WHEN NECESSITY BECOMES A VIRTUE: THE EFFECT OF PRODUCT MARKET COMPETITION ON CORPORATE SOCIAL RESPONSIBILITY[*]

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Abstract

We report evidence that product market competition is positively associated with widely-used Corporate Social Responsibility measures. In particular we show that different market concentration proxies are negatively related to social impact ratings. We also provide evidence that increases in import penetration rates are positively correlated with these social ratings. Finally, we report that firm pollution levels are negatively associated with market concentration measures. Our estimates suggest that –if all else is constant- doubling competition in the marketplace would increase the CSR ratings of an average company by between 184 percent and 800 percent.

Keywords: Product market competition, strategic corporate social responsibility

JEL Codes: D21, L10, M14

I. Introduction

Corporate Social Responsibility (CSR) is advocated as a key component of the social contract between business and society. Yet competition and markets demand efficiency, and to the extent that CSR imposes costs on a firm, its competitive position with respect to its rivals may suffer. This would suggest an inverse relationship between healthy Product Market Competition and corporate engagement in relevant CSR activities. However, some authors (Baron, 2001; Baron 2006b, Chapter 17) have illustrated how companies can use CSR strategically to improve their competitive position, and once we consider that CSR strategies may obey exactly the same logic as any other innovation or differentiation strategy, then the relationship between CSR market conditions may follow far more complex functional forms. In this paper we take an empirical look at the nature of the CSR-competition linkage.

Since Friedman (1963) first argued that the "sole social responsibility of business is to increase its profits", the debate about whether companies should engage in socially responsible behavior has raged endlessly, without the academic profession achieving a minimum consensus. While economists in general tend to agree with Friedman's assertion, many management scholars (for examples see Swanson, 1999 and Donaldson and Preston, 1995) have reacted against Friedman's exclusive focus on maximizing the present value of a firm's future cash flows. These authors defend CSR initiatives as a vehicle to engage in activities that non-financial stakeholders perceive to be important, while at the same time stressing the moral and ethical implications of CSR.

Yet, independently of the normative conflicts about the appropriateness or desirability of CSR initiatives, the sheer weight of facts shows that CSR plays an increasingly prominent role in today's business environment. For example,

investments in socially responsible funds – funds that use socially responsible investing strategies – have rocketed in the United States from $639 billions in 1995 to $2.3 trillions in 2005. That is, nearly one out of every ten dollars under professional management in the United States today – 9.4 percent of the $24.4 trillion in total assets – is involved in socially responsible investing (Socially Responsible Forum, 2006). Also, large pension fund investors, including governments, are increasingly using their voting rights as shareholders to press for good CSR practices. In 2006, Wal-Mart and Freeport were excluded from the Norwegian government pension fund on the grounds that the companies had been responsible for either violations of human rights or environmental damage.

From the consumer point of view, a research report by market research firm Datamonitor emphasizes CSR as one of the primary mechanisms through which firms may build trust with customers (Datamonitor, 2002). According to this study, the proportion of consumers that consider CSR as very important when buying products or services has increased from 28 percent in 1991 to 48 percent in 2002. Naturally consumers can lie when asked about their evaluation of CSR initiatives. Yet, more indicative of increasing consumer concern over social and environmental issues is the rapid growth in the sales of ethical and Fairtrade labeled products. As an example, between 2001 and 2005 the number of Fairtrade Certified Producers and registered traders experienced growth of 127 percent and 132 percent, respectively. In 2006, these Fairtrade sales amounted to approximately €1.6 billion worldwide (Fairtrade Labelling International Organization, 2007).

Furthermore, consumer boycotts over the use of sweatshops in third-world countries have forced multinational companies -like Nike, Reebok and Gap- to acknowledge that the company is responsible for the working conditions in the

factories it contracts with overseas. As a result, these and other companies have passed their own internal code of conduct to establish labor guidelines not only for their own employees but also for their suppliers. Other consumer boycotts over social or environmental issues have forced companies to drastically modify some of their strategies. Relevant examples include Texaco, which has been accused of racist behavior by executives; Philip Morris, under the spotlight because of its financial support for a senator who allegedly held anti-gay views; Mitsubishi, forced to stop the use of old-growth timber and to abandon plans to construct a major salt mine that would have threatened the habitats of 72 animal species; or Home Depot that had to halt its practice of purchasing timber from ancient forests[1].

This growing pressure and scrutiny from both investors and consumers has culminated in an escalation in the number of companies across the world issuing annual independent CSR reports. According to the consulting company KPMG, the number of companies producing this kind of report almost tripled in the period 1993 to 2005. In 2005, 52 percent of the 250 world-largest companies published separate CSR reports. In a cross-country comparison, 33 percent of the top 100 largest national companies issued annual specific CSR reports, on average (KPMG, 2005).

In a world in which there are growing environmental and social concerns, businesses could use CSR as a means to preempt regulatory action (Maxwell, Lyon and Hackett, 2000). Additionally, and closer to the focus of this paper, consumers' willingness to pay for products or services and investors' valuations of individual stocks might increase when companies undertake CSR activities. In this context, during the decision making process, when deciding on their willingness to pay for a particular product or service, consumers might bundle the firm's output together with its perceived level of CSR. If this has been indeed the case, and consumers obtain

larger utility levels when consuming products that come from socially responsible companies, we can legitimately study CSR as one more attribute of a firm product or service, in the same way that we might analyze the role of air conditioning in the demand for cars, or what part advertising plays in reputation-building in the soft-drink sector. This then is the "pragmatic" approach to CSR adopted in this paper. Along these same lines, many authors have already modeled CSR as a specific strategy designed to compete for socially responsible consumers, investors or employees (for a review see McWilliams, Siegel & Wright, 2006).

According to this pragmatic approach, and independent of any altruistic motivation, CSR strategies also pursue the goal of improving firm profitability. In fact, there is a vast empirical literature devoted to the issue of whether CSR is indeed associated with superior financial performance, but with inconclusive results regarding the causality of the relationship (for a survey of the literature and its methodological challenges see Griffin and Mahoney, 1997). Recent work has studied other empirical implications of firms engaging in "strategic" CSR with more promising findings. Fisman, Heal and Nair (2006) show that visible CSR is more prominent in advertising-intensive industries and that firm performance is negatively correlated with visible CSR only in industries with low advertising intensity. Furthermore, they report that the company benefits of engaging in CSR strategies increase as industry-level competition increases, but decrease in the fraction of other firms in the industry that also have high CSR. Siegel and Vitaliano (2006) find evidence that firms selling experience or credence goods and services are more likely to be socially responsible than firms selling search goods. Both papers interpret their findings as evidence that, similar to corporate reputation, CSR policies work as a

credible signal that alleviates informational asymmetry problems between consumers and companies.

This paper contributes to the literature devoted to studying the implications of "strategic" CSR theories, by studying the effect of product market competition on CSR. Intuitively, the difference between a pure altruistic model and this strategic view of CSR can be better understood by studying the linkage between product market competition and the actions of socially responsible firms. If managers design CSR strategies and initiatives based on purely altruistic motives, the effect of competition on the amount and importance of CSR initiatives would be either zero, since altruistic preferences are likely unrelated to the competitiveness of the sector; or negative, since firms in more competitive industries would have fewer resources to pay for costly CSR initiatives. On the contrary, if the main drive of CSR is strategic, firms facing strong market competition may turn to CSR as a strategic way to differentiate the company from its competitors.

In this paper we empirically test whether CSR is more or less prevalent in more competitive industries. While a variety of different measures of both CSR and product market competition are used, the results always show a positive correlation between market competition and CSR. Three distinct empirical tests are provided to support this claim. First, we show how increases in market concentration measures are negatively associated with the CSR ratings devised by an independent investment company. This result holds true when controlling for a variety of observed and unobserved firm characteristics. Second, we provide evidence about how higher import penetration rates instrumented by import tariffs are strongly linked to higher CSR ratings. Third, we find that firm pollution levels decrease when there is a reduction in market concentration measures. These results are not only statistically

significant, but they also reveal effects of economic significance. In particular, our estimates suggest that –if all else is constant- doubling competition in the marketplace would increase the CSR ratings of an average company by between 184 percent and 800 percent. Overall, these findings are interpreted as evidence that strategic motives are relevant when explaining CSR policies.

The rest of the paper is structured as follows: Section II discusses the theoretical link between product market competition and CSR. Section III describes the data and the variables used in our empirical analysis. We describe the empirical strategy in Section IV, while in sections V and VI we show the empirical evidence of a positive relationship between competition and CSR. Section VII looks at several robustness tests and Section VIII provides our conclusion.

II. Theoretical link between product market competition and CSR

Before developing the main arguments that link competition in the product market with CSR, it is useful to define what we mean when using the term CSR. For the goals of this paper we follow Mackey, Mackey & Barney (2007) and consider CSR practices as voluntary firm actions designed to improve social or environmental conditions. This broad definition includes a variety of quite different activities ranging from initiatives to defend human rights in third world countries to green strategies focused on improving the environmental performance of firms. Yet these seemingly unrelated actions share the characteristics of being voluntary and therefore go beyond what the law abides and they are action designed to improve social or environmental conditions. This concept of CSR corresponds to what Baron (2006a) denominates Corporate Social Performance and includes performance motivated by self-interest and not only morally-motivated performance.

Stakeholders that value socially responsible undertakings could be customers, investors, employees or the government. The main assumption behind the "strategic" CSR literature is that in return for these social or environmental practices, firms obtain either a higher willingness for consumers to pay for their market product (McWilliams & Siegel, 2001; Waddock & Graves, 1997; Bagnoli & Watts, 2003; Feddersen and Gilligan, 2001; Fisman, Heal & Nair, 2006; Siegel 2005) more or cheaper sources of capital (Mackey, Mackey & Barney, 2007), or a higher willingness for people to work for the company (Turban & Greening, 1997).

The "strategic view" of CSR considers CSR as an additional business strategy where the goal is maximizing firm profits, in the same way as any other of a firm's actions or strategies. The theoretical literature that looks at the relationship between market competition and strategic CSR has found conflicting results so far. Whereas Bagnoli & Watts (2003) find that more intense product market competition tends to reduce the provision of CSR, Fisman, Heal & Nair (2006) and Baron (2001) find that the pay-off of CSR initiatives could be higher in more neck-and-neck markets.

Bagnoli & Watts (2003) model firms as competing for socially responsible consumers by linking the provision of a public good (environmentally friendly or socially responsible activities) to sales of their private goods. Their results show that the provision of the public good, the amount the firm spends on CSR, varies inversely with the competitiveness of the private good market. This inverse relation between increased product market competition and CSR is found both when they define intense competition as a larger number of competitors, and also when they increase product competition by considering Bertrand price competition instead of less aggressive Cournot quantity competition. Intuitively, Bagnoli & Watts' (2003) results come from the fact that they model a market in which products associated with CSR

are substitutes of otherwise identical products – "private goods" – that are not linked to any CSR activity. As a result, the more competition that exists in the market of the "private good", the lower its market price, and since products with and without CSR are substitutes, the demand for the more expensive goods associated with CSR decreases, resulting in the theoretical inverse relation between CSR and competition in the product market.

Fisman, Heal & Nair (2006) present a signaling model of corporate philanthropy in which CSR operates as a vertical differentiation device. Consumers value products coming from firms that engage in CSR activities because it credibly signals the firm's aversion to sacrificing unobservable quality. The credibility of CSR as a signal comes from the critical assumption that firms which obtain extra-profits from CSR are those that are less likely to offer low quality products. In this context, Fisman, Heal & Nair (2006) find that strategic CSR activities are more likely to occur in those markets in which product market competition is more intense. The reason being that the profitability of a differentiation strategy – achieved by partaking in CSR activities – is larger in those markets in which price competition is strong.

Next, we discuss the potential effects of product market competition on Corporate Social Responsibility with the help of a toy model that is useful in helping to understand the main forces in play. We do not consider the existence of any market failure to correct, nor do we intend to build a fully-fledged theoretical model about CSR. Instead, we want to explain, in the simplest possible way, the reasons why CSR could be affected by product market competition, making explicit the assumptions of our arguments.

In this toy model we assume that consumers value positively the CSR strategies undertaken by companies. This is, ceteris paribus, a consumer's willingness

to pay for a given product increases when the company selling the good is perceived as socially responsible, for example because it pollutes less, or it has good employee working conditions. We could think about this assumption as if the utility obtained for consuming a given good or services, depended on a combination of the value of the product or service plus the level of CSR demonstrated by the company that sells this product or service.

Using Andreoni's (1989, 1990) terminology, consumers have "egoistic" preferences. This is, consumers are selfish and care nothing for the "public good" that CSR strategies supposedly help to provide. Instead, consumers simply experience a "warm glow" from having done their bit when buying products from firms labeled as socially responsible. This is a similar assumption as in Bagnoli & Watts (2003), although we do not explicitly consider the public good characteristic of CSR as it happens in their model.

Under these assumptions then, an individual firm's demand X_i will depend both on the firm's price, p_i and on the N competitor's prices: $p_1,..p_j,..p_N; j \neq i$. It will also depend on that firm's level of CSR as perceived by consumers, S_i; and on the competitors' level of CSR $S_1,..S_j,..S_N; \forall j \neq i$.Firm i profits are then determined by:

$$\pi_i = (p_i - c) \cdot X_i(p_1,..p_N, S_1,..S_N) - C(S_i) - F_i \quad (1)$$

Where c is a constant marginal cost of production and $C(S_i)$ is the increase in fixed costs due to CSR, with $C'(S_i) \geq 0$and $C''(S_i) \geq 0$. Finally, F_i represents fixed costs of production other than the costs related to the level of CSR.

With the profit function depicted in (1) any Nash Equilibrium in a game of monopolistic competition, in which firms choose simultaneously the level of CSR and prices, has to satisfy that the first derivative of (1) with respect to S is equal to zero:

$$(2) \qquad (p_i - c)\frac{dX_i}{dS_i} = C'(S_i)$$

Basically, (2) states that the marginal productivity of CSR has to be equal to the marginal cost of CSR. With this simple FOC depicted in (2) two main effects of product market competition on CSR levels can be identified: the margin effect and the business stealing effect.[2] In equation (2) an increase in product market competition reduces the product margin (p_i-c) and this in turn reduces the marginal return of CSR, because the margin gained by each additional unit sold will be lower. According to this *margin effect,* product market competition would reduce CSR. Additionally, in equation (2), an increase in CSR by assumption increases the residual firm demand $(\frac{dX_i}{dS_i} \geq 0)$ and this effect should be larger in more competitive environments. Intuitively, we can see this if we consider a Bertrand model of competition in prices in which products are homogeneous. In this case, for equal levels of firm CSR consumers just choose the firm with the lowest price. In this extremely competitive scenario a small increase in the level of CSR of one of the competitors could translate in a market share of 100 percent. According to this *business stealing effect*, product market competition would increase firm levels of CSR.

Thus, the effect of product market competition on CSR levels will depend on whether the business-stealing effect is stronger than the margin effect. One effect may dominate the other depending on how competition in the product market is modeled, the level of market competition itself, as well as on how we model consumers' preferences towards CSR. This ambivalence is consistent with the conflicting findings of the theoretical models described above, regarding the CSR-competition linkage. Appendix B demonstrates, as an example, a simplified model of monopolistic competition that shows how under reasonable assumptions it is possible to build a

model of a positive relationship between competition and CSR, but that this result is far from general. The purpose of the rest of the paper is to empirically estimate the nature of this relationship.

III. Data Description and Variable Construction

In this paper we combine two datasets: KLD STATS[3], with information on the CSR behavior of firms, and Compustat, which provides accounting statement information of public companies. The KLD dataset comes from Kinder, Lyndenberg and Domini (KLD), a firm that rates the social performance of public companies with the purpose of facilitating the integration of environmental, social and governance factors into investment decisions.

In comparison to other CSR indicators, KLD's ratings are based on the assessment of experts outside the focal firm, and therefore the KLD ratings are more objective than accounts of companies' self-reported CSR activities as used in other indexes. Furthermore, the KLD data has been found to be consistent with other commonly used measures of CSR. Sharfman (1996) found that the KLD data correlated very well with the 1991 *Fortune* reputation score of 300 corporations and the holdings list of 11 ethical funds.

The KLD data covers the period 1991-2005 and is computed as follows.[4] First, KLD considers seven broad areas of CSR: community relations (COMM), corporate governance (CGOV), employee relations (EMP), diversity (DIV), the environment (ENV), human rights (HUM) and product quality and safety (PRO). Then, within each of the seven areas, KLD analyzes the behavior of companies on various aspects or activities, differentiating between good or socially responsible behavior (KLD calls this a strength) and bad social behavior (KLD calls this a concern).

Based on this assessment, KLD assigns each company a strength rating and a concern rating for each CSR area. These ratings are shown individually for each company. For example, within the area of community relations, KLD considers eight different types of positive behavior (eight strength ratings) and five different types of bad behavior (five concern ratings). One of these strengths is *charitable giving*, defined as "the company consistently giving over 1.5 percent of trailing three-year net earnings before taxes (NEBT) to charity, or having otherwise been notably generous in its giving". An example of one of the concerns is *investment controversies*, defined as "the company being a financial institution whose lending or investment practices have led to controversies, particularly ones related to the Community Reinvestment Act".

For each CSR strength or CSR concern rating, KLD applies to each company in the sample a "1", indicating either the presence of a CSR strength, or a CSR concern. On the contrary KLD assigns a "0" rating to a company in a given activity if there is nothing good or bad to report about the company's behavior with respect to that activity. KLD decides about company strengths and concerns in the following manner: "*Each year, KLD takes a snapshot of all company ratings at calendar year end. Throughout the year, each company is reviewed annually and engagement with the company is initiated. As part of this process, (KLD) analysts review the company's public documents, including the annual report, the proxy, the company website, corporate social responsibility (CSR) reporting, and other stakeholders and data sources. KLD analysts also monitor media sources for developing issues on a daily basis. Additionally, companies are updated with information on an industry- and universe-level from discrete sources on an on-going basis.*"

Table I shows the evolution of the number of firms and the total number of concern and strength ratings across time in the KLD dataset. In total, the KLD dataset contains 17,753 firm*year observations with 935 different CSR ratings. On average, there are 1,183 firms per year and 62 ratings per firm and year. Of these 62 ratings, an average of 33 and 28 rate each firm's strengths and concerns in CSR, respectively.

Insert Table I about here

Note that the number of firms in the sample experiences a substantial increase in the year 2001. The reason is that KLD expanded the universe of firms under scrutiny. From 1991 to 2000, KLD reported CSR data for firms either in the *S&P 500 Index* or in the *Domini 400 Social Index* -an index of 400 socially screened stocks selected by KLD. However, from 2001 onwards, KLD added CSR ratings for all firms belonging to the *Russell 1000 Index* – an index elaborated by the Russell Investment Group consisting of the large-cap segment of the United States equity universe that represents approximately 92 percent of the United States market. From 2003 onwards KLD additionally reports CSR data on all those companies belonging to the *Russell 2000 ® Index* - an index that offers investors access to the small-cap segment of the United States equity universe and also elaborated by the Russell investment group.

In our empirical analysis below, we exclude firms in the *Domini 400 Social Index* to avoid selection bias caused by KLD selecting specific types of corporations. By doing this we lose 1,014 firm*year observations. However, in non-reported results we replicate our specifications including companies in the *Domini 400 Social Index*, and qualitatively obtain the same results.

Throughout the years KLD has changed the number of activities that it scrutinizes. In particular, many of the activities rated in years 1994-2005 were not

rated in 1991-1993, and vice versa. For this reason years 1991-1993 are excluded from the analysis. We also dropped those ratings which appear in some years but not in others, and this resulted in the exclusion of an average of two strengths and three concerns per year. Finally, those observations which had no match in the Compustat dataset were left out, which led to the exclusion of 2,870 firm*year observations.[5]

The last four columns in Table I show the number of observations and the number of strength and concern ratings for every year in our sample. In total, we keep 12,933 firm*year observations with an average of 56 CSR ratings for every firm-year. The resulting unbalanced panel consists of 3,630 firms, each of them staying an average of 3.56 years in our sample. The list and a brief description of each of the 56 CSR ratings we use are shown in the Appendix A.

Dependent variables: measures of CSR performance

Our main measure of CSR performance summarizes all the information from the distinct CSR ratios provided by KLD for each firm and year. For this, we compute the difference between total strengths (STR) and total concerns (CON) across all different CSR areas to get an aggregate measure of CSR, ACSR, for each firm (i) and year (t):

$$ACSR_{it} = \sum_{kn} STR_{it}^{kn} - \sum_{kn} CON_{it}^{kn}$$

where n indicates each of the seven CSR areas (e.g., community giving, corporate governance, etc.) and k indicates a rating within an area. This ACSR variable is the same used by Siegel and Vitaliano (2006). The analysis below also studies the linkage with market competition of concerns and strengths separately since as Creyer and Ross (1996) argue, consumers may value asymmetrically positive rather than negative firm CSR-related events.

Insert Table II about here

Table II shows some descriptive statistics of these CSR performance measures. The ACSR values range from -9 to 12 and the standard deviation across firms (holding time constant) is 1.51 and across time (holding firm constant) is 0.90. 27 percent of the observations have an ACSR score equal to 0, whereas this percentage is almost 37 percent in the case of the concern score (CON) and 41 percent in the case of the strength score (STR). Interestingly, both across time and across firms, there is a positive correlation between strengths and concerns. This may be due to the fact that those companies with larger public visibility have a larger number of analysts following them and as a result receive at the same time more positive appraisals (strengths) and also more negative attention calls (concerns).

Independent variables: measures of product market competition

We construct three different market competition proxies. First we construct the Hirschman-Herfindahl Index (HHI) for each industry defined at the six-digit NAICS code level. This is a standard index of industry concentration used profusely in the standard Industrial Organization literature and we compute it as follows:

$$HHI_t^I = \sum_{i=1}^{n} ms_{it}^2$$

Where ms_{it} is market share of firm *i* in industry *i* in year *t*. To compute total sales in industry *i* we have considered all Compustat independent companies active solely in industry *i* as well as those divisions of diversified firms that report industry *i* as their primary sector of activity. Note that this HHI is constructed using information from public companies in Compustat exclusively, and therefore it is an upwards biased estimator of the real HHI. However, it constitutes a good proxy for industry concentration since larger firms are usually public and this limits the importance of

the bias. Furthermore, a large number of small local private companies may not be competing with large national or international companies even if they operate in the same four-digit SIC code. For this reason, our in-sample concentration index might be a better proxy of the relevant extent of market competition for public companies.

Second, the number of competitors in the same industry is taken as another proxy for the intensity of competition, again defined at the 6-digit NAICS code level. As above, both divisions of diversified firms and non-diversified firms active in the same sector are considered as competitors.

For the last measure of competition we utilize measures of import penetration and industry tariff protection obtained from Xu (2006) that uses data from the John Romalis U.S. Tariff Database 1989-2001 files, the TradeStats Express National Trade Data, and the U.S. Industry Annual Accounts data section in the Bureau of Economic Analysis of the U.S. Department of Commerce to construct measures of import penetration and industry tariff protection, covering a total of 21 manufacturing industries (3-digits NAICS level) for the period 1994-2001.

A large percentage of firms in our sample (43.23 percent) are diversified, and as a result, in any given year they operate in more than one industry. The corresponding market competition proxy for these companies is constructed as the weighted average of the market competition in all the industries in which the company operates, where the weights are given by the percentage of firm sales in each industry. This is:

$$PLAYERS_{it} = \sum_{j} \frac{divisionsales_{it}^{j}}{totalfirmsales_{it}} \cdot PLAYERS_{t}^{j}$$

$$HHI_{it} = \sum_{j} \frac{divisionsales_{it}^{j}}{totalfirmsales_{it}} \cdot HHI_{t}^{j} ,$$

$$IMPORT_{it} = \sum_{j} \frac{segmentsales_{it}^{j}}{totalfirmsales_{it}} \cdot IMPORT_{t}^{j}$$

Insert Table III about here

We show some descriptive statistics of these variables in Table III. All three competition variables display a significant degree of variation across industries, across firms and across time. For example, for the case of the HHI, its mean is 0.20 and its standard deviation across firms is 0.18 and 0.06 across time.

We are also interested in making sure that these variables indeed proxy for competition in the product market. With this purpose, the last two rows of table 3 show the correlation coefficients between these measures of competition and profitability measured by profits over sales. All the signs of the correlation coefficients are as expected, since the three market competition proxies correlate negatively with firm profitability.

Controls

A potential bias in our estimations could arise if, in more competitive markets, only 'high quality' or well-managed firms survive ('composition effect'). The definition of 'good quality' firms is beyond the scope of this paper, but it might happen that surviving firms engage in substantial R&D, invest in branding and maybe also in CSR. In this case, omitting controls such as R&D and advertising expenditures would lead to an overestimation of the impact of competition on CSR (McWilliams and Siegel, 2000 strongly advocate for introducing these controls in CSR empirical specifications).

With this in mind, all our specifications have controls for R&D intensity (R&D) and advertising intensity (ADVER), defined as R&D expenditures over sales

and advertising expenditures over sales, obtained from Compustat. Since companies are not forced by the SEC to report advertising and R&D expenditures separately, there are a large percentage of companies that have missing values for these two variables. Instead of dropping those observations, we follow the standard practice and assign them a value of zero and at the same time create two dummies, one for each variable, that have a value equal to 1 if the company reports each respective type of expenditures, and zero otherwise. These two dummies are included in all the specifications in which these controls are used.

Another potential bias could be caused if profits are lower in highly competitive markets and this causes CSR expenditures to be lower as well. In this case, omitting controls for the profitability of firms would introduce a downward bias in the estimated coefficients. We take this effect into account by including firm accounting profits (PROFITS), defined as the firm's operating profits, in all our specifications.

We are also concerned about the possibility of a spurious correlation between CSR and competition due to a size effect. This can happen if CSR has economies of scale and firm size varies with competition (e.g., in less competitive markets firms have a larger size). Also, large companies are more likely to have a greater public visibility and, as a result, larger companies may have higher chances to qualify for any of the strengths and concerns considered by KLD. For this reason, a control for firm size (ASSETS) is included, computed as the log of book value of firms' assets.

Insert Table IV about here

We report descriptive statistics of these control variables in Table IV. Table IV displays how firms operating in manufacturing industries, NAICS code between

31 and 33, are the largest group in our sample followed by firms competing in the service sector, NAICS 51-92. Across time the proportion of firms in manufacturing decreases, from 51 percent in the interval 1994-1997, to 36 percent in 2002-2005; while the percent of companies in the service sector increase from 19 percent to 34 percent during the same period of time.

This time variation in the sector composition of our sample is due to the changing universe in the KLD sample reported above. First, KLD has added companies belonging to other broader indexes than the S&P 500 index. These indexes have different industry mix since they include much smaller companies. Additionally, the sector combination of the indexes captured in the KLD data varies across time. This is clear in the case of S&P 500 in which the proportion of manufacturing companies is decreasing. Note also that the mean values of the control variables change considerably across time. The effect of any potential time biases in our estimations is taken into account by including year dummies in all our specifications.

IV. Empirical Strategy

In our empirical analysis we run a set of regressions to estimate the following linear equation:

$$CSR_{it} = \beta_0 + \beta_1 \cdot COMP_{it} + \beta_2 \cdot ASSETS_{it} + \beta_3 \cdot R\,\&\,D_{it} + \beta_4 \cdot ADVER_{it} + \beta_5 \cdot PROFITS_{it} + YEAR_t$$

where *i* indicates firm, *t* is year, $COMP_{it}$ is the competition variable (HHI, PLAYERS or IMPORT) and CSR_{it} is the CSR measure (ACSR, STR, CON). Note that even if the proxies of market competition are by its nature defined at the industry-level, COMP has firm level variability given that each diversified firm has potentially a distinct value for COMP. Since both STR and CON are left-censored variables, we

fit Tobit models whenever using these as dependent variables, whereas we run standard OLS regressions when using ACSR.

In some specifications below, industry dummies are added. These industry dummies represent six-digit NAICS codes in those regressions with HHI and PLAYERS as independent variables and instead three-digit NAICS codes for those regressions with IMPORTS as proxy of market competition (We are consistent with the industry definition used in each competition variable). This captures the effect of intra-industry changes in competition across time. The inclusion of industry dummies is important because of two separate reasons. First, as Nickell (1996) points out market share-based measures of market power (such as the HHI) have little value when utilized in a cross-section but instead are more reliable when exploiting the explanatory power of their time variability as we do when introducing industry dummies. Second, Siegel and Vitaliano (2006) show how CSR levels vary systematically across industries since they report that companies selling experience goods are more socially responsible than firms selling search goods. Adding industry dummies avoids biases caused by the presence of unobserved industry characteristics that could be correlated at the same time with CSR levels and market competition proxies. We also estimate regressions with firm fixed effects to take into account generic unobserved firm heterogeneity.

An important potential drawback of our analysis is the potential endogeneity of HHI and PLAYERS and standard reverse causation arguments. In particular, it could happen that CSR strategies modify market structure rather than being the result of competition in the marketplace. This could be the case if for example the CSR strategies implemented by incumbents act as an entry barrier and reduce the level of competition in a mechanism similar to the one described in Sutton (1993) for R&D

and Advertising. This issue is addressed by using an exogenous source of market competition, as is the level of industry trade barriers. We follow Xu (2006) using the time variation of tariffs as instruments for import penetration across three-digit manufacturing industries. As seen below, the results will not change qualitatively when employing this exogenous measure of market competition.

V. Preliminary evidence on the CSR-Market Competition linkage

We start by showing some anecdotal evidence regarding the relationship between product market competition and the CSR measures described above. Table 5 looks at the connection between the change in market concentration, as measured by the change in the HHI, and the change in CSR over a twelve-year period from 1994 to 2005. The first panel in Table V looks at this relationship at the firm-level, while panel B takes industry, six-digit NAICS, as the unit of analysis.

Insert Table V about here

The evidence presented in Table V clearly suggests a positive relationship between the change in market competition and CSR. Those companies operating in industries in which concentration has lessened the most, a decrease of 0.10 in the HHI from a mean of 0.20, are those that have experienced the largest increase in the ACSR ratings- a rise of 0.25 where the average of ACSR in the sample is just 0.13. At the same time, those companies in sectors in which market concentration has increased the most (increase of 0.11 in the HHI) are those with the largest reduction in ACSR ratings (a decrease of 0.33). Also, those companies that have undergone the largest decrease of ACSR ratings in 2005 respective to their historical means (Wal-Mart and Home Depot among them) have all simultaneously encountered an increase in market concentration; while those companies (like Intel and GM) that have experienced the

largest increase in the ACSR levels are also those operating in sectors in which market concentration has diminished.

At the industry level a similar pattern is observed. The quartile of industries where concentration has fallen the most (a fall of 0.11) presents the largest increase in ACSR levels (an increase of 0.22). On the contrary, in the quartile of industries in which market concentration has grown the most (an increase of 0.12), ACSR levels have decreased the most (a decrease of 0.27 points). Analogously, the worst (best) CSR performers industries are those that operate in sectors in which concentration has gone up (down).

Insert Table VI about here

More generally, there is a positive correlation between competition and CSR in our data. Table VI shows the partial correlation coefficients across firm and across time and the coefficients from simple OLS regressions of CSR proxies against market competition measures and year dummies. In all cases, the sign of the coefficients clearly indicates a positive relationship between competition and CSR. A smaller HHI and a larger number of firms in an industry (PLAYERS) are associated with a higher level of CSR, and also with higher CSR strengths and lower concerns. This relationship holds true across time and across firms, regardless of the competition measure we use and for the simple OLS models.

VI. Empirical results

Next we investigate the relationship between competition and CSR in fully-fledged econometric specifications. Table VII and Table VIII display the results of a set of regressions with CSR measures as dependent variables against market competition proxies, HHI and PLAYERS, and controls for firm size (ASSETS), R&D

intensity (R&D), advertising intensity (ADVER) and the level of profits (PROFITS) in addition to year dummies. The first three columns of both tables display the results of standard OLS-Tobit regressions, whereas columns (4) to (6) exhibit the results when adding fixed firm-effects and columns (7) to (9) show the results when adding industry dummies. Across these different models we are primarily interested in the sign and significance of the coefficient of the competition variable (HHI or PLAYERS) on CSR ratings measured by ACSR.

Insert Table VII and Table VIII about here

In all cases the sign of the coefficient indicates a consistent pattern: more market competition, lower HHI or more PLAYERS, is associated with superior social responsibility levels, and higher ACSR levels. This happens in the standard OLS regression, but also when adding industry dummies or firm-fixed effects. All six coefficients, three for each competition variable, are statistically significant -columns (1), (4) and (7) in Tables 7 and 8.

Tables VII and VIII also allow us to investigate whether these superior CSR ratings in more competitive sectors are due to either higher CSR strengths or lower CSR concerns. In general, the coefficients on both competition variables, HHI and PLAYERS, seem to suggest that competition in the marketplace is positively associated with both higher CSR strengths and lower CSR concerns: four out of six coefficients of the competition variable significantly affect the number of strengths, whereas for concerns the same proportion is three out of six. In none of the six specifications do we find that market competition proxies negatively and significantly affect the number of CSR strengths. Also, there is not a single specification which

shows that market competition has a positive and statistically significant effect on the number of CSR concerns.

A comparison of the OLS coefficients in Table VI and the coefficients of HHI and PLAYERS in columns (1) to (3) of Tables VII and VIII indicates that not only does introducing additional controls, not reduce the significance of the coefficients, but it increases it. This suggests that omitting certain firm characteristics was downwardly biasing the univariate correlation results. For example, in the case of ACSR as dependent variable, the coefficient on HHI goes from -0.24 to -0.41 once we control for firm characteristics. The results obtained when introducing firm fixed effects or industry dummies are quite similar. Using ACSR as the dependent variable, the coefficient of HHI is statistically significant and almost identical in the two fixed-effects models (around -.53 in both cases). We interpret this as evidence that the positive linkage between ACSR and competition cannot be explained by unobserved firm or industry heterogeneity biases.

Regarding the control variables, the fact that both ASSETS and PROFITS are consistently associated with more CSR strengths but also with more CSR concerns, may be because larger corporations are active in more activities and markets than smaller ones; and hence have a higher chance of being spotted under the radar of KLD both for positive and negative practices. The estimated coefficient for the advertising intensity is highly significant in the pooled data OLS models and bears a positive relationship with strengths and negative with concerns, i.e., firms that invest a lot in advertising tend to be also more socially responsible, something that is consistent with the signaling theories of CSR (Fisman, Heal and Nair, 2006). However, once we add firm fixed effects or industry dummies these coefficients lose

statistical significance suggesting that the effect of advertising intensity can be explained by unobserved firm or industry heterogeneity.

Apart from the statistical significance discussed above, the coefficients on the competition variables presented in Table VII and Table VIII suggest the existence of important effects of market competition in the magnitude of CSR ratings. In particular, the coefficients in column (3) in both tables suggest that doubling the concentration ratio/number of players of the industries in which a given firm is competing should lead to a decrease of 1.07/ increase of 0.24 points in the ACSR levels. Since the average of the ACSR variable is just 0.13, this means that if the company had an average ACSR rating, the effect of dividing the industry concentration by two would imply a decrease of CSR levels of around 800 percent whereas multiplying the number of competitors by two would result in an increase of ACSR ratings of around 184 percent.

Next we examine models that use import penetration as the proxy of market competition. For this variable we report just the results of specifications including firm fixed-effects or industry dummies, defining industries at the 3-digit NAICS code level. Standard OLS regressions are not reported since import penetration variables are only good proxies of market competition when considering the effects of changes in this measure across time (see Wu, 2006 for a similar approach).

Insert Table IX about here

In both specifications, industry tariffs are used as the instrument for import penetration. The objective here is to rule out the possibility that reverse causation is the reason for the positive association found so far between competition and CSR. By using industry tariffs as the instrument for import penetration we can test the

relationship between CSR and an exogenously determined measure of competition. In the first stage estimation of import penetration against tariffs, industry tariffs always had a negative impact on import penetration, and the coefficients were significant at the 1 percent level (the coefficient of tariffs in the firm fixed-effects model was -.34 and in the case of the industry fixed-effects model -.69). The results in Table IX show the same pattern as before: an increase in product market competition (IMPORTS) causes firms to be more socially responsible measured by higher ACSR levels. These results hold both for the firm fixed-effects model and the model with industry dummies. As before, market competition measured by changes in import penetration is associated with both more CSR concerns and less CSR strengths, although the coefficient on CSR strengths is not statistically significant when using firm-fixed effects. The economic significance of the coefficients reported in Table 9 is also important. If the level of import penetration doubles in the industries in which a given firm operates this should translate, ceteris paribus, into an increase of 0.68 points in the level of ACSR using the coefficient of column (1) of table 9 or into an increase of 0.98 points using the corresponding coefficient in column (3). If we assume that the firm had an average of 0.13 ACSR rating, this means an increase of around 623 percent (853 percent) in the ACSR ratings.

VII. Robustness tests

Up to now we have only used CSR measures computed by KLD. In this section we investigate the robustness of our results when using distinct measures of CSR performance that do not depend on the assessment of KLD experts. In particular, the analysis of the previous section is repeated but using as dependent variable toxic emissions at the firm level. Finally, we also test whether the competition-CSR linkage has a non-linear functional form.

Pollution levels are good proxies of firm environmental performance and it is one of the seven areas used to evaluate CSR as explained in section III. The main advantage of this proxy of CSR consists in their objective nature, since firms in SIC codes 2000 to 3999 (the entire manufacturing sector) are required by the U.S. Environmental Protection Agency (USEPA) to report emissions for a considerable number of toxic chemicals (the current TRI toxic chemical list contains 582 individually listed chemicals in 30 categories) into the air, the water, or the ground, once they exceed certain minimum thresholds.

We construct our measure of firm environmental performance as the natural logarithm of the total generation of toxic chemical waste produced by a firm in a given year. This measure includes offsite waste transfers (i.e., dumping), as well as wastes that were treated or recycled. Environmental studies have used adjusted toxic releases by relative toxicity (for example see King & Lenox, 2002), and we follow their method in adjusting the toxic emissions by their level of toxicity. The toxicity weighting scheme used was developed by the EPA to serve as a threshold for reporting accidental spills: the reportable quantities (RQ) in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). The most toxic chemicals, like the chemical war agent heptachlor or arsenic compounds, have to be reported if just a pound of the material is spilled, while spills of the least toxic materials like methanol have to be reported only if they exceed 5,000 pounds. We use these RQ to group the different chemicals into the following seven groups: 1 pound (most toxic), 10 pounds, 100 pounds, 500 pounds, 1,000 pounds, 5,000 pounds, and 10,000 pounds (least toxic).

The USEPA webpage (http://www.epa.gov/) provides data to obtain waste composition at the facility level and we have downloaded this information for the

years 1998 and 2000. We only downloaded information from these two years because the matching of this pollution information with the rest of the variables is quite time consuming, since it has to be done very carefully, manually checking the exact company name. We chose 1998 and 2000, to have two alternate years around the middle period of our sample. With this information, we compute a toxicity-weighted measure of waste for each facility *i*, TWI_i :

$$TWI_i = \sum_k w^k T_i^k$$

where w^k corresponds to the inverse of the RQ corresponding to each group in which the chemical *k* is classified and T_i^k is the number of pounds of chemical waste emitted by the facility *i*. In a final step, this information is aggregated to our firm level measure of TOXIC by summing, for each firm, the TWI_i of all its facilities. Because the company identifier used by the U.S. EPA is different from the company identifiers employed in Compustat, this new variable must be manually matched with our financial variables, identifying companies by their names. By keeping only positively matched data, approximately two percent of the observations in our original sample is lost.

Next we test the robustness of our previous results using the level of toxic emissions by firms as the measure of CSR. We have information on toxic emissions, TOXIC, for 388 companies and years 1998 and 2000, amounting to a total of 621 firm*year observations. TOXIC has a mean value of 5.86 and a standard deviation of 5.08. One third of the observations take the value zero because the level of emissions in those cases was below the threshold for reporting. As above, we fit a Tobit regression model to take into account the left censoring of the dependent variable.

We use as competition measures HHI and PLAYERS as above, but cannot replicate the analysis for the variable IMPORTS because of the lack of sufficient

longitudinal data for this new dependent variable. Also, the data on toxic emissions is by the total emissions level of each firm rather than by unit of output. In order to rule out any spurious correlation between our dependent variable and the competition variables due to omitting output measures, we control for firms size (ASSETS & SALES) and also include a control for the industry average level of toxic emissions, TOXIC_IND. This variable is an industry level variable computed at the six-digit NAICS level utilizing the whole USEPA sample rather than the restricted number of companies that can be matched with Compustat data.

Before looking at the results it is worth noting that TOXIC correlates well with the KLD indicators of social responsibility. For example, the correlation between TOXIC and the KLD rating for environmental performance, ENV-CSR, is -.29 when measuring toxic emissions in absolute value, and -.25 when measuring each firm's toxic emissions relative to the industry average (these correlations are statistically significant at the 1 percent level).

Insert Table X about here

Columns (1) and (2) in Table X show the results for the Tobit models without industry dummies and columns (3) and (4) show the results for the models that include industry dummies defined at the three-digit NAICS code. In all four cases the results confirm the pattern obtained before: a higher degree of competition- lower HHI and more PLAYERS - is associated to superior social performance of firms, in this case, a lower level of toxic emissions. We obtain this result even after controlling for the industry average emissions level and firm characteristics, and in three of the four cases the coefficients are significant at the 1 percent level. Also consistent with our previous results, R&D and advertising intensity are both negatively correlated

with the level of toxic emissions. Not surprisingly, the variables that proxy for the size of the firm are positively correlated with the level of firm pollution levels, but controlling for these variables does not reduce the significance of the coefficients of the competition variables.

In non-reported results we also investigate whether the market competition-CSR linkage follows a non-linear functional form. In particular we replicate the same baseline regressions displayed in Tables VII, VIII and IX but adding a quadratic term for the market competition variables. The value of the estimated coefficient on the quadratic term differed drastically depending on the market competition variable utilized and also depending on the particular econometric specification (OLS, industry dummies and firm fixed effect). We find no robust evidence of a quadratic relation between CSR and competition, but avoid reporting these results here for fear of flooding the paper with tables. These results are available upon request to the authors.

VIII. Conclusions

In this paper we investigate the empirical link between product market competition and CSR. The findings of this paper suggest that firms in highly competitive markets are more socially responsible, a result that holds true regardless of the measure of CSR we use, CSR ratings or pollution emissions, and for three different proxies of competition, two different concentration indexes and import penetration. These results are consistent with a strategic view of CSR in which consumers perceive CSR actions as an additional attribute that increases their willingness to pay for firm products or services, and it is harder to reconcile with a purely altruistic view of socially responsible corporate initiatives.

Previous accounts of consumer boycotts have suggested that stakeholders are more sensitive to news about the negative impact of firms than to positive news. We

find no evidence that firms behave asymmetrically with regards to initiatives with negative or positive social impact. Our results point to the same direction: more competition in the marketplace seems to be associated to both less negative social impact and to greater positive social impact initiatives. We also find that large and more profitable firms are rated (both positively and negatively) more often than smaller ones. All in all, our results are consistent with a strategic view of CSR that considers CSR initiatives simply as another differentiation strategy carried out with the purpose of raising firm profitability.

Appendix A

CSR ratings used to compute the CSR measures of performance.

RATING	DEFINITION	*AREA*
COM-STR-A	Charitable giving	COMMUNITY STRENGTH
COM-STR-B	Innovative giving	
COM-STR-C	Support for housing	
COM-STR-D	Support for education	
COM-STR-F	Non-US charitable giving	
COM-STR-X	Other community strength	
COM-CON-A	Investment controversies	COMMUNITY CONCERN
COM-CON-B	Negative economic impact	
COM-CON-D	Indigenous peoples relations	
COM-CON-X	Other community concern	
CGOV-STR-A	Limited compensation to top management	C.GOVERNANCE STRENGTH
CGOV-STR-C	Ownership strength	
CGOV-STR-X	Other: unique and positive corporate culture	
CGOV-CON-X	Other controversies	C.GOVERN. CONCERN
DIV-STR-A	CEO is a woman or a member of a minority group	DIVERSITY STRENGTH
DIV-STR-B	Promotion of women and minorities	
DIV-STR-C	Board of directors: women, minorities, disabled	
DIV-STR-D	Outstanding work/life benefits to employees	
DIV-STR-E	Women and minority contracting	
DIV-STR-F	Employment of the disabled	
DIV-STR-X	Other diversity strength	
DIV-CON-A	Controversies: paid fines or civil penalties related to affirmative action controversies	DIVERSITY CONCERN
DIV-CON-B	No women in board of directors	
DIV-CON-X	Other	
EMP-STR-A	Union relations	EMPLOYEE REL. STRENGTHG
EMP-STR-C	Cash profit sharing	
EMP-STR-D	Employee involvement	
EMP-STR-F	Retirement benefits	
EMP-STR-X	Other	
EMP-CON-A	Union relations	EMPLOYEE REL. CONCERN
EMP-CON-B	Health and safety conditions concern	
EMP-CON-C	Workforce reductions	
EMP-CON-D	Retirement benefits	
EMP-CON-X	Other	
ENV-STR-A	Beneficial products and services that promote efficiency use of energy and/or environmental preservation	ENVIRONMENTAL STRENGTH
ENV-STR-B	Pollution prevention	
ENV-STR-C	Recycling	
ENV-STR-D	Clean energy	
ENV-STR-X	Other	
ENV-CON-A	Hazardous waste	ENVIRONMENTAL CONCERN
ENV-CON-B	Regulatory problems	
ENV-CON-C	Ozone depleting chemicals	
ENV-CON-D	Substantial emissions	
ENV-CON-E	Agricultural chemicals	
ENV-CON-X	Other	
HUM-STR-X	Other	H. RIGHTS STRENGTH
HUM-CON-C	Burma concern	H. RIGHTS CONCERN
HUM-CON-X	Other	
PRO-STR-A	Quality	PRODUCT STRENGTH
PRO-STR-B	R&D/Innovation	
PRO-STR-C	Benefits to economically disadvantaged	
PRO-STR-X	Other	
PRO-CON-A	Safety	PRODUCT CONCERN
PRO-CON-D	Marketing/contracting concern	
PRO-CON-E	Antitrust	
PRO-CON-X	Other	

Appendix B

We develop a simplified model of monopolistic competition as in Aghion et al. (2002) in which we assume a duopolist market with two firms A and B that compete simultaneously in prices and CSR. We assume that the two firms sell X_A and X_B respectively to a representative consumer, and undertake CSR represented by S_A and S_B. The representative consumer has a utility function of the form:

(1) $$U = \log(S_A X_A^{\alpha} + S_B X_B^{\alpha})^{1/\alpha}$$

Where a higher $\alpha \in (0,1]$ represents a higher degree of substitutability between the two goods. Note that if $\alpha = 1$ the goods are perfect substitutes and competition would be extreme whereas for values of α near zero the substitutability between the two goods is relatively low and product market competition is lower.

The representative consumer maximizes utility subject to the usual budget constraint $p_A x_A + p_B x_B = 1$, where we have normalized total expenditure to one. Under these assumptions the demand functions have the form:

(2) $$X_A = \frac{p_A^{\frac{1}{\alpha-1}}}{p_A^{\frac{\alpha}{\alpha-1}} + p_B^{\frac{\alpha}{\alpha-1}} \left(\frac{S_A}{S_B}\right)^{\frac{1}{\alpha-1}}}; X_B = \frac{p_B^{\frac{1}{\alpha-1}}}{p_B^{\frac{\alpha}{\alpha-1}} + p_A^{\frac{\alpha}{\alpha-1}} \left(\frac{S_B}{S_A}\right)^{\frac{1}{\alpha-1}}}$$

Where firm demand depends negatively on own price and the competitor's level of CSR and positively on competitor's price and own CSR. We assume that CSR is costly for firms. With these assumptions profit functions are given by the following equations:

(3) $$\pi_A = (p_A - c)X_A - C(S_A)$$

(4) $$\pi_B = (p_B - c)X_B - C(S_B)$$

As stated above firms choose simultaneously S_A , S_B and p_A , p_B. Therefore any Nash equilibrium will have to satisfy the two First Order Conditions with respect to price and the two First Order Conditions with respect to CSR. Using the FOC with

respect to price in a symmetric equilibrium in which: $p_A = p_B = p; S_A = S_B = S$; it is straightforward to find that:

(5) $p = c(2-\alpha)/\alpha$

Thus the equilibrium price depends negatively on the intensity of product market competition and it does not depend on CSR. Operating the FOC with respect to CSR in a symmetric Nash-equilibrium and using (2) to substitute for p we get that:

(6) $(\frac{c(2-\alpha)}{\alpha} - c)\frac{1/S}{2(1-\alpha)c(\frac{2-\alpha}{\alpha})} = C'(S)$

This expression summarizes the main effects of the intensity of competition on CSR. The first term in parenthesis $(\frac{c(2-\alpha)}{\alpha} - c)$ is the margin, p-c, while the second term in the left hand side of the equation is the increase in the demand due to implementing more CSR. The right hand side of the equation represents the marginal cost of CSR. In that equation, more competition or an increase in α, decreases the first term in parenthesis (the margin effect) whereas an increase in α affects positively the marginal increase in demand caused by CSR, the second term in the left hand side of the equation (the business stealing effect). It turns out that in this particular specification the business-stealing effect is always larger than the margin effect and therefore product market competition is systematically positively associated with CSR levels. Under the functional form $C(S) = \frac{aS^2}{2}$ we can manipulate (3) to get:

(7) $\frac{1}{2-\alpha} = aS^2$

And hence there is always a positive relation between product market competition and CSR.

Note also that the unambiguous relation between competition and CSR reflected in (7) is far from general. For example if we assume that CSR strategies also affect variable production costs, for example because environmentally friendly products have larger costs of production, and we assume $C(S) = \frac{aS^2}{2} + SX$, then (6) with some manipulation becomes:

$$(8) \qquad (\frac{c(1+S)(2-\alpha)}{\alpha}) \frac{\frac{X}{1-\alpha}\frac{1}{S}}{2p^{\alpha/(\alpha-1)}} = cX$$

(8) does not predict anymore an unambiguous relation between competition and CSR, since differentiating (8) with respect to alpha we get:

$$(9) \qquad \frac{dS}{d\alpha} = \frac{1+S}{2-\alpha}\left[\log S + \log\alpha + \frac{\alpha-1}{\alpha} + \log c + \log(\frac{2-\alpha}{\alpha}) - \frac{2}{2-\alpha}\right]$$

Where the sign of dS/dα depends on the particular values of α (and c). This implies that the relation between CSR and competition may be nonlinear and its slope may vary depending on the levels of competition. In the case of (9), we obtain an inverted U relationship between competition and CSR. This is, the margin effect dominates the business stealing effect in extremely competitive markets (α→0) and in this case more competition decreases CSR levels. On the contrary, for relatively low levels of competition, (α→1), and for large enough values of c and S, the business stealing effect is larger than the margin effect and more competition increases CSR levels.
In sum, (6) and (9) show that under reasonable assumptions it is possible to build a model of a positive relationship between competition and CSR but that this result is far from general.

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[1] For more details on these and others consumer boycotts see the Boycott Organizer's Guide that can be found at www.coopamerica.org

[2] These two effects are similar to the ones found by Raith [2003] when studying the effect of product competition on managerial incentives.

[3] STATS stands for Statistical Tool for Analyzing Trends in Social & Environmental Performance.

[4] A detailed description of this dataset can be obtained from KLD's web page at http://www.kld.com

[5] In the KLD and Compustat datasets companies are identified by the ticker and the company name. The ticker information of a company may change across time and Compustat and KLD follow different methods for updating a firm's ticker information. In Compustat each company is given a key code (GVKEY), in addition to the ticker, which is constant across time. When the ticker information in the KLD dataset and in Compustat did not coincide we used the company's name and the key code to try to match the observations.

Tables

Table I

KLD dataset. Summary statistics.

	RAW DATA				ANALYSIS DATASET			
Year	**N. Firms**	**CSR ratings**	**Strength ratings**	**Concern ratings**	**N. Firms**	**CSR ratings**	**Strength ratings**	**Concern ratings**
1991	647	54	30	24	..	..	..	..
1992	652	55	30	25	..	..	..	..
1993	651	55	30	25	..	..	..	..
1994	643	64	34	30	428	56	31	25
1995	648	62	34	28	477	56	31	25
1996	652	61	34	27	500	56	31	25
1997	653	61	33	28	500	56	31	25
1998	658	62	33	29	440	56	31	25
1999	662	63	33	30	463	56	31	25
2000	660	65	34	31	492	56	31	25
2001	1,107	65	34	31	885	56	31	25
2002	1,108	65	35	30	909	56	31	25
2003	2,963	66	36	30	2,494	56	31	25
2004	3,034	66	36	30	2,666	56	31	25
2005	3,015	71	38	33	2,679	56	31	25
Total	**17,753**	**935**	**504**	**431**	**12,933**	**672**	**372**	**300**
Average	**1,183**	**62**	**33**	**28**	**1,077**	**56**	**31**	**25**

Table II

CSR measures. Descriptive statistics (12,933 observations).

		ACSR	CON	***STR***
<-2 (%)		6.25		
[-2, 0) (%)		29.98		
0 (%)		27.64	36.59	40.26
(0, 2] (%)		25.63	50.65	41.28
>2 (%)		10.51	12.77	18.46
Average		.13	1.21	1.34
Max		12	13	14
Min		-9	0	0
SD between (across firms)		1.51	1.14	1.28
SD within (across time)		.90	.70	.66
SD overall		1.98	1.49	1.72
Correlation across time	CON		1.00	
	STR		.22	1.00
Correlation across firms	CON		1.00	
	STR		.24	1.00

Table III

Market competition measures. Descriptive statistics.

		PLAYERS	HHI	***IMPORTS***
Manufacturing (average)		74.89	.24	19.32
Services (average)		234.89	.15	..
Trade (average)		23.53	.28	..
Other (average)		175.45	.12	..
Mean		138.76	.20	19.32
Max		830	1	74.80
Min		1	.01	2.80
SD between (across firms)		190.11	.18	12.36
SD within (across time)		26.20	.06	2.36
SD overall		181.98	.19	12.62
Partial correlation with Profits[1]/sales	Across time*	-.31	.16	-.14
	Across firms*	-.32	.17	-.15

[1] Operating profit net of depreciation, amortization expense and cost of capital.
* All correlation coefficients are statistically significant at the 1% level.

Table IV

COMPUSTAT Variables. Summary statistics.

	1994-1997	**1998-2001**	*2002-2005*
Manufacturing (NAICS 31-33) (%)	51.60	45.61	36.57
Services (NAICS 51-92) (%)	19.11	22.50	34.77
Trade (NAICS 42-45) (%)	9.61	10.92	8.78
Other sector (%)	19.69	20.96	19.88
Sales (MM$)	6,592.34	7,763.89	3,586.13
Assets (MM$)	12,947.34	17,247.94	9,400.02
Profits (MM$)	1,225.55	1,427.23	672.53
Advertising expense (MM$)	379.33	307.44	131.01
R&D expense (MM$)	290.25	316.73	133.22

Table V

CSR and market concentration (HHI). 1994-2005

PANEL A. Firm level data. Only firms present all years in the dataset. 1,800 obs.					
	Difference from 12-year average			Difference between 2005 value and the 12-year average	
Quartile*	**ACSR**	**HHI**	**Worst 5 CSR performers**	**ACSR**	**HHI**
1st (least concentrated)	.25	-.10	Fuller Company	-4.66	.13
2nd	.14	-.02	Kroger Co.	-4.50	.02
3rd	-.05	.01	Albertson's, Inc.	-4.16	.02
4th	-.33	.11	Wal-Mart Stores, Inc.	-4.00	.13
			Home Depot, Inc.	-3.83	.05
			Best 5 CSR performers	**ACSR**	**HHI**
			Unisys Corporation	3.25	-.21
			Intel Corporation	3.41	-.01
			Ecolab Inc.	3.41	-.05
			Advanced Micro Devices, Inc.	4.33	-.01
			General Motors Corporation	4.58	-.03
PANEL B. Industry level data (6-digits NAICS). 1,356 obs.					
	Difference from 12-year average			Difference between 2005 value and the 12-year average	
Quartile*	**ACSR**	**HHI**	**Worst 5 CSR performers**	**ACSR**	**HHI**
1st	.22	-.11	Adhesives and sealants (325520)	-4.66	.13
2nd	.12	-.02	Pens, pencils, other office material (339941)	-3.66	.06
3rd	-.07	.01	Plastics, resins and elastomers (325211)	-3.58	.04
4th	-.27	.12	Grocery stores (445110)	-3.47	.02
			Convrt papr, paprbrd, ex boxes (322222)	-3.41	-.10
			Best 5 CSR performers	**ACSR**	**HHI**
			Motor vehicles and car bodies (33611)	3.79	-.05
			Paperboard mills (322130)	2.50	-.01
			Semiconductor, related devices (334413)	2.13	-.01
			Special industry machinery (333295)	2.08	.00
			Aircraft (336411)	1.91	-.01

* Based on HHI distribution.

Notes: Only firms present all years in the dataset. CSR is the Corporate Social Responsibility index as reported by KLD. HHI is the Herfindahl Index, calculated at the 6-digits NAICS industry level and averaged over industries if a firm is diversified.

Table VI

Partial correlation analysis. Product market competition and CSR

		HHI	*PLAYERS*
ACSR	Across firms	-.025***	.116***
	Across time	-.020**	.092***
	OLS (year dummies)	-.245***	.126***
TOTAL STRENGTHS	Across firms	-.000	.026***
	Across time	-.000	.009
	TOBIT (year dummies)	-.345***	.093***
TOTAL CONCERNS	Across firms	.032***	-.122***
	Across time	.026***	-.113***
	TOBIT (year dummies)	.388***	-.149***

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level. PLAYERS is number of firms in 00's.

Table VII

Results for the OLS/Tobit Models. Competition variable: HHI

	OLS/Tobit Pooled data			OLS/Tobit with Firm Fixed-Effects			OLS/Tobit with industry dummies (6-digit NAICS)		
Dependent variable	ACSR	STR	CON	ACSR	STR	CON	ACSR	STR	CON
	(1) Coeff (SE)	(2) Coeff (SE)	(3) Coeff (SE)	(4) Coeff (SE)	(5) Coeff (SE)	(6) Coeff (SE)	(7) Coeff (SE)	(8) Coeff (SE)	(9) Coeff (SE)
HHI	**-.411***	**-.551*****	**.385*****	**-.536*****	**-.515*****	**.021**	**-.538****	**-.326**	**.212**
	(.214)	**(.111)**	**(.093)**	**(.198)**	**(.147)**	**(.141)**	**(.273)**	**(.221)**	**(.174)**
ASSETS	-.052	.293***	.351***	.096*	.138***	.042	-.056*	.349***	.405***
	(.033)	(.015)	(.013)	(.058)	(.043)	(.042)	(.029)	(.024)	(.019)
R&D	.011	-.030	-.006	-.035	.234	.270	-.682*	-.925*	-.242
	(.050)	(.066)	(.053)	(.477)	(.356)	(.341)	(.417)	(.337)	(.265)
ADVER	4.342***	5.227***	-1.243*	-1.657	.917	2.574**	-.493	-.528	-.034
	(1.353)	(.832)	(.733)	(1.758)	(1.313)	(1.257)	(1.362)	(1.101)	(.867)
PROFITS	.003	.018***	.014***	-.001	.005***	.006***	.005***	.016***	.010***
	(.003)	(.000)	(.000)	(.001)	(.000)	(.000)	(.001)	(.000)	(.000)
R^2	.070	.070	.058	.751	.807	.771	.415	.471	.575
N. Obs	12,473	12,473	12,473	6,206	6,206	6,206	6,206	6,206	6,206

*** indicates significance at the 1% level.
** indicates significance at the 5% level.
* indicates significance at the 10% level.
All regressions include year dummies and dummies for missing observations on R&D and ADVERTISING. Robust standard errors - observations independent across firms but not within firms and across time. CSR is total strengths (STR) minus total concerns (CON). HHI is the Hirschman-Herfindahl Index, calculated as the weighted average of HHI for each firm and year where the weights are given by the percentage of sales of the firm in each industry. ASSETS is the log of the firms' assets. R&D and ADVER are R&D intensity and advertising intensity, respectively, calculated as R&D and advertising expenditures over sales. PROFITS is the firm's operating profits in 00's (data 13).
(2), (3) Tobit regression.
(4) – (9): Firms in the dataset for a minimum of five years.

Table VIII

Results for the OLS/Tobit Models. Competition variable: PLAYERS

	OLS/Tobit Pooled data			OLS/Tobit with Firm Fixed-Effects			OLS/Tobit with industry dummies (6-digit NAICS)		
Dependent variable	ACSR	STR	CON	ACSR	STR	CON	ACSR	STR	CON
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
PLAYERS	**.153*** **	**.101*** **	**-.168*** **	**.112*** **	**.160*** **	**.047**	**.104***	**-.040**	**-.145*** **
	(.016)	**(.011)**	**(.010)**	**(.051)**	**(.038)**	**(.036)**	**(.063)**	**(.051)**	**(.040)**
ASSETS	-.072***	.285***	.371***	.089*	.131***	.041	-.056*	.345***	.401***
	(.033)	(.015)	(.012)	(.058)	(.043)	(.042)	(.029)	(.024)	(.019)
R&D	-.065*	-.065	.085**	-.056	.197	.253	-.731*	-.883***	-.152
	(.051)	(.066)	(.053)	(.478)	(.356)	(.341)	(.419)	(.339)	(.266)
ADVER	4.349***	5.122***	-1.245**	-1.425	1.176	2.602***	-.397	-.514	-.116
	(1.357)	(.829)	(.723)	(1.758)	(1.312)	(1.257)	(1.362)	(1.101)	(.866)
PROFITS	.003*	.018***	.013***	-.001*	.005***	.006***	.005***	.016***	.010***
	(.002)	(.000)	(.000)	(.001)	(.000)	(.000)	(.001)	(.000)	(.000)
R^2	.086	.071	.064	.750	.807	.771	.415	.471	.576
N. Obs	12,473	12,473	12,473	6,206	6,206	6,206	6,206	6,206	6,206

*** indicates significance at the 1% level.
** indicates significance at the 5% level.
* indicates significance at the 10% level.
All regressions include year dummies and dummies for missing observations on R&D and ADVERTISING. Robust standard errors - observations independent across firms but not within firms and across time. CSR is total strengths (STR) minus total concerns (CON). PLAYERS is the number of competitors in 00's, calculated as the weighted average of the number of firms in each of the industries where the firm operates and where the weights are given by the percentage of sales of the firm in each industry. ASSETS is the log of the firms' assets. R&D and ADVER are R&D intensity and advertising intensity, respectively, calculated as R&D and advertising expenditures over sales. PROFITS is the firm's operating profits in 00's (data 13).
(2), (3) Tobit regression.
(4) – (9): Firms in the dataset for a minimum of five years.

Table IX

Results for the IV Models. Competition variable: IMPORTS

	IV Firm Fixed-Effects			IV with industry dummies (3-digit NAICS)		
Dependent variable	ACSR	STR	CON	ACSR	STR	CON
	(1)	(2)	(3)	(4)	(5)	(6)
	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
IMPORTS	**.339***	**.141**	**-.198***	**.489*****	**.366*****	**-.123***
	(.183)	**(.130)**	**(.114)**	**(.143)**	**(.113)**	**(.072)**
ASSETS	.061	.160	.098	-.554***	-.294***	.259***
	(.164)	(.116)	(.102)	(.082)	(.065)	(.041)
R&D	2.114	1.235	-.878	-3.168	-2.313	.854
	(2.232)	(1.589)	(1.390)	(2.011)	(1.593)	(1.009)
ADVER	.215	-2.868	-3.083	4.132	.276	-3.855***
	(4.811)	(3.425)	(2.995)	(3.096)	(2.453)	(1.553)
PROFITS	-.015	.003	.019***	.041***	.069***	.027***
	(.010)	(.007)	(.006)	(.0009)	(.007)	(.004)
R^2	.791	.823	.776	.210	.269	.353
N. Obs	1,202	1,202	1,202	1,202	1,202	1,202

*** indicates significance at the 1% level.
** indicates significance at the 5% level.
* indicates significance at the 10% level.
Firms in the data set for a minimum of five years. Only manufacturing industries (NAICS 311-339). All regressions include year dummies and dummies for missing observations on R&D and ADVERTISING. Robust standard errors - observations independent across firms but not within firms and across time. CSR is total strengths (STR) minus total concerns (CON). IMPORTS is import penetration calculated as imports over sales at the 3-digit industry level and is calculated as the weighted average of IMPORTS in each of the industries where the firm operates where the weights are given by the percentage of sales of the firm in each industry. IMPORTS is instrumented with industry tariffs. ASSETS is the log of the firms' assets. R&D and ADVER are R&D intensity and advertising intensity, respectively, calculated as R&D and advertising expenditures over sales. PROFITS is the firm's operating profits in 00's (data 13).

Table X

Results for Toxic Emissions. Dependent variable TOXIC.

	TOBIT		TOBIT with industry dummies	
Dependent variable	TOXIC	TOXIC	TOXIC	TOXIC
	(1)	(2)	(3)	(4)
	Coeff	Coeff	Coeff	Coeff
	(SE)	(SE)	(SE)	(SE)
HHI		**3.2689*** **		**2.210***
		(1.2712)		**(1.346)**
PLAYERS	**-1.086*** **		**-.942*** **	
	(.339)		**(.327)**	
TOXIC_IND	.965***	1.003***	.647***	.689***
	(.082)	(.083)	(.089)	(.089)
ASSETS	1.310**	1.348**	1.428***	1.414***
	(.534)	(.537)	(.496)	(.498)
SALES	1.044*	1.038*	.758	.810
	(.560)	(.562)	(.518)	(.520)
R&D	-17.635***	-22.230***	-12.760***	-16.014***
	(4.504)	(4.115)	(3.854)	(3.752)
ADVER	-28.608**	-32.053***	-33.068***	-33.330***
	(11.999)	(12.072)	(11.149)	(11.218)
PROFITS	-.005	-.007	-.008	-.011
	(.009)	(.009)	(.008)	(.008)
IND DUMMIES	NO	NO	YES	YES
R^2	.129	.128	.185	.183
N. Obs	621	621	621	621

*** indicates significance at the 1% level.
** indicates significance at the 5% level.
* indicates significance at the 10% level.
Only manufacturing industries (NAICS 311-339). All regressions include year dummies and dummies for missing observations on R&D and ADVERTISING. TOXIC is the firm level of toxic emissions weighted by toxicity of emission type. TOXIC_IND is the industry average level of toxic emissions. ASSETS is the log of the firms' assets. SALES is the log of the firm's sales. R&D and ADVER are R&D intensity and advertising intensity, respectively, calculated as R&D and advertising expenditures over sales. PROFITS is the firm's operating profits in 00's (data 13). HHI is the Hirschman-Herfindahl Index, calculated as the weighted average of HHI for each firm and year where the weights are given by the percentage of sales of the firm in each industry. PLAYERS is the number of competitors in 00's, calculated as the weighted average of the number of firms in each of the industries where the firm operates and where the weights are given by the percentage of sales of the firm in each industry.