7, 135-150.
- Preston, L.E., O'Bannon, D.P., 1997. The corporate social-financial performance relationship, A typology and analysis. *Business and Society* 36, 41 9-429.
- Renneboog, L., Horst J.T., Zhang C., 2008. Socially responsible investments: Institutional aspects, performance, and investor behaviour. *Journal of Banking & Finance* 32, 1723–1742.
- Rockness, J., Schlachter, P., Rockness, H.O., 1986. Hazardous waste disposal, corporate disclosure, and financial performance in the chemical industry. *Advances in Public Interest Accounting* 1, 167-191.
- Russo, M.V., Fouts, P.A., 1997. A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal* 40, 534-559.
- Sandberg J., Juravle C., Hedesström T.M., Hamilton I. 2009. The heterogeneity of Socially Responsible Investment. *Journal of Business Ethics*, 87, 519-533.
- Saunders, A., Allen, A., 2002, *Credit Risk Measurement*, 2nd edition, John Wiley and Sons, New York.
- Shane, P.B., Spicer, B.H., 1983. Market response to environmental Information produced outside the firm. *Accounting Review* 58, 521-538.
- Simerly, R.L., 1994. Corporate social performance and firms' financial performance, An alternative perspective. *Psychological Reports* 75, 1091 -1103.
- Spencer, B.A., Taylor G.S., 1987. A within and between analysis of the relationship between corporate social responsibility and financial performance. *Akron Business and Economic Review* 18 3), 7-18.
- Statman, M., 2005, *Socially responsible indexes: Composition and performance*, Santa Clara University, Santa Clara, CA., mimeograph.
- Stevens, W.P., 1984. Market reaction to corporate environmental performance. *Advances in Accounting* 1, 41-61.
- Turban, D.B., Greening, D.W., 1997. Corporate social performance and organizational attractiveness to prospective employees. *Academy of Management Journal* 40, 658-672.
- Vance, S.C., 1975. Are socially responsible corporations good investment risks? *Management Review* 64, 18-24.
- Waddock, S.A., Graves S.B., 1997. The corporate social performance-financial performance link. *Strategic Management Journal* 18, 303-319.
- Wokutch, R.E., Spencer, B.A., 1987. Corporate saints and sinners, The effects of philanthropic and illegal activity on organizational performance. *California Management Review* 29, 62-77.

Wright, P., Ferris, S.P., 1997. Agency conflict and corporate strategy, The effect of divestment on corporate value. *Strategic Management Journal* 18, 77-83.

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Table 1.**Overview of empirical findings**

performance measure	total number of studies	positive relation		negative relation		mixed relation		no relation	
		number	%	number	%	number	%	number	%
market-to-book	5	5	(100%)	0	(0%)	0	(0%)	0	(0%)
accounting profit	36	27	(75%)	0	(0%)	0	(0%)	9	(25%)
stock market- returns	27	7	(26%)	9	(33%)	3	(11%)	8	(30%)
Total	68	39	(57%)	9	(13%)	3	(5%)	17	(25%)

Overview of the results of the studies on the relation between corporate social responsibility and corporate financial performance, classified by financial performance measure.

Appendix A

MATHEMATICAL APPENDIX

Derivation of the pricing equation

Set up the Lagrangean:

$$E[U^j (rb_j + \sum_{i=1}^n \omega_{ij} R_i, \sum_{i=1}^n \omega_{ij} D_i)] + \kappa (W_j - b_j - \sum_{i=1}^n \omega_{ij} p_i)$$

where κ is the Lagrange multiplier. Taking the derivative yields the first-order condition for a maximum:

$$E[U_c^j R_i] + E[U_d^j] D_i - p_i \kappa = 0 \quad (\text{A.1})$$

Taking the derivative for b_j yields an expression for the Lagrange multiplier κ :

$$\kappa = E[U_c^j r] = E[U_c^j] r \quad (\text{A.2})$$

since bonds pay with certainty.

Consequently, we get the pricing equation:

$$p_i = \frac{1}{E[U_c^j] r} (E[U_c^j R_i] + E[U_d^j] D_i) \quad (\text{A.3})$$

Use $E[xy] = E[x]E[y] + cov[x, y]$ to get:

$$p_i = \frac{1}{E[U_c^j] r} (E[U_c^j] E[R_i] + cov[U_c^j, R_i] + E[U_d^j] D_i) \quad (\text{A.4})$$

$$= \frac{E[R_i]}{r} + \frac{E[U_{cc}^j]}{E[U_c^j]} \frac{\text{cov}[c_j, R_i]}{r} + \frac{E[U_d^j]}{E[U_c^j]} \frac{D_i}{r} \quad (\text{A.5})$$

where the last result is obtained by noting that if two random variables x and z are jointly normally distributed, then $\text{cov}[g(x), z] = E[g'(x)]\text{cov}[x, z]$ due to a Lemma by Cochrane (2001, p. 164). Consequently, we obtain the pricing equation (8).

Lemma 1 *With production externalities, maximizing the market value of the firm is different from maximizing profits. More specifically, if a firm maximizes its market value, it chooses k_i such that in equilibrium:*

$$f_i'(k_i) = \frac{r}{1 - \delta\sigma_i^2 f_i(k_i) - \bar{\lambda}\eta_i}. \quad (\text{A.6})$$

In contrast, if a firm maximizes pure profits subject to the socially preferred fixed risk level, then it chooses k_i such that in equilibrium:

$$f_i'(k_i) = \frac{r}{1 - \delta\sigma_i^2 f_i(k_i)}. \quad (\text{A.7})$$

Proof:

Socially responsible behavior

We assumed a decomposable production function, so the effect of the state of nature is multiplicative. As a price taker, the firm recognizes that its value will change in proportion to output. In general, when the input level and market value equal \hat{k}_i and \hat{M}_i , the firm calculates the market value given an alternative input level k_i as:

$$M_i = \frac{f_i(k_i)}{f_i(\hat{k}_i)}(\hat{M}_i + \hat{k}_i) - k_i. \quad (\text{A.8})$$

The firm chooses its input level such that the derivative of the market value with respect to k_i equals zero, which at the equilibrium input level where $\hat{k}_i = k_i$ yields:

$$\frac{f'_i(k_i)}{f_i(k_i)}(M_i + k_i) = 1. \quad (\text{A.9})$$

Substituting the expression for the market value of the firm Eq. (15) in Eq. (A.9) we see that in equilibrium:

$$\frac{f'_i(k_i)}{f_i(k_i)} \frac{1}{r} [f_i(k_i) - \delta \sigma_i^2 f_i^2(k_i) - \bar{\lambda} \eta_i f_i(k_i)] = 1 \quad (\text{A.10})$$

which simplifies to

$$f'_i(k_i)[1 - \delta \sigma_i^2 f_i(k_i) - \bar{\lambda} \eta_i] = r. \quad (\text{A.11})$$

We see that the socially responsible firm takes into account the social damage it creates.

Socially irresponsible behavior

We consider a firm to be irresponsible if it does not take social damage related to production into account.

So we define an irresponsible firm as a firm that maximizes pure profits (pay-offs to the shareholder). A

pure profit maximizing firm faces the following problem:

$$\max_{k_i} E[\mu_i] \text{ subject to } \text{cov}(\pi_i, R^m) = \bar{\rho} \quad (\text{A.12})$$

where R^m is the market return and $\bar{\rho}$ a fixed risk level. The restriction is on the covariance of profits with respect to market return, since the firm acknowledges that only systematic risk is priced. Rewrite, substitute, and set up the Lagrangean:

$$f_i(k_i) - rk_i - \xi(f(k_i)cov(g_i(\theta), R^m) - \bar{\rho}) \quad (\text{A.13})$$

Here, ξ is the Lagrange multiplier. Maximizing with respect to k_i yields the following first-order condition:

$$f'(k_i)(1 - \xi cov(g_i(\theta), R^m)) = r \quad (\text{A.14})$$

Covariances between the $g_i(\theta)$'s are assumed equal to zero, so that in equilibrium we have $cov(g_i(\theta), R^m) = \sigma_i^2 f_i(k_i)$. To find the equilibrium solution we directly substitute consumers' risk attitude δ for the shadow cost of risk ξ :

$$f'_i(k_i)[1 - \delta\sigma_i^2 f(k_i)] = r \quad (\text{A.15})$$

Rewrite and we obtain Eq. (A.7).

Q.E.D.

Appendix B**Studies using market-to-book ratio**

Authors	Relationship	Strength of result
Brown and Perry (1994)	Positive	strong
Dowell, Hart and Yeung (2000)	Positive	strong
Fombrun and Shanley (1990)	Positive	strong
King and Lenox (2001)	Positive	strong
Hamilton, Jo and Statman (1993)	Positive	strong

Studies using market-to-book (Tobin's Q) find a positive relation between corporate social responsibility and corporate financial performance.

Appendix C

Studies using accounting profit ratios

Authors	Relationship	Strength of Result
Berman, Wicks, Kotha and Jones (1999)	Positive	Strong
Brown and Perry (1994)	Positive	Strong
Dooley and Lerner (1994)	Positive	Strong
Judge Jr. and Douglas (1998)	Positive	Strong
Preston and O'Bannon (1997)	Positive	Strong
Simerly (1994)	Positive	Strong
Waddock and Graves (1997)	Positive	Strong
Graves and Waddock (1994)	Positive	Moderate
Graves and Waddock (2000)	Positive	Moderate
Hart and Ahuja (1996)	Positive	Moderate
Heinze (1976)	Positive	Moderate
Herremans, Akathaporn and McInnes (1993)	Positive	Moderate
McGuire, Sundgren and Schneeweis (1988)	Positive	Moderate
Russo and Fouts (1997)	Positive	Moderate
Spencer and Taylor (1987)	Positive	Moderate
Turban and Greening (1997)	Positive	Moderate
Abbott and Monsen (1979)	Positive	Weak
Anderson and Frankle (1979)	Positive	Weak
Bowman (1978)	Positive	Weak
Bragdon Jr. and Marlin (1972)	Positive	Weak
Griffin and Mahon (1997)	Positive	Weak
Marcus and Goodman (1986)	Positive	Weak

Parket and Eilbirt (1975)	Positive	Weak
Appendix C – continued –		
Pava and Krausz (1995)	Positive	Weak
Wokutch and Spencer (1987)	Positive	Weak
Preston (1978)	Positive	N/A
Greening (1995)	Positive	N/A
Johnson and Greening (1999)	No Effect/Positive	Moderate
Cochran and Wood (1984)	No Effect/Mixed	Weak
Patten (1991)	No Effect	Strong
Aupperle, Carroll and Hatfield (1985)	No Effect	Weak
Chen and Metcalf (1980)	No Effect	Weak
Freedman and Jaggi (1982)	No Effect	Weak
Ingram and Frazier (1983)	No Effect	Weak
O’Neill, Saunders and McCarthy (1989)	No Effect	Weak
Rockness, Schlachter and Rockness (1986)	No Effect	Weak

Studies using accounting profit ratios (i.e. return on assets, return on equity, return on investments, return on sales) find a positive relationship between corporate social responsibility and corporate financial performance.

Appendix D**Studies using stock market returns***A) Average return studies*

Authors	Relationship	Strength of result
Freedman and Stagliano (1991)	Positive	Strong/Moderate
McGuire et al. (1988)	Positive	Moderate
Ingram (1978)	Positive	Moderate
Brown (1998)	Positive	Moderate
Vance (1975)	Negative	Strong
Newgren, Rasher, LaRoe and Szabo (1985)	Negative	Moderate
Guerard Jr. (1997b)	Mixed	Moderate
Davidson III and Worrell (1992)	Mixed	Weak
Brown (1997)	No effect/Positive	Weak
Hamilton, Jo and Statman (1993)	No effect	Moderate
Alexander and Buchholz (1978)	No effect	Weak
Guerard Jr. (1997a)	No effect	N/A
Chen and Metcalf (1980)	No effect	Weak

Appendix D – continued –*B) Event Studies*

Authors	Relationship	Strength of result
Blacconiere and Northcut (1997)	Negative	Moderate
Blacconiere and Patten (1994)	Negative	Moderate
Klassen and McLaughlin (1996)	Negative	Moderate
Shane and Spicer (1983)	Negative	Moderate
Stevens (1984)	Negative	Moderate
Posnikoff (1997)	Negative**	Moderate**
Belkaoui (1976)	Negative	Weak
Meznar, Nigh and Kwok (1994)	Positive**	Strong**
Wright and Ferris (1997)	Positive**	Moderate**
Boyle, Higgins and Rhee (1997)	Positive	Moderate
Diltz (1995)	Mixed	Weak
Freedman and Jaggi (1986)	No effect	Moderate
Patten (1990)	No effect	Weak
Pava and Krausz (1995)	No effect	Weak

Studies using stock market returns find an ambiguous relation between corporate social responsibility and corporate financial performance.

*Other than the usage of the researchers, the results are given the interpretation “negative”, if news on increased social responsibility increases the stock price significantly in the event window. In the context of our model, a correction of the stock price results in lower stock market returns for these firms, given that operating profits are not affected by the news. This way, our interpretation makes it possible to compare event studies with studies that use average stock market returns.

**These are studies on the effect of announcing withdrawal from South-Africa, with conflicting

results.

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**Towards a Theory of Responsible Investing:
On the Economic Foundations of Corporate Social
Responsibility**

Highlights

- We develop a model that links socially responsible investing and corporate social responsibility.
- Responsible firms have higher market-to-book ratios and higher return on assets.
- The overall effect on stock market returns depends on the relative strength of demand and supply side effects.
- Our framework reconciles the contradictory findings from the empirical literature.

Towards a Theory of Responsible Investing: On the Economic Foundations of Corporate Social Responsibility

Lammertjan Dam^a & Bert Scholtens^{a,b}

ABSTRACT

Studies that link corporate social and financial performance usually find a positive association between the two. However, the literature does not establish a significant impact of socially responsible investing on stock market returns. We develop a coherent economic framework of responsible investing to address this paradox. The framework offers theoretical underpinnings for all research on responsible investment as it provides the theoretical underpinnings for the actual behavior of market participants. We associate corporate social performance with key financial accounting ratios like the market-to-book ratio (market value of the firm in relation to accounting value), return on assets, and stock market return. We conclude that there is a strong theoretical foundation for a positive relationship between corporate social responsibility and financial performance, though the relation is conditional on which financial performance measure is considered. We illustrate that the empirical literature about responsible investing is well in line with our model's propositions.

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Socially Responsible Investing; Corporate Social Performance; Market-to-book; Return on assets; Stock market return.

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