Corporate Social Responsibility, Stock Prices and Tax Policy

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Abstract

We model a market in which some investors get utility from owning shares of firms that engage in corporate social responsibility (CSR). In equilibrium, investors' CSR considerations influence portfolio choices, stock prices and CSR spending. We study tax policy designed to maximize total giving (individual and corporate) net of government tax breaks and find that its effectiveness is non-monotonic in the proportion of altruistic investors: with few or many altruistic investors, it has little impact on giving; but, at intermediate levels, effective tax policy relates the corporate tax rebate rate on giving and the cap on allowable tax savings intuitively.

1 Introduction

This paper builds an equilibrium model of personal and corporate charitable giving, referred to respectively as "personal gifts" and "CSR spending" (short for corporate social responsibility).

The fundamental driver of both personal gifts and CSR spending is the existence of *altruistic* investors, who value both personal gifts and holding in their investment portfolios shares of firms that are socially responsible. Altruistic investors' social preferences enter their portfolio decisions, thereby influencing share prices. CSR spending then becomes a tool used by firm management, acting to maximize the value of their firm's shares.

We hypothesize that there exist two types of firms:"good" firms, who investors view as a positive influence in the community (e.g., for-profit firms that support education or employee-friendly high-tech firms), irrespective of CSR spending, as compared to"bad" firms who, perhaps by the nature of their production process (e.g., mining firms) or their product (arms or tobacco firms), are viewed by altruistic investors as a negative community influence. Altruistic investors will view good and bad firms differently, inducing different CSR spending policies at the two types of firms.

The model's equilibrium levels of personal gifts and CSR spending depend crucially on the presence and influence of altruistic investors. In this context, we examine the effect of tax policy, as characterized by the tax rebate rates given for personal gifts and for CSR spending, and the limit on CSR spending for which a tax rebate is applicable. We search for policy vari-

ables that maximize *Total Net Giving*, defined as the sum of all personal gifts and CSR spending less the tax rebates granted for that charitable giving. Effective tax policy parameters depend crucially, and non-monotonically, on the fundamental driver of our results, the proportion of altruistic investors. With few or many altruistic investors. tax policy is ineffective in changing corporate giving: with too few, stock prices are not sensitive to giving at any tax rebate rate and with many altruistic investors, corporations give to maximize share price regardless of the tax rebate or cap. For intermediate proportions of altruistic investors, tax policy is effective. In this intermediate region we find that the level of the tax rebate cap affects the effective rebate rate: at low caps, raising the cap requires raising the effective rebate rate as well. However, the cap reaches a point where firms are giving as much as they would if there were no cap, and at that point the effective rebate rate also becomes constant.

It is clear that the concept of *corporate social responsibility* (CSR) is becoming more prominent. Hopkins and Cowe (2004) portray CSR as defining the "ethical corporation," and categorize CSR as covering human rights, labor conditions, environmental impacts and health issues. Hopkins and Cowe (2004) point to events that indicate *non-shareholder stakeholders* are becoming increasingly aware of CSR. Increasing globalization makes local regulation of companies more difficult. In a recent survey among CEOs, McKinsey and Company report that 60% of them feel that environmental, social, and/or governance programs increase shareholder value and are

necessary to maintain profitability.[1]

Investors are also becoming more CSR-sensitive. The 2010 report on socially responsible investing (SRI) trends in the United States revealed that at the beginning of 2010, socially responsible investing had been expanding at a much faster pace than the broader universe of all investment assets under professional management. The report found that, from 2007 to 2010, SRI assets increased more than 13 percent while all investment assets under management edged up by less than 1 percent. Overall, the report identified $3.07 trillion in total assets under management using one or more of three SRI strategies. This is more than 12% of total funds under management as of 2010. With the market rebound since 2010 and increasing social activism, it seems likely the proportion of funds managed ethically has increased even more.

The literature on charitable giving covers both personal giving and corporate CSR spending, but few deal with both, as we do in a world of heterogeneous (altruistic or not) utility-maximizing investors, making portfolio and personal charitable giving decisions, and value-maximizing firm managers making CSR spending decisions.

Existing models of *corporate* CSR behavior fall primarily into two camps with contrasting motivations for the CSR spending. First, there are models where CSR expenditures improve operating income. For example, providing daycare facilities for employees may attract more productive employees, all else equal, leading to greater revenues and/or lower costs. In these models,

[1]McKinsey Global Survey Result: Valuing corporate social responsibility, The McKinsey Quarterly, 2009.

CSR expenditures will increase (up to some point) share prices regardless of the ownership structure of the firm. Navarro (1988) and Webb (1996) make the assumption that corporate donations are part of the firm's advertising strategy. Navarro (1988) assumes that corporate CSR spending improves the quantity of sales of the firm's product at any price, while Webb (1996) assumes that CSR spending improves price, at any given output level. Webb (1996) focusses on the issue of corporate giving either directly or through a foundation, in a profit-maximization model. Navarro (1988) also focusses on profit maximization as the objective, but he also allows for the agency possibility that the manager gains personal benefits beyond the profit-maximizing level of CSR. Navarro (1988) examines comparative statics results of the profit-maximization equation, constrained by a takeover threat that limits the agency problem of CSR spending. Alternatively, our interest is in developing equilibrium implications by assuming different types of value-maximizing firms and a market-clearing condition.

The second camp of CSR models assumes that CSR expenditures are made because the corporate decision-maker or other, non-shareholder, stakeholders feel better for having supported their community with CSR spending, even with no benefit to operating income. For example, Barnea and Rubin (2010) test a model in which management makes CSR expenditures to maximize its own self interest, at the expense of shareholders. They find some evidence consistent with this agency story. Similarly Brown et. al. (2006) find that agency costs play a prominent role in explaining corporate giving. They report that firms with larger boards of directors are associated

with significantly more cash giving and with the establishment of corporate foundations. In addition they find that firms with higher debt-to-value ratios give less cash to charities and are less likely to establish foundations. Also, Cespa and Cestone (2007) examine a model in which inefficient management has incentives to team with social activists to entrench themselves against management replacement. Cespa and Cestone advocate specialized institutions (social auditors) that would monitor social responsibility independent of management.

In contrast, our model assumes: (i) CSR expenditures have no effect on operating cash flows, (ii) corporate decision makers are equity market value maximizers and (iii) *altruistic* investors have preferences for CSR expenditures by firms in which they invest. We will show that these investors' portfolio choices impact stock prices in a way that leads equity value-maximizing managers to make CSR expenditures.

There is little theoretical work in finance that explores equilibrium CSR behavior undertaken by value-maximizing managers. Heinkel, Kraus and Zechner (2001) and Barnea, Heinkel and Kraus (2004) construct a model in which one class of investors is *assumed* to boycott a class of firms that do not meet their standards for anti-pollution efforts (or other social criteria). If enough investors boycott, the authors show that these neglectful firms can be induced to clean up.

Instead of assuming that one class of investors boycotts (has a zero position in) certain stocks, here we assume altruistic investors gain utility from corporate social expenditures, as well as utility from personal social expen-

ditures. This might allow investors to continue to hold stocks that have less-than-perfect social records (to benefit the investors' risk-sharing possibilities) while using their own wealth to gain utility from social expenditures.

Graff Zivin and Small (2005) develop a simple model that shares some similarities to the one developed here. An investor with utility that is concave in consumption and donations (both hers and a corporation's) makes donations and invests in two riskless firms' shares. One firm makes a fixed donation and one does not. The investor consumes out of the end-of-period riskless cash flows from her shareholdings, less what she donates. There are no frictions in the model, such as taxes. In this simple world, Graff Zivin and Small (2005) develop a "Modigliani-Miller" irrelevance result. Suppose that the investor optimally wishes to donate. The two firms' share prices will be equal and they will be independent of the level of donation made by the donating corporation. The idea is that if the donating firm changes its donation level, the investor can offset the effect of this by altering her private donation. Our model below can duplicate this "irrelevance result" if we assume the conditions in Graff Zivin and Small (2005): (i) a riskless technology, (ii) exogenously fixed levels of corporate investment and CSR spending, (iii) only one type of investor (our altruistic investor) and (iv) no taxes.

Baron (2007) expands the Graff Zivin and Small paper in a manner similar to our model. He shows that indifference between CSR and personal giving yields a "Miller-Modigliani" irrelevance result, as in Graff Zivin and Small. When CSR is not as highly valued as personal giving, Baron (2007)

finds that two firms with the same profits will be priced differently, based on their CSR spending. He also introduces taxes and shows conditions for CSR being tax-advantaged. Lastly, Gollier and Pouget (2009) also develop an equilibrium model in which altruistic investors are allowed to purchase the majority of the shares and impose their views on management.

There is a literature on personal giving, going back at least to Becker (1982). For example, Andreoni (1989) builds a utility-maximizing model of personal giving and consumption in a world where social causes are supported by personal gifts or government support. In a "pure altruism" model, the consumer has utility over her consumption and total personal giving, across all consumers. Andreoni defines a "warm glow" model where the consumer has utility over personal consumption and just her personal giving. He then combines these two utility functions so that the consumer has utility over personal consumption, personal giving and total giving. We will employ a similar utility function over personal giving for our altruistic investors. Andreoni studies the substitutability of personal and government charity giving and how the "warm glow" affects this "crowding out."

Finally, there is a substantial empirical literature, mostly related to the elasticity of personal gifts to income or tax rebate rates. Brooks (2007) for example, studies the percentage change in after-tax giving if the "price of giving" (one minus the tax rebate rate) changes. His results vary across the type of giving, but all the elasticities are negative, consistent with our model's elasticity. In an earlier paper, Reece (1974) finds an elasticity of personal giving with respect to the price of giving as just slightly larger

than -1, consistent with our model.

Our equilibrium model, with uncertain output and taxes, offers several interesting results. When there are few altruistic investors, their preferences have little impact on market equilibrium share prices and they find it utility-maximizing to short firms with poor CSR records. With few altruistic investors, tax policy related to corporate giving is ineffective; spending a CSR dollar to get a .40 dollar in tax rebates has little positive affect on equity-value-maximizing firms because CSR does not affect share price.

However, when the fraction of altruistic investors in the economy becomes significant, they do wield market power and equity value-maximizing firms find it optimal to make CSR expenditures. Each altruistic investor also makes personal social contributions but, like Graff Zivin and Small (2005), they reduce personal donations as corporate CSR increases. In this intermediate range of altruistic investors, tax policy can impact corporate giving over a range of tax rebate caps and tax rebate rates.

Alternatively, where altruistic investors are a large fraction of the investing population, then altruistic investors' affect on share prices dominates the impact of setting tax rebate rates and caps so that tax policy is ineffective: low rebate rates at any cap amount are most effective. Firms don't need tax incentives to spend on CSR.

Thus, the effectiveness of tax policy depends critically on the fraction of altruistic investors in the economy. Focusing on intermediate levels of altruistic investors, we find tax policy does matter. Total Net Giving (TNG), defined as the total economy-wide social spending (corporate CSR and per-

sonal donations) less the tax rebates given for such spending, is a function of the three simple tax policy variables we study: (i) the tax rebate *rate* given to firms for CSR, (ii) the tax rebate rate given to individuals for their donations and (iii) the limit on corporate CSR spending to which the rebate rate is applicable.

For example, at an intermediate level of altruistic investors, conditions exist such that TNG is monotonically decreasing in the tax rebate rate given to individuals; an additional dollar of tax rebate generates less than a dollar of new giving. On the other hand, TNG is non-monotonic and concave in the corporate tax rebate rate given to CSR. At low tax rebate rates, increasing the tax rebate rate generates more in new CSR and personal giving than the marginal tax rebate given. This reverses when the tax rebate rate gets larger.

For a given fraction of altruistic investors, we examine how different rebate limits, or caps, affect the TNG-maximizing rebate rate. A simple point of the paper is that, whatever determines the rebate limit (there are arguments for low and high caps), there is generally a different TNG-maximizing rebate rate for each limit, until the limit gets large, when the optimal rebate rate stays constant.

Section 2 sets up the model and Section 3 describes the equilibrium investor portfolio decisions, optimal personal giving and value-maximizing CSR spending, all easily derived from our simple investor utility formulation. We construct a numerical example in Section 4 with parameters chosen to reflect equilibrium results largely consistent with empirical observation.

We use this numerical example to study the impact of changing tax policy variables in Section 5. Section 6 concludes.

2 The Model

There are two types of firms: there are N_g *good* firms that are viewed by some investors as having better corporate social responsibility (CSR) attributes at any social expenditure level than *bad* firms. These fundamentally good firms make social expenditures of D_g each. There are N_b *bad* firms that are viewed negatively by some investors as fundamentally less socially correct than good firms. Each *bad* firm can improve its social commitment by making corporate social expenditures of D_b. At the start of the period, the entrepreneurs of a firm type j, $j \in \{b, g\}$ can raise K_j dollars, of which D_j is expended on CSR spending and $K_j - D_j$ is invested in a production process that produces normally distributed end-of-period cash flows to investors. The expected end-of-period cash flow of a firm of type j is

$$\mu_j = k_1(K_j - D_j) - (1/2)k_2(K_j - D_j)^2 \tag{1}$$

where k_1 and k_2 are exogenous production parameters assumed to be the same for both firm types.

There are two types of investors: there are I_n *neutral* investors who care only about their financial portfolios, i.e., they ignore CSR behavior; there are also I_a *altruistic* investors who do care about CSR and the dollar equivalent of their utility is enhanced by CSR behavior in the amount $W(D_b, D_g, D_I, x_{ab}, x_{ag})$, where D_I is the donation made by each altruistic

investor and x_{ab} and x_{ag} are the number of bad and good firm shares held by an altruistic investor. We assume that altruistic investors have preferences that are separable over wealth and donations and all investors have CARA utility over terminal wealth. For convenience, we also assume that the riskless rate is zero.

Neutral investors choose shareholdings (number of shares per firm per investor) x_{nb} and x_{ng} in bad and good firms to maximize:

$$U_n = x_{ng}\mu_g + x_{nb}\mu_b - \frac{1}{2\tau}[x_{ng}^2\sigma_g^2 + x_{nb}^2\sigma_b^2 + 2x_{ng}x_{nb}\sigma_{bg}]$$

$$-(x_{ng} - \omega_{ng})P_g - (x_{nb} - \omega_{nb})P_b \tag{2}$$

where τ is the investor's risk tolerance.

Good and bad firms have standard deviations of ending cash flows of σ_g and σ_b and the two cash flows have a covariance of σ_{bg}. To simplify the analysis of the equilibrium, we assume that $\sigma_{bg} = 0$. We will relax this assumption in our numerical examples. ω_{nb} and ω_{ng} are each neutral shareholder's endowment of shares in bad and good firms.

Altruistic investors choose shareholdings x_{ag} and x_{ab} in good and bad firms and their individual charitable donations, D_I, to maximize:

$$U_a = x_{ag}\mu_g + x_{ab}\mu_b - \frac{1}{2\tau}[x_{ag}^2\sigma_g^2 + x_{ab}^2\sigma_b^2 + 2x_{ag}x_{ab}\sigma_{bg}]$$

$$-(x_{ag} - \omega_{ag})P_g - (x_{ab} - \omega_{ab})P_b + W(D_b, D_g, D_I, x_{ab}, x_{ag}) - (1 - t_i)D_I \tag{3}$$

where t_i is the personal tax rebate provided to the donor for one dollar of donation.

We choose the following dollar-equivalent of the utility of altruistic investors for donations and corporate social expenditures.

$$W = [u_i D_I - (1/2)vD_I^2] + x_{ab}[u_b D_b - (1/2)vD_b^2 - w_b]$$

$$+x_{ag}[u_g D_g - (1/2)vD_g^2 - w_g] + \beta T - (1/2)\eta T^2 \quad (4)$$

where $T = I_a D_I + N_b D_b + N_g D_g$ is total donations and corporate social expenditures, and v, β and η are positive constants.

The first term in W is the value to an altruistic investor from her personal donation, D_I, and the second and third terms represent the dollar-equivalent utility of corporate social expenditures by b and g firms. If x_{ab} or $x_{ag} = 0$, then that firm's corporate social expenditures do not benefit the altruistic investor (except through their inclusion in total expenditures, T). The last two terms represent the dollar-equivalent of utility for total corporate social expenditures and donations, $T = N_b D_b + N_g D_g + I_a D_I$.

The constants in W define the altruistic investors in this economy. We make three key assumptions that reflect our interpretation of "altruism" as related to CSR spending.

Assumption: $u_b > u_g > 0$.

At equal CSR expenditures, $D_b^* = D_g^*$, and stockholdings, $x_{ab}^* = x_{ag}^*$, the marginal utility to an altrusitic investor of one more dollar of CSR is greater for a dollar from firm type b than from firm type g. Altruistic investors value another CSR dollar from type b more than from type g. As will be seen below from each firm type's optimal CSR expenditure equation, this implies $D_b^* \geq D_g^*$. We will offer empirical support for the implication of

this assumption.

Assumption: $w_b > 0 \geq w_g$.

If neither firm type makes CSR expenditures, then holding type b shares yields the altruistic investor negative utility, while holding type g shares is neutral or positive utility to the altruistic investors. This reflects the altruistic investor's perception of type b and g firms.

Assumption: $\beta > 0$ and $\eta > 0$.

Altruistic investors have utility for total social expenditures, as well as for each expenditure separately in proportion to their shareholdings. As will be seen from the altruistic investor's optimal donation equation, $\eta > 0$ induces substitutability: a dollar of corporate CSR will cause a reduction in the altruistic investor's personal donation.

Entrepreneurs sell their firms at their market values: good firms get P_g and bad firms get P_b. Both types of entrepreneurs choose K_j and D_j to maximize:

$$P_j + t_c * \text{Min}\{D_j, \bar{D}_j\} - K_j \tag{5}$$

where t_c is the corporate tax rebate provided by making one dollar of social expenditures[2], as long as the firm's social expenditure is below some limit set by law (expressed in our model as a fraction of μ_j, expected ending cash flow), $\bar{D}_j = l_j \mu_j$.

[2]Note that t_c applies only to CSR expenditures by the firm, as distinct from the firm's tax rate on net income. The latter is reflected in μ_j, which we hold constant in later comparative statics results from varying t_c.

3 Equilibrium

Our model of two types of investors, n and a, and two types of firms, viewed differently by altruistic investors, b and g, allows for very simple equilibrium portfolio holdings, firm prices and donations and CSR expenditures.

The investors' portfolio first order conditions come from the derivatives of U_n and U_a with respect to their shareholdings and are functions of market prices, P_b and P_g. We also get the optimal altruistic investor donations, D_I^* from maximizing U_a.

We then combine the optimal shareholdings as a function of prices with the market clearing conditions:

$$I_n x_{ng}^* + I_a x_{ag}^* = N_g \tag{6}$$

$$I_n x_{nb}^* + I_a x_{ab}^* = N_b \tag{7}$$

to obtain the equilibrium prices:

$$P_b = \mu_b - \frac{1}{I\tau}[N_b \sigma_b^2] + \frac{I_a}{I} B \tag{8}$$

$$P_g = \mu_g - \frac{1}{I\tau}[N_g \sigma_g^2] + \frac{I_a}{I} G \tag{9}$$

where:

$$B = u_b D_b - (1/2) v D_b^2 - w_b$$

and

$$G = u_g D_g - (1/2) v D_g^2 - w_g$$

from the W function.

Implication #1: When there are altruistic investors ($I_a > 0$) and no CSR expenditures ($D_j = 0$), $B = -w_b < 0$ and $G = -w_g \geq 0$, and so $w_b > 0 \geq w_g$ implies $P_b < P_g$. Even though both firm types have identical expected cash flows and, we assume, identical risks, they do not have the same market values. This effect is larger when there are more altruistic investors. Thus, value-maximizing corporate managers may react to altruistic investors' non-economic feelings. As will become apparent, any tax policy must take into account the presence of altruistic investors.

Our primary objective is to explore equilibrium CSR spending and individual donations. The firms' first order conditions for CSR expenditures come from choosing D_j to maximize $P_j + t_c * \text{Min}\{D_j, \bar{D}_j\} - K_j$. Bounded by $(0, \bar{D}_j)$, the interior solution is:

$$D_j^* = \frac{1}{v}[u_j - (\frac{I}{I_a})(1 - t_c)] \tag{10}$$

Donations beyond $\bar{D}_j$ are allowed with no tax rebate, and will only be taken if such donations add to value with $t_c = 0$.

Implication #2:

(2a) Corporate CSR spending is non-decreasing in the proportion of altruistic investors ($\frac{\partial D_j^*}{\partial I_a} \geq 0$). At low levels of I_a, $D_j^* = 0$, but at some point, the optimal CSR spending will increase with I_a. The optimal CSR expenditure also shows the two factors drive that spending: the tax rebate will encourage CSR spending, but so does the presence of altruistic investors. In fact, sufficient altruistic investors could induce CSR spending even in the absence of a tax rebate (i.e., $t_c = 0$). Thus, tax policy must take into account

the level of altruistic investing.

(2b) Corporate CSR spending is increasing in altruistic investors' marginal utility of that spending ($\frac{\partial D_j^*}{\partial u_j} > 0$). With $u_b > u_g$, then $D_b^* > D_g^*$, which appears to have empirical support.

(2c) The derivative of CSR spending with respect to the "price of giving" is negative ($\frac{\partial D_j^*}{\partial(1-t_c)} < 0$), and this will be more negative when I_a is small. This interaction between the fraction of altruistic investors and tax policy will be apparent in the next section.

It is easy to show that the optimal investment, $K_j - D_j$, is a function solely of production parameters k_1 and k_2, which we assume are the same for both firm types. So, through all of our examples, when D_j^* varies, so will K_j^* in exactly the same way, to keep optimal investment, $K_j^* - D_j^*$, the same, depending only on parameters k_1 and k_2.

The altruistic investor must also choose her charitable donation, D_I. The optimal personal contributions are the maximum of zero or

$$D_I^* = \frac{u_i + \beta I_a - \eta I_a(N_b D_b + N_g D_g) - (1 - t_i)}{v + \eta I_a^2} \tag{11}$$

Implication #3:

(3a) Individual giving decreases in the price of giving ($\frac{\partial D_I^*}{\partial(1-t_i)} = \frac{-1}{v+\eta I_a^2} < 0$). This finding is consistent with much of the empirical literature on personal giving.

(3b) Individual giving decreases with higher corporate CSR spending ($\frac{\partial D_I^*}{\partial(N_b D_b^* + N_g D_g^*)} < 0$), since $\eta > 0$. This leads to substitutability of corporate for individual donations.

With these general results, in the next section we introduce a numerical example to allow us to examine how the fraction of altruistic investors impacts tax policy effectiveness, and when it is effective, how the tax policy parameters are related when maximizing TNG.

4 A Numerical Example of Equilibrium

For exposition, we compute a numerical example of the equilibrium for three levels of I_a. The input parameters are:

$k_1 = 6$	$\tau = 200$	$\beta = 6$
$k_2 = 1$	$u_i = 3$	$\eta = .5$
$\sigma_b = 20$	$u_b = 2$	$I = 1.0$
$\sigma_g = 20$	$u_g = 1$	$l_j = .05\ j = b, g$
$\sigma_{bg} = 200$	$v = 1$	
$N_b = 0.5$	$w_b = 1$	
$N_g = 0.5$	$w_g = -1$	
$t_c = 0.4$	$t_i = 0.3$	

Table 1 demonstrates how changes in the proportion of altruistic investors in the economy affects investor and firm behavior. In the last three columns of Table 1 we show $T = I_a D_I^* + N_b D_b^* + N_g D_g^*$, total individual donations and corporate CSR spending, the total tax rebates paid, $C = t_c(N_b D_b^* + N_g D_g^*) + t_i I_a D_I^*$ and the difference, $T - C$, termed TNG for Total Net Giving.

With few ($I_a = .05$) altruistic investors, they short-sell type b firm shares,

reducing P_b relative to P_g and firm values are not impacted enough to generate corporate CSR spending, even with a tax rebate rate of $t_c = .4$.

At a higher level, $I_a = .35$, we see the impact of altruistic investors. Type b firms now spend $D_b = .29 < \bar{D}_b = .875$ on CSR to boost share price. At a high level of altruistic participation ($I_a = .60$), good firms have not yet been induced to generate CSR spending, but bad firms have now reached the limit on CSR spending that generates a tax rebate, $D_b^* = .875 = l_b * \mu_b = .05 * 17.5$, where $\mu_b = 17.5$ is the expected cash flow from firm b's optimal production decision.

In this one-period model, expected stock returns are measured as $E(r_j) = (\mu_j / P_j) - 1$. Since both firm types in the numerical example have $\mu_j = 17.5$, the expected returns differ by only .6% when $I_a = .05$, while, at $I_a = .35$, the expected returns are 3.2% bigger for type b firms than type g firms. Altruistic investors shun bad stocks, pushing prices down and thereby raising expected returns.

There is a large and growing body of evidence on relative returns of firms with differing CSR expenditures, much of it mixed or finding no significant return differences. This could result from, as indicated by our model, there being too few altruistic investors, so that the prices (and the expected returns) of b and g firms do not differ significantly. One paper which finds that CSR activity does reduce returns, as our model predicts, is Brammer, Brooks and Pavelin (2005). They use measurements of CSR activity for British firms provided by the Ethical Investment Research Service, which encompass more CSR activity than just corporate donations. They note:

"firms with higher social performance scores tend to achieve lower returns, while firms with the lowest possible CSP (corporate social performance) scores of zero considerably outperformed the market."

In a very direct test of the differences in returns between type b and g firms, Hong and Kacperczyk (2009) do both time-series and cross-sectional regressions of returns on "sin stocks," namely alcohol, tobacco and gaming companies, compared to other "type g" firms and find approximately a 3% outperformance by the sin stocks, as our model would suggest with a sufficient proportion of altruistic investors.

We take these empirical results as indirect evidence that the actual proportion of altruistic investors (as measured by the dollars invested altruistically) is big enough to impact stock prices and corporate behavior.

The effectiveness of tax policy will be examined for all three levels of altruistic participation shown in Table 1.

5 Tax Policy Choices

In our numerical example with $I_a = .35$, b firms are donating, but below the maximum allowable for tax deduction purposes. This appears to be the case empirically. Evidence from the publication Giving USA: the Annual Report on Philanthropy, lists tax-deductible donations as a fraction of net income before taxes, by industry, for 1998. Most industries were well below the maximum of 10%: Finance and Insurance gave .4%; Manufacturing gave 1.4% and Information gave 2.1%. The largest donating industries were Agriculture (8.3%) and Mining (8.1%).

In our numerical example g firms will not donate until a larger proportion of altruistic investors appears. The above evidence also suggests that, consistent with our result that $D_b^* > D_g^*$, b firms spend more on CSR than do g firms. Mining would be considered by altruistic investors much more of a b industry and information technology much more of a g firm.

Brammer, Brooks and Pavelin (2005) offer evidence on British firms' CSR activity, using measurements of CSR activity for British firms provided by the Ethical Investment Research Service. The two industries with the highest measures of CSR activity were utilities and resource companies, which includes oil and energy companies. In fact, near the top of the CSR measures were British Petroleum, Shell and British Energy. These industries would certainly fall into our b-type category, as opposed to information technology and cyclical consumer companies (g firms) that had the lowest CSR activity measures.

The big social contributors are individuals. In Table 1 when $I_a = .35$, then $I_a D_I^* = 1.443$ and $N_b D_b^* + N_g D_g^* = .143$, the ratio of personal donations to corporate CSR is about 10 times. If we take recent levels of personal donations relative to business donations (source: Giving USA: the Annual Report of Philanthropy) this ratio is about 15 times. However, we believe that the reported corporate contributions underestimate the amount of CSR spending because some amount of CSR is not actual donations but capital expenditures or normal business expenses. As I_a changes from 0 to 1, both total personal donations, $I_a D_I^*$, and corporate social expenditures, $N_b D_b^* + N_g D_g^*$, increase.

In this section we examine, through our numerical example, the impact of tax policy. For a given proportion of altruistic investors, I_a, tax policy, in the form of parameters t_i, t_c and $l_j = \frac{\bar{D}_j}{\mu_j}$, will impact the level of total donations, $T = I_a D_I^* + N_b D_b^* + N_g D_g^*$, as well as the cost of lost tax revenues, $C = I_a t_i D_I^* + N_b t_c \text{Min}\{D_b^*, \bar{D}_b\} + N_g t_c \text{Min}\{D_g^*, \bar{D}_g\}$.

We will search for tax policy parameters which maximize TNG for each of the three levels of I_a shown in Table 1. We have in mind the following situation. Suppose that, in the absence of individual donations and corporate CSR spending, government would provide the necessary level of spending from tax revenues to meet a society's minimum needs. We will look for policies that transfer as much of that obligation from government to private sources, net of any tax rebate that the government must provide to induce the donations and CSR spending; TNG measures exactly that.[3]

Observation 1 A sufficient condition for Total Net Giving, TNG, to be decreasing in t_i, the tax rebate given for personal donations, is $D_I^* > (1 - t_i)\frac{\partial D_I^*}{\partial t_i}$.

An increase in the tax rebate rate must be applied to all the donations, which are proportional to the left-hand side of the sufficient condition. However, total donations only go up proportional to the right-hand side of the sufficient condition. This sufficient condition holds in all our numerical examples.

[3]Our motivation for using TNG as a measure of social giving rather than a utility-based measure of the worth of giving is practical: TNG can be measured empirically, while utility-based measures cannot.

Thus, using the personal tax rebate rate to raise total donations is not effective in terms of Total Net Giving because the tax rebate cost goes up faster than total donations. This happens for two reasons. First, from the sufficient condition, the marginal increase in the rebate rate must be applied to *all* donations, not just the marginal increase. Second, corporate donations (see equation (10)) are independent of the tax rebate given to individuals. Thus, while individuals give more as t_i increases, corporations don't, and marginal total donations are less than the marginal tax rebates given. So, in our model, allowing individuals to deduct donations does not appear to be an efficient policy.

Observation 2 The presence of altruistic investors is fundamental to tax policy effectiveness.

This observation is most easily demonstrated when $I_a = .05$. Figure 1 shows a graph of TNG as a function of three levels of $\bar{l}_j$ and corporate tax rebates rates, t_c, running from zero to one, when $I_a = .05$. Regardless of $\bar{l}_j$, no rebate rate is capable of generating any corporate CSR until $t_c = .95$. Without the price effect of altruistic investors reacting favorably to corporate CSR, spending a dollar to get back a rebate of less than one dollar is not a value-maximizing investment. At $t_c = .95$, even the few altrustic investors are enough to get type b firms to jump to $D_b^* = \bar{D}_b = l_b \mu_b$. However, the rise in CSR spending is almost totally offset by the tax rebate, so TNG rises only by a small dollar amount.

Observation 3 In our numerical example, Total Net Giving is non-monotonic in the corporate tax rebate, t_c, for all levels of l_j.

Figure 2 shows the level of TNG for three levels of l_j and t_c running from 0 to 1 when $I_a = .35$.

The case of $l_j = .025$ leads to CSR spending that induces the non-monotonicity seen in TNG. As t_c rises, D_b^* turns positive at $t_c = .35$ and TNG continues up until $TNG = 1.125$ at $D_b^* = .45$. D_b^* reaches $\bar{D}_b$ at $t_c = .50$ and the larger tax rebate rate applied to all CSR spending then turns TNG down, dropping from 1.125 to 1.084 at $t_c = .65$. Because $D_g^* > 0$ for the first time at $t_c = .70$, TNG grows from 1.014 to 1.092 at $t_c = .75$. From there, the rising rebate rate dominates and TNG falls.

Because, at any I_a and t_c, $u_b > u_g$ implies $D_b^* > D_g^*$, we see type b firms begin CSR spending along the t_c spectrum prior to type g firms, leading to the non-monotonicity described above.

Raising the upper bound on tax-rebatable CSR spending to $l_j = .075$ results in only one local maximum for TNG. D_b^* still kicks in at $t_c = .35$ but D_b^* does not reach its maximum allowable amount until $t_c = .80$. While $D_g^* > 0$ at $t_c = .70$, TNG turns down past $t_c = .7$, resulting in the maximum TNG at $t_c = .7$.

Observation 4 The optimal rebate rate, t_c, that maximizes TNG, varies with the upper limit on tax-deductible CSR expenditures, l_j. Using our numerical example, at $I_a = .35$:

A limit of:	optimal tax rebate rate of:	for a Total Net Giving of:
.025	.45	1.125
.050	.60	1.170
.075	.70	1.183
.010	.70	1.183
.125	.70	1.183

As we increase l_j, the tax rebate rate, t_c, that maximizes TNG increases until the maximum TNG continues to occur at $t_c = .70$ and remains constant at 1.183.

Thus, a tight upper limit on the amount of CSR, $l_j = .025$, leads to a lower optimal tax rebate rate, $t_c = .45$, and a lower (maximum) TNG, 1.125, than if the limit is $l_j = .075$.

However, loosening the upper limit beyond some point does not change the optimal rebate rate. From above, the optimal t_c remains at .70 at a limit of $l_j = .075$ (or higher). So, as l_j increases beyond about $l_j = .075$, total donations and tax revenue lost remain constant, meaning that social surplus is also constant. Beyond $l_j = .075$, firm CSR spending is unconstrained and the levels are dictated by unconstrained value-maximization.

This result has policy implications. Whatever the reason for limiting the tax rebate on CSR spending (e.g., agency concerns), the tax rebate rate that maximizes TNG is a function of the chosen l_j, only if l_j is below some point ($l_j = .075$ in our numerical example). If l_j is above this point, the optimal t_c is the same for any l_j.

This optimal (l_j, t_c) relationship only holds for intermediate values of I_a. As shown, at low values of I_a, $D_b > 0$ does not occur until very large tax rebate rates are offered and $D_g = 0$ for all tax rebate rates. Since individual donations are independent of these policy variables, TNG is low and quite insensitive to l_j and t_c.

At higher proportions of altruistic investors, like $I_a = .60$, Figure 3 shows that the TNG-maximizing corporate tax rebate rate, t_c, is lower at each cap, l_j, than at $I_a = .35$. The power of altruism allows the rebate rate to be lower.

At even higher values of I_a, the optimal tax rebate rate for almost any rebate limit is $t_c = 0$. In these cases, the market power of altruistic investors is so great that no tax incentive is necessary to generate the maximum TNG.

6 Conclusion

This paper does not assume that CSR spending increases revenues or decreases costs; neither do we assume that CSR spending is done to increase firm management utility for helping the community. Rather, we assume the existence of *altruistic investors* who get utility from owning shares of firms that make CSR spending. Even firms with a poor reputation for social values like sustainability, environmental protection, community giving, etc., can improve their status with altruistic investors through CSR spending.

The existence of altruistic investors, through their portfolio decisions, influences stock prices: poorly-perceived firms will have lower P/E ratios and higher average stock returns than favorably-perceived firms. There is some

empirical support for poorly-perceived firms having higher average returns. This occurs because altruistic investors are willing to sacrifice diversification, by shunning "bad" stocks, which then must be held in larger proportion than optimal by neutral investors, who demand a risk premium to hold the extra bad firm shares.

Thus, CSR spending is undertaken by *value-maximizing* managers, acting in their shareholders' best interests, to maximize their stock price. However, we show that, if there are few altruistic investors, then their price impact is negligible and no CSR spending will occur, regardless of tax rebates for such spending. Similarly, if there are a great majority of altruistic investors, then value-maximizing firms will, without *any* tax incentives, undertake CSR spending.

For the intermediate cases of a meaningful, but not overwhelming, proportion of altruistic investors, tax policy matters. We formulate the simplest possible model of altruistic and neutral, risk-averse, investors, investing in "bad" and "good" firms. For what we feel is a simple, but realistic model of non-economic utility for corporate social responsibility (CSR) spending, we derive equilibrium stock prices, portfolio holdings, individual donations and CSR spending. A numerical example provides several results we feel have empirical validity. First, individual donations are roughly 10 times the size of CSR spending. Also, we find that bad firms spend more on CSR than do good firms, but bad firms are below the current limit on tax-rebatable CSR spending.

We then define Total Net Giving (TNG) as the sum of all individual

donations plus all CSR spending, minus the total tax rebates paid by the government to individuals and corporations. We choose this as our objective function when examing the tax policy parameters t_i, the tax rebate rate for individuals, t_c, the tax rebate rate for corporate CSR spending, and l_j, $j \in \{b, g\}$, the maximum proportion of corporate income for CSR spending that will generate a tax rebate.

We find, for a broad range of parameter values in our numerical example, several important policy implications. First, TNG decreases as t_i increases: since individual donations do not affect corporate CSR spending, and an increased tax rebate rate applies to all donations, not just the marginal ones, the additional donations generated by raising the rebate rate are less than the tax breaks given. Thus, lower individual tax rebate rates will increase TNG.

Second, for a given l_j, TNG is non-monotonic in t_c, usually having one or two local maxima, determined by when, as t_c rises, bad firms begin CSR spending and then, at higher t_c, bad firms hit the rebate limit and/or good firms begin CSR spending.

Third, the TNG-maximizing t_c for any l_j, is first increasing in l_j, and then is constant for any l_j beyond a given point. When l_j gets so big that it no longer constrains the firms' value-maximizing CSR spending amount, it becomes irrelevant and CSR spending remains constant for all higher l_j.

There are arguments for high or low tax rebate limits, l_j. Some may want a high limit, feeling that corporate CSR spending may be more *tax-efficient* than individual donations, which must be made out of after-tax corporate

dividends. Others may feel that agency concerns over how corporate CSR spending is allocated indicate lower limits. What our model suggests is that, at lower limits, the rebate rate should increase with l_j, but past some l_j, the optimal rebate rate remains constant.

The proportion of altruistic investors (i.e., those considering non-economic objectives in forming their investment portfolios) has certainly increased over the past few decades. Value-maximizing corporate executives must be aware of this trend when making corporate capital allocations, with CSR spending becoming more predominant. This paper indicates that lawmakers also need to pay attention to this trend. As Heinkel, Kraus and Zechner (2001) and Baron (2007) point out in simple models, expected rates of return on firms favored by altruistic investors can be less than the expected returns on firms not favored. Many empirical studies of these rates of return over the past twenty years have given mixed results, so that return differences are not obvious. However, results like Hong and Kacperczyk (2009) indicate to us that the proportion of altruistic investors is in a region where it may be starting to impact firm values. If so, as this paper tries to show, tax policy can make a difference in the level of total net giving and needs consideration.

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Table 1 - A numerical example of Equilibrium

Ia	Pb	Pg	Xng	Xnb	Xag	Xab	Db	Dg	Dl	T	C	TNG
0,05	15,95	16,05	0,450	0,550	1,450	-0,450	0,000	0,000	2,597	0,130	0,039	0,091
0,35	15,84	16,35	0,212	0,726	1,035	0,080	0,286	0,000	4,122	1,586	0,490	1,096
0,60	16,22	16,60	0,173	0,553	0,718	0,465	0,875	0,000	4,889	3,371	1,055	2,316

Figure 1 - TNG with *Ia* = 5% and various levels of *Tc*

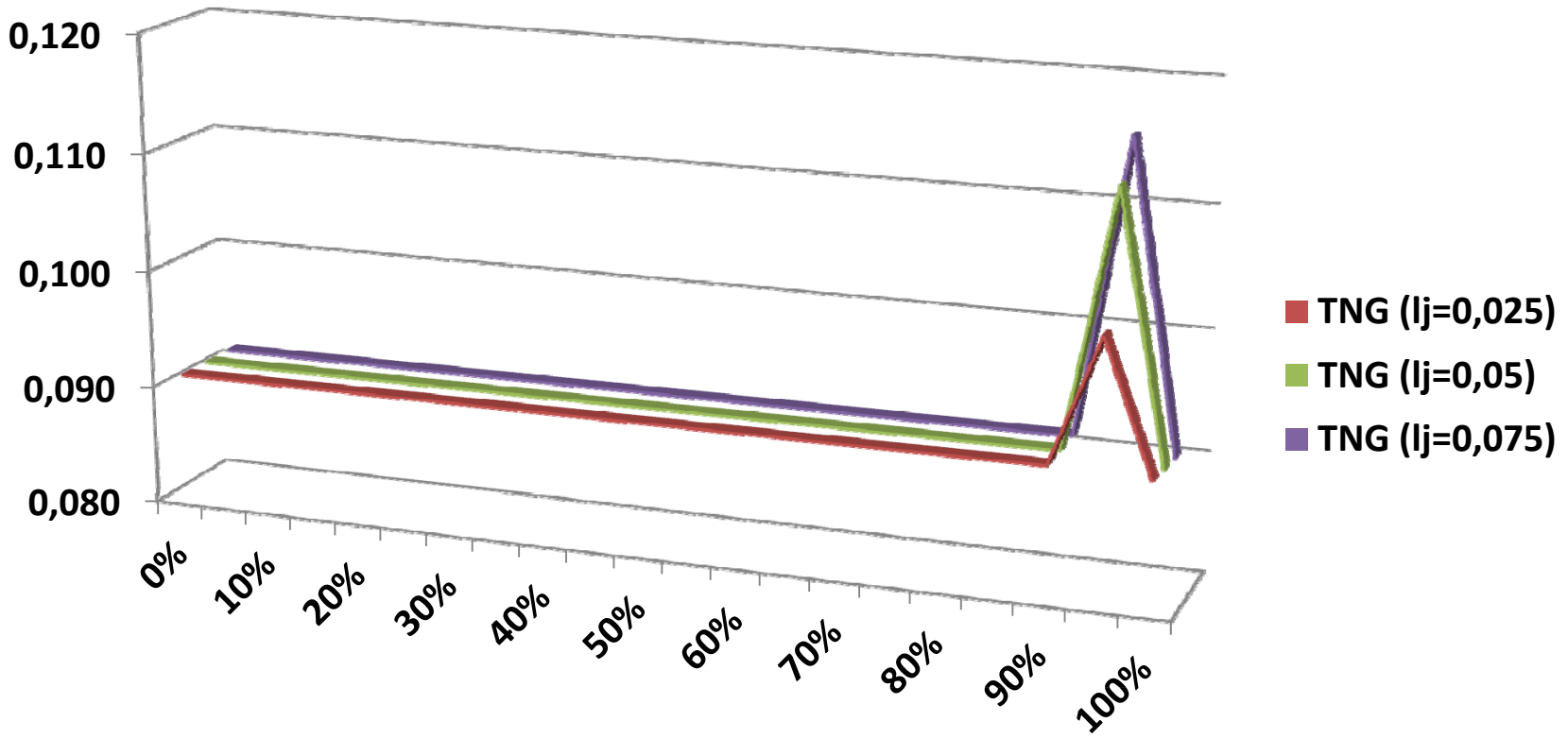

Figure 2 - TNG with *Ia* = 35% and various levels of *Tc*

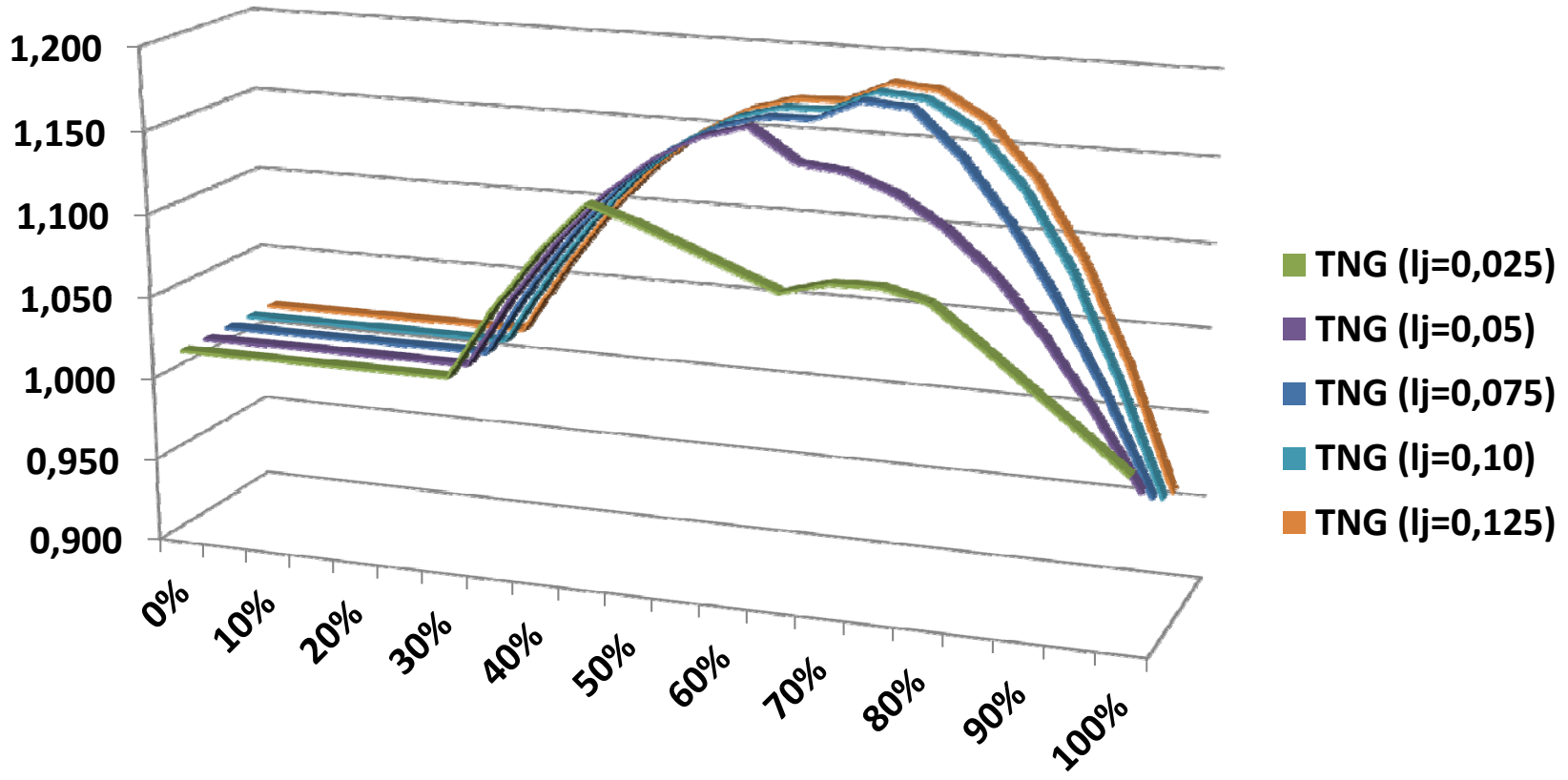

Figure 3 - TNG with *Ia* = 60% and various levels of *Tc*