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FINANCIAL CONSTRAINTS ON CORPORATE GOODNESS

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ABSTRACT

An influential thesis, dubbed "Doing well by doing good," argues that corporate social responsibility is profitable. But heterogeneity in firm financial constraints can induce a spurious correlation between profits and goodness even if the motives for goodness are non-profit in nature. We use two identification strategies to show that financial constraints are indeed an important driver of corporate goodness. First, during the Internet bubble, previously constrained firms experienced a temporary relaxation of their constraints and their goodness temporarily increased relative to their previously unconstrained peers. Second, a constrained firm's sustainability score increases more with its idiosyncratic equity valuation and lower cost of capital than a less-constrained counterpart. In sum, firms are more likely to do good when they do well.

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1. Introduction

Many firms, especially large corporations, annually invest significant resources on corporate social responsibility practices such as cleaner environmental technology, employee and community development programs and philanthropic endeavors. In 2009, Intel allocated $100 million for global education programs and energy conservation efforts such as the purchase of renewable energy certificates. In 2007, General Electric gave $160 million to community and employee philanthropic programs and earmarked billions more for developing eco-friendly products. Most famously, Google in the mid-2000s initiated a 1% project that would take 1% of its profits and invest it in socially responsible projects that had both philanthropic and profit interests.[1] Moreover, many corporations increasingly use evaluation systems and compensation programs that include the social performance of firms (see, e.g., Kaplan and Norton (1996)).

There is a large management literature going back many years that examines the relationship between corporate social responsibility and financial performance. It has focused on why such practices might be positive net present value (NPV) similar to standard forms of corporate investments like capital expenditures or research and development (R&D). Many theories have been developed to rationalize such a profit angle to sustainability.[2] This profit motive for corporate social responsibility, dubbed "Doing well by doing good", is highly influential with both practitioners and policy makers and has some empirical support (Heal (2005), Margolis, Elfenbein, and Walsh (2007)). But these empirical studies in the literature are cross-firm in nature and suffer from potential omitted variables problems.

[1] This program has subsequently been folded into their other social responsibility practices. See Delevingne (2009) for a more detailed description of such projects.

[2] For reviews of these strands of theories, see Benabou and Tirole (2010). A number of theories of profits from goodness implicitly rely on the idea that firms are well-positioned to deliver warm-glow feelings (Becker (1974) and Andreoni (1989)) to consumers. See for instance Besley and Ghatak (2005) for a model which includes such strategic complementarities involving goodness in the production function. See Baron (2001) for a model of strategic deterrence of regulation through using corporate goodness. Other reasons for why goodness pays is that is improves employee efficiency, lessens conflicts among stakeholders, mitigates litigation risk, deters potential regulation, signals product quality or as investor relations in dealing with product or capital market boycotts by socially responsible consumers or investors.

One important source of these omitted variables involves heterogeneity in firm financial constraints that might create a spurious correlation between financial performance and goodness. For example, firms that are less financially constrained can have better financial performance because they can invest. Even if firm goodness spending is driven by altruistic or agency reasons as opposed to a profit motive, goodness spending could also be limited by the degree of the firm's financial slack, thereby potentially inducing a relationship between firm financial performance and goodness. Therefore, the question of whether financial constraints drive corporate goodness is a fundamental one since a strong relationship would call into question the methods the literature uses to measure whether goodness leads to higher profits.

In this paper, we show that financial constraints are indeed an important driver of corporate social responsibility. We first develop a simple model of financial constraints and investments in capital and corporate goodness to illustrate the potential relationships between these and other variables of interest in a setting where the firm's motive for goodness can be profit or non-profit driven.[3] The key prediction of this model is that regardless of the motive for goodness spending, less constrained firms spend more on capital and goodness. The beneficial impacts of financial constraints on higher capital investment and higher firm profits have already been documented elsewhere (see, e.g.,Baker, Stein, and Wurgler (2003) and Campello and Graham (2007)).

The focus of our paper is hence to establish a causal link that less financially constrained firms are more socially responsible. We test this prediction using data on firm scores of corporate social responsibility provided by Kinder, Lydenberg and Domini (KLD) and standard measures of financial constraints from the literature. Companies are evaluated based on a number of criteria, including community relations, employee relations, diversity of the

[3]Non-profit motives for corporate responsibility include the firm acting as a delegated philanthropist when the firm faces a lower cost for giving than shareholders or agency rationales in which managers consume corporate goodness as a perk or use it to entrench themselves by currying favor with important stakeholders. The perspective in Friedman (1970) is that corporate goodness is managerial entrenchment in which managers use corporate cash to further their own interests, whether it be for their own philanthropy or to entrench themselves further. See Tirole (2001) for a discussion of how goodness is related to governance.

workforce, environmental protection, product quality and governance. Our sample consists of S&P 500 firms observed yearly from 1991 to 2008. Firms are scored in terms of concerns and strengths for these six criteria.

We consider two measures of corporate concerns and strengths. The first is the simple sum of the scores for strengths and concerns. The second is based on a factor analysis of these scores. Factor analysis points toward putting an equal weight on the various criteria but zero weight on governance strenghs. This analysis suggests that each of the categories is likely to carry information about the responsibility of the firm and should be used in combination. We then take the difference between strengths and concerns (using both the simple sum scores and the factor scores) to be the measures of a firm's goodness. We measure a firm's financial constraint using a variety of measures from the literature including the Kaplan and Zingales (1997) score, share repurchases and bond ratings.

We find that less financially constrained firms indeed have higher goodness scores, using both of our measures of corporate goodness and all of our financial constraint measures. But there is still the question of whether this strong correlation is causal. We consider two identification strategies.

Our first identification strategy builds on Campello and Graham (2007) who argue that the Internet bubble relaxed financing constraints even for non-technology firms. They show that even non-technology firms received excessively high valuations and that those that were constrained issued equity to finance capital expenditures and to elevate their cash holdings.[4] If there is a causal connection between financial constraints and corporate goodness, then we expect that during the Internet bubble of 1996-2000 previously constrained non-technology firms would increase their corporate goodness relative to other non-technology firms compared to other periods in our sample.

[4]We interpret our quasi-experiment regarding the rise and fall of internet valuations following Campello and Graham (2007) as a bubble. However, it does not matter for us whether the rise of market valuations was due instead to more rational motives such as time varying risk aversion that lowered the required rate of returns for equities. Indeed, Pastor and Veronesi (2006) argue that time varying equity premium might have played an important role in driving these valuations. The key is that the market equity risk premium changed and made it cheaper for firms to raise financing during the Internet period.

Our identification strategy differs from Campello and Graham (2007) in terms of the set-up and its emphasis that this convergence in goodness scores was indeed temporary and occurred during the Internet period. Therefore, we are able to rule out alternative explanations related to coincident trends. We conduct a variety of robustness checks, including showing this result for all of our financial constraint measures.

One way to gauge the economic significance of our finding is to compare the sensitivity of goodness to constraints with the corresponding sensitivities for capital expenditures and R&D. Using the same identification strategy, we find that sensitivity for goodness is higher than for these other standard investments.

Our second identification strategy, originally developed by Baker, Stein, and Wurgler (2003) in the context of corporate investments, is that a constrained firm's stock price, as measured by its log market-to-book ratio, has a bigger influence on its investment activity than for unconstrained firms. For an unconstrained firm such as Google who have billions in cash, its stock price level is irrelevant for its investments in goodness since these companies do not need to issue equity to fund these investments. But for constrained firms, its stock price is crucial as a low stock price or higher cost of capital due to idiosyncratic reasons will lead the firm to not under-take investments in goodness that it otherwise would if it were unconstrained.

We show that this is indeed true in the data. Constrained firms' corporate goodness scores increase more with its idiosyncratic stock valuation than unconstrained firms. We make sure to purge out common shocks to the cost of capital using time dummies. Corporate goodness for constrained firms is also more sensitive to stock valuation than is the case for capital expenditures or R&D spending. In other words, this second identification strategy yields very similar results as the first strategy. This consistency of results across the two strategies is reassuring.

In sum, we conclude that firms are more likely to do good when they do well. Heterogeneity of firm financial constraints is an important source of omitted variables bias in the

large and growing literature on "Doing well by doing good". Importantly, it is not enough to simply try to control for financial constraints on the right-hand side since there are measurement error issues with such a crude strategy. Rather, our paper suggests that a clear identification strategy is crucial to understanding other fundamental questions on the nexus of corporate social responsibility and firm financial performance. There may very well be a causal relationship between goodness and profits but instruments for goodness need to be found.

Our paper proceeds as follows. In Section 2, we present a simple model of a manager's capital and goodness choices in the presence of financial constraints and an exogenously given utility or objective function. In Section 3, we describe the data. We present the empirical results in Section 4 and conclude in Section 5. Details of the proofs for the model are in the Appendix.

2. Model

We develop a static model of the firm's choices of capital (K) and goodness (G). The firm's output is solely a function of capital and is given by the production function $\alpha f(K)$. $f(K)$ is a neoclassical production function with the following properties: $f'(0) = \infty$, $f'(K) > 0$, and $f''(K) < 0$. α is a technology parameter that captures the productivity of capital. For simplicity, we assume that the cost of one unit of capital is 1 and that the cost of one unit of goodness is also 1. Then let Γ denote the amount of cash needed to finance investments in capital and goodness (*i.e.*, the firm faces the financing constraint $K + G \leq \Gamma$). A low Γ is a proxy for a firm that has little cash, that finds it difficult to raise funds in debt markets, and that is more equity dependent. As we elaborate on below, we can think of Γ as being shifted by either aggregate shocks such as the Internet bubble or idiosyncratic shocks which made financing more accessible (i.e. a higher Γ) through excessively high valuations that the firm

can then exploit by issuing over-priced equity.[5]

The firm derives utility over profits and the amount spent on goodness G given by the following utility function:

$$u(\alpha f(K) - K - G, G) \tag{1}$$

We assume that u is increasing in each argument and that D^2u is a negative definite matrix. This utility function is a flexible form meant to capture varied motives for goodness; it can be interpreted as the utility function of shareholders or the manager. Under a non-strategic (*i.e.* non-profit related) motivation, u is the utility that shareholders or the manager get from delegated giving; under an agency interpretation, u is the utility that the manager derives from giving or perhaps from entrenchment. Importantly, u can also be interpreted as providing the payoffs for the firm from investing in goodness for strategic or profit reasons.

A benchmark case is where $u(\cdot, \cdot) = f(K) - K - G + v(G)$ and $v(G)$ satisfies the following properties: $v'(0) < \infty$, $v'(G) > 0$ and $v''(G) < 0$. The firm derives the net benefit $v(G) - G$ from goodness that can be interpreted as either dollars to the bottom line under a profit-motive interpretation or as private benefits to the manager under an agency interpretation.

We will also place a limit on the degree substitution between profits and goodness in the utility function by assuming that

$$u_{12} \geq u_{11}.$$

Note that we assume the usual nice properties regarding utility function and hence $u_{11} < 0$. u_{12} measures the substitutability of profits and goodness. If $u_{12} > 0$, then goodness and profits are complements; while if $u_{12} < 0$ then profits and goodness are substitutes. If $u_{12} = 0$, then profits and goodness are separable in the utility function of the firm.[6]

[5] This point has been already formalized in Baker, Stein, and Wurgler (2003) and we use the simplest model for expositional reasons.

[6] It is easiest to think of our setting as one in which goodness and profits complements, but we do allow for substitution, provided it is not too strong.

The firm then has the following constrained optimization problem:

$$\max_{K,G} u(\alpha f(K) - K - G, G) \tag{2}$$

subject to

$$K + G \leq \Gamma \tag{3}$$

and

$$G \geq 0 \tag{4}$$

Because $f'(0) = \infty$, we know that the optimal K is greater than zero whenever $\Gamma > 0$ and so there is no need to impose a non-negativity condition on K. But we do need to impose a non-negativity condition on G because a firm with a financial constraint may potentially want to choose a negative G to loosen that constraint. In fact, we assume that $u_2(\cdot, 0)$ is finite; so whenever Γ is small, the firm would be tempted to choose a negative G.

The solution has three regions defined by the level of cash Γ. The first region, Region 1, is given by $\Gamma \geq \Gamma^{FB}$, where Γ^{FB} is the level of cash that finances the first-best levels of investments in capital and goodness and where the firm is unconstrained (*i.e.*, the constraint given by equation (3) is not binding). Let the optimal unconstrained solution be denoted by (K^{FB}, G^{FB}). The solution K^{FB} satisfies the following equation:

$$\alpha f'(K^{FB}) = 1 \tag{5}$$

Equation (5) is the familiar first-order condition that the marginal product of capital equal to the marginal cost of capital, which we assume is equal to 1. And because $f'' < 0$, we know that K^{FB} is unique.

Furthermore, if

$$-u_1(\alpha f(K^{FB}) - K^{FB}, 0) + u_2(\alpha f(K^{FB}) - K^{FB}, 0) > 0 \tag{6}$$

then $G^{FB} > 0$ solves

$$-u_1(\alpha f(K^{FB}) - K^{FB} - G^{FB}, G^{FB}) + u_2(\alpha f(K^{FB}) - K^{FB} - G^{FB}, G^{FB}) = 0. \quad (7)$$

Equation (7) gives the first-order condition that determines G^{FB}. It states that at the unconstrained solution, the marginal benefit of goodness ($u_2(\alpha f(K^{FB}) - K^{FB} - G^{FB}, G^{FB})$) equals the marginal cost of goodness ($u_1(\alpha f(K^{FB}) - K^{FB} - G^{FB}, G^{FB})$), which is simply the lost marginal utility of profit. We will assume that inequality (6) holds; otherwise there is no investment in goodness at the first best. The negative definiteness of D^2u guarantees that G^{FB} is unique. The first-best level of cash is then given by

$$\Gamma^{FB} = G^{FB} + K^{FB}. \quad (8)$$

We will now consider the solution when the financial constraint is binding. If $\Gamma < \Gamma^{FB}$, then inequality (3) binds. The solution then is further characterized by a unique cut-off value $\Gamma^* < \Gamma^{FB}$. The second region, Region 2, is defined by $\Gamma^* < \Gamma < \Gamma^{FB}$. Here, financial constraints bind but $G > 0$, $G = \Gamma - K$ and an increase in Γ leads to an increase in both K and G. The third region, Region 3, is defined by $\Gamma \leq \Gamma^*$. In this region, financial constraints bind and $G = 0$. An increase in Γ only leads to an increase in K and no change in G. Intuitively, because the marginal product of capital is infinite at zero, a very constrained firm will spend its resources on capital and nothing on goodness. Only when its financial constraint is not very binding will it consider then spending an extra dollar on goodness. As Γ increases and the firm has more financial resources, it begins to spend on goodness.

These results are summarized in the following Proposition, the proof of which we complete in the Appendix.

Proposition 1. *For an unconstrained firm, $\Gamma > \Gamma^{FB}$, the firm invests in the first best levels of capital and goodness. There exists a unique cut-off value Γ^* such that for $\Gamma^* < \Gamma < \Gamma^{FB}$, $G > 0$, $G = \Gamma - K$ and G and K increase with Γ and for $\Gamma \leq \Gamma^*$, $G = 0$ and only K*

increases with Γ.

A firm's financial constraint status is one of the key parameters of our model. Proposition 1 provides a complete guide to how all the variables of interest vary with this parameter. Using Proposition 1, we have the following predictions.

Prediction 1. *Less financially constrained firms spend more on goodness.*

Notice that this prediction holds regardless of the motive for goodness.

We will test this prediction using measures of corporate goodness and standard measures of financial constraints. We will start by examining simple correlations between firm financial constraints and corporate goodness. Then we will help determine the causal relationship between these constraints and goodness using the two identification strategies.

Prediction 2. *When financing constraints ease, the increase in the goodness of financially constrained firms should be bigger than unconstrained or less-constrained firms.*

The reason is simply that unconstrained firms have already made their first-best levels of investments in goodness and hence even if their constraints loosened, they would not change their investments. This is consistent with Baker, Stein, and Wurgler (2003) and Campello and Graham (2007) who find that unconstrained firms did not change their investment levels nor issue more equity during the Internet period. Indeed, the comparison still holds if we compared constrained versus less constrained firms as less constrained firms would need to increase their investments in goodness by proportionally less than constrained ones who are very far from the first best.

In the first identification strategy, we measure the easing of financial constraints using the Internet bubble which temporarily eased constraints and ease of equity issuance for all firms. One can think of this as an aggregate shock to financial constraints. In the second identification strategy, we think of the exogenous shock to firm constraints as being idiosyncratic having to do with firm level sentiment which made it cheaper for particular firms to issue equity.

Finally, we prove a proposition that speaks to the potential importance of heterogeneity of financial constraints in the data to induce a spurious correlation between goodness and profits. We show in our model that even if the motives for the managers for goodness are agency based, goodness and profits can covary with financial constraints.

Proposition 2. *Assume that* $\Gamma < \Gamma^*$. *Let*

$$\pi = \alpha f(k) - K - G$$

be the the profits and the manager's utility is given by $U = \pi + v(G)$. *That is all the benefits of goodness accrue to the manager. In this pure agency-based setting for goodness spending, assuming*

$$v'(\Gamma - K(\Gamma))\frac{v''}{\alpha f'' + v''} > 1,$$

less financially constrained firms, i.e. higher Γ *firms, have higher profits and goodness spending.*

The condition in the proposition is that the rate at which the marginal product of capital falls (captured by f'') is not too large relative to the rate at which the marginal private benefit of goodness falls (captured by v''). As long as there are still high marginal product to spending on K, then as Γ increases, the firm spends more on G and the firm profit still rises.

3. Measures of Goodness and Financial Constraints

3.1. Data

Our study uses data from three main sources. Ratings of corporate social responsibility are from the Kinder, Lydenberg, Domini, & Co. (KLD) database. Stock prices and shares outstanding are from the Center for Research in Security Prices (CRSP), and all accounting

variables are from Compustat. KLD's coverage of S&P 500 firms starts in 1991; our analysis uses KLD information for S&P 500 firms from 1991 to 2008.

The KLD ratings are built on a point-by-point assessment of companies along a number of dimensions. We focus on ratings in six KLD categories: Community Activities, Diversity, Employee Relations, Environmental Record, Products, and Corporate Governance. To understand how these ratings are calculated, we will describe how KLD measures a firm's rating for the Communities Activities and Environmental Record categories. KLD classifies four Community Activities strengths: "Charitable Giving', "Innovative Giving", "Support for Housing", and "Other Community Strengths". A firm gets a score of one if they perform well in a particular criterion and zero otherwise. There are also four Community Activities concerns: "Investment Controversies", "Negative Economic Impact", "Tax Disputes", and "Other Community Concerns". A firm gets a score of 1 if they have a problem in one of these four sub-categories and zero otherwise. For example, if a company has no strengths or concerns, it receives a Community Activities strength and concern score of zero. Alternatively, if it performs "Charitable Giving" and "Innovative Giving" but also has "Tax Disputes", its strengths score is 2 and concerns score is 1.

For Environmental Record, there are five components of strengths: "Delivers Products or Services that Help Protect the Environment", "Strong Pollution Prevention Program","Uses Recycled Materials or Major Player Recycling Industry", "Energy Efficiency Leader" and "Other Strengths". The potential of one point for each strength means a firm can have a minimum score of zero to a maximum score of 5. There are six components of concerns: whether a firm has "Hazardous Waste Sites or Waste Management Violations", "Environmental Regulation Violations (Clean Air Act, Clean Water Act, et al.)", "Manufacturer of Ozone-Depleting Chemicals", "Emissions of Toxic Chemicals (from TRI reports)", "Manufacturer of Agricultural Chemicals" and "Other Concerns". One point for each concern means that a firm can have a minimum score of 0 to a maximum score of 6. Ratings for the other categories are calculated similarly.

The scores from these six categories for a firm are summed to arrive at a yearly measures of *Total Strengths* and *Total Concerns*. We only use scores for sub-categories that were available throughout our sample period.[7] For example, there is a Community Activities subcategory called "Indigenous Peoples Relations" that was introduced in 2000. We omit it to allow scores to be comparable over time. There are also two additional categories tracked by KLD beyond the six we consider: Human Rights and Controversial Business. There are no Human Rights subcategories available throughout our sample period so we again omit it to keep our measures comparable over time. Controversial Business pertains to whether the firm is in a controversial line of business. Because there is little a firm can do to change its line of business, we also exclude it from our analysis.

3.2. Factor Analysis and Alternative Measures of Goodness

In addition to *Total Strengths* and *Total Concerns*, we also construct *Factor Score Strengths* and *Factor Score Concerns* by performing factor analysis on the scores from the six components of the KLD ratings described above and taking the first factor score for strengths and concerns. *Total Strengths* and *Total Concerns* puts equal weight across the six categories. There is no reason to think that the categories need to be equal weighted. Factor analysis is one way to let the data speak.[8] Table 1 reports the factor loadings from the factor analysis that is used to construct the *Factor Score Strengths* and *Factor Score Concerns*.

Panel A reports the results for strengths. The factor analysis places a zero weight on the corporate governance strengths and shifts the remaining weight fairly equally across the remaining five categories, with Diversity strengths getting the most weight (0.33) and the remaining categories receiving a weights between about 0.20 and 0.25. The zero loading on corporate governance is interesting since it says that at least in the domain of strengths, corporate governance is different from the other attributes.

[7] We have also done our empirical work including sub-categories that are added or deleted during our sample period. We obtain very similar results using these alternative corporate goodness measures.

[8] We have also tried a closely related approach of principal components analysis and found similar results.

Panel B reports the results for concerns. Here, factor analysis places roughly equal weight across all six categories. Corporate Governance and Diversity concerns get the lowest weight of 0.18 and 0.19 respectively; Product concerns get the highest at 0.26. But the deviation from equal-weighting is very slight in terms of concerns. As we show below in our empirical analysis, using raw KLD scores or factor scores yield for the most part similar results.

We follow the literature and take the difference between strengths and concerns (using both the simple sum scores and the factor scores) to be the measures of a firm's goodness. *Raw Goodness* is strengths minus concerns using the raw KLD data. *Factor Score Goodness* is the strengths minus concerns using the factor scores.

3.3. Measures of Financial Constraints

The literature has many established ways to measure a firm's financial constraint. All the measures are meant to capture the equity dependence of firms, but no measure is perfect. Our strategy involves trying several financial constraint proxies. The first is the Kaplan and Zingales (1997) index that is a weighted score that accounts for a variety of firm characteristics including variables such as firm cash, cashflow, leverage and a firm's productivity measured by a firm's market-to-book ratio. Following Baker, Stein, and Wurgler (2003), we construct the five variable *KZ Score* for each firm/year as the following linear combination:

$$KZScore_{i,t} = -1.002CF_{i,t}/A_{i,t-1} - 39.368D_{i,t}/A_{i,t-1} - 1.315C_{i,t}/A_{i,t-1} + 3.139B_{i,t} + 0.283Q_{i,t}$$

where $CF_{i,t}/A_{i,t-1}$ is cash flow (Compustat Item 14+Item 18) over lagged assets (Item 6); $DIV_{i,t}/A_{i,t-1}$ is cash dividends (Item 21+Item 19) over assets; $C_{i,t}/A_{i,t-1}$ is cash balances (Item 1) over start-of-the-year book assets (Item 6); book leverage, denoted by $BLEV_{i,t}$, which is total debt divided by the sum of total debt and book equity ((Item 9+Item 34)/(Item 9+Item 34+Item 216)) measured at fiscal year-end, and Tobin's Q is the market value of equity (price times shares outstanding from CRSP) plus assets minus the book value of 16

equity (Item 60+Item 74) all over assets. We winsorize the ingredients of the index before constructing it.[9]

This score measures a firm's equity dependence as captured by its cash and leverage ratios and also a firm's productivity. More productive firms (α in our model) will be more constrained (*i.e.* they are less likely to be in the unconstrained region) all else equal because their first-best level of capital investment will be higher. A worrisome aspect of this measure is that it uses a firm's market-to-book ratio as a proxy for a firm's average productivity from Q-theory. But this is difficult since the market-to-book ratio also captures potential mispricings. This interpretation is potentially problematic in our setting because earlier work argues that the demand for goodness on the part of socially responsible investors has a price effect in the direction of depressing the valuations of bad companies in favor of good companies (see, Heinkel, Kraus, and Zechner (2001), Hong and Kacperczyk (2009), Hong and Kostovetsky (2009)). As such, we also consider two other measures of financial constraints.

Our second financial constraint measure is an indicator for whether or not a firm engages in stock repurchases: *No Repurchase Indicator*. We calculate a firm's repurchases as expenditure on the purchase of common and preferred stocks (Compustat Item 115) minus preferred stock reduction (the first difference of Item 10). We then construct a dummy variable equal to one if the firm has no repurchases.[10] Firms that engage in equity repurchases are presumably less equity dependent and hence less financially constrained.

Our final measure of firm financial constraints is a firm's average bond rating.[11] A lower bond rating forces a firm to be more equity dependent and hence more financially constrained. Using data from Lehman Brothers and Merrill Lynch, we take all of the bonds issued by a

[9]For some firm/year observations, one or more of the five components used to construct the KZ score will be missing. In those circumstances, we use a firm's KZ score from the previous year. We obtain similar results if we drop these observations instead of using previous values of the KZ score.

[10]We parameterize the variable to turn on when a firm has no repurchases instead of when a firm has repurchases to standardize all of our financial constraint variables so that higher values correspond to more constrained firms.

[11]The idea behind using bond rating in the literature is that the firm has a target optimal capital structure. A low bond rating means that the firm has inadvertently migrated toward excessive leverage and financial distress. The firm hence has a strong need for equity in order to remedy the problem.

firm and assign a numerical score to its rating from Moody's.[12] For each year, we take the average of these numerical scores and merge these averages with the KLD data set.[13] We can confidently merge about three-quarters of the KLD sample with bond information, so analysis using bond ratings will use a smaller data sample than the rest of the analysis.[14]

3.4. Summary Statistics

Table 2 provides the summary statistics on our variables of interest for the sample of S&P 500 firms from 1991 to 2008. We start with the KLD measures. The means of *Total Strengths* and *Total Concerns* are about 2 and 1.6 respectively. Figure 1 shows the time trend of these averages; both are increasing over time. *Raw Goodness* has a mean of .41 with a standard deviation of about 2.4. Figure 2 shows the trend in *Raw Goodness* over time. It increases during the early part of the sample, peaking in the late nineties and then it starts declining and even becomes negative the last two years of the sample. Our analysis below differences out this aggregate trend and hence it is not crucial to our analysis. But it is interesting to note in passing that the aggregate goodness measure peaks during the Internet period when financial constraints were looser, consistent with the premise of our natural experiment. We also show the means of the factor score variables, which have similar time trends to the raw KLD measures.

The second part of Table 2 presents the summary statistics of the three financial constraint measures. In this data set, the financial constraint information is calculated using firm information from the year before the KLD score.[15] For all three measures, firms with

[12]Lower quality ratings are assigned higher numerical scores. AAA bonds are 2; AA1 bonds are 3; AA2 bonds are 4; AA3 bonds are 5; A1 bonds are 6; A2 bonds are 7; A3 bonds are 8; BAA1 bonds are 9; BAA2 bonds are 10; BAA3 bonds are 11; BA1 bonds are 12; BA2 bonds are 13; BA3 bonds are 14; B1 bonds are 15; B2 bonds are 16; B3 bonds are 17; CAA1 bonds are 18 ; CAA2 bonds are 19; CAA3 bonds are 20; CA bonds are 21; C bonds are 22; D bonds are 23.

[13]We have also used the maximum and minimum bond rating for the firm in a year instead of the average and obtain similar results to what is reported.

[14]We first try to match bond ratings to KLD observations using CUSIPs. For KLD observations that are not matched with bond information at this point, we then try to find their bond information matching on firm name. Some observations are missing bond information because the firm had no outstanding bonds at the time and others are missing because they were missed using this procedure.

[15]In other words, the financial constraint measures are lagged one year.

higher values are considered more constrained.

4. Empirical Results

4.1. Financial Constraints and Corporate Goodness

We begin our empirical work by taking a detailed look at how firm goodness varies with financial constraints. Our model predicts that goodness should increase as firms become less constrained. We examine the results of OLS regressions of firm goodness on our three standard measures of financial constraints. These results are presented in Table 3. In Panel A of Table 3, the dependent variable of the regressions is *Raw Goodness*; *Factor Score Goodness* is the dependent variable in the regressions presented in Panel B. Besides the financial constraint measures, also included in the regression specification are *Year Effects*, Fama-French 49 *Industry Effects* and in the even-numbered columns *Market Capitalization Quintile Effects*.

We start by looking at how firm goodness varies with *KZ Score* in the first two columns of Panel A. In column (1), the coefficient on *KZ Score* is negative a statistically different from zero, indicating that more constrained firms have less corporate goodness. The magnitude of the coefficient suggests that easing a firm's constraint with a one standard deviation decline in *KZ Score* (-1.24) is associated with a .16 increase in *Raw Goodness*. There are several ways to describe the size of this increase in *Raw Goodness*. For example, it is about 7% of the standard deviation of *Raw Goodness* (2.42); also, it is about 15% of the standard deviation of the yearly change in *Raw Goodness* (1.12). In column (2), *Market Capitalization Quintile Effects* are added to the regression specification; the relationship between *KZ Score* and *Raw Goodness* is almost identical to column (1), suggesting that our results are not being driven by comparing relatively large and small S&P 500 firms.

The financial constraint measure in the next two columns is *No Repurchase Indicator*. In column (3) of Panel A, there is a negative and statistically significant relationship between

this constraint measure and *Raw Goodness*. The coefficient suggests that a firm doing no repurchases the previous year has a *Raw Goodness* score that is about .23 lower than other firms. This is about 10% of a standard deviation of *Raw Goodness* and about 20% of a standard deviation of the yearly change in *Raw Goodness*. When *Market Capitalization Quintile Effects* are added to the specification in column (4), the estimated relationship between *No Repurchase Indicator* and *Raw Goodness* is slightly smaller but similar to column (3).

The financial constraint of the final two columns is *Average Bond Rating*. In column (5), there is a negative and statistically significant relationship between bond rating score and *Raw Goodness*. The size of the coefficient indicates that a one standard deviation improvement in bond rating quality (-2.90) is associated with a .45 increase in *Raw Goodness*. This is about 19% of a standard deviation of *Raw Goodness* and about 37% of a standard deviation of the yearly change in *Raw Goodness*. This relationship is qualitatively unchanged when *Market Cap Quintile Effects* are added to the regression specification in the final column.

Panel B of Table 3 is identical to Panel A, except that the dependent variable is *Factor Score Goodness* instead of *Raw Goodness*. The pattern of results is very similar to Panel A. Using all the different financial constraint measures, the results suggest that more financially constrained firms have lower *Factor Score Goodness*. The magnitudes of these relationships are also very similar to Panel A.

Taken together, Table 3 shows that financially constrained firms have less corporate goodness. However, this does not necessarily mean that financial constraints are *causing* firms to produce less goodness. Other unobserved factors might be causing some firms to be financially constrained and to have relatively little corporate goodness. Establishing causality is a ubiquitious issue in the corporate responsibility literature. We next turn to a natural experiment that we will argue will help us determine whether there is a causal relationship between financial constraints and corporate responsibility.

4.2. First Identification Strategy: Sensitivity of Goodness over the Dot-Com Period by Financial Constraint Status

To determine the causality of the relationship between financial constraints and corporate goodness, we need to find some exogenous variation in the financial constraints that firms face and observe how this variation alters their corporate goodness decisions. Our first candidate for this exogenous variation is the Internet bubble of the late 1990s. As argued in the Introduction and the Model sections, during this period, it was easier for firms that were constrained to raise funds only with equity to raise capital. Therefore, if there is a causal relationship between financial constraints and corporate goodness, we expect that during this period the negative relationship between financial constraints and corporate goodness should be smaller than other periods. We now examine this relationship between the Internet bubble and sensitivity of financial constraints and corporate goodness using the KLD data set.

Because our data sample is from 1991 to 2008, we have KLD information for S&P 500 firms before, during and after the tech bubble. We construct a difference-in-difference estimator comparing the sensitivity of financial constraints and corporate goodness during the bubble to the sensitivity during the periods before and after the bubble. To do this, we need to classify firms as constrained or not based on criteria that will not change over time because of the Internet bubble. We construct measures of firm financial constraints based on their constraint measures during 1991 and 1992: the first two years of our data. That is, we will classify a firm over the entire sample based on their financial constraint measures during these two years, making this classification time invariant.[16] We create three measures. *Initial KZ Score* is the average *KZ Score* of a firm during 1991 and 1992. *Initial No Repurchase Indicator* is a dummy variable equal to one if the firm did not have a repurchase in either of those years. Finally, *Initial Bond Rating* is the average numerical rating of the firm's bonds

[16]Therefore, our sample for the diff-in-diff estimation will only include firms that we observe in 1991 and/or 1992.

in 1991 and 1992.

Table 4 shows summary statistics of the diff-in-diff data set. The sample includes S&P 500 non-technology firms that have observations in 1991 or 1992. We drop technology firms from the sample because we worry that the Internet bubble might have affected the corporate goodness of technology firms for reasons other than changes in their financial constraints.[17] The summary statistics of the diff-in-diff sample is similar to the full sample presented in Table 2.

In Table 4, we also report the summary statistics for two measures of firm investment we use at the end of the paper as a benchmark for how sensitive firm goodness scores are to financial constraints. The first measure is the standard measure of capital investment, which is simply Capital Expenditure (Compustat Item 128) divided by last year's (once lagged) Capital Stock (Compustat Item 8). The second measure is just R&D spending by the firm (Compustat Item 46) measured in millions. Both of these variables are winsorized at the 1% level by year. The mean capital expenditure 0.19 with a standard deviation of 0.14. The mean R&D spending is 343 million dollars with a standard deviation of 614 million dollars.

The regression specification we estimate with this sample is one of our measures of corporate goodness on a measure of initial financial constraint, a dummy variable for the observation being during the Internet bubble, an interaction of these two variables and year and firm fixed effects.[18] Because the initial financial constraint variable is time invariant and the Internet bubble dummy has no cross-sectional variation, they cannot be uniquely identified when year and firm fixed effects are included in the specification. The coefficient of interest is on the interaction of the initial financial constraint variable and the Internet bubble dummy; it shows how the relationship between financial constraints and corporate goodness is different during the Internet bubble compared to the rest of the sample.

Table 5 shows the diff-in-diff regression results for both of our measures of corporate

[17] We classify technology firms based on SIC codes. Firms with three digit SIC codes of 355, 357, 366, 367, 369, 381, 382 and 384 are considered technology firms.

[18] The Internet bubble period is defined as observations from 1996 through 2000.

goodness and the three measures of initial financial constraints. As before, Panel A shows the results with *Raw Goodness* as the dependent variable. The results in Panel B with *Factor Score Goodness* as the dependent variable are similar. The first column uses *Initial KZ Score* as the financial constraint measure. The coefficient on the interaction term is positive and statistically significant from zero, indicating that more financially constrained firms have higher corporate goodness scores during the Internet bubble compared to other firms than other periods in the data sample. The magnitude of the interaction term is similar in size but opposite signed to the average relationship between *KZ Score* and *Raw Goodness* shown in Table 3, suggesting that the negative effect of *KZ Score* on corporate goodness is roughly eliminated during the Internet bubble when traditional financial constraints are relatively unimportant.

Column (2) shows the results when the financial constraint measure is *Initial No Repurchase Indicator*. As in column (1), the coefficient on the interaction term is positive and statistically significant, showing that firms that did not repurchase have higher corporate goodness scores compared to other firms during the Internet bubble compared to other periods. Again, the coefficient on the interaction is roughly similar in size but opposite signed to the average effect of no repurchases on corporate goodness shown in Table 3, indicating that during the Internet bubble this constraint did not lower corporate goodness. Finally, column (3) shows the results using *Initial Bond Rating* as the measure of financial constraint. It shows a very similar pattern to the results using the other two financial constraint measures.[19]

These diff-in-diff results are consistent with a causal relationship between financial constraints and corporate goodness. When constraints exogenously relaxed for firms during the Internet bubble, more-constrained firms increased their corporate goodness relative to less-constrained firms compared to other time periods. However, there are some important

[19]We have also estimated these regressions using as the dependent variable the six components of the goodness measure separately. Not surprisingly, the results are less precise than when we use all of the goodness components together. But we find positive coefficients on the interaction terms for all of the goodness components except for corporate responsibility.

assumptions we must make to interpret the diff-in-diff results as causal that we will now examine. The most important assumption of this methodology is that there is no other reason why more financially constrained firms have more corporate goodness relative to other firms during the Internet bubble compared to other periods besides the direct effect of the easing the importance of financial constraints during the bubble. There are a few simple stories that can be told in which this assumption might not hold; however, we are fortunate to have data to help determine whether these alternative stories are important.

One potential problem that is a concern when using a diff-in-diff methodology is that the treatment and control groups might have different pre-existing time trends in the outcome variable. In our context, it might be worrisome if more financially constrained and less-constrained firms have differently evolving trends in corporate goodness over the period of our sample. For example, if technology was changing so that corporate goodness was increasing for more financially constrained firms over time relative to other firms, then a diff-in-diff estimator might be capturing that pre-existing time trend instead of the causal effect of the bubble.

Another potential problem with the diff-in-diff strategy involves attrition. Our sample consists of S&P 500 firms with KLD and financial constraint information in 1991 or 1992. Some of those firms disappear later in the sample. If there is differential attrition across treatment and control groups that changes the average corporate goodness for those groups, then the diff-in-diff estimator could be picking up this attrition effect instead of the causal effect of easing financial constraints. For example, it might be that more financially constrained firms that spend a lot of resources on corporate goodness are financially vulnerable, increasing the likelihood that they disappear later in the sample. Also, the Internet bubble might alter these attrition probabilities.

Luckily, our data set allows us to determine how important these potential problems might be. Our data sample spans both sides of the Internet bubble; that is, we have a period before the Internet bubble (1991-1995), a period during the bubble (1996-2000) and a

period after the bubble (2001-2008). Therefore, we can calculate two diff-in-diff estimators. The first compares the sample before the Internet bubble to the Internet bubble; the second compares the Internet bubble period to the post-bubble period. If the Internet bubble estimator is measuring a causal effect of easing financial constraints on corporate goodness, then we expect these two diff-in-diff estimators to produce similar estimates. If these potential problems are important, we expect the two estimators to produce substantially different results.

To see this, consider the example where there are different pre-existing trends in corporate goodness between more financially constrained and less-constrained firms: corporate goodness is growing over time for more financially constrained firms compared to others for reasons we cannot measure. The diff-in-diff estimator comparing the pre-bubble sample to the bubble sample would produce a positive estimate of corporate goodness during the bubble for financially constrained firms compared to others because of this time trend even if there is no causal impact of the Internet bubble on corporate goodness. However, the diff-in-diff estimator comparing the bubble sample to the post-bubble sample would produce the opposite estimate. The time trend would cause the corporate goodness of financially constrained firms to be lower compared to other firms during the Internet bubble.

The attrition argument is a little more complicated. Consider the story where more financially constrained firms that produce a lot of corporate goodness are financially vulnerable and this vulnerability is less important during the Internet bubble. The diff-in-diff estimator comparing the Internet bubble to the later sample might be problematic. After the Internet bubble ends, these vulnerable firms are more likely to disappear, decreasing the average corporate goodness of more financially constrained firms after the Internet bubble even if individual firms do not change their behavior. However, this should not be a problem for the diff-in-diff that compares the pre-bubble sample to the bubble sample. During the pre-bubble period, vulnerable firms are leaving the sample, decreasing the average corporate goodness of financially constrained during this period. But when this attrition ends during

the Internet bubble, this should not increase the average corporate goodness of financially constrained firms (there is no sample replacement). If we observe an increase in corporate goodness for more financially constrained firms compared to other firms during the bubble compared to earlier, it cannot be driven by this type of attrition.

Table 6 presents the estimates of the two diff-in-diffs. We estimate them using both of our corporate goodness measures and all three of our financial constraint measures. The odd-numbered columns show the diff-in-diff comparing the pre-bubble sample to the Internet bubble (Early). The even-numbered columns present the diff-in-diff using the Internet bubble and the post-bubble samples (Late). For all of the different combinations of goodness and financial constraint measures, the estimates from the two diff-in-diffs are very similar. Not surprisingly, the estimates of the coefficients of the interaction of financial constraints and the Internet bubble indicator are less precise than those presented in Table 5 because of the smaller sample size. But there is no evidence of systematic differences between the two diff-in-diff estimators consistent with concerns that our results are being driven by pre-existing trends or sample attrition, buttressing the argument that the diff-in-diff estimators are measuring a causal effect.

We plot how the goodness scores evolve for our two groups, the initial constrained versus the unconstrained, using the three different measures of financial constraints, KZ in Figure 3, repurchases in Figure 4 and bond ratings in Figure 5. One can see that the growth of the goodness scores for the initially constrained group grows much faster than the unconstrained group in the Internet period and then drops much faster after the Internet period. The figures for KZ and bond ratings show the temporary convergence of the goodness scores of constrained and unconstrained firms during the Internet period, very much consistent with our theory.

Note that the pattern associated with repurchases differs from the KZ and bond rating measures. Using the latter two measures, the KLD scores of the constrained group are typically below the unconstrained group. Their scores converge during the internet bubble.

But in the case of repurchases, the KLD scores of these two groups are similar in the non-internet periods and the KLD scores of the constrained group somewhat rise above that of the unconstrained during the internet period. It is difficult to speculate on why the repurchase measure gives rise to these differences in the non-internet periods. Our diff-in-diff exercise indeed takes out the level differences and only focuses on how their difference varies in internet versus non-internet periods. As such, we draw the same conclusions from these figures from the perspective of our identification strategy.

4.2.1. Comparison to Capital Investment and R&D Spending

Having established the sensitivity of corporate goodness to financial constraints, we want in this section to benchmark this sensitivity by looking at how firm capital and R&D spending changed using the same quasi-experiment. These diff-in-diff results using the two investment variables above as dependent variables are reported in Table 7.

Panel A reports the results for capital expenditures. For KZ, the coefficient of interest is 0.004. We obtain a similar number using the No Repurchase measure financial constraint, which implies an increase of about 3% relative to the mean investment expenditures for financially constrained firms compared to unconstrained firms during the bubble period. But neither estimate is statistically significant. When we use bond rating measure, the estimate is essentially zero. In sum, we find evidence consistent with the literature that financial constraints matter for investments in terms of the sign of the estimates, but our estimates are naturally smaller than those in the literature because we focus just on very large S&P500 firms.

Panel B reports analogous results for R&D development. Here the results are much stronger. Using the No Repurchase measure, we obtain a coefficient of 48.8 and the coefficient is marginally statistically significant. Here a financially constrained firm raised R&D spending by nearly fifty million dollars compared to unconstrained firms during the bubble period. This is around 14% of the mean R&D spending of firms in the sample, which is quite

a sizeable number. So in the dimension of R&D spending, we find much more sensitivity to financial constraints. The figures are somewhat smaller for the other financial constraint measures but they all point to financial slack during the Internet Bubble Period resulting in higher R&D expenditures for constrained firms compared to unconstrained ones.

These findings point to how sensitive corporate goodness scores are to financial slack when benchmarked to sensitivities of investment and R&D spending. Even for very large firms, financial slack matters much more for corporate social responsibility than it does for investment and R&D spending. This suggests that such goodness expenditures are not core to the firms' themselves but are plausibly interpreted as off-sets. This evidence is consistent with our model.

4.3. Second Identification Strategy: Sensitivity of Goodness to Firm's Stock Price by Financial Constraints Status

Our second identification strategy is to compare the goodness sensitivity of constrained versus less-constrained firms' goodness scores to their stock prices. We expect a constrained firm's goodness score to increase more with its stock price, as measured by log of the firm's market-to-book ratio, than for a less-constrained firm. We implement this test by expanding the regression specification of Table 3, which simply compared the goodness scores of constrained versus less-constrained firms, to include as independent variables the firm's log market-to-book ratio and this ratio interacted with the financial constraint status of the firm. The coefficient in front of this interaction term is our coefficient of interest: it measures whether there is a differential effect of stock price on contrained firms versus other firms.

The regression specification includes both year effects and firm fixed effects. The year effects distinguish this identification strategy which focuses on firm level variation net of aggregate variation in stock market valuations from the previous identification strategy which focuses just on aggregate time series variation. The stock fixed effects deal with potential heterogeneity in a firm's market-to-book ratio which might pick up permanent differences

unrelated to sentiment which we expected to be mean reverting. This is similar to the specification used in Baker, Stein, and Wurgler (2003).

The results are presented in Table 8, where we estimate the findings for our three measures of financial constraints status. In Panel A, we use raw goodness as the dependent variable. In the firm column, we show the baseline regression with just log of market-to-book as the independent variable. We see that firms with higher market-to-book have higher goodness scores. A one-standard deviation move in log of market-to-book, which is 0.83, yields a movement in *Raw Goodness* of around .08, which is around 4.5% of the standard deviation of *Raw Goodness*.

In column (2), we include the *KZ score* and the *KZ score* interacted with log of market-to-book. The coefficient on the interaction term is the one of interest. It is .226 with a t-statistic of over 2. This means that among financial constrained firms, the effect of stock prices on *Raw Goodness* is roughly double the average effect. Or put another way, all of the relationship between stock prices and *Raw Goodness* measured in the first column is being driven by constrained firms as measured by *KZ Score*.

Similar results hold for the other two measures of financial constraints. The result is not statistically significant for *No Repurchases* but is statistically significant for *Bond Rating*. In Panel B, we repeat the same exercise using *Factor Score Goodness* on the left hand side. The results are very similar to those in Panel A.[20]

5. Conclusion

We develop a simple model to understand how corporate goodness varies with financial constraints. Regardless of the motive for goodness spending, the model predicts that less financially constrained firms ought to spend more on goodness. We confirm this prediction using two identification strategies and find that goodness spending is much more sensitive

[20] We have also estimated the same regression specifications as in Table 9 using as the dependent variable the six different components of the goodness scores. The results are similar to those from the first identification strategy: across almost all categories with the exception of corporate governance we get similar signs.

to financial slack than is the case for capital and R&D expenditures. These findings are important in that they show that the large literature on "Doing well by doing good" suffers from an omitted variables bias due to heterogeneity in firm financial constraints.

The challenge is then to identify clearly the potential motives for goodness spending. One strand of work that is consistent with our findings is to relate an agents' preferences for socially responsible actions to their Democratic political affiliation (see Hong and Kostovetsky (2012) and DiGuili and Kostovetsky (2012)). But these political affiliations need not imply an agency problem since Democratic managers who undertake more goodness may believe these types of investments are profitable. Another recent strand tries to more cleanly identify an agency motive using the 2003 Dividend Tax Cut and close governance votes (see Cheng, Hong, and Shue (2012)). This early work suggest that this line of research is likely to be fruitful.

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Appendix

Proof of Proposition 1. What determines the cut-off level of financial constraint at which the firm will invest its first dollar in goodness? It has to be the point where the firm is indifferent between allocating a dollar to goodness or allocating it to capital at $\Gamma = \Gamma^*$ and $G = 0$. Put differently, the cut-off value Γ^* solves the following equation

$$-u_1(\alpha f(\Gamma^*) - \Gamma^*, 0)\alpha f'(\Gamma^*) + u_2(\alpha f(\Gamma^*) - \Gamma^*, 0) = 0, \tag{9}$$

where the first term is minus 1 times the marginal benefit of a dollar allocated to capital and the second term is the marginal benefit of allocating a dollar to goodness. Because $f'(0) = \infty$ and $u_2(\cdot, 0) < \infty$ the left-hand side of equation (9) equals $-\infty$ at $\Gamma^* = 0$. In addition, from the assumption expressed by (6), the left-hand side of (9) is positive at $\Gamma^* = K^{FB} < \Gamma^{FB}$. Furthermore, differentiating the equation (9) with respect to Γ^* one obtains

$$-u_{11}(\alpha f'(\Gamma^*) - 1)\alpha f'(\Gamma^*) + u_{21}(\alpha f'(\Gamma^*) - 1) - u_1\alpha f''(\Gamma^*) > 0,$$

because $\alpha f'(\Gamma^*) > 1$ and $u_{11} < u_{12}$. Hence there is a unique $\Gamma^* < K^{FB} < \Gamma^{FB}$ such that equation (9) holds.

Moreover, in Region 2 an increase in Γ leads to an increase in both output and goodness. In fact, here $G = \Gamma - K$ and thus

$$u_1(\alpha f(K) - \Gamma, \Gamma - K)\alpha f'(K) - u_2(\alpha f(K) - \Gamma, \Gamma - K) = 0 \tag{10}$$

Thus

$$\frac{\partial K}{\partial \Gamma} = -\frac{(-u_{11} + u_{12})\alpha f' - u_{22} + u_{21}}{u_{11}\alpha^2(f')^2 - u_{12}\alpha f' - u_{21}\alpha f' + u_{22} + u_1\alpha f''}. \tag{11}$$

Notice that the first four terms of the denominator forms a quadratic form:

$$(-\alpha f', 1) * D^2u * (-\alpha f', 1)' < 0$$

Because $D^2u < 0$, it follows that the first four terms are less than zero and so is the fifth term $u_1\alpha f''$ by concavity of the production function. Now consider the numerator. Because $\alpha f' \geq 1$ and $u_{11} < u_{12}$

$$(-u_{11} + u_{12})\alpha f' - u_{22} + u_{21} > -u_{11} + u_{12} - u_{22} + u_{21} > 0$$

again from using

$$(1, -1) * D^2u * (1, -1)' < 0.$$

Hence we have $0 < \frac{\partial K}{\partial \Gamma}$. Furthermore using $\alpha f' > 1$ and again the inequality $u_{11} < u_{12}$, we can show that

$$\frac{\partial K}{\partial \Gamma} < 1.$$

This is equivalent to showing that

$$u_{11}\alpha^2(f')^2 - u_{12}\alpha f' - u_{21}\alpha f' + u_{22} < (u_{11} - u_{12})\alpha f' + u_{22} - u_{21}$$

(i.e. the denominator is bigger in absolute value than the numerator, or that the denominator is more negative than the numerator). This in turn is equivalent to

$$(u_{11}\alpha f' - u_{21})\alpha f' < u_{11}\alpha f' - u_{21},$$

which follows from our assumption that $u_{11} - u_{21} < 0$.

To summarize, $\Gamma \leq \Gamma^*$ defines *Region 3*. In this region, the optimal $K = \Gamma$ and the optimal $G = 0$, since the right hand side of (9) is negative. *Region 2* is defined as $\Gamma^* < \Gamma < \Gamma^{FB}$. In this region financial constraints bind, but $G > 0$ and an increase in Γ leads to an increase in both output and goodness. Finally, *Region 1* is where $\Gamma \geq \Gamma^{FB}$, and firms choose the first best.

Proof of Proposition 2. The financing constraint is:

$$G + K \leq \Gamma. \tag{12}$$

The interesting portion is where the constraint (12) is binding. In this portion, managers solve

$$\max_{k \leq \Gamma} U = \max_{k \leq \gamma} \alpha f_k - \gamma + v(\Gamma - k) \tag{13}$$

If the solution is $K = \Gamma$ then obviously $\frac{d\pi}{dK} > 0$. So we may as well assume that Γ is large enough so that the solution to the managers problem entails $K < \gamma$. In this region,

$$U = \alpha f(K) - \Gamma + v(\Gamma - K), \tag{14}$$

$$\pi = U - v(\Gamma - K), \text{and} \tag{15}$$

$$\alpha f'(K) = v'(\Gamma - K). \tag{16}$$

Furthermore, writing $K(\Gamma)$ for the solution, the envelope theorem guarantees that

$$\frac{dU}{d\Gamma} = -1 + v'(\Gamma - K(\Gamma))$$

and thus

$$\begin{aligned} \frac{d\pi}{d\Gamma} &= -1 + v'(\Gamma - K(\Gamma)) + v'(\Gamma - K(\Gamma)) \left(1 - \frac{dK}{d\Gamma}\right) \\ &= -1 + v'(\Gamma - K(\Gamma)) \frac{v''}{\alpha f'' + v''}, \end{aligned} \tag{17}$$

where the last equality follows from (16) and the implicit function theorem.

Notice that as $\Gamma \to \Gamma^*$ then $v'(\Gamma - K(\Gamma)) \to 1$. Thus for Γ close to Γ^* profits decline with an increase in Γ. However away from Γ^* profits increase with Γ whenever v'' is large relative

to f'', that is whenever the marginal product of capital falls sufficiently slower relative to the speed at which the marginal benefit of goodness to mangers falls.

Table 1: Factor Loadings of the First Factor of Strengths and Concerns

The entries are the factor loadings on the components of strengths and concerns from factor analysis. These loadings are used to create the variables *Factor Score Strengths* and *Factor Score Concerns*.

Panel A: Strengths	
Total Environmental Strengths	.19
Total Corporate Governance Strengths	-.01
Total Community Strengths	.20
Total Diversity Strengths	.33
Total Product Quality Strengths	.21
Total Employee Relation Strengths	.23

Panel B: Concerns	
Total Environmental Concerns	.21
Total Corporate Governance Concerns	.18
Total Community Concerns	.23
Total Diversity Concerns	.19
Total Product Quality Concerns	.26
Total Employee Relation Concerns	.22

Table 2: Summary Statistics of Main Data Set

The entries are summary statistics of the data set used to measure the relationship between firm financial constraints and corporate goodness. The sample consists of yearly observations of S&P 500 firms from 1991 to 2008 that can be matched to corporate responsibility information from KLD and data from Compustat and CRSP to calculate financial constraint information. There are 6798 observations. *Total Strengths* is the sum of strengths a firm has in a year (measured consistently across years). *Total Concerns* is the sum of concerns a firm has in a year (measured consistently across years). *Raw Goodness* is the difference of *Total Strengths* and *Total Concerns*. *Factor Score Strengths* is the first factor score from a factor analysis of the components of strengths. *Factor Score Concerns* is the first factor score from a factor analysis of the components of concerns. *Factor Score Goodness* is the difference of *Factor Score Strengths* and *Factor Score Concerns*. For the other investment measures, *Capital Investment* is a firm's capital expenditure in a year divided by its capital stock the previous year. *Research and Development* is the firm's spending on R&D during the year in millions. *KZ Score* is a linear combination of a firm's cash flow, dividends, cash balances, book leverage and Tobin's Q measured the previous year. Higher *KZ Score* is associated with more financial constraints. *No Repurchase Indicator* is a dummy for the firm not having any repurchases the previous year. *Average Bond Rating* is the average Moody rating of the firm's bonds the previous year. Higher values are associated with lower credit quality. *Log(Market to Book)* is the logarithm of the firm's market to book ratio the previous year. Standard deviations are in brackets.

	Mean	25th Percentile	Median	75th Percentile
	(1)	(2)	(3)	(4)
Raw KLD Measures				
Total Strengths	1.99 [1.99]	0	1	3
Total Concerns	1.62 [1.91]	0	1	2
Raw Goodness	.37 [2.39]	-1	0	2
Factor Scores of KLD Measures				
Factor Score Strengths	-.01 [.67]	-.67	-.13	.29
Factor Score Concerns	.02 [.76]	-.47	-.19	.35
Factor Score Goodness	-.03 [.87]	-.52	.03	.43
Other Investment Measures				
Capital Investment	.23 [.20]	.12	.19	.28
Research and Development	335.8 [601.2]	29.1	118.6	372.0
Financial Constraint Measures				
KZ Score	.86 [1.24]	.26	.85	1.45
No Repurchase Indicator	.33			
Average Bond Rating	8.46 [2.94]	6.83	8.00	10.00
Log(Market to Book)	1.01 [.83]	.42	.93	1.48

Table 3: OLS Estimates of the Relationship between Financial Constraints and Corporate Goodness

The entries are OLS regression coefficients measuring the relationship between financial constraints and corporate goodness. In Panel A, the dependent variable of the regressions is *Raw Goodness*; the dependent variable in Panel B is *Factor Score Goodness*. In the first two columns, the financial constraint measure is *KZ Score*. The financial constraint measure in columns (3) and (4) is *No Repurchase Indicator*, and *Average Bond Rating* is the financial constraint measure of the last two columns. *Year Effects* and Fama-French 49 *Industry Effects* are included in all the specifications. Also, *Market Cap Quintile Effects* are included in the specifications shown in the even-numbered columns. Standard errors are in parentheses and are clustered to account for the potential correlation of multiple observations of the same firm across years.

Panel A: Raw Goodness

	KZ Score		No Repurchase		Bond Rating	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Constraint Measure	-.130 (.046)	-.112 (.045)	-.225 (.089)	-.169 (.086)	-.156 (.028)	-.150 (.033)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes
Market Cap Quintile Effects	No	Yes	No	Yes	No	Yes
Observations	7500	7500	7922	7922	5904	5904

Panel B: Factor Score Goodness

	KZ Score		No Repurchase		Bond Rating	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Constraint Measure	-.063 (.017)	-.061 (.016)	-.055 (.032)	-.053 (.032)	-.052 (.011)	-.064 (.012)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes	Yes	Yes	Yes
Market Cap Quintile Effects	No	Yes	No	Yes	No	Yes
Observations	7500	7500	7922	7922	5904	5904

Table 4: Summary Statistics of Bubble Difference-in-Difference Sample

The entries are summary statistics of the data set used to estimate how the tech bubble affected the relationship between financial constraints and corporate goodness. The sample consists of yearly observations of non-tech S&P 500 firms from 1991 to 2008 that have observations in 1991 and/or 1992 and can be matched to corporate responsibility information from KLD and data from Compustat and CRSP to calculate financial constraint information. *Raw Goodness* and *Factor Score Goodness* are defined as before. For the other investment measures, *Capital Investment* is a firm's capital expenditure in a year divided by its capital stock the previous year. *Research and Development* is the firm's spending on R&D during the year. The financial constraint measures are measured in 1991 and 1992. *Initial KZ Score* is the average *KZ Score* of the firm during those two years. *Initial No Repurchase Indicator* is a dummy variable for the firm having no repurchases in either 1991 or 1992. *Initial Bond Rating* is the average bond rating of the firm during those two years. Standard deviations are in brackets.

	Mean	25th Percentile	Median	75th Percentile
	(1)	(2)	(3)	(4)
Goodness Measures				
Raw Goodness	.39 [2.44]	-1	0	2
Factor Score Goodness	.01 [.88]	-.48	.03	.57
Other Investment Measures				
Capital Investment	.19 [.14]	.12	.17	.24
Research and Development	343 [614]	25	92	326
Financial Constraint Measures				
Initial KZ Score	.48 [1.29]	-.04	.50	1.18
Initial No Repurchase Indicator	.55			
Initial Bond Rating	7.45 [2.83]	5.86	7.03	9.00

Table 5: The Effect of the Tech Bubble on the Relationship between Financial Constraints and Corporate Goodness

The entries are OLS regression coefficients measuring how the tech bubble affected the relationship between financial constraints and corporate goodness. In Panel A, the dependent variable of the regressions is *Raw Goodness*; the dependent variable in Panel B is *Factor Score Goodness*. *Financial Constraint* is one of the three measures of the firm's initial financial condition: *Initial KZ Score*, *Initial No Repurchase Indicator* and *Initial Bond Rating*. *Bubble Indicator* is a dummy that the observation is between 1996 and 2000. Because *Year Effects* and *Firm Fixed Effects* are included in the regression specifications, the coefficients for *Bubble Indicator* and the initial financial state of the firms are not uniquely identified. Standard errors are in parentheses and are clustered to account for the correlation of observations of a firm over time.

Panel A: Raw Goodness

	KZ Score	No Repurchase	Bond Rating
	(1)	(2)	(3)
Financial Constraint×Bubble Indicator	.165 (.050)	.285 (.144)	.102 (.032)
Year Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	5039	5288	3999

Panel B: Factor Score Goodness

	KZ Score	No Repurchase	Bond Rating
	(1)	(2)	(3)
Financial Constraint×Bubble Indicator	.056 (.018)	.097 (.053)	.040 (.012)
Year Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	5039	5288	3999

Table 6: Robustness Checks of the Difference-in-Difference Estimates

The entries are coefficients of OLS regressions measuring how the tech bubble affected the relationship between financial constraints and corporate goodness using different samples. The regressions are identical to those presented in Table 5 except that the results shown in the odd-numbered columns include observations from 1991 to 2000 (Early) and the results shown in the even-numbered columns include observations from 1996 to 2008 (Late). Standard errors are in parentheses and are clustered to account for the correlation of observations of a firm over time.

Panel A: Raw Goodness

	KZ Score		No Repurchase		Bond Rating	
	Early	Late	Early	Late	Early	Late
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Constraint×Bubble Indicator	.152	.172	.335	.252	.100	.094
	(.056)	(.100)	(.164)	(.228)	(.036)	(.061)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3386	2826	3543	2971	2689	2242

Panel B: Factor Score Goodness

	KZ Score		No Repurchase		Bond Rating	
	Early	Late	Early	Late	Early	Late
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Constraint×Bubble Indicator	.046	.068	.137	.058	.044	.033
	(.019)	(.037)	(.060)	(.087)	(.013)	(.023)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3386	2826	3543	2971	2689	2242

Table 7: The Effect of the Tech Bubble on the Relationship between Financial Constraints and Investment

The entries are OLS regression coefficients measuring how the tech bubble affected the relationship between financial constraints and investment. In Panel A, the dependent variable of the regressions is *Capital Investment*; the dependent variable in Panel B is *Research and Development*. *Financial Constraint* is one of the three measures of the firm's initial financial condition: *Initial KZ Score*, *Initial No Repurchase Indicator* and *Initial Bond Rating*. *Bubble Indicator* is a dummy that the observation is between 1996 and 2000. Because *Year Effects* and *Firm Fixed Effects* are included in the regression specifications, the coefficients for *Bubble Indicator* and the initial financial state of the firms are not uniquely identified. Standard errors are in parentheses and are clustered to account for the correlation of observations of a firm over time.

Panel A: Capital Investment

	KZ Score	No Repurchase	Bond Rating
	(1)	(2)	(3)
Financial Constraint×Bubble Indicator	.004 (.004)	.005 (.011)	.000 (.002)
Year Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	4872	5034	3612

Panel B: Research and Development

	KZ Score	No Repurchase	Bond Rating
	(1)	(2)	(3)
Financial Constraint×Bubble Indicator	6.6 (18.9)	48.8 (34.0)	11.8 (5.8)
Year Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	2722	2745	1956

Table 8: OLS Estimates of the Relationship Between Firm Market to Book and Corporate Goodness For Firms with High and Low Financial Constraints

The entries are OLS regression coefficients measuring the relationship between firm market to book and corporate goodness. In Panel A, the dependent variable of the regressions is *Raw Goodness*; the dependent variable in Panel B is *Factor Score Goodness*. *Log(Market to Book)* is the logarithm of the firm's market to book ratio the previous year. *High Firm Financial Constraint Indicator* is a dummy variable for firms with high financial constraint using three measures. In column (2), firms in the top half of the KZ Score (without Tobin's Q) distribution are defined as having high financial constraints. In column (3), firms with no repurchases the previous year are defined as having high financial constraints. In column (4), firms with non-investment grade bond ratings are defined as having high financial constraints. All specifications include a full set of firm fixed effects and year effects. Standard errors are in parentheses and are clustered to account for the potential correlation of multiple observations of the same firm across years.

Panel A: Raw Goodness

		KZ Score	No Repurchase	Bond Rating
	(1)	(2)	(3)	(4)
Log(Market to Book)	.130 (.054)	-.031 (.068)	.090 (.066)	.158 (.076)
High Firm Financial Constraint Indicator		-.504 (.121)	-.133 (.075)	-.419 (.185)
Log(Market to Book)× High Firm Financial Constraint Indicator		.226 (.082)	.059 (.067)	.225 (.114)
Observations	8579	7997	7706	5704

Panel B: Factor Score Goodness

		KZ Score	No Repurchase	Bond Rating
	(1)	(2)	(3)	(4)
Log(Market to Book)	.037 (.021)	-.016 (.026)	.029 (.025)	.044 (.030)
High Firm Financial Constraint Indicator		-.176 (.046)	-.036 (.025)	-.168 (.070)
Log(Market to Book)× High Firm Financial Constraint Indicator		.071 (.032)	.012 (.025)	.078 (.044)
Observations	8579	7997	7706	5704

Figure 1: Time Trend of Corporate Strengths and Concerns

The figure shows the time trend in the yearly average *Total Strengths* and *Total Concerns* of S&P 500 firms between 1991 and 2008.

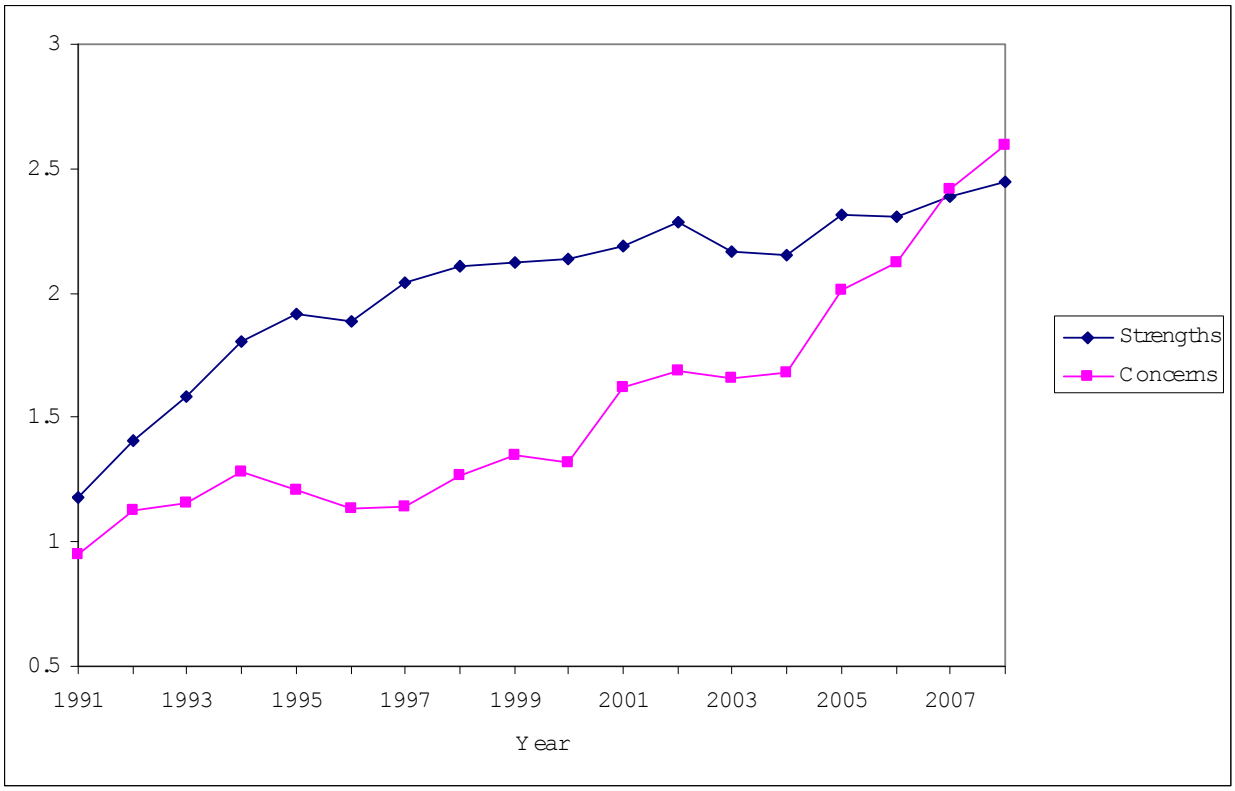

Figure 2: Time Trend of Corporate Goodness

The figure shows the time trend in the yearly average *Raw Goodness* of S&P 500 firms between 1991 and 2008.

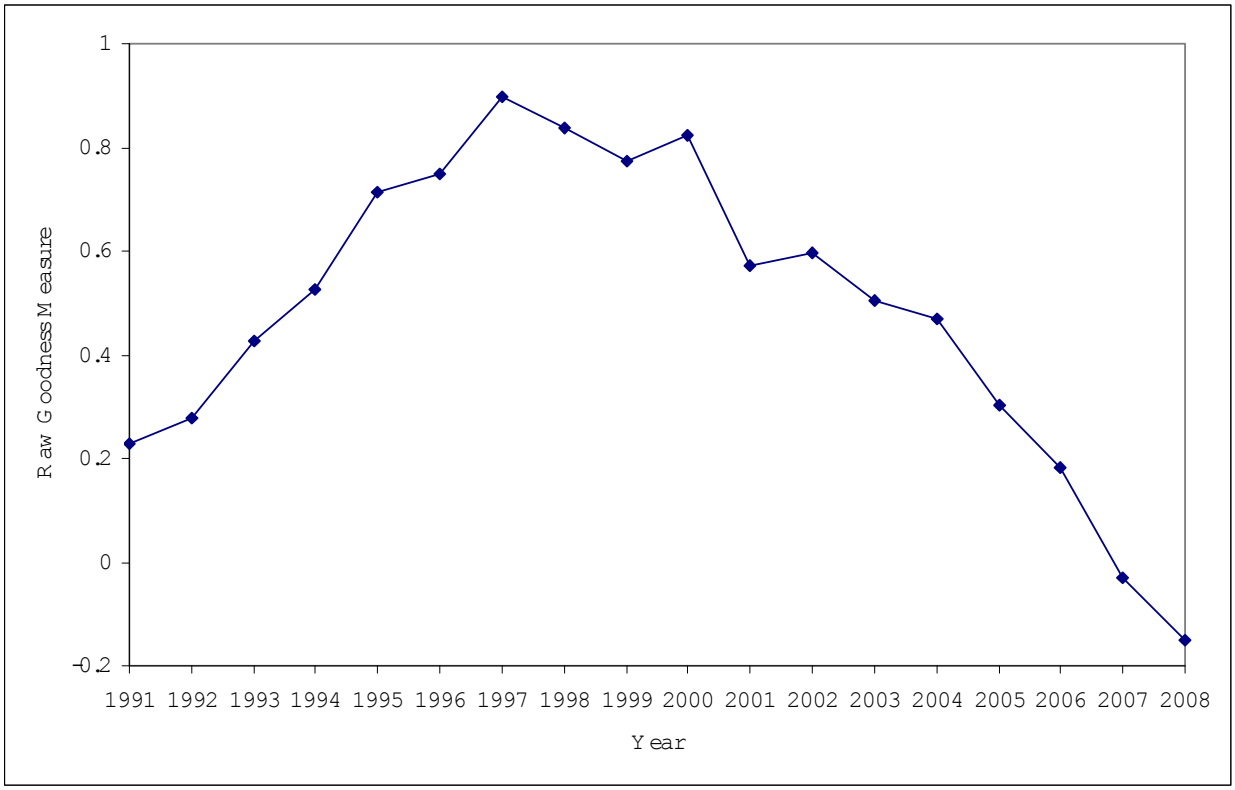

Figure 3: Trends in Average Corporate Goodness by Initial KZ Score

The figure shows the time trend in the yearly average of corporate goodness for two groups of firms. The first group is firms in the bottom half of the *Initial KZ Score* distribution. These are relatively unconstrained firms. The second group is firms in the top half of this distribution; these are relatively constrained firms.

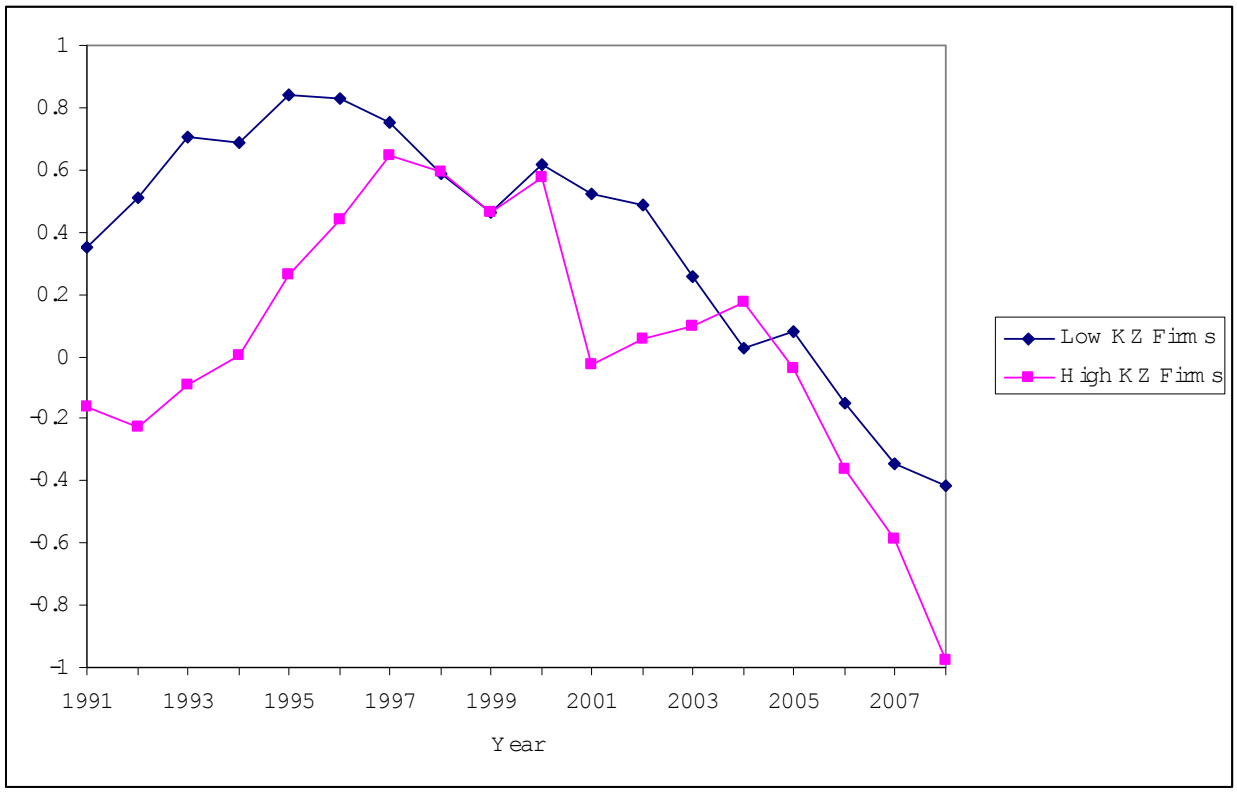

Figure 4: Trends in Average Corporate Goodness by Initial Repurchases

The figure shows the time trend in the yearly average of corporate goodness for two groups of firms. The first group is firms with a value of zero for *Initial No Repurchase Indicator*. These are relatively unconstrained firms. The second group is firms with a value of one for this variable; these are relatively constrained firms.

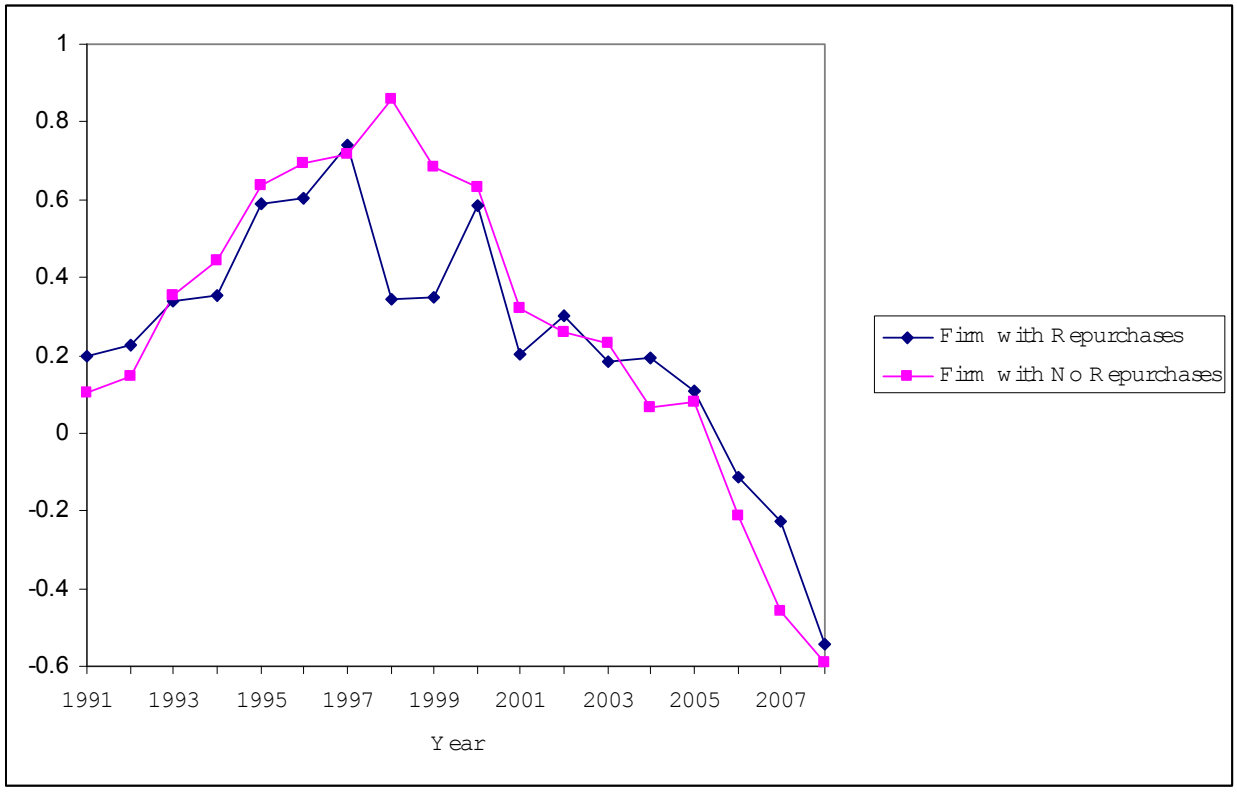

Figure 5: Trends in Average Corporate Goodness by Initial Bond Rating

The figure shows the time trend in the yearly average of corporate goodness for two groups of firms. The first group is firms in the bottom half of the *Initial Bond Rating* distribution. These are relatively unconstrained firms. The second group is firms in the top half of this distribution; these are relatively constrained firms.