WPS6251

Policy Research Working Paper 6251

Is Better Information Always Good News?

International Corporate Strategy and Regulation

Markus Kitzmuller

The World Bank
South Asia Region
Office of the Chief Economist
October 2012

Policy Research Working Paper 6251

Abstract

This paper develops a simple model to analyze the interaction between strategic corporate public good provision, international firm location and national regulation. An information-based strategic corporate public good provision mechanism is proposed to shed light on recent firm behavior within different regulatory environments. The main insight derived is that in the presence of firms with geographic flexibility (multinational enterprises) and market provision of an international public credence good, unilateral (non-cooperative) regulatory scope depends on (1) the absolute probabilities to verify firms' corporate public good provision levels within different geographic and institutional environments, and (2) the differential between these probabilities across countries. The relative information asymmetry determines not only the market levels of the public good produced under autarky, but also the relocation incentives of multinational enterprises. A firm trades off lower production costs, which increase its competitiveness in pricing, with higher expected informational price premiums, which decrease its competitiveness. A government's ability to regulate above market (corporate public good provision) levels decreases with the absolute level of foreign transparency, while it increases in the relative (positive) difference between the same transparency at home and abroad. This may not only explain mixed empirical evidence of theoretic propositions such as the Pollution Haven Hypothesis and Regulatory Race to the Bottom dynamics, but also open up interesting policy implications as the international information playing field becomes leveled through development, while existing regulations are rather rigid, and policy coordination remains limited.

This paper is a product of the Office of the Chief Economist, South Asia Region. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at mkitzmuller@worldbank.org.

Is Better Information Always Good News? International Corporate Strategy and Regulation [§]

Markus Kitzmuller[**]

Keywords: Corporate Strategy, Public Goods Provision, Regulation, International Firm Location, Information Asymmetry

JEL: H11, H41, D82, L1, M14

Sector Boards: Economic Policy (EPOL)

[§] I would like to thank Franklin Allen, Pascal Courty, Luigi Guiso, Bard Harstad, Francine Lafontaine, Mark Le Quement, Ben Lockwood, Tom P. Lyon, Mario Macis, Paolo Masella, Marcello Sartarelli, Fernando Vega-Redondo and seminar participants at the European University Institute (EUI), the University of Michigan (Ann Arbor) and Ecole des Mines (MINES ParisTech) for clarifying comments, discussion and suggestions. Finally, the author acknowledges the support of the Frederick A. and Barbara M. Erb Institute for Global Sustainable Enterprise at the University of Michigan (Ann Arbor). An earlier version of this working paper was circulated and presented with the title "International Corporate Social and Environmental Strategy and Public Policy".

[**] Economist (Office of the Chief Economist, South Asia /SARCE), The World Bank Group; email: mkitzmuller@worldbank.org

Introduction

The relationship between national regulation and international corporate behavior is characterized by a puzzling divergence between theoretical predictions and empirical findings. Concepts such as the Pollution Haven Hypothesis (in the case of environmental public goods) or regulatory arbitrage and subsequent regulatory race to the bottom are supported by mixed empirical evidence at best[1]. The literature has not provisioned any active role for demand and focused on regulation and its implied increase in production costs as the strategic dimension of interest to firms. This paper, however, suggests that the emergence of strategic, demand and market driven corporate provision of public goods[2] (often referred to as strategic Corporate Social Responsibility (CSR)) can play a crucial role in explaining why some firms might not follow the standard cost incentives to chase pollution or (labor standard) havens, thereby altering the framework for the use of environmental (social) regulation for purposes of international economic competition.

Observing that actual CSR often is inseparably linked to a firm's production process (e.g. "green" production technologies or labor standards along corporate supply chains) and therefore only imperfectly observable to outsiders, we find that absolute levels of information asymmetry between firm and market within a country as well as between country differences in such verifiability of CSR may jointly determine corporate incentives to (re)locate and ultimately a national authority's regulatory scope. CSR is analyzed as a consumption good characteristic with public and credence good character, and rational consumers with preferences for the respective public good expect CSR price premiums to be increasing in the degree of information asymmetry. Similar in spirit to Shapiro's (1983) incentive payment to induce quality maintenance or Leffler and Klein's (1981) protection money to induce contract performance, firms facing a higher incentive to cheat require higher compensation to induce contract performance, a circumstance that, combined with Bertrand competition, will determine equilibrium prices and CSR provision. Let's assume for the moment that firms face the choice to locate either in a developing country featuring lower production costs but high information asymmetry or in a developed country with higher production costs but low information asymmetry. Then, according to the outlined mechanism, a CSR firm[3] will trade off lower production costs, which increase its competitiveness in pricing, with higher expected informational price premiums, which decrease its competitiveness. The difference in the information environment will not only define location, but also the effective bandwidth (between CSR levels and relocation inducing levels of the public good) of non cooperative, national regulation. Then, while international convergence in transparency and information (e.g. through international labeling or standards) empowers markets, it simultaneously requires adaptation and increased coordination in environmental regulation and policy making.

The remainder of the paper is structured as follows. Section 1 will revisit the mismatch between theory and empirics of the trade, environment and regulation literature and

[1] See Oates and Portney (2003) for a survey on Environmental Federalism (Section 5).
[2] or reduction of public bads or externalities
[3] being a firm that serves a consumer segment with respective environmental or social preferences

provide an overview of strategic CSR and the potential role of information in an international framework. Section 2 outlines the theoretic set up. Subsections (2.1.) and (2.2.) will elaborate the sub game perfect equilibrium of the basic CSR game with imperfect information, then (2.3.-2.6.) will derive the main proposition regarding the interaction between international firm location and regulation as well as analyze and discuss welfare and policy implications. Section 3 concludes.

1. A Quick Look at "Trade versus Environment"

Recent decades have been characterized by unprecedented transnational economic integration and trade liberalization, inducing both firms and the public goods and externalities they produce to expand geographically. Constant technological and political advances such as the internet or the end of the East West Divide in 1990 led to significant reductions in transport and communication costs, a fact that required competitive firms to increasingly decide about international location, outsourcing or relevant markets. According to the United Nations, the number of transnational corporations increased from 37,000 in 1990 to over 60,000 in 2001, with foreign affiliates growing from 170,000 to over 800,000, while OECD data on Foreign Direct Investment (FDI) suggest significant growth in international corporate (investment) activity with worldwide FDI outflows increasing from 241,824 to 1,249,275 million US$ and worldwide FDI outward stocks growing from 1,797,630 to 11,891,825 million US$ between 1990 and 2009[4]. Naturally, the globalization of economic activity opened up the opportunity for firms to stretch supply chains across countries and, in theory, international competition should have acted as a major pull factor for locations endowed with cheap production factors and low regulatory costs. This idea is formalized within the literature on the Pollution Haven Hypothesis (PHH) and Environmental Dumping (ED). In a nutshell, the PHH states that a country's comparative advantage in hosting pollution intensive industries is decreasing in stringency of its respective regulatory framework. Assuming that an increase in environmental regulation makes a state's pollution intensive production more expensive, imports of such "dirty" goods will increase while their home production will decrease. Then, the lower are trade barriers between states, the more clean and dirty industries will sort across different (stringent=developed country and lax=developing country) regulatory environments (see Copeland and Taylor (1994) and Taylor (2004) for a detailed discussion). Such a pure effect of environmental regulation (stringency) may trade off with a Heckscher-Ohlin factor endowment effect[5] that assumes a positive correlation between a sector's capital and pollution intensity. Then, trade liberalization would induce specialization of capital abundant, developed countries into pollution intensive production. Furthermore, if the regulatory effect was true and states started to interact strategically by competing for production, international capital and/or firm location, equilibrium levels of environmental (or social) regulation could end up well below optimal levels and give rise to ED or, in the extreme case, lead to a "race to the

[4] Source: OECD FDI Statistics (Directorate for Financial and Enterprise Affairs, www.oecd.org/investment/statistics)

[5] also referred to as the capital labor effect by Cole and Elliott (2003)

bottom (RTB)". However, empirical evidence of the PHH and subsequent RTB predictions is not at all conclusive. Early cross sectional analyses did not find environmental regulation to have a statistically significant effect on firm location, while recent panel data studies[6] do find evidence of PHH. In their comprehensive review of the empirical literature, Brunnermeier and Levinson (2004) conclude that although such studies can shed light on the sensitivity of capital and goods flows to regional differences in regulation, they cannot demonstrate that governments purposely set suboptimal environmental regulations to attract business. Antweiler et al. (2001) analyze the above outlined trade environment composition effect and find evidence that international trade creates only small changes in pollution concentrations and that the opposing technique and scale effects result in a net reduction of pollution. Cole et al. (2003) similarly take per capita income as a proxy for stringency of environmental regulation and try to reproduce the results of Antweiler et al. (2001). They similarly find evidence for both the environmental regulation and factor endowment effects for SO_2, however, these results do not hold for other pollutants and the pollution reducing net effect of trade is not found for per capita emissions while it seems to exist for pollution intensities. Furthermore, Birdsall and Wheeler (1993) found that in Latin America pollution intensive industries tend to be located in those countries most protected from trade, while openness brings higher international standards.

Besides the trade-environment relationship, a development-regulation nexus has been approached under the label of the Environmental Kuznets Curve, which posits an inverted U relationship between income per capita and pollution. Carson (2010) concisely states that there is robust evidence that pollution levels fall at high income levels, however, different political jurisdictions can follow very different paths, income may influence pollution in slow and subtle ways[7], and it may be hard to disentangle growth from diffusion of clean technology. Along these lines and according to empirical work by Dasgupta et al. (1995) there exists a positive correlation between development indicators such as income per capita, security of property rights, or general development of the legal or regulatory system, and (performance of) environmental regulation and overall environmental quality. Hettige, Lucas and Wheeler (1992) add evidence of an industrial displacement effect where since 1970 lower income countries were subject to a stronger positive long term trend in industrial emissions relative to GDP and manufacturing output than their high income counterparts. While prior evidence postulated a relatively small cost of environmental regulation, they conjecture that eventually growing concerns over legal liability and/or reputational damage may have contributed to the above finding.

When it comes to Regulatory Race to the Bottom, there is the initial claim that firms actually locate production in close proximity to important sales markets (including developing and emerging market economies) and exports actually constitute a minor share of total foreign production (US Department of Commerce Study 1996). This would

[6] controlling for 1) unobserved heterogeneity in country or industry characteristics that are correlated with regulation or economic performance and/or 2) endogeneity of regulatory stringency due to (two way) causality between trade and regulation

[7] I.e. rather than thinking about the curve as a reduced form relationship between income and pollution, one could imagine its structural counterpart, where income directly affects demand and supply factors, which in turn influence pollution.

substantially weaken the race to the bottom incentive ex ante. When looking at trade patterns in general, for example in the context of environmental regulation, Jaffe et al. (1995), among others, did not find any significant (negative) correlation between such regulation and industry competitiveness, but stress the general costs and benefits related to regulatory activity. Evidence that firms then chose their investment locations according to environmental regulation is equally unsupported (see Drezner 2006 for a summary). An OECD study on Trade, Employment and Labor Standards (1996) concluded that there exists a positive correlation between successfully sustained trade reforms and improvements in core standards. Similarly, Bhagwati (2004) states that without the recent globalization the exploitation of workers would have been much greater in many parts of the world. In sum, corporate preferences regarding location and regulation are not straight forward but rather complex and complemented by considerations of agglomeration or income effects. Furthermore, there are potential gains from stringent regulation such as the protection of assets (e.g. via IP rights), competitive advantages vis-a-vis firms that need to adjust in light of regulatory upwards convergence (see Garcia Johnson (2000) or Maxwell and Lyon (2004)), or positive correlation between single international standards and strong corporate culture (Dowell, Hart and Yeung 2000). Davis, v. N. Whitman and Zald (2008) then conjecture that if large and important sales markets such as the EU or the US are characterized by high regulatory standards, firms will tend to adopt those high standards even abroad (export of standards) and a "race to the top" might occur.

So can strategic CSR actually help realigning empirical findings with theory? Emerging but still very preliminary evidence hints exactly at that, although one has to be cautious in light of issues related to estimation and measurement. Dam and Scholtens (2008) investigate a cross sectional firm level dataset (EIRIS, AMADEUS, WBES and WDI) covering 44,149 subsidiaries of 540 European Multinational Enterprises (MNEs) in 188 countries and find that increased CSR[8] activity within a firm reduces its likelihood to locate in regulatory pollution heavens. This finding suggests the existence of a broad separating equilibrium (as proposed in Kitzmuller and Shimshack (2012)), where a neutral sector is more likely to follow classical PHH and RTB predictions, while a CSR sector is subject to some mechanism that may dampen classical incentives.

International CSR and the Role of Information

Economists have recently started to analyze strategic, market driven corporate provision of public goods or reduction of public bads and externalities. This behavior has been termed self regulation or CSR[9]. Besley and Ghatak (2007), Bagnoli and Watts

[8] The authors use a variable called Environmental Responsibility as a proxy for CSR. Environmental Responsibility contains factor scores based on a factor analysis of four indicators from the EIRIS (Ethical Investment Research Service) database ranking all firms on a scale between -1 and 3. The four indicators are Environmental Performance, Impact Improvement, Environmental Reporting and Environmental Management.

[9] The fact that CSR can be used in a strategic fashion while being perfectly coherent with profit maximization led to the term "strategic CSR" coined by Baron (2001). Potential strategies range from attracting a motivated workforce (e.g. Besley and Ghatak 2005) to selling to socially responsible consumers (e.g. Bagnoli and Watts 2003) to hedging against private (e.g. Baron 2001) or public policy interventions (e.g. Lyon and Maxwell 2004).

(2003), Kotchen (2006) or Arora and Gangopadhay (1995) among others investigated the economic motivation beneath CSR as well as related welfare implications. An important insight is the emergence of a sorting equilibrium along heterogeneous stakeholder preferences where firms supply different levels of the public good to different demand segments. However, market driven CSR can only achieve second best levels of public goods provision. Public provision in theory can achieve first best levels but may itself be subject to government failure[10]. Few authors such as Lyon and Maxwell (2004) or Maxwell, Lyon and Hackett (2000) have begun to investigate the interaction between public policy, CSR and other strategic considerations by firms, however, no explicit attention has been paid to the potential tradeoff between strategic CSR and firm location in the international context as well as the resulting implications for regulation or welfare.

The concept of international strategic CSR rests upon two main pillars, multinational enterprises (MNEs) and international public goods (of environmental or social character), which are linked via an information dependent demand channel. We will shortly discuss each pillar and intuitively characterize the role of information in determining the workings of this market. First, MNEs are usually large(r) corporations with big societal impact and prominent presence in public (stakeholder) discussion, awareness and scrutiny. These correlations are witnessed empirically by Edwards et al. (2007) among others. Second, environmental and social public goods and externalities today are inseparably linked to corporate conduct and affect large parts of society through a mix of extrinsic, physical impact and/or intrinsic, reputational perception. In short, demand for public goods was able to expand 1) quantitatively through stronger and wider spread preferences, and 2) qualitatively through empowered market mechanisms. The quantitative effect can be explained by concepts such as the above discussed Environmental Kuznets Curve[11]. Only when basic needs are fulfilled, do people start worrying about more indirect needs such as the environment, global warming, or ethical firm behavior. Then, in a development perspective, in the initial process of industrialization people only care about jobs and income while public environmental spending and regulations are weak and unpopular. As income rises, however, technology improves pollution levels, and preferences as well as regulation begin to favor environmental protection.

Besides regulation, markets constitute a relevant mechanism to match such demand with supply. Both regulation and markets, especially in today's international framework, are constrained by imperfect information. Here, technology has greatly improved the availability and flow of information over the last 20 years. In a recent (2005) US consumer survey conducted by Fleishman Hiller and the National Consumer League it is found and concluded that [t]echnology is changing the landscape in which consumers gather and communicate information about how well companies are being socially responsible. The majority of consumers seek out information about social issues (77 percent) or the social responsibility record of companies (52 percent) "some" or "all of the time." Furthermore, [t]he respondents' demographic characteristics appear to influence their level of interest in seeking out CSR information. For example, those who tend to seek out this information tend to have Internet access and/or have at least some college education. In sum, both purchasing power and information through education and

[10] In the international context a candidate for such failure is coordination failure.
[11] Originally outlined by Grossman and Krueger (1993) and revisited later by Dasgupta et al. (2002)

access to technology propose developed countries (such as the EU or US) as the cradle and important pull factor of CSR activity.

As production and consumption are often geographically separated and internationally (even globally) dispersed, two overlapping questions arise: (1) why are corporate externalities international and (2) how do preferences for such public goods overcome geographic distance between source and effect? The answer can be found in the nature of the channel connecting corporate conduct and individual utility. We distinguish extrinsic and intrinsic international effects of public goods. Either distant public goods reach consumers physically (e.g. global warming, pollution) or stakeholders care about distant local public goods as if they were affected physically at home. This latter channel resembles a mental affection or compassion channel. In other words, conditional on information, the strategic CSR mechanism still works across borders and even in absence of direct physical effects if stakeholders have certain intrinsic preferences. Therefore, national preferences are sufficient to make a public good international. In both cases utility, choice and willingness to pay, all crucial determinants of corporate strategy, may be affected. It follows that in a world of perfect information and transparency, a MNE - encompassing vertical and horizontal integration as well as arm's length outsourcing - and all the products it produces constitute a brand subsumed under a common organizational roof, and all related activities of the respective firm and/or its affiliates and contractual partners feed into one unique reputation and perception[12]. In other words, a MNE will be held accountable for actions of contractors or upstream suppliers, as was the case for Nike and child labor in some of its contractors' sweat shops, or even for actions of governments of states it operates in (e.g. Royal Dutch Shell in Nigeria in the 1990s[13]). This reputation based mechanism, jointly with cost based efficiency (technology) arguments, may incentivize MNEs to apply one (environmental or social) standard of production across different geographic and product markets[14]. Evidence of such behavior is found by Dowell, Hart and Yeung (2000), who state that nearly 60% out of 89 US based manufacturing and mining multinationals with operations in developing countries apply one stringent internal standard that reflects OECD norms[15]. They find that firms with one internal standard featured a 10.4 billion US$ premium in market value (measured by Tobin's q) as compared to their competitors. A different setting in which coherence of CSR matters is proposed by Corporate Social Marketing scholars[16], who state that the successful strategic use of CSR depends on credibility, which in turn is a result of how aligned CSR and core activities of the firm are. Becker-Olsen and Hill (2005) find that consumers are able to identify low fit CSR as advertisement and tend to negatively perceive such CSR efforts as greediness of firms rather than genuine interest into social or environmental concerns. Ultimately, the incentive to adopt a single standard opens up the question of which standard to apply and leads us back to our discussion of

[12] Note that in this respect, ownership and outsourcing appear as outcome equivalent.
[13] See http://en.wikipedia.org/wiki/Shell_Nigeria
[14] Multiple standards simply may convey an incoherent or "non credible" image or mission to consumers (or stakeholders).
[15] A word of caution: Of course purely strategic incentives also play a role, as for example investors and financial markets may interpret heavy emissions as a signal of inefficient production techniques, as witnessed by stock market reactions to environmental news.
[16] e.g. Kotler and Lee (2004)

RTB and Davis, v. N. Whitman, Zald's (2006) proposition of race to the top. However, the essential role of information underlying these conjectures should be shortly discussed.

If important sales markets require high social or environmental regulatory standards and information about product characteristics or production processes is perfect, firms will find it optimal to adopt sufficiently high standards as the corporate standard. In the international context this may lead to export of such standards and CSR in countries that lack such standards. The perfect information assumption often holds when CSR relates to the product itself (e.g. toxics in toys or fuel efficiency of cars) and CSR becomes a search good that can be verified upon import and hence be subjected to regulation. However, if CSR represents a characteristic of international production and supply chains (e.g. fair trade, child labor or pollution abatement), information will likely be imperfect and environmental or social corporate behavior becomes a credence good subject to reputation considerations. In short, the information environment will influence firm strategy and the way it interacts with regulation.

Empirical evidence underlines various links between information and CSR. Siegel and Vitaliano (2006) test and confirm the hypothesis that firms selling experience or credence goods are more likely to be socially responsible than firms selling search goods, a finding that suggests that consumers perceive some observable CSR activity to be positively correlated with unobserved product quality[17]. Chatterji and Toffel (2007) find that more efficient firms are more responsive to rankings and "shaming" by third party information providers. A legal perspective on the importance of rules that govern voluntary and mandatory disclosure of information and liability in case of misreporting is provided by Johnston (2005), who foresees a more limited role for legal tools and justifies this by the emergence of an industry of NGOs, private accounting firms and certification organizations that will provide the third party information firms seek to credibly compete in the market for CSR. Especially in the international context, governments will be severely constrained (due to coordination failure) and market mechanisms based on expectations and beliefs about CSR will guide the actions of consumers, firms, and ultimately states. Strategic location and CSR decisions will interact with cross country variation in regulation and transparency. Goedhuys and Sleuwaegen (2012) find solid empirical evidence for a signaling role of certification (here ISO9000) for a cross section of 7320 firms across 59 countries. The strength and strategic power of signaling via certification increases when institutional quality (at the firm location/often production site as they look at manufacturing sectors) decreases. Also, the hypothesis that increasing information asymmetry due to geographical, social, institutional or cultural distance (here international/national versus local markets) increases the probability to use certification as a signal is confirmed. Ultimately, the effect of certification on firm performance is found to be positive and increases in institutionally weak environments as well as in the quality (i.e. productivity) of the firm.

Therefore, it will be crucial for governments to understand these strategic interactions to determine necessity, scope and scale of public policy, and to know when regulation actually can improve upon market provision of public goods and when it might entail adverse effects in the form of (re)location of business activity abroad and potentially

[17] A similar notion of expected correlation between location/transparency and incentives to lie about true CSR efforts will be assumed in the theoretic setting of Section 2.

lower, then foreign, production of international public goods. The next section outlines the model.

2. *The Model*

The broad theoretic framework resembles a two stage game where firms initially decide to locate production either at home or abroad, and then compete in prices for consumers with heterogeneous preferences for the private-public good bundle produced. It is assumed that information regarding the public good level produced alongside the private good is imperfect within and asymmetric across countries. The public good or externality is international in nature (due to extrinsic as well as intrinsic channels as discussed in section 1.2) and due to our focus on quality related to the production process of the private good it constitutes a partial credence good[18] in consumption. Based upon the separating equilibrium in the sub game of stage 2 and the resulting equilibrium condition determining firm location in stage 1, we will derive and analyze the upper bound regulatory level of public good provision that a national government can sustain, i.e. impose ex ante without triggering relocation of firms within the respective sector[19].

The game will be solved backwards. Therefore, the point of departure is the sub game played by firms and consumers in the final stage, i.e. after governments have decided about public policy and firms about where to locate production.

Let $J = \{0,1,..,J\}$ be the set of firms. There are $J > 3$ firms, which are identical and capacity unconstrained in the production of good g. Good g has two characteristics, a private good and a public good one (the public good one can be an externality related to the production process). The unit production cost of g for firm $j \in J$ is $c + \alpha\theta_j$, where c denotes the constant marginal cost of the private good characteristic and α its equivalent for the public good characteristic θ_j (per unit of g). Firms can choose θ_j and the respective price p_j that will be charged for good g. Any consumer $i \in I = \{1, \dots, (n+m)\}$ purchases one unit of g. Consumers derive a constant amount of utility $b > 0$ from the private good characteristic as well as $\gamma_i[f(\Theta)]$ from the public good resulting from total production of g in the economy, i.e. $\Theta = \sum_J \theta_j$. Let the Inada conditions be satisfied, i.e. $f' > 0$ and $f'' < 0$. Parameter $\gamma_i \in \{0,1\}$ determines consumer type according to preferences for the public good. For the moment there are only two types of consumers: n "caring" consumers with $\gamma_i = 1$ and m "neutral" ones with $\gamma_i = 0$. The consumer problem is to choose the one firm to buy g from. Note that there exists a firm $0 \in J$ which denotes the option not to buy the good at all. Denote the buying decision of consumer i concerning firm j by $a_{ij} \in \{0,1\}$ where $a_{ij} = 1$ if she buys at firm j and 0 if not. A complete decision profile therefore features $a_{ij} = 1$ and $\sum a_{ik} = 1$, i.e. a vector a_i with one 1 and all 0s. The strategy behind this decision is guided by utility maximization such that

$$a_{ij} = 1 \; iff \; (p_j, \theta_j) = argmax \; U_i(p_j, \Theta) \quad (1)$$

[18] Partial here refers to the positive but <1 probability of actually observing the environmental or social quality of the production process.

[19] This stage is reduced form and just a preliminary analysis of the government problem will be conducted.

where quasi-linear utility of consumer i buying at firm j is a function of the price paid as well as the total amount of CSR[20] produced in the economy, and reads

$$U_i = b + \gamma_i f(\theta_j + \sum_{I-i} \sum_{J} \theta_{-ij}) - p_j$$

Note that $\Theta = \theta_j + \sum_{I-i} \sum_J \theta_{-ij} a_{-ij}$ and the subscript $-i$ denotes all consumers except i. If a consumer decides not to buy g at all, i.e. $a_{i0} = 1$, then

$$U_i = \gamma_i f(\sum_{-i} \sum_J \theta_{-ij} a_{-ij}) \, .$$

In sum, a strategy a_i is a mapping from (p_j, θ_j) to action $\{buy\ or\ no\ buy\}$ $\forall$ j.

Firms maximize profits by setting (p_j, θ_j). Assume that consumers randomize their buying decision between firms that satisfy (1) with equal offers (p, θ). Then the ex ante market share (i.e. the sales) of firm j in equilibrium depends upon its own strategy $A_j = (p_j, \theta_j)$, all the other firms' $(k \neq j)$ strategies $A_k = \{p_k, \theta_k\}_{k=1}^{J}$ and consumers' strategies $a_i(p_j, \Theta)$ as outlined above. Denote this demand share by d_j. So firms

$$max_{(p_j, \theta_j)} \Pi_j(d_j)$$

and $\Pi_j = (p_j - c - \alpha\theta_k) d_j$.

Now we are in a position to add imperfect information by assuming that consumers observe environmental or social quality θ_j only with some probability s. This creates an incentive for firms to charge prices that suggest levels of public good above the actually produced level θ_j (i.e. "cheating") due to potential profits to be earned even in Bertrand equilibrium. The timing of the game can be summarized as follows:

1. First, firms choose the real, actual $\theta_j \geq 0$, i.e. either to produce just the private good characteristic or to engage into CSR and provide some positive public good level θ_j per unit of g. This actual production decision of θ_j is private information to each firm. At this point all firms that chose $\theta_j > 0$ have to make some investment related to the production of g such as put some infrastructure, internal monitoring technology or management system into place. However, there needs to be some consumer commitment device that prevents consumers with preferences for CSR from switching to neutral firms in the last minute before consumption. This could be some contractual obligation such as a consumer or downstream firm placing an order. Alternatively, in a repeated interaction environment commitment could arise as otherwise the CSR sector would disappear and Θ=0 would not be optimal for caring consumers. Ultimately, if consumers derive utility directly from contributing to a public good, here purchasing from a CSR firm, they would not forego such a *warm glow* anyway.

[20] Note that Θ is a pure public good.

2. Second, firms set prices p_j and thereby suggest a level of $\hat{\theta}_j$ attached to this price, i.e. consumers observe prices but not the true level of public good produced θ_j. However, they can deduct the level of CSR charged for by the respective firm, i.e. $\hat{\theta}_j$. In this respect, either costs must be public information or firms might incur some cost of announcing $\hat{\theta}_j$ e.g. in the form of advertising. Firms compete a la Bertrand.
3. Third, nature reveals θ_j to consumers with probability $s \in [0,1] \sim i.i.d.$ across firms (and nothing with probability $(1-s)$). Denote this message $N_j = \{\emptyset, A_j\}$. Consumers observe $N_j \; \forall j$, and they know exactly the respective information content, i.e. they can distinguish between $\theta_j = 0$ and $\emptyset$. s can be interpreted as an exogenous monitoring technology (or an institutional environment) or more generally as transparency that exposes all firms with equal likelihood.
4. Fourth, based on the information available (i.e. p_j and $N_j \; \forall j$), consumers form their beliefs $\mu_i(p_j, N_j)$ regarding the relationship between $\hat{\theta}_j$ and θ_j for each firm j subject to Bayes' rule, and
5. Ultimately decide to buy g or not, and which firm to purchase from.

2.1. Price Setting under Incentive Compatibility

When moving towards the equilibrium in focus, it becomes clear that the crucial role is played by the price setting mechanism. It is two forces that determine equilibrium price $p_j^*(\theta_j^*)$: Bertrand competition and consumer belief formation. The respective constraint that must hold to assure at least the actual or truthful production of any $\hat{\theta}_j$ (i.e. $\hat{\theta}_j \leq \theta_j$) that firms charge for reads

$$p_j - c - \alpha\theta_j \geq (1-s)(p_j - c)$$

$$\rightarrow p_j \geq c + \frac{1}{s}\alpha\theta_j \quad (2)$$

In other words, in order to be credible vis-a-vis consumers, firms have to charge a price above marginal costs in case of imperfect information, i.e. $s < 1$. This result is similar in spirit to Shapiro's (1983) incentive payment to induce quality maintenance or Leffler and Klein's (1981) protection money to induce contract performance. Clearly a firm would never find it optimal to produce $\theta_j > \hat{\theta}_j$ for it could not cover its costs and would incur losses. It follows that $\theta_j \leq \hat{\theta}_j$ must hold[21]. Then, as outlined above, the firm's incentive compatibility constraint determines the exact relationship between price and real public

[21] If firms deviated to production of any fraction λ of θ, the above constraint would be written as

$$\rightarrow p \geq c + \frac{1-\lambda(1-s)}{s}\alpha\theta$$

Due to loss making ($\lambda > 1$) is never feasible. Furthermore, if a firm were to deviate from truthful production, it would always set $\lambda = 0$.

good level θ_j that rational consumers expect to hold if a firm truly were to produce a suggested/priced $\widehat{\theta}_j$. In other words, (2) must be satisfied for a firm's CSR and pricing strategy to be credible. At this point it is established that $\theta_j = \widehat{\theta}_j$[22]. Furthermore, p_j cannot exceed $c + \frac{1}{s}\alpha\theta_j$ due to Bertrand competition. As any firm announces a price after it has already incurred some cost (between c and $c + \alpha\,\theta_j$) per unit of g, Bertrand competition clearly entails the risk to incur losses as firms could undercut such a high price and still credibly offer the same quality θ. Therefore, $p_j = c + \frac{1}{s}\alpha\theta_j$ and $\theta_j = \widehat{\theta}_j$ must hold. Given this mechanism, firms actually just need to announce or charge a price p_j (and suggest a corresponding $\widehat{\theta}_j$) and consumers will be able to infer θ_j. Then, there exists one level of public good θ^* that maximizes consumer utility and will be produced by all firms in equilibrium (see Proposition 1 for detailed proof). In sum, it is optimal for firms to charge p_j reflecting the actually/truthfully produced CSR level θ_j in line with rational consumer beliefs including out of equilibrium beliefs $\mu_i(\overset{\circ}{p_j}, N_j) = 0\ for\ \overset{\circ}{p_j} \neq p_j$.

2.2.The Subgame Equilibrium

The equilibrium of interest is a Bayesian Nash Equilibrium where firms are charging price $p_j^*(\theta_j^*)$ and actually produce θ_j^* due to the ICC. No firm has an incentive to deviate from θ_j^* given Bertrand competition and rational consumer expectations, and all consumers buy one unit of g at some firm j. Proposition 1 sums up.

PROPOSITION 1: *The truthfully produced (what Besley and Ghatak 2007 call "sustainable") equilibrium level of public good produced per unit of g by each firm is endogenously determined by*

$$f'(n\theta^*) = \frac{\alpha}{s} \quad (3)$$

The equilibrium price charged will be

$$p^* = c + \frac{\alpha\theta^*}{s} \quad (4)$$

Note that this equilibrium is symmetric, i.e. all firms serving caring consumers set the same (θ^*, p^*) *in this equilibrium.*

PROOF. There are three important steps in this proof: First, the ICC will bind and determine prices. Second, it will be shown that all firms will offer the same θ. Third, it will be proven that the optimal level must correspond to θ^*.

[22] Again, note that this equality follows from the derivation of the ICC constraint, where firms will not gain larger profits from cheating (producing zero public good but charging a price above marginal cost of producing the private good) given probability s of being caught.

1) p^*: p^* is determined by the IC (credibility) constraint which is binding in equilibrium due to Bertrand competition and rational consumer expectations. Firms set prices under a (quasi) 0-profit condition. So for any θ_j, a price $p > p^*$ could and would be undercut by another firm $-j$ offering the same public good level at a lower price thereby capturing the whole market. On the other hand, for any θ_j a price $p < p^*$ will invoke consumer beliefs such that the θ suggested by the firm via p is incredible and consumers refrain from buying g at firm j.

2) $\theta_j^* = \theta^* \; \forall \; j$: Suppose not, then $\exists \, (p^\circ, \theta^\circ) \neq (p^*, \theta^*)$, where the only chance of price differential exists via $\theta^\circ \neq \theta^*$. Consumers, however, have to be indifferent between the two packages, i.e. $U^\circ = U^*$, which reduces to $\theta^\circ = \theta^*$. Contradiction.

3) θ^*: As price setting is determined by 1), i.e. $p^*(\theta^*)$, the equilibrium level of θ will be determined by consumer preferences. Let j be the firm consumer i buys g from in equilibrium. Then it must be true for all i that $j = argmax_j[b + f(\theta_j + \sum_{-i}\sum_J \theta_j) - p_j^*]$. Note that there is a fictitious firm $j = 0$ which represents consumers' outside option of not buying g at all. When solving the consumer problem, i.e. $max_{\theta_j} U(f(\theta), p(\theta)) \rightarrow f'(\theta) = p'(\theta)$ taking into account that $p'(\theta) = \frac{\alpha}{s}$ from p^*, we get one optimal level θ^* that determines p^*, and the resulting package is always preferred to any other $(\theta, p) \neq (\theta^*, \; p^*)$ by consumers. ■

Those firms serving the m neutral consumers without preferences for $\Theta = n\theta^*$, i.e. the non-CSR sector of the economy set $\theta = 0$ and charge $p = c$ in the Bertrand equilibrium. It is also assured that no caring consumer has an incentive to buy the "neutral" version of $g(\theta = 0)$ as due to concavity of f the following inequality (a consumer incentive compatibility constraint) holds:

$$b - c - ((\alpha\theta^*)/s) + f(n\theta^*) > b - c + f((n-1)\theta^*)$$

$$\rightarrow ((f(\theta^*) - f((n-1)\theta^*))/(\theta^*)) > f'(n\theta^*)$$

given equation 3. In the CSR sector (firms serving n caring consumers), θ^* is second best and identical with the private provision equilibrium level as derived by Bergstrom, Blume and Varian (1986)) if $s = 1$, or even lower if $s < 1$. Note that Besley and Ghatak (2007) arrive at the same conclusion in a distinct multi period repeated game setting. Similarly, Bond and Gresik (1996) conclude that the presence of incomplete information creates profits for the firm in equilibrium. In addition and to round off this separating equilibrium, it needs to be noted that given ex post profits in the CSR sector are positive, we need to have some entry costs or advertising expenditures to sustain the 0-Π condition ex ante as well as 0-Π overall. Both possibilities have been mentioned in the timeline of the game, where firms need to invest into infrastructure in period 1 or may have to advertise their type in period 2. This assumption has been used by Klein and Leffler (1981), Shapiro (1983) and Besley and Ghatak (2007) among others.

2.3.CSR and Firm Location

Assume the world consists of two countries, Home and Foreign, i.e. $l = \{H, F\}$. For the moment, all consumers $(n + m)$ are located in H (let us assume that H corresponds to a developed country, e.g. the US or EU economies), while F only serves as a potential offshore location (e.g. a developing country or an emerging market economy). Firms are free to produce in either country at identical costs, i.e. $c^H = c^F$ and $\alpha^H = \alpha^F$. Although one might be inclined to argue that production costs differ across countries (especially in this example), this assumption allows us to focus on pure information effects. Along these lines, there are also no transportation costs and no fixed costs of production. Hence, firms within each sector will produce all g in one production site and country. However, it will be assumed that $s^H \neq s^F$. As all results are perfectly symmetric for $s^H >$ and $< s^F$, it suffices to look at either case for further analysis. Therefore, let $\theta_j$of a firm producing in F be harder to verify (less likely to be revealed) than its equivalent in H, i.e. $s^H > s^F$. This assumption could easily be motivated by geographic distance between H and F, as well as less developed infrastructure, communication channels, reliable media and information standards or little local awareness in F, in short it is more difficult for stakeholders (here consumers in H) to gain information about firm conduct there.

When integrating stage 1, we get the following timing:

1. Nature reveals s_l for $l = H, F$. Firms decide whether to produce g (i.e. locate production) in Home or Foreign. Note again that in this simple set up, firms will locate sector wide.
2. Firms choose (θ_j^l, p_j^l) subject to the above outlined Bayesian game.

From Proposition 1 establishing the final stage levels of public good production and prices it follows immediately that if $s^H > s^F$ then

$$\frac{1}{s_H} < \frac{1}{s_F}$$

and

$$\theta_H^* > \theta_F^*$$

while the effects on p^* are of opposing signs. Therefore the overall effect on U will depend on $\Delta s = s_H - s_F$. Given that profits are 0 in the CSR sector independent of where firms will produce, the decisive condition determining location of CSR firms is uniquely determined by demand, i.e. consumer preferences. All CSR firms will produce g in H if consumers prefer the respective H specific offer (θ_H^*, p_H^*). The following inequality summarizes

$$U(\theta_H^*, p_H^*) \geq U(\theta_F^*, p_F^*)$$
$$(n\theta_H^*) - f(n\theta_F^*) \geq \alpha\left(\frac{\theta_H^*}{s_H} - \frac{\theta_F^*}{s_F}\right) = f'(n\theta_H^*)\theta_H^* - f'(n\theta_F^*)\theta_F^* \quad (5)$$

and vice versa. Firms maximize profits, however profits are 0 and firms have made some initial investment or have a broader reputation at stake, so there will be the threat of losses if $U(\theta_H^*, p_H^*) < U(\theta_F^*, p_F^*)$ and another firm relocated to F and would capture the whole market.

This is simple and intuitive in the sense that consumers maximize utility, which is determined by concave valuation of the total public good level minus the price charged for the good, both of which depend critically on the location of production and therefore on information asymmetry s_l. For the moment, the non CSR sector is of less interest as the absence of any non CSR related cost asymmetries (here c_l s.t. $c_H = c_F$) implies that non CSR firms will be indifferent between H and F, but as relocation is at least marginally costly/risky, the tie breaking is assumed to play in favor of H (absent any regulation regarding θ). However, for a government deciding about imposing national regulation, the offshoring dynamics of the non CSR sector will be of significant importance and resulting welfare effects (in terms of employment, tax base, technology spill over etc.) will have to be taken into account. To sum up, location of corporate activity in the CSR sector will be determined by cross country levels and differences in transparency $|\Delta s|$.

2.4. Implications for Regulation

This subsection constitutes a preliminary analysis and short discussion of how the difference in transparency between states may translate into severe constraints for national, non-cooperative regulation. The question is simple: When can a government, here H, successfully force firms with a powerful outside relocation option to produce above strategically optimal market levels of CSR? In other words, when can a government realistically improve upon the second best market provision of public goods? This scope of national and uncoordinated regulation depends on 1) the maximum level of public good θ to be produced while sustaining CSR firms' location in H - denote this level by x - where

$$x \to f(nx) - f(n\theta_F^*) = \alpha\left(\frac{x}{s_H} - \frac{\theta_F^*}{s_F}\right)$$

and 2) its relationship to the strategic CSR level θ_H^*. If $x \leq \theta_H^*$ there is no scope for regulation whatsoever (which in this set up always holds), while if $x > \theta_H^*$, a government actually can correct market inefficiencies by exploiting the advantage of relatively transparent markets due to e.g. efficient institutions and monitoring capacity (information advantage). The following proposition summarizes.

PROPOSITION 2: Let $s_H > s_F$ (Results are perfectly symmetric for $s_H < s_F$). The regulatory upper bound x faced by a regulator in H is implicitly defined by

$$f(nx) - f(n\theta_F^*) = \alpha\left(\frac{x}{s_H} - \frac{\theta_F^*}{s_F}\right) \quad (6)$$

X depends on both s_H and s_F in a way that

$$\frac{\partial x}{\partial s_H} > 0 \text{ and } \frac{\partial x}{\partial s_F} < 0 .$$

In the case of $\Delta s = 0$, a national, non cooperative regulator will never be able to improve upon the market level of CSR in F, H, i.e. $x = \theta_H^* = \theta_F^*$ (This follows directly from equation #6).

PROOF. Take $f(nx) - f(n\theta_F^*) = \alpha\left(\frac{x}{s_H} - \frac{\theta_F^*}{s_F}\right)$ and $s_H > s_F$. We assume n and α to be strictly positive parameters.

1) As a first step we are interested in getting $\frac{\partial x}{\partial s_H} > 0$ holding s_F constant. Hence, denote $F = f(n\theta_F^*) - \frac{1}{s_F}\alpha\theta_F^*$ and note that given any s_F implicitly determines also $\theta_F^*(s_F)$ via equation 3 ($f'(n\theta^*) = \frac{\alpha}{s}$). Then rewrite as

$$[f(nx) - F]\alpha^{-1}s_H = x$$

and implicitly differentiate to get

$$\frac{\partial x}{\partial s_H} = f(nx)\alpha^{-1} + f'(nx)n\alpha^{-1}s_H\frac{\partial x}{\partial s_H} - F\alpha^{-1}$$

Rearranging and simplifying yields

$$\frac{\partial x}{\partial s_H} = \frac{f(nx)-F}{\alpha - nf'(nx)s_H}$$

For x to be increasing in s_H we need to show that both nominator and denominator feature an equal sign (in this case they are both > 0). First $f(nx) > F$ as long as $x > 0$ and $s_F > 0$ from equation 6. The denominator is positive if $\alpha\frac{1}{s_H} > nf'(nx)$ which is true for all levels of x of interest, i.e. above second best θ_H^* determined by $f'(n\theta_H^*) = \alpha\frac{1}{s_H}$ but below "first best" (given imperfect information s_H) level x^* s.t. $\alpha\frac{1}{s_H} = nf'(nx^*)$.

2) We repeat this sequence to show $\frac{\partial x}{\partial s_F} < 0$ holding s_H constant. First implicit differentiation yields

$$\frac{\partial x}{\partial s_F} = [nf'(nx)\frac{\partial x}{\partial s_F} - \frac{\partial F}{\partial s_F}]\alpha^{-1}s_H$$

where

$$\frac{\partial F}{\partial s_F} = nf'(n\theta_F^*)\frac{\partial \theta_F^*}{\partial s_F} - \frac{1}{s_F^2}\alpha\theta_F^* - \frac{1}{s_F}\alpha\frac{\partial \theta_F^*}{\partial s_F}$$

After rearranging and simplifying we get

$$\frac{\partial x}{\partial s_F} = \frac{\frac{\partial \theta_F^*}{\partial s_F}[\frac{\alpha}{s_F} - nf'(n\theta_F^*] + \frac{\alpha}{s_F^2}\theta_F^*}{\alpha - nf'(nx)s_H}$$

Knowing that the denominator is positive from (1), we are left to show if and when the nominator is negative. It can be shown that $\frac{\partial \theta_l^*}{\partial s_l} > 0$ for $l = H, F$ (See Appendix Section 4.1). Then for $s_F > 0$ and $n > 1$, $\frac{\partial \theta_F^*}{\partial s_F}[\frac{\alpha}{s_F} - nf'(n\theta_F^*] + \frac{\alpha}{s_F^2}\theta_F^* < 0$ if

$$nf'(n\theta_F^*) > \frac{\alpha}{s_F}$$

which is true from equation 4 establishing that $f'(n\theta_F^*) = \frac{\alpha}{s_F}$. ■

2.5. Some Analysis and Discussion

In sum, information asymmetries between stakeholders and firms determine the market level of corporate public good provision, which is subject to the standard market failure inherent in public goods provision, as well as the scope for regulation of geographically flexible MNEs in the absence of international policy coordination between governments. It is therefore in this context and with great care that one should read the potential of CSR as a substitute for regulation as proclaimed in Scherer and Palazzo's (2008) statement that *business firms are not just considered the bad guys, causing environmental disasters, financial scandals, and social ills. They are at the same time considered the solution of global regulation and public goods problems.* Note here that often economic theory treats governments' access to information different than that of non-state stakeholders. However, although governments do possess a monopoly of coercive power or in the words of Stigler (1971) ...the state has one basic resource which in pure principle is not shared with even the mightiest of its citizens: the power to coerce...[23], this by no means translates into better or more information available to states and regulators (see a discussion of the role of information within the Coasian framework in Farrell (1987)).

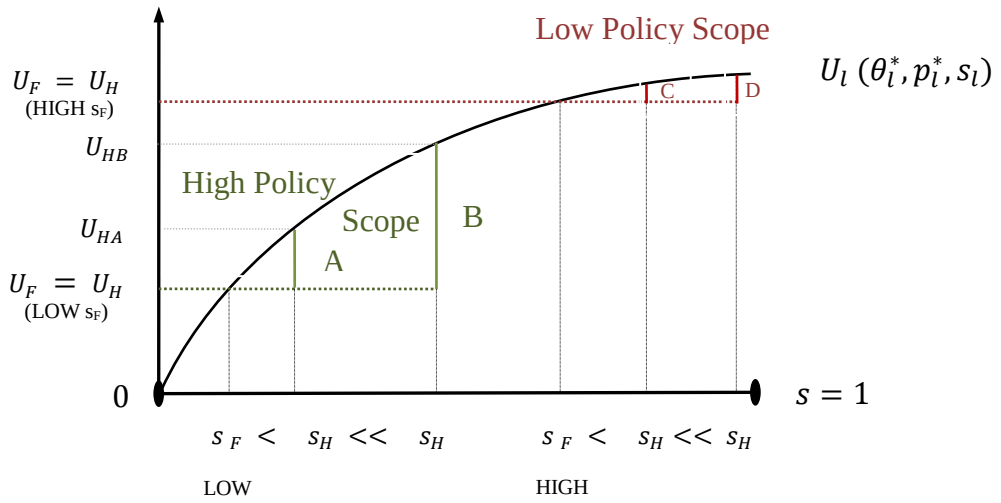
More precisely, if a potential regulator has geographically limited powers (confined to national borders) and firms have an outside location option, the informational environment at home and abroad (i.e. at the potential offshore location) both determine the strength of the regulatory constraint and whether unilateral regulation at all is a feasible tool to increase public goods provision. Here a short note on the assumption that governments are equally subject to imperfect information s_l is in order: Regulation can

[23] This quote then leads Stigler to conclude that this power is subject to (industry) capture and most often used in selective and less/in-efficient way.

be seen as a public (and credible) announcement of a firm's or industry's minimum price for good g. In the equilibrium in focus this plays out as either relocation or truthful production of the regulatory level. Figure 1 graphically outlines this result for the above chosen case of $s_H > s_F$. Dependent on 1) where the absolute level of s_F is located (low or high) and 2) how much larger s_H is relative to the respective s_F (> or >>), it can be seen that scope for setting $x > \theta_H^*$ is decreasing in s_F for a given s_H - (A and B) versus (C and D) - as well as increasing in Δs for a given s_F. The horizontal lines denoted $U_F = U_H$ constitute the policy upperbound. Regulator H then can reduce U_H by increasing x beyond $\theta_H^*(s_H)$ until tie breaking level U_F is matched.

It should be noted that the strength of these effects depends on the concavity of $U_l = f(n\theta_l^*) - p_l$, i.e. the reduction of U_H by increasing x for given s_H, s_F is trading off a concave (and hence decreasing) increase in $f(.)$ and a constant linear increase in price p_H, weighted by $\frac{\alpha}{s_H}$.

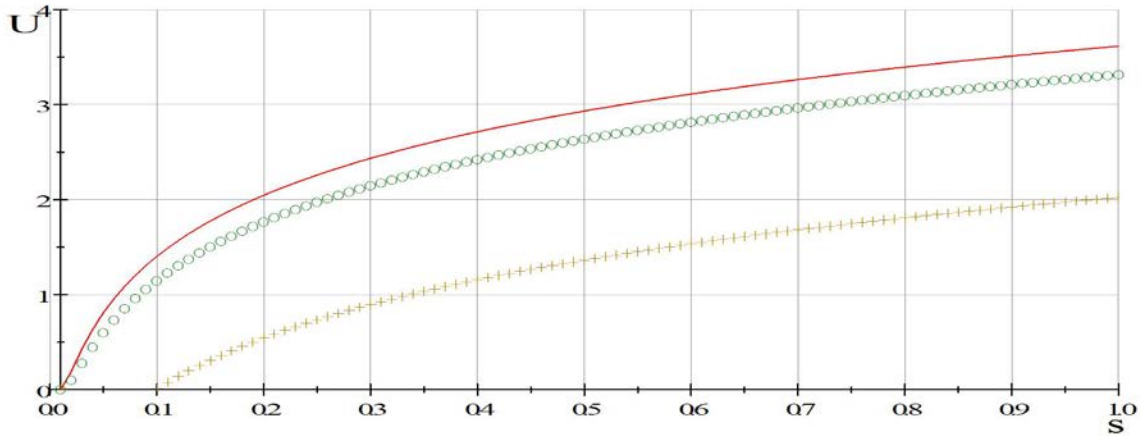
[Figure 1: Location Incentives and Policy Scope]



The following short example (simulation) will further clarify the mechanics of $\Delta s = d$ in determining x. Assume we want to determine the distance between s_H and s_F that is necessary to impose a level $x = 2\theta_F^*$ while keeping the CSR sector producing in H. Figure 2 plots the two crucial ingredients of equation 6, i.e. $U(x, s_H, p_H)$ and $U(\theta_F^*, s_F, p_F^*)$, where the equality of equation 6 is represented as a horizontal line cutting the two utility functions. Then, the horizontal distance between the two functions measures the exact difference between $s_H > s_F$ needed to sustain $x = 2\theta_F^*$. Note that $d(x = 2\theta_F^*)$ increases in the absolute level of s_F, i.e. the better monitoring and information availability in F, the less regulatory scope for H for equal distance between s_H and s_F}.

In terms of policy this means that the more developing countries invest into institutions, monitoring and transparency, the more important becomes policy coordination between developed and developing countries. In short, if interest in and preferences for public goods vary along the development and wealth distribution, then the bargaining power of emerging market economy governments vis-a-vis leaders such as the EU or the US increases significantly.

[Figure 2: Assume $f = ln(1 + n\theta), n = 100, \alpha = 1, line = F\ (\theta_F^*), dots = H(x = 2\theta_F^*), cross = (x = 4\theta_F^*)$]



Furthermore, the case of unconstrained export of regulation (i.e. the theoretic possibility to impose the first best public good level) as proposed by Davis et al. (2008)[24] constitutes a special case of this model and holds true only if $s_H = s_F = 1$. In this case the market (CSR) would fail in the classic sense although achieving the market optimal second best, and a government controlling an important sales market could theoretically force firms to fully internalize their externalities as regulation can be enforced independent of geographic production due to perfect global information (i.e. Importing a good that has been produced with a negative externality abroad could be treated as if a search good was sold at the border). For all $s_H = s_F < 1$, one sided, i.e. uncoordinated, regulation above x will not succeed as firms simply relocate and produce only market levels of the public good. Note also that, from a total welfare perspective, there exists an upward bias of x as any positive level of regulation immediately drives the non CSR

[24] In the words of Davis, v. N. Whitman, Zald (2006) [t]he overall proposition that emerges ... is that social and regulatory pressures are drivers of Global CSR, but that cost driven processes of standardization within companies will tend to lead the tightest standards to prevail ... Many have deduced a race to the bottom in labor and environmental standards, in which producers chase the lowest cost labor housed in the most lax regulatory environment, thus inducing states to compete to provide a docile and union free labor force and an anything goes approach to pollution...Regulation is the most consistent and effective force favoring CSR. The companies with the best records in particular domains of CSR have tended to be those that are most heavily regulated ... Ironically then globalization is accompanied both by a race for lowest production costs and increasing demand for CSR.

sector abroad. This feature is also reflecting the empirical finding that the PHH holds for firms performing low or no CSR. This off shoring of non-CSR production not only does not change the global level of externality, it also may have adverse effects on the home economy in terms of lower employment, lower tax revenue or other foregone efficiencies and positive spill over from MNE location. In total, a government like H will never find any incentive to regulate at all if $x \leq \theta_H^*$.[25], and if there is scope for regulation, it will have to take into account effects related to the non CSR sector and total welfare. Remember that firms ultimately maximize $f(n\theta)$ subject to the Bertrand competition constraint and stakeholder expectations, so by imposing regulation above θ_H^* one takes a quite striking redistributive measure as "caring" consumers (i.e. those with preferences for the public good) will have to pay for the optimal corporate provision of θ via higher prices and reduced U_H, possibly going down until U_F. Neutral consumers still get served by the non CSR sector from abroad at standard competitive prices as before.

2.6. Public Policy and Welfare

Some basic observations follow from this model. First, the importance of international policy coordination increases with s_F as unilateral regulatory scope decreases. Second, we can conduct some preliminary analysis with regard to welfare and public policy. Assume that government H maximizes some welfare function W_H that is composed of the sum of consumer welfare and firm profits as well as some exogenous benefits from firm location in H across sectors (e.g. firms locating in H will employ people, pay corporate taxes or provide for technology spill over). The standard government problem will be to choose some regulatory level θ_H^R, given $s_{H,F}$, such that

$$W_H = n[f(n\theta_H^R) - \alpha\theta_H^R] + (n+m)(b-c) + 1(\theta_H^R = 0)L_H^{nonCSR} + 1(\theta_H^R \leq x)L_H^{CSR}$$

is maximized. Note that $1(\theta_H^R = 0)$ is an indicator function that equals 1 in absence of regulation and 0 otherwise, i.e. benefits from location in the non CSR sector, L_H^{nonCSR}, vanish as soon as regulation is imposed as the sector immediately will relocate in F. The same holds for the CSR sector, however, the tipping point inducing location in F will be x. As there are no consumers in F, the reduced form objective of government F will be to attract firm location, i.e. $\theta_F^R = 0$. Furthermore, we assume for the moment that government H is subject to s_H in the same way as markets are, then regulation can be interpreted as a public announcement that will induce consumers to expect θ_H^R. The baseline CSR market mechanism then will lead firms to offer (θ_H^R, p_H^R) s.t. Proposition 1. As long as $s_H > s_F$, H will have a strong disincentive to choose $\theta_H^R > x$, because it stands to lose not only location benefits L_H^{CSR} but also reduces levels of public good to (third best) θ_F^*, however at lower prices p_F^*. In more detail, regulating above x will be dominated by no regulation, i.e. $W_H(\theta_F^*, \theta_H^R > x) < W_H(\theta_H^*, \theta_H^R\} = 0), if$

[25] x will never be $< \theta_H^*$.

$$[f(n\theta_H^*) - \alpha\theta_H^*] + \underbrace{\frac{L_H^{CSR} + L_H^{nonCSR}}{n}}_{-\Phi-} > \left[f(n\theta_F^*) - \alpha\frac{\theta_F^*}{s_F}\right] \quad (26)$$

$$f(n\theta_H^*) - f(n\theta_F^*) > \alpha(\theta_H^* - \frac{\theta_F^*}{s_F}) - \Phi$$

, which is likely to hold. Then, the FOC of the government problem will read

$$nf'(n\theta_H^R) = \alpha + L_H^{nonCSR} \quad (27)$$

, given $\theta_H^R \leq x$. In case $c_F < c_H$ the non CSR sector will locate in F even in total absence of regulation in H and the only binding constraint will be upper bound x. For simplicity we will proceed under this assumption.

PROPOSITION 3: Assume $f(n\theta_H^*) - f(n\theta_F^*) > \alpha(\theta_H^* - \frac{\theta_F^*}{s_F}) - L_H^{CSR}$ *holds. Then, the government will choose* $\theta_H^R = x$ *as long as* $x \leq \theta_H^{**}$ *where* $\theta_H^{**} \rightarrow nf'(n\theta_H^{**}) = \alpha$ *is the first best public good level.*

So it is s_F and Δs that will directly determine regulation and the government's capability to improve upon CSR levels of θ in H. It is also quite reasonable to assume that L_H^{CSR} and L_H^{nonCSR} are (increasing) functions of n and m respectively. Hence, in case costs are equal across countries, a larger non CSR sector constitutes a disincentive to regulate at all and simultaneously reduces the first best level of public good provision according to W_H. In case firms serving neutral consumers locate abroad due to cost advantages anyway, a larger CSR sector increases the strength of x as a binding upper bound.

On the other hand, we can have a first investigative look at s being a potential policy instrument itself.[28] If we endogenize the choice of s and assume costs $c_l(s) = 0$ we find that F will find it optimal to set $s_F = s_H$ and while non CSR firms again will chase lower costs as above ($c_F < c_H$), this time even CSR firms will locate in F for the very same reason. If $c_F = c_H$and as long as H sets $\theta_H^R = 0$, they will be indifferent between home and foreign. As F only cares about firm location, it has no incentive to regulate, which makes policy coordination, which would be absolutely necessary to improve upon $\theta_H^* =$

[26] Note that 1) neutral consumer welfare is equal under both regimes and cancels, and 2) $W_H(\theta_F^*)$ has no firm locating in H and therefore firm profits are absent in total welfare of H.

[27] Note that $\frac{\partial 1(.) L_H^{nonCSR}}{\partial \theta_H^R} = -L_H^{nonCSR}$.

[28] We remember that changes in s could be caused by rating agencies (Chatterji and Toffel 2007), NGOs (Locke et al. 2006), international organizations (e.g. the Global Reporting Initiative, the UN, the World Bank or the OECD) or even government agencies or regulators.

θ_F^* , in this case, very difficult. Once there would be caring consumers in F as well, this would clearly change.[29]

A more realistic perspective, however, would be to assume that s is costly. Then, F will not invest anything into its own transparency, i.e. choose $s_F = 0$, as long as H considers it worthwhile to retain the CSR sector within the country, and F cannot choose s_F such that the CSR sector locates in F and $L_F^{CSR} > c_F(s_F)$. Furthermore, there may be interesting complementarities between s_H and θ_H^R. Even if F has no incentive to choose a positive s or finds it optimal to set $s_F = s_H$, H may have to refrain from regulation (in order to keep the CSR sector at home). However it can improve the functioning of the market, i.e. the production of θ_H^* by increasing s_H as long as the costs of doing so are outweighed by the benefits in terms of welfare. Ultimately, in case government H can enforce regulation in H independently of s_H, it has no incentive to set $s_H > 0$ at all. One also can think about the potential implication for markets knowing that the government can enforce θ_H^R perfectly, i.e. this would amount to $s_H = 1$ in market perception. Then s_F alone will determine x and the regulatory upper bound for H where F again has almost no incentive to invest into $s_F > 0$ given that $s_F = s_H$ will be very costly and eventually not attainable (at least for convex costs).

To sum up, this baseline model can provide a useful platform for further analysis. The next steps of this project will involve more detailed investigation of how this mechanism relates to insights derived by the theoretic literature on environmental policy towards MNEs, e.g. Bond and Gresik (1996) or Hoel (1997)[30], and further explore regulatory choices by governments controlling asymmetric markets (developed versus developing countries, two potential sales markets with differing consumer preferences/shares of n, m).

3. Conclusions

This paper has developed a simple baseline model to analyze the interaction between strategic corporate public good provision (CSR), international firm location and national regulation. Given the mismatch between theory and empirical evidence within the firm location and regulation literature, this information based strategic CSR mechanism is proposed to shed light on recent firm behavior and the corporate relationship to the regulatory environment. CSR is modeled as an international public credence good, which constitutes the most interesting case of CSR as otherwise, i.e. in the case of CSR as a search or experience good, the information asymmetry decreases to levels a creative regulator could tackle via classical policy tools. The main insight derived is that in the

[29] This is work in progress. In addition, I am currently exploring the case when there are consumers of type n and m in both countries, however their respective s_l differ, i.e. consumers in H are faced with $s_{HH}$and s_{HF} while consumers in F will face s_{FH} and s_{FF}. I am particularly interested into the case of $s_{HH} \neq s_{FH}$ and/or $s_{HF} \neq s_{FF}$.

[30] Bond and Gresik (1996) find the existence of conditions under which a MNE prefers to face a unified international regulatory authority as opposed to national competing ones. Hoel (1997) finds that non cooperation between governments leads to stricter environmental policy than cooperation due to a tradeoff between attracting firms with low regulation and avoiding too high pollution levels through high regulation.

presence of MNEs with geographic flexibility and market provision of an international public credence good, unilateral, i.e. non cooperative regulatory scope depends on the absolute probabilities to verify firms' CSR levels within different geographic and institutional environments as well as the differential between these probabilities.

In other words, these probabilities can be interpreted as firm accountability or quality of information or monitoring available to markets and governments across nation states and/or jurisdictions. They determine not only the market levels of the public good produced under autarky, but also the relocation incentives of multinational firms facing national regulation that aims at improving CSR levels of the respective good. A separating equilibrium with CSR and non CSR firms arises, and in equilibrium a CSR firm[31] will trade off lower production costs, which increase its competitiveness in pricing, with higher expected informational price premiums, which decrease its competitiveness. In sum, the classical production cost incentive is complemented by an information based demand channel.

Then, a government's ability to regulate above CSR levels decreases with the absolute level of foreign information quality, while it increases in the relative (positive) difference between its home and the aforementioned foreign probability to observe firm conduct. This may explain why firms serving caring stakeholders (e.g. consumers with social or environmental preferences) are less likely to (re)locate in pollution havens or other low information environments such as developing countries, while other firms (those serving the neutral demand segment) follow this proposed location logic based on production costs and regulatory differences. In the past, models predicting a PHH or RTB have not assumed any important role for demand and consumer preferences, which may have ultimately led to the mismatch between theory and empirics. However, in reality firm strategy may be subject to more complex considerations regarding public goods provision and regulatory (over)compliance, reputation and stakeholder perception. Ultimately, a total welfare maximizing government will aim at the first best level of public good provision by firms; however, information asymmetry across countries will determine the upper bound of regulatory scope. The bigger the demand for a public good and hence the CSR sector in a country, the more relevant becomes this mechanism based on relative strength of information asymmetries. Furthermore and somewhat counter intuitively, the more developing countries develop and technology, NGOs and media reduce international monitoring costs, the more constrained developed country regulators will be, putting more emphasis on necessary policy coordination, thereby strengthening emerging markets' bargaining power vis-a-vis developed countries with social or environmental preferences.

[31] being a firm that serves a consumer segment with respective environmental or social public good preferences

Bibliography

- Antweiler W., Copeland B.R., Taylor M.S. "Is free trade good for the environment?" *American Economic Review* Vol.91 (2001); pp.877-908
- Arora S., Gangopadhay S. "Toward a theoretical model of voluntary over compliance" *Journal of Economic Behavior and Organization* Vol.28 (1995); pp.289-309
- Bagnoli M., Watts S.G. "Selling to Socially Responsible Consumers: Competition and the Private Provision of Public Goods" *Journal of Economics and Management Strategy* Vol.12/3 (2003); pp.419-445
- Baron D.P. "Private Politics, Corporate Social Responsibility, and Integrated Strategy" *Journal of Economics and Management Strategy* Vol.10/1 (2001)
- Becker-Olsen K.L., Hill R.P. "The Impact of Perceived Corporate Social Responsibility on Consumer Behavior" University of California Berkeley WP Series (Center for Responsible Business) 2005, published in *Journal of Business Research* Vol.59/1 (2006); pp.46-53
- Besley T., Ghatak M. "Retailing public goods: The economics of corporate social responsibility" *Journal of Public Economics* Vol.91 (2007); pp.1645-1663
- Bond E.W., Gresik T.A. "Regulation of multinational firms with two active governments: A common Agency approach" *Journal of Public Economics* Vol.59/1 (1996); pp.33-53
- Brunnermeier S.B., Levinson A. "Examining the Evidence on Environmental regulations and Industry Location" *Journal of Environment and Development* Vol.13/1 (2004); pp.6-41
- Carson R. "The Environmental Kuznets Curve: Seeking Empirical Regularity and Theoretical Structure" *Review of Environmental Economics and Policy* Vol.4/1 (2010); pp.3-23
- Caves R.E. "Multinational Enterprise and Economic Analysis" (3rd edition), Cambridge University Press (2007)
- Chatterji A.K., Toffel M.W. "Shamed and Able: How firms respond to information disclosure" Corporate Social Responsibility Initiative Working Paper No. 39 (2007). Cambridge, MA: John F. Kennedy School of Government, Harvard University
- Cole M.A., Elliott R.J.R. "Determining the trade-environment composition effect: the role of capital, labor and environmental regulations" *Journal of Environmental Economics and Management* Vol.46 (2003); pp.363-383
- Copeland B.R., Taylor M.S. "North-South Trade and the Environment" *Quarterly Journal of Economics* Vol.109/3 (1994); pp.755-787
- Davis G.F., Neumann Whitman M., Zald M.N. "The Responsibility Paradox: Multinational Firms and Global Corporate Social Responsibility" (Working Paper University of Michigan 2006) published as "The Responsibility Paradox" *Stanford Social Innovation Review* Vol.6/1 (2008); pp.30-37
- Dam L., Scholtens B. "Environmental regulation and MNE's location: Does CSR matter?" *Ecological Economics* Vol.67/1 (2008); pp.55-65
- Dasgupta S., Laplante B., Wang H., Wheeler D. "Confronting the Environmental Kuznets Curve" *Journal of Economic Perspectives* Vol.16/1 (2002); pp.147-168
- Dasgupta S., Mody A., Roy S., Wheeler D. "Environmental regulation and development: A cross-country empirical analysis" World Bank Policy Research Paper No. 1448 (1995)

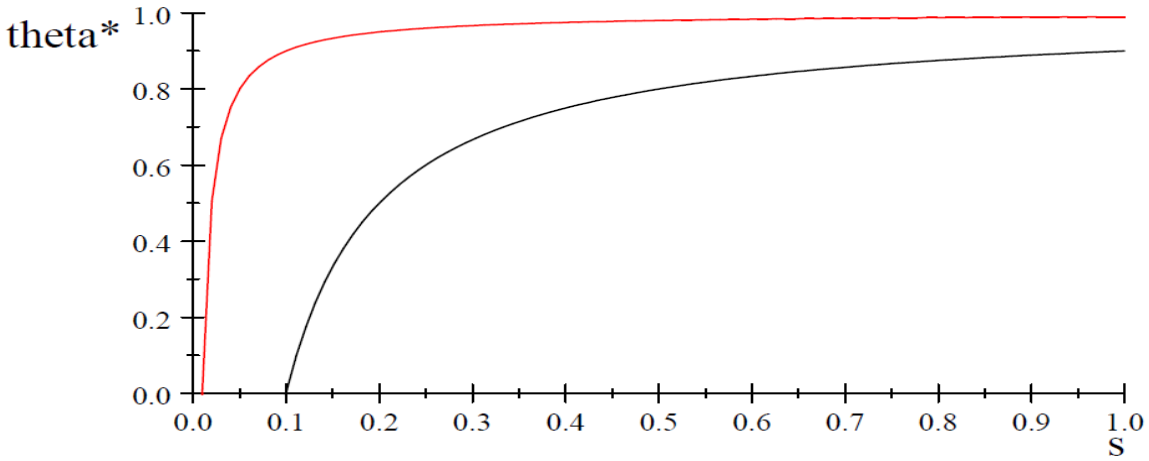
- Dowell G., Hart S., Yeung B. "Do Corporate Global Environmental Standards Create or Destroy Market Value?" *Management Science* Vol.46 (2000); pp.1059-1074
- Drezner D.W. "The Race to the Bottom Hypothesis: An Empirical and Theoretical Review" mimeo (dec. 2006), The Fletcher School, Tufts University
- Edwards T., Marginson P., Edwards P., Ferner A., Tregaskis O. "CSR in multinational companies: Management Initiatives or negotiated agreements?" International Labor Organization (International Institute for Labor Studies) Working Paper (2007)
- Farrell J. "Information and the Coase Theorem" *Journal of Economic Perspectives* Vol.1/2 (1987); pp.113-129
- Goedhuys M. and Sleuwaegen L. "The role of international quality standards certification for firms in institutionally weak countries" mimeo KU Leuven (2012)
- Grossman G., Krueger A. "Environmental Impacts of the NAFTA" in The U.S.-Mexico Free Trade Agreement MIT Press (1993), pp.13-56
- Hettige H., Lucas R.E.B., Wheeler D. "The Toxic Intensity of Industrial Production: Global Patterns, Trends, and Trade Policy" *American Economic Review* Vol.82/2 Papers and Proceedings (1992); pp.478-481
- Hoel M. "Environmental Policy with endogenous Plant Locations" *Scandinavian Journal of Economics* Vol.99/2 (1997); pp.241-259
- Jaffe A.B., Peterson S.R., Portney P.R., Stavins R.N. "Environmental Regulation and the Competitiveness of U.S. Manufacturing: What does the Evidence tell us?" *Journal of Economic Literature* Vol.33/1 (1995); pp.132-163
- Fleishman-Hillard and the National Consumer League (NCL) "Rethinking Corporate Social Responsibility" (Full Report based on 2005 survey)
- Johnston J.S. "Signaling Social Responsibility" Corporate Social Responsibility Initiative Working Paper No. 14. Cambridge, MA: John F. Kennedy School of Government, Harvard University (2005)
- Kitzmuller M., Shimshack J. "Economic Perspectives on Corporate Social Responsibility" *Journal of Economic Literature* Vol.50/1, March 2012
- Kitzmuller M. "Incentives and Corporate Social Responsibility" (mimeo, EUI 2008)
- Klein B., Leffler K.B. "The role of Market Forces in Assuring Contractual Performance" *Journal of Political Economy* Vol.89/4 (1981); pp.615-641
- Kotchen M.J. "Green Markets and Private Provision of Public Goods" *Journal of Political Economy* Vol.114/4 (2006); pp.816-834
- Kotler P., Lee N. "Best of Breed" *Stanford Social Innovation Review* Spring (2004)
- Locke R., Fei Q., Brause A. "Does monitoring improve labor standards? Lessons from Nike" Corporate Social Responsibility Initiative Working paper No. 24. Cambridge, MA: John F. Kennedy School of Government, Harvard University (2006)
- Lyon T.P., Maxwell J.W. "Corporate Environmentalism and Public Policy" Cambridge University Press (First Edition 2004)
- Maxwell J.W., Lyon T.P., Hackett S.C. 2000. "Self-Regulation and Social Welfare: The Political Economy of Corporate Environmentalism." *Journal of Law and Economics* Vol.43/2; pp.583-617.
- Scherer A.G., Palazzo G. "Globalization and Corporate Social Responsibility" Oxford Handbook of Corporate Social Responsibility (2008)
- Shapiro C. "Premiums for High Quality Products as Returns to Reputation" *Quarterly Journal of Economics* Vol.98/4 (1983); pp.659-680

- Siegel D.S., Vitaliano D.F. "An Empirical Analysis of the Strategic Use of Corporate Social Responsibility" *Journal of Economics and Management Strategy* Vol.16/3 (2007); pp.773-792
- Stigler G.J. "The Theory of Economic Regulation" *Bell Journal of Economics and Management Science* No.3 (1975); pp.3-18
- Taylor M.S. "Unbundling the Pollution Heaven Hypothesis" *Advances in Economic Analysis & Policy* Vol.4/2 Article 8 (2004)

Appendix

The implicit determination of θ^* *given* $f'(n\,\theta^*) = \frac{\alpha}{s}$

It can be shown that $\frac{\partial \theta^*}{\partial s} > 0$ by graphically simulating this derivative (knowing that f is concave by assumption):



[Assume $f = ln(1 + n\theta)$ and $\alpha = 1$; Black $n = 10$; Red $n = 100$.]

We see that $\theta^*(s)$ is concave as well and depends on n in a way that the higher is n, the smaller levels of s already get markets to produce high(er) levels of θ. Then, let $g \equiv (f')^{-1}$ be the inverse of the first derivative of f (f concave). So it is true that

$$g(f'(n\theta^*)) = f'(g(\theta^*)) = n\theta^*$$

By differentiating with respect to θ we get

$$f''(g(n\theta))g'(n\theta) = 1 \rightarrow g'(.) = \frac{1}{f''(g(.))} < 0$$

Now it can be stated that

$$\theta^* = \frac{g(\frac{\alpha}{s})}{n} \rightarrow \frac{\partial \theta^*}{\partial s} = -\frac{1}{n} g'(.)\alpha s^{-2} > 0 \quad \blacksquare$$