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Sebastian Krautheim and Thierry Verdier

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Sebastian Krautheim, Paris School of Economics
Thierry Verdier, Paris School of Economics and CEPR

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Centre for Economic Policy Research
77 Bastwick Street, London EC1V 3PZ, UK
Tel: (44 20) 7183 8801, Fax: (44 20) 7183 8820
Email: cepr@cepr.org, Website: www.cepr.org

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ABSTRACT

Globalization, Credence Goods and International Civil Society*

The process of globalization is characterized by an impressive growth in global value chains, as well as the proliferation of non-governmental organizations (NGOs) interacting with production and sourcing decisions of multinational firms. In this paper, we present a simple North-South model of international trade allowing for the joint emergence of firm offshoring to South and NGO activism financed by donations from the civil society. In our model northern consumers care about unobservable "credence" characteristics of goods such as the environmental and social impact of production. The analysis highlights a complementarity between the growth of global value chains and the emergence of NGOs: for a range of trade costs potential NGO emergence allows firms to capture gains from globalization, which would otherwise be unattainable. We show that, somewhat paradoxically, when offshoring triggers NGO emergence, this can be at the expense of the consumers, who for a range of trade costs, would be better-off in a world without NGOs. In an extension we show that NGOs may also crowd out investment in regulatory capacities in low cost countries, as consumers in North have a willingness to fund NGOs providing a substitute for regulation in South.

JEL Classification: F23, F61 and L31
Keywords: globalization, multinationals, NGOs and regulation

Sebastian Krautheim
Goethe University Frankfurt
RuW, Postbox 47
Grueneburgplatz 1
60323 Frankfurt am Main
GERMANY

Email: sebastian.krautheim@eui.eu

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Thierry Verdier
Paris School of Economics
48 Boulevard Jourdan
75014 Paris
FRANCE

Email: verdier@pse.ens.fr

For further Discussion Papers by this author see:
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1 Introduction

In the recent decades, globalization has been characterized by two remarkable features. The first one, widely noted by economists, concerns the impressive growth in global value chains, production networks and offshoring activities spanning across national borders. As commonly argued, this phenomenon is directly related to enhanced coordination and communication capacities of international corporations. This development is also believed to yield efficiency gains from trade associated with the exploitation of economies of scale in production and/or differences in factor endowments and technologies across countries.

The second phenomenon, somewhat less studied by economic scholars, is the proliferation of non-governmental organizations (NGOs) and activism across a wide variety of areas related to global production and sourcing decisions by multinational firms. Earlier reports by the OECD mention an increase from 1600 to 2500 NGOs within the twenty four member nations in the period 1980-1990 (Van Tuijl (1999)). Currently, however, the number of international NGOs is estimated to be over 23,000 (Union of International Associations (2012)). As highlighted in the press and other media, many of these NGOs significantly shape the socio-economic environment of international corporations on issues ranging from human rights to environmental standards and labor conditions.

In the United States and in Europe, NGOs have triggered several well-publicized scandals involving pollution, child labor, hazardous working conditions, excessive working hours, and poor wages in factories supplying major global brands. The case of Nike's *sweatshops* is probably one of the most notorious examples. After NGOs triggered a wave of media attention and harsh criticism of the company's practice leading to weak consumer demand and retail oversupply, in May 1998 Nike's CEO Phil Knight admitted that *"the Nike product has become synonymous with slave wages, forced overtime, and arbitrary abuse. I truly believe the American consumer doesn't want to buy products made under abusive conditions."* (quoted in Spar and La Mure (2003), p. 91). Following this statement, the company raised the minimum ages of sneaker and apparel workers, adopted U.S. clean air regulations in all of its factories, and expanded monitoring and educational programs to workers. Harrison and Scorse (2011) empirically identify the causal effect of the campaigns on these changes in the production process.

The campaign of the Rainforest Action Network (RAN) against Staples, the leading retailer for paper and office supplies in the U.S. with more than 1000 retail outlets and annual sales of $11 billion, is another example. The campaign included an extensive research effort on the use of

old growth rainforest woods in paper production for Staples as well as over 600 protests around the U.S. over a two year period. The campaign created large media attention and ultimately led Staples to agree to phase out the sale of products made from old growth rainforest wood and to obtain a minimum average of 30% of recycled paper products (O'Rourke (2005)).

An example for an ongoing campaign is the Detox Campaign by Greenpeace.[1] According to Greenpeace, a year long investigation on water pollution by textile factories in China preceded a campaign against major global brands like Nike, H&M, Lacoste and C&A. Confronting the companies with the threat of a negative PR campaign in 2011, a significant number of global brands agreed to eliminate hazardous chemicals across their entire supply chains by 2020.[2]

How are these two facets of globalization - multinationalization of the value chain and NGO activities - interrelated? How do they interact? Are NGOs obstructing or facilitating factors in the process of trade integration? What are the welfare implications of these interactions for consumers, donors, firms and governments? The purpose of this paper is to address some of these issues, building up a simple model of international trade and offshoring integrating the two dimensions of multinationalisation and NGO activism.

Our starting point is the idea that the mounting leverage of NGOs on trade related-issues is directly related to the fact that consumers in developed northern economies do not only care about the physical characteristics of goods. In addition they also are concerned about the *ethical* implications of their consumption decision related to whether environmental, labor and health standards are respected in the production process. As these features cannot be inferred from the final product they constitute credence characteristics implying an informational asymmetry between the firm and consumers (Feddersen and Gilligan (2001), Baksi and Bose (2007)). The relevance of such credence characteristics of goods is supported by survey evidence where a large fraction of consumers in developed countries reports preferences for ethical and environmentally friendly products along with a higher willingness to pay for such goods (see e.g. O'Rourke (2005) and Loureiro and Lotade (2005)).[3] This is also in line with findings from field experiments with fair trade and eco labels in US department stores and in eBay auctions, showing that consumers express higher demand as well as a higher willingness to pay for labeled products (Hiscox and

[1] See http://www.greenpeace.org/international/en/campaigns/toxics/water/detox/intro/ (accessed October 2012) for information on the campaign provided by Greenpaece.

[2] Other examples of related campaigns can be found at http://www.cleanclothes.org/ (Clean Clothes Campaign, accessed October 2012) and on http://www.laborrights.org/ (International Labor Rights Forum, accessed October 2012).

[3] Whether the strong preference of such a large number of consumers found in most surveys is plausible or rather due to the fact that in surveys no actual purchasing decisions are taken into account is still a matter of debate (see e.g. O'Rourke (2005) and Vogel (2008)).

Smyth (2011), Hainmueller and Hiscox (2012)).

Regulation is the natural response to asymmetric information and related market failures associated with credence goods. When all or most of the production takes place in their domestic market, northern governments can ensure that appropriate national regulations are enforced. Multinationalization and delocalization of production, however, put natural limits on national regulation. Moreover, the spread of production to poorer, southern economies implies that an increasing proportion of production for the global market takes place in locations with weak institutional and governance capacities. These institutional asymmetries between northern and southern countries and the limits of national regulatory enforcement powers, create a "governance deficit" (Gereffi and Mayer (2006)) and consequently a need and a demand for other forms of regulations (*private regulation*) provided by civil society actors: NGOs.[4] Global value chains of production in a world with asymmetric regulatory institutions and trade-related NGOs are therefore jointly interacting phenomena characterizing the process of globalization.

In order to illustrate these ideas and investigate their implications, we construct a simple model of international trade allowing for the joint emergence of multinationalization and NGO activism. More precisely, we propose a partial equilibrium model with one firm serving a domestic market (North). Consumers in that market do not only care about consumption of the good, but are also concerned about the technology used for production. The production technology used is unobservable to consumers and therefore constitutes a credence characteristic of the good. The firm can choose to use a 'dirty' technology or to upgrade to a 'clean' technology. The dirty technology has effects that are undesired by the consumer. We think of these effects as pollution or poor labor and health standards which the consumer worries about although she is not directly affected. The firm can choose to produce in North or to offshore its production chain to a poor developing country (South). In South, production costs are lower, but the firm has to incur a transport cost to serve consumers in North. When the firm upgrades to a clean technology, this implies a higher variable cost of production.

We assume that North is endowed with a perfect institutional regulatory capacity and that technology upgrading is enforced by the government through regulation. In the baseline model, South has no such enforcement capacity. When production occurs in this country, consumers may observe the technology used by the firm with some probability. When a firm is identified as dirty, demand drops to zero. An identified clean firm gets the full demand. Unidentified

[4] A large strand of the political science literature has, among others, coined the terms of 'transnational civil society', 'transnational civil activism' and 'global civil society' to describe the phenomenon (Vogel (2008)).

firms, however, face an intermediate demand which depends on the expected probability of clean production. Given this, a multinational firm using the dirty technology in South will always find it optimal to pretend to be clean by mimicking the behavior of a clean firm, i.e. setting the same price and quantity.

An international NGO created by some motivated agent (an NGO entrepreneur) can incentivize the upgrading to the clean technology by increasing the probability that the true type of the firm is revealed to consumers. We assume that this NGO needs to be financed by donations that are collected from the consumer-donors from the North. The NGO does so through fundraising campaigns that motivate consumers to provide donations for its activities.

In such a setting, we discuss how globalization (as captured by lower transport cost or better access to markets) in sectors where the credence dimension of goods is important, interacts with demand for and provision of private regulation through NGOs.

Our first contribution is to characterize the conditions under which there is the joint development of offshoring and international NGOs financed by donations from northern consumers. Specifically, we show that globalization can trigger the emergence of NGOs monitoring multinational corporations. Indeed a strong enough reduction of transportation or trade costs creates incentives for the firm to locate production in South and to choose the dirty technology, given the weak regulatory environment of that country. This in turn generates a demand by consumers for private monitoring by an NGO as a substitute for domestic regulation. Correspondingly, the scope for financing by donations of northern consumers can be high enough to allow the creation of such an organization by a motivated NGO entrepreneur.

More interestingly, and somewhat paradoxically, we highlight a complementarity between the growth of global value chains and the emergence of NGOs monitoring production of credence goods. The possibility of NGO emergence allows firms to capture more of the standard efficiency gains from globalization than in a world without NGOs. When offshoring, the firm faces a dilemma. Its profits would be maximized it if could use the dirty technology without losing demand. As consumers know about the firms' incentives to choose the dirty technology, they revise downwards their expectations on the likelihood of clean production and adjust their demand accordingly. This can lead to situations in which both consumers and the firm would be better off if the firm could commit to clean production. The emergence of an NGO can reduce the commitment problem of the firm by increasing the incentive for clean production, leading consumers to adjust their expectation on the technology used and increase demand. This implies

the possibility for international offshoring and NGO activism to be *complements*: the presence of an NGO enables the firm to offshore at higher levels of trade costs than it otherwise could. Conversely, delocalization by the firm triggers a demand for private regulation that is at the source of NGO emergence.

Our second contribution is to investigate the welfare properties of trade integration. The model highlights the ambiguous effects international integration can have on the production of credence goods in a global economy with asymmetric regulatory capacities. On the one hand, by locating in a country with weak governance structures (the South), the firm is more likely to choose the dirty technology. On the other hand, through the emergence of NGOs monitoring the firm, the globalization process triggers a countervailing reaction. This countervailing regulation mechanism, however, does not lead to the first best optimum for two reasons. First, being financed by voluntary contributions, the NGO needs to overcome the free rider problem of public goods provision: the NGO has to spend costly resources on fundraising in order to convince consumers to donate. Second, the NGO is less efficient in monitoring the firm in the international context than the North government is in its own jurisdiction.

We show that in our model, offshoring can take place at the expense of consumers translating into an overall welfare loss in North. The intuition behind this result is that there is a range of trade costs for which consumers would prefer the firm to produce in Home, while the firm would want to offshore but only in the presence of an NGO. As the firm is the one to decide on offshoring, it has a first mover advantage. It can offshore taking into account that this will induce consumers to finance an NGO. For a range of trade costs the firm offshores at the expense of consumers: offshoring (weakly) increases firm profits but leads to a fall in consumer surplus, reducing social welfare in North. Only for higher degrees of globalization (lower trade costs) is this effect gradually offset by the standard gains from trade associated with lower costs of production in South.

Upon offshoring of the firm, consumers lose for two reasons. Facing the offshoring decision of the firm, consumers bear the cost of financing the NGO, which reduces their surplus. Moreover, there is a second reason why the interests of the firm and consumers are not aligned. It is related to the signalling problem associated with credence goods for the firm. Typically when choosing offshoring, the firm decides between a dirty or clean technology with positive probabilities. In this case the risk of being identified as a dirty firm is compensated through the lower production cost of dirty production. In order not to be identified when choosing the dirty technology, the

firm has to mimic the price and quantity choices corresponding to the clean technology. The cost advantage of dirty production therefore is not passed on to consumers and goes fully into the profits of the firm. This implies that at a level of trade costs at which the firm is indifferent between offshoring and staying in North, consumers are not. Indeed, they do not receive any compensation for the possible loss in surplus when the firm is revealed to be dirty and demand drops to zero.

Our third contribution in this paper is to extend our perspective on global production chains and international NGO activism when the national regulatory system in South is endogenous and affected by the governments' investment in capacity building. Specifically, we show that the emergence of an international NGO sector may actually crowd out the incentives of a southern government to invest in local regulatory capacities that would fit the credence needs of northern consumers. The reason for this is simple. The southern government may underinvest in regulations, expecting sensitive consumers in northern markets to finance NGOs filling that gap. The existence of NGOs may therefore crowd out the implementation of effective public regulations in exporting countries. We show that this crowding out is more likely to occur when northern consumers are more likely to ask for such regulatory mechanisms, the NGO technology is efficient at monitoring the multinational and when there are important efficiency gains from trade associated with offshoring.

The remainder of the paper is structured as follows. Section 2 discusses the related literature. Section 3 presents the baseline model. Section 4 characterizes the globalization equilibrium and highlights the complementarity between international offshoring and NGO activism. In section 5 we discuss the normative implications of globalization. Section 6 extends the framework to endogenous regulatory capacity in South. Section 7 presents conclusions and avenues for future research.

2 Literature

Our paper makes a contribution to the international economics literature as it addresses the positive and normative effects of international trade in credence goods in the absence of international governmental regulatory systems. It also relates to several strands of literature in other fields.

At a general level, our paper first builds on the informal insights of Gereffi and Mayer (2006) and Mayer and Gereffi (2010) who emphasize that the current round of economic globalization

created a global "governance deficit" in the production value chain, characterized by limited capacities in emerging economies, weak international institutions, increasingly challenged institutions in advanced industrial countries, and everywhere greater emphasis on facilitation than on regulation or redistribution. Consistent with our framework, they argue that because of the deregulation of public forms of governance and the broader governance deficit, social pressures generated by globalization have found expression in a variety of private governance experiments, ranging from voluntary efforts to expand Corporate Social Responsibility (CSR) across the supply chain, to NGO activist and consumer pressure for ethical sourcing.

On the more analytical side, our paper also builds first upon the economic literature on non-profit organizations and NGO functioning. This literature focuses specifically on non profit competition for contractual aid projects (Chau and Huysentruyt (2006)), monopolistic competition on the donation market (Economides and Rose-Ackerman (1993); Pestieau and Sato (2006)), fundraising competition between NGOs and diversion of funds (Castaneda et al. (2008), Aldashev and Verdier (2010)), or NGOs as platforms in the two-sided "aid" market between donors and recipients when there are problems of moral hazard and adverse selection (Rowat and Seabright (2006)). None of these papers though consider the issue of globalization and the emergence of NGOs in this process.

Closer to us, Aldashev and Verdier (2009) consider the issue of emergence of international NGOs. The focus, however, is different. Their analysis provides a supply side driven explanation for the existence of international NGOs, as it concentrates on the role of fund raising technologies in the international competition for donations, assuming an exogenous demand for NGO services. The current paper in contrast provides a demand driven explanation for the surge of international NGOs, as it emphasizes the role of offshoring of credence good production in a context of asymmetric national regulatory capacities, as the source of an endogenous demand for NGO services.

In our baseline model (as well as in an extension in the Appendix), we view the emergence of an NGO as coming from the initiative of an intrinsically motivated agent that needs to raise funds to set up the organization. In this sense, our work also relates to the literature on non-profit firms and motivated agents (see e.g. Benabou and Tirole (2003), Francois (2003), Besley and Ghatak (2005)).

Our piece of work also contributes to the recent economic literature on the determinants and effects of CSR of firms surveyed by Kitzmueller and Shimshack (2012). Starting with Baron

(2001), this literature considers the role of *private politics* and CSR focusing on different aspects of the interaction between firms and activist groups (NGOs) and how these interaction affects corporate decisions on production, lobbying and advertising (Baron and Diermeier (2007), Baron (2009))[5], or patterns of competition and market structure outcomes (Aldashev, Limardi and Verdier (2011). In contrast to our paper, this literature is mainly concerned about the actions of pre-existing agents and therefore does not focus on the endogenous emergence of NGOs. In addition, the aspect of internationalization of production has not received much attention in the CSR literature (Kitzmueller (2011) is a notable exception)[6]. Our paper contributes to the CSR literature by investigating the CSR investment of a firm (clean instead of dirty production) that can choose the production location facing the potential emergence of an international NGO.

Our paper also connects to the literature on CSR and the private provision of public goods (see e.g. Bagnoli and Watts (2003) and Kotchen (2006)). The most related paper in this literature is Besley and Ghatak (2007) where perfectly competitive firms serve consumers that do and consumers that do not care about a public good which can be provided along with the production of a private good. They find that firms specialize in the production of the private good either with or without the public good component. Therefore in equilibrium, both caring and non-caring consumers are served. In their setup the level of provision of the public good through CSR is identical to the level obtained with voluntary contributions. They show that when firms cannot credibly commit to 'clean' production the equilibrium provision of the public good is lower. They also consider the possibility that the public good is directly provided by an NGO. We take a very different view on NGOs as the NGO in our model does not directly provide a public good, but rather incentivizes the firm to do so. In addition, they do not consider the international dimension of CSR provision and how it relates to globalization.

Kitzmueller (2011) takes the setup of Besley and Ghatak (2007) to the international level and considers the location choice of multinationals as well as the scope for government regulation in this context. In his model firms face a trade off between lower production cost in the South and better transparency in CSR provision (increasing demand) in the North. This setting is similar to our modeling of lower production costs and lower probability of detection abroad. The focus in Kitzmueller (2011) is on the constraints informational asymmetries between locations put on national regulation and the scope for policy coordination. In our analysis we focus on

[5] See also Calveras et al. (2007), Feddersen and Gilligan (2001), Innes (2006) and Heyes and Maxwell (2004) and Baron (2011).

[6] Another somewhat less related exception is Balboni and Balboni (2009).

the endogenous emergence of NGOs as a response to informational asymmetries and how this affects welfare effects of globalization.

In Immordino (2008) a multinational firm allocates a fraction of its production to the South where wages and labor standards are potentially different from the North. Some consumers care about labor standards and are informed about their application in the two countries. This exogenous fraction of caring informed consumers is interpreted as the manifestation of NGO activity. The focus of the analysis is on the game between the North and the South government in setting labor standards. This competition provides an incentive for mutual undercutting, possibly leading to a race to the bottom. This mechanism is the stronger the larger the number of informed caring consumers, leading to the result that there are welfare losses in both countries when more consumers care and are informed.

3 Basic setup

3.1 Preference for 'clean goods'

We consider an economy (the North) with a continuum of individuals (of mass $L = 1$) consuming a numeraire good and a "credence good". As introduced by Darby and Karni (1973), credence goods are goods whose qualities are expensive to judge or even impossible to be inferred by consumers after their purchase. This is in general the case for products that are vertically differentiated by process attributes. Examples include smartphones that are produced under decent workplace conditions respecting health and safety standards - or not, soccer balls that are stitched by children - or not or clothing that is made complying with environmental laws - or not.

The typical assumption made is that consumers know what they want or need, but do not actually know what they get. In order to capture this idea, we consider the following utility from consumption for a given consumer:

$$U = c_0 + IQ - \frac{Q^2}{2}.$$

c_0 is the level of consumption of a bundle of goods. In addition, consumers get utility from consumption of a differentiated good produced by a monopolist. The quantity of this good consumed is Q. Consumers do not only care about the physical properties of the good, but also about the technology used for production. Specifically, we assume that the valuation of the

good is high when it was produced with a 'clean' technology and low if it was produced with a 'dirty' technology. This is reflected by the indicator variable I which equals one if the good is clean, and zero otherwise. Expected utility is then given by:

$$E(U) = c_0 + q^e Q - \frac{Q^2}{2}$$

where q^e is the expectation formed by the consumer on the probability that the good was produced with a clean technology.[7] This implies that demand is given by:

$$Q = \max\{q^e - p, 0\}. \tag{1}$$

3.2 Firms:

We model a monopolist that produces with a constant returns to scale technology. Depending on technology- and location choices, the firm faces different variable costs of production. The firm can choose between a clean and a dirty technology. We assume that in the Home country (North) regulations exist, which do not allow the use of the dirty technology. For simplicity, we assume that enforcement by the Home government is perfect and costless.[8] We denote the cost of production in Home by c_H.

When the firm chooses to locate production in Foreign (South), it faces imperfect enforcement and can therefore choose between clean production with a marginal cost of c and dirty production with a lower marginal cost of $c - \Delta$ with $\Delta \in (0, c)$.

The marginal cost c includes both the cost of production and the trade cost of shipping the output produced back to Home, where the consumer is located. We model globalization as a decrease in trade costs, which maps into a decrease in c.

In the absence of an NGO, there is an exogenous probability of π_0 that the technology used by the firm is revealed to consumers. If the firm is revealed to be clean (1) implies that demand is given by $Q_c = 1 - p$ and zero (or negative) in the latter case. With probability $(1 - \pi_0)$ the type of the firm is not revealed to consumers. In this case, the intercept of the demand function in (1) is the expected probability of the firm being clean q^e.

The firm chooses the production location, the technology (clean or dirty) and its optimal price. If the firm produces in Home under perfect enforcement, the standard problem of the

[7] Note that consumption of the good does not reveal whether it was of the clean or dirty type.
[8] Both assumptions could be relaxed without changing the qualitative results.

monopolist delivers:

$$p_H = \frac{1 + c_H}{2}$$

which implies profits of

$$\Pi_H = \frac{(1 - c_H)^2}{4}.$$

If the firm chooses to offshore, it has to choose between the clean and the dirty technology. In both cases demand and therefore the optimal price depend on whether consumers know the type of the firm or not. A clean firm optimally sets:

$$p_c = \begin{cases} \frac{1+c}{2} & \text{if identified} \\ \frac{q^e+c}{2} & \text{if not identified.} \end{cases} \tag{2}$$

The corresponding profits are:

$$\Pi_c = \begin{cases} \frac{(1-c)^2}{4} & \text{if identified} \\ \frac{(q^e-c)^2}{4} & \text{if not identified.} \end{cases}$$

While for the credence good, the production technology cannot be inferred from the final product, consumers do know the cost structures and demand. This implies that when the firm sets a price that differs from the optimal price of a clean firm, consumers infer that the firm must be dirty and therefore demand drops to zero. If the firm chooses the dirty technology, it is therefore forced 'mimick' the clean firm and to set its price according to an unidentified clean firm in equation (2). Its profits are then given by:

$$\Pi = \frac{(q_i^e - c)^2}{4} + \Delta \frac{(q_i^e - c)}{2}.$$

For the offshoring decision of the firm, we distinguish between two cases $i \in \{0, 1\}$ where '0' stands for the case without NGO and '1' for the case where an NGO exists. While there is no scope for an NGO as long as the firm produces in Home under perfect enforcement, this is different when the firm chooses to produce abroad. If an NGO is active, it increases the probability that the type of technology used by the firm is revealed to consumers to $\pi_1 > \pi_0$. It will be convenient for the sequel to assume a minimum level of detection without an NGO: $\pi_0 > 0.1$.

The probability consumers attach to clean production of the offshoring firm is given by q_i^e. In an

expectation consistent equilibrium, this expected probability has to equal the true probability chosen by the firm.[9] We have to distinguish two possible cases. When expected profits of clean production are larger than expected profits from dirty production, the firm will always choose to be clean ($q^e = 1$). In an interior solution of $0 < q^e < 1$, expected profits of clean and dirty production must be the same.[10] This implies:

$$\pi_i \frac{(1-c)^2}{4} + (1-\pi_i)\frac{(q_i^e - c)^2}{4} = \pi_i \cdot 0 + (1-\pi_i)\left[\frac{(q_i^e - c)^2}{4} + \Delta\frac{(q_i^e - c)}{2}\right] \tag{3}$$

$$\Rightarrow (q_i^e - c) = \frac{1}{\Delta} \cdot \frac{(1-c)^2}{2} \cdot \frac{\pi_i}{1-\pi_i}. \tag{4}$$

This equality pins down the q_i^e for which the firm is indifferent between clean and dirty production abroad. Unless otherwise mentioned, we focus the analysis on the case of the interior solution. We therefore impose the following sufficient condition, for $q^e \in (0,1)$:

$$\textbf{Assumption 1}\text{: } \frac{1-\pi_1}{\pi_1}\Delta > \frac{1-c}{2}.$$

This condition tends to be violated when the detection probability in the presence of an NGO π_1 is high, the cost advantage of dirty production Δ is low and when overall production costs are low.

3.3 Expected profits and expected consumer surplus

The optimal location, production and technology choices of the firm are determined by expected profits without and with an NGO ($i \in \{0,1\}$). These are given by:

$$E(\Pi_i) = \pi_i \cdot \frac{(1-c)^2}{4} + (1-\pi_i)\frac{(q_i^e - c)^2}{4}. \tag{5}$$

[9] In the pooling equilibrium in which a dirty firm mimicks a clean firm with a price strategy p, each consumer revises her belief that the firm is using a clean technology according to Bayes Law. This belief writes as $q^e = \Pr(clean \mid p)$ which gives:

$$\begin{aligned}\Pr(clean \mid p) &= \frac{\Pr(p \mid clean)\cdot\Pr(clean)}{\Pr(p \mid clean)\cdot\Pr(clean) + \Pr(p \mid dirty)\cdot\Pr(dirty)} \\ &= \frac{1\cdot\Pr(clean)}{1\cdot\Pr(clean) + 1\cdot\Pr(dirty)} = \Pr(clean)\end{aligned}$$

where $\Pr(clean)$ (respectively $\Pr(dirty) = 1 - \Pr(clean)$) are the mixed equilibrium strategy probabilities of the firm to choose a clean (respectively a dirty) technology when it offshores.

[10] Note that $q^e = 0$ cannot be a solution, as in this case demand would be zero.

By (4) this implies:

$$E(\Pi_i) = \pi_i \frac{(1-c)^2}{4}\left[1 + \frac{\pi_i}{1-\pi_i}\frac{(1-c)^2}{4}\frac{1}{\Delta^2}\right]. \tag{6}$$

Note that equation (5) is just the left hand side of equation (3) representing expected profits of a clean firm. In an interior solution this equals expected profits of a dirty firm. Equation (5) implies that the production cost level c affects expected profits through two channels. The first term in equation (5) represents expected profits when the product is identified as clean. Through this channel, a lower cost c leads to higher profits as demand is unaffected. In the second case, the product is not identified as clean, so that consumers form an expectation about the probability of the good being clean, q^e. Equation (4) implies that $q^e - c$ increases when c falls. This opens a second channel for the impact of globalization: the cost level c affects the expectations consumers form on the probability of clean production.

The corresponding expected consumer surplus in the two cases is:

$$E(W_i) = q_i^e \pi_i \frac{(1-c)^2}{8} + (1-\pi_i)\frac{(q_i^e - c)^2}{8}. \tag{7}$$

By (4) this implies:

$$E(W_i) = \pi_i \frac{(1-c)^2}{8}\left[q_i^e + \frac{\pi_i}{(1-\pi_i)}\frac{(1-c)^2}{4}\frac{1}{\Delta^2}\right]. \tag{8}$$

The differences between expected profits and expected consumer surplus are crucial for the mechanics of the model. Comparing equations (5) and (7) first note that, besides the factor 1/2, the last terms are identical. These terms reflect the situation where the type of the firm is not revealed to consumers. The first term in (5) represents profits of an identified clean firm. The corresponding term in (7) includes a q_i^e and represents surplus of consuming an identified clean good. With probability $\pi_i(1-q^e)$, however, the good is identified as dirty and therefore surplus is zero.

To see the intuition behind this difference between expected profits and consumer surplus, first note that by the indifference condition in (3), (5) also equals expected profits of a dirty firm. The dirty firm is compensated for the risk of being identified (and therefore facing zero demand) by the cost advantage of dirty production. This lower cost, however, is not passed on to the consumers. This implies that consumers are not compensated for the possibility of a zero surplus when the firm chooses the dirty technology and is caught. This is key for the pattern discussed in detail below that firm and consumer preferences for offshoring are not aligned.

3.4 The NGO

In our model a motivated agent can decide to create an NGO which monitors the technology used by the firm. We assume that the NGO technology is such that the detection probability increases from π_0 to π_1 once the firm is monitored by an NGO.[11]

While most consumers only care about whether the good they consume was produced with a clean or with a dirty technology, the motivated agent additionally cares about the possibility of dirty production in itself. When she faces a situation where the probability of dirty production $(1 - q^e)$ is positive, she gets utility from 'fighting dirty production' i.e. from creating an NGO. This utility is independent of the actual level of the probability of dirty production: as soon as it is above zero, the motivated agent is ready to start monitoring the firm.

NGO creation requires both a monetary fixed cost X and an effort fixed cost e. To avoid effects on aggregate welfare, we normalize the utility the motivated agent gets from fighting dirty production to be marginally higher than the fixed effort cost.[12] This implies that the motivated agent will set up an NGO as soon as there is some positive probability of dirty production and she is able to raise sufficient funds to cover the fixed cost X. In the appendix, we provide a more sophisticated microfounded model of the NGO entrepreneurial behavior where fundraising depends on two complementary inputs: cash and effort. We show that the model provides the same insights as the simplified version that we present here in the main text.[13]

If an NGO is active it increases the detection probability to $\pi_1 > \pi_0$. This requires a fixed

[11] We assume that any additional NGO monitoring the same firm would not lead to an additional increase in the detection probability. We therefore do not have to take a stand on the number of motivated agents in the economy, as for the firm we consider, at most one NGO will emerge.

[12] As the motivated agent running the NGO is small compared to the mass of consumers, aggregate welfare would not be affected, even if this assumption was relaxed. As we abstract from any intensive margin (monitoring intensity) choices of the NGO, all that matters is that the utility of fighting dirty production exceeds the effort cost e.

[13] In our model the NGO provides monitoring services in the foreign country that cannot be provided by the northern government. As consumers demand such services, they could in principle also be provided by for profit firms, similar to rating agencies in the financial sector. An important element of NGO campaigns is the acquisition of relevant information on production technologies used in foreign countries even if this is not in the interest of the monitored firm (O'Rourke (2005)). Not-for-profit organizations have an advantage in acquiring and publishing such information for several reasons. They are more likely to hire intrinsically motivated agents that are reluctant to accept bribes by the monitored firm. Their not-for-profit constraint makes it more difficult for the monitored firm to collude with them through financial transfers (as these have to be non pecuniary benefits). These features give a credibility advantage to the NGO which is also reflected in surveys where NGOs are repeatedly found to be the most trusted institutions before government, business and media (see e.g. the Edelman Trust Barometer, http://trust.edelman.com/trust-download/global-results/ accessed October 2012). In addition, NGOs have cost advantages over for profit firms as they can largely rely on the help of volunteers e.g. for verifying compliance of firms on the retail level. Moreover, NGOs are less likely than for profit organizations to run the risk of being sued by the targeted firm, as they often have loose organizational structures that can be easily dissolved and recreated under new names. In fact, it seems hard to imagine that campaigns including a call for a consumer boycott of e.g. Nike, Staples,Inc or Shell could be run by for-profit firms, without enormous legal costs putting the profit objective at stake.

investment of X, which needs to be financed with fundraising. As donors are small, they would usually have an incentive to free ride on the donations of others, leading to zero donations to the NGO. A model of NGO financing needs to overcome this problem of free riding when the number of potential donors is large. The most common way to deal with the issue is to assume warm glow in preferences along the lines of Andreoni (1989, 1990) (see Bagnoli and Watts (2003) and Baron (2009) and references therein). In this case agents get a utility from the mere fact that they are contributing to the provision of the public good.

While the warm glow assumption is a very parsimonious way to overcome the free riding problem, it remains an unresolved question how the utility from donating through warm glow should be accounted for in the welfare analysis. As we will focus at some point on the welfare effects of globalization, we use an alternative approach.

Atkinson (2009) analyzes the marketing strategies of NGOs and argues that NGOs aim at convincing donors that their donation does make a difference e.g. by mapping each donor to a specific recipient - or at least to make the donor think that this is the case. We take a reduced form approach of this strategy by assuming that through the costly process of activating donors, the NGO overcomes the free riding problem of funding by making donors 'feel important'.

Specifically, the NGO can pay costly resources to 'activate' a fraction ν of consumers. An activated consumer believes that her donation is crucial to the ability of the NGO to be active. The NGO requests a donation x from each donor. An activated donor is convinced to make a difference and is willing to donate up to the point where the donation equals the gain in her personal consumer surplus implied by NGO existence. This implies the following participation constraint for donors: $x \leq E(W_1) - E(W_0)$.

First the firm decides whether or not to produce abroad. As enforcement in Home is assumed to be perfect, there is only scope for an NGO if the firm offshores.[14] In this case, the NGO chooses the fraction of donors to activate and makes them a take it or leave it offer. Next, activated donors decide whether or not to donate to the NGO. Finally, the NGO enters if it was able to raise sufficient funds.

The NGO minimizes fundraising costs φ subject to a fundraising constraint and a participation constraint for the donors:

$$\min_{\{\nu\}} \varphi(\nu)$$

[14]The assumption of perfect enforcement in Home is not key for the mechanics of the model, but simplifies the analysis.

subject to

$$\nu x - \varphi(\nu) \geq X \quad \text{and} \quad x \leq E(W_1) - E(W_0).$$

The second constraint implies that the gain of surplus the NGO gives to a donor must be larger or equal the amount donated.

For the maximum donation the NGO can extract from one particular individual, the participation constraint holds with equality: $x^* = E(W_1) - E(W_0)$. As activating additional donors is costly, the NGO will extract the maximum possible amount from each donor and choose the smallest possible fraction of consumers that still allows it to raise the funds X necessary for operation. Defining ν^* as this minimum fraction of consumers to be activated, we can write:

$$\nu^* x^* - \varphi(\nu^*) = X.$$

For tractability, we consider the case of a linear NGO cost function of the type $\varphi(\nu) = y\nu$. In the linear case the NGO optimality condition is given by:

$$x^* \nu^* - y\nu^* = X.$$

The optimal fraction ν^* is:

$$\nu^*(c) = \frac{X}{x^* - y}. \tag{9}$$

Note that the maximum individual donation x^*, and therefore also ν^*, is a function of the cost level c. This implies that the willingness to donate varies for different levels of globalization.

4 Globalization equilibrium

4.1 Firm Cutoffs:

We can now characterize the conditions for the firm to choose to produce abroad with and without the existence of an NGO. As the firm is the first mover, it takes into account the optimal response of the NGO to its offshoring decision. Define therefore $\bar{c}_i$ for $i \in \{0, 1\}$ the cutoff cost levels below which the firm chooses production abroad when the NGO does not enter ($i = 0$) and when an NGO emerges in response to the offshoring decision ($i = 1$). $\bar{c}_i$ is pinned

down by $\Pi_H = E(\Pi_i)(\bar{c}_i)$. This gives

$$\frac{(1-c_H)^2}{4} = \pi_i \frac{(1-\bar{c}_i)^2}{4} + (1-\pi_i)\frac{(q_i^e - \bar{c}_i)^2}{4}. \tag{10}$$

Using equation (4) and solving the resulting quadratic equation for $(1-\bar{c}_i)^2$ delivers:

$$(1-\bar{c}_i)^2 = \frac{1-\pi_i}{\pi_i}\ 2\ \Delta^2\ \left[\left(1 + \frac{(1-c_H)^2}{1-\pi_i}\ \frac{1}{\Delta^2}\right)^{\frac{1}{2}}\ - 1\right].$$

From this we have the first immediate result

Proposition 1. *Assume that assumption 1 holds.*

i) The cutoff productivity level below which the firm chooses production abroad is given by:

$$\begin{aligned} \bar{c}_0 &= \bar{c}(c_H, \pi_0, \Delta) \ \textit{ without the existence of an NGO} \\ \bar{c}_1 &= \bar{c}(c_H, \pi_1, \Delta) \ \textit{ with the existence of an NGO} \end{aligned}$$

where $\bar{c}_i(c_H, \pi_i, \Delta)$ is the following function:

$$\bar{c}_i(c_H, \pi_i, \Delta) = 1 - \sqrt{\frac{1-\pi_i}{\pi_i}\ 2\ \Delta^2\ \left[\left(1 + \frac{(1-c_H)^2}{1-\pi_i}\ \frac{1}{\Delta^2}\right)^{\frac{1}{2}}\ - 1\right]}.$$

ii) The function $\bar{c}_i(c_H, \pi_i, \Delta)$ is increasing in c_H, increasing in π_i, and decreasing in Δ.

Proof. See the appendix. □

Figure 1 provides a graphical illustration of Result 1. The three solid lines represent expected profits in the cases of autarky $E(\pi_H)$, offshoring without NGO $E(\pi_0)$ and offshoring with NGO $E(\pi_1)$. The thin dashed lines depict the cutoff levels with and without an NGO $\bar{c}_1$ and $\bar{c}_0$ at the intersections of the expected offshoring profits with autarky profits.

The intuition for the comparative statics is straightforward. First, a larger domestic cost c_H makes it more profitable for the firm to move abroad, in order to enjoy the lower local production costs there. This should therefore increase the threshold of such local costs below which there is offshoring. Second, better monitoring, as reflected by a higher probability of detection π_i, induces the firm to choose a good technology with a higher probability. This in turn makes consumers more confident about the characteristics of the credence good. The firm faces a lower

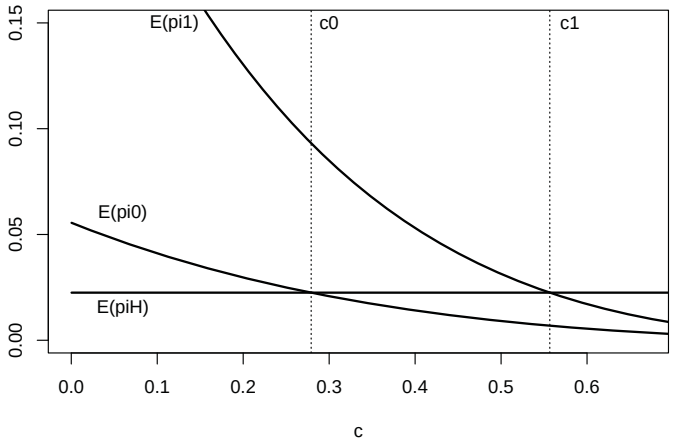

Figure 1: Expected profits as a function of offshoring cost c for the cases of production in Home $E(\pi_H)$, offshoring without NGO $E(\pi_0)$ and offshoring with NGO $E(\pi_1)$ (solid line). Dotted lines: offshoring cutoffs with and without an NGO ($\bar{c}_1$ and $\bar{c}_0$).

problem of credibility when moving abroad and enjoys a larger market and larger profits when delocalizing production abroad. This makes the decision to move more likely, again increasing the threshold $\bar{c}$. Finally a larger value of Δ induces a higher temptation to the firm to choose the bad technology when it moves abroad. As consumers are integrating this fact in their beliefs, the resulting market size is reduced, discouraging therefore the incentives for the firm to move abroad; as a consequence the threshold cost below which the firm chooses production abroad is reduced.

4.2 NGO Cutoff

Given that there is a cost of activating additional donors, but no cost of requesting additional funds from activated donors, the NGO will always extract the maximum donation from each donor. At a cost level of c, this donation is given by:

$$x(c)^* = E(W_1) - E(W_0) = (q_1^e \pi_1 - q_0^e \pi_0)\frac{(1-c)^2}{8} + \frac{(1-c)^4}{32}\frac{1}{\Delta^2}\left[\frac{\pi_1^2}{(1-\pi_1)} - \frac{\pi_0^2}{(1-\pi_0)}\right].$$

By (4) this gives:

$$x(c)^* = c\ (\pi_1 - \pi_0)\frac{(1-c)^2}{8} + \frac{(1-c)^4}{32}\frac{1}{\Delta}\left[\frac{\pi_1^2}{1-\pi_1} - \frac{\pi_0^2}{1-\pi_0}\right]\left(2 + \frac{1}{\Delta}\right).$$

This maximum donation is the gain in consumer surplus that an individual consumer has

when the NGO enters. When the consumer is activated and faces the take it or leave it offer by the NGO, this is the maximum donation the NGO can extract from the donor. We can therefore state the following proposition:

Proposition 2. *Assume that assumption 1 holds. Then we have:*

(i) The maximum donation the NGO can extract from an individual donor x^* is given by:

$$x^* = x^*(c, \pi_1, \pi_0, \Delta) = c\ (\pi_1 - \pi_0)\frac{(1-c)^2}{8} + \frac{(1-c)^4}{32}\frac{1}{\Delta}\left[\frac{\pi_1^2}{1-\pi_1} - \frac{\pi_0^2}{1-\pi_0}\right]\left(2 + \frac{1}{\Delta}\right). \quad (11)$$

(ii) Stronger globalization leads to an increase in the maximum donation when $\pi_0 > 1/10$ (i.e. $\frac{\partial x^*}{\partial c} < 0$).[15]

(iii) A higher detection probability with an NGO π_1, a lower detection probability without an NGO π_0 and a lower cost advantage of dirty production Δ imply a higher maximum donation, (i.e. $\frac{\partial x^*}{\partial \pi_1} > 0$, $\frac{\partial x^*}{\partial \pi_0} < 0$ and $\frac{\partial x^*}{\partial \Delta} < 0$).

Proof. See the appendix. □

With the linear cost function the marginal cost of activating an additional donor is constant. The NGO can therefore raise additional funds by activating more donors if the marginal cost of doing so is lower than the individual willingness to pay i.e. $x^* > y$. As the NGO needs to finance a fixed amount X, it can only enter if the funds it can raise when all consumers are activated are large enough, namely $x(c) - y \geq X$.

Define $\bar{c}_N$ as the cost level for which (conditional on offshoring of the firm) the NGO would be able to raise sufficient funds to start operating. With the linear cost function this is the case for $\nu^* = 1$. The NGO cutoff is therefore pinned down by:

$$E(W_1)(\bar{c}_N) - E(W_0)(\bar{c}_N) - y = x^*(\bar{c}_N, \pi_1, \pi_0, \Delta) - y = X. \quad (12)$$

and we have the following result:

Proposition 3. *Assume that assumption 1 holds and that $\pi_0 > 1/10$. We then have:*

(i) The NGO cutoff for entry $\bar{c}_N$ is implicitly determined by the following equation :

$$x^*(\bar{c}_N, \pi_1, \pi_0, \Delta) = X + y \quad (13)$$

[15] Using numerical maximization, it can be shown that the much lower value of $\pi_0 > 0.019$ is a sufficient condition.

(ii) A low fixed cost of entry X and low fundraising marginal cost y, a high NGO detection probability π_1, a low baseline detection probability π_0 as well as a low cost advantage of dirty production Δ increase the NGO cutoff, i.e. $\frac{\partial \bar{c}_N}{\partial \pi_1} > 0$, $\frac{\partial \bar{c}_N}{\partial \pi_0} < 0$ and $\frac{\partial \bar{c}_N}{\partial \Delta} < 0$.

Proof. See the appendix. □

The NGO cutoff $\bar{c}_N$ is the highest cost level for which - conditional on offshoring of the firm - the NGO can raise sufficient funds to operate. Equation (13) delivers an implicit solution for this cutoff cost level. Clearly, anything that increases the willingness to donate of an individual consumer x^* relaxes the constraint of the NGO and makes NGO emergence for higher cost levels possible. In particular, when the detection technology of the NGO is more efficient (high value of π_1 compared to π_0) the willingness to donate is high and "early" NGO entry is possible.[16] The level of the cost advantage of dirty production Δ also affects the impact of the NGO: a high Δ creates a strong incentive for the firm to choose the dirty technology, which reduces the desired impact of the NGO on the probability of clean production and therefore reduces the willingness to donate.

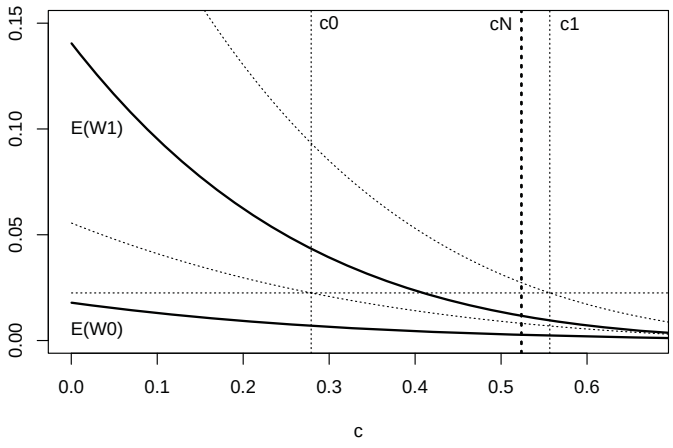

Figure 2: Pattern of expected consumer surplus with NGO $E(W_1)$ and without NGO $E(W_0)$ (solid lines) as a function of the cost level c. Thin dotted lines: expected profits and firm cutoffs from Figure 1. Vertical dashed line: NGO cutoff $\bar{c}_N$.

Figure 2 provides a graphical illustration. The graph plots all the elements concerning the optimal choices of the firm (expected profits and cutoffs) from Figure 1 as thin dotted lines.

[16] It is well understood that this is not a dynamic model. The term "early" is used to refer to the (higher) cost levels corresponding to earlier stages of globalization.

The thick solid lines represent expected consumer surplus with an NGO $E(W_1)$ and without an NGO $E(W_0)$. Their difference gives the willingness to donate $x^*(c)$. It can be seen that the willingness to donate increases for lower values of c i.e. for stronger globalization. The vertical dashed line represents the resulting NGO cutoff $\bar{c}_N$.[17]

An increase in the difference between the two solid lines implies an increased willingness to donate and therefore shifts the NGO cutoff level to the right. Such an increase can be triggered by an increase in π_1 (shifting the solid curve up) or a decrease in π_0 (shifting the dashed line down). A decrease in the cost advantage of dirty production Δ also increases the difference between the two curves by shifting up both of them, but the solid line by more. The intuition is that a lower Δ reduces the incentive for dirty production and therefore makes the firm more responsive to an increased detection probability.[18]

4.3 The globalization cutoff

We now know under which condition on the degree of globalization the NGO enters and also the cutoff levels of the firm with and without the existence of an NGO. Define $\bar{c}_g$ as the 'globalization cutoff', i.e. the cost level at which the firm goes global. This cutoff is given by $\bar{c}_g = \max\{\min\{\bar{c}_1, \bar{c}_N\}, \bar{c}_0\}$. There are therefore three cases to distinguish:

- *Case 1:* $\bar{c}_g = \bar{c}_1$ iff $\bar{c}_N \geq \bar{c}_1$. In this case, the NGO enters directly when the firm starts offshoring.

- *Case 2:* $\bar{c}_g = \bar{c}_N$ iff $\bar{c}_0 \leq \bar{c}_N \leq \bar{c}_1$. In this case, the firm would want to enter conditional on NGO existence early on, but the NGO only emerges for lower cost levels forcing the firm to postpone offshoring till $\bar{c}_N$ is reached.

- *Case 3:* $\bar{c}_g = \bar{c}_0$ iff $\bar{c}_N \leq \bar{c}_0$. In this case, NGO entry is so late that the firm offshores even without an NGO.[19]

To determine the globalization cutoff $\bar{c}_g$, we need to determine in which of the three cases considered above we are. To do so, we can use the fact that at $\bar{c}_N$ (and only there) we have $\nu^* = 1$. In which of the three cases we are depends on when (conditional on offshoring of the firm) the NGO is able to raise sufficient funds.

[17] Note that assumption 1 ensures that we have interior solutions for q^e. If this assumption was violated, there would be a minimum cost level c_{min} below which no dirty production would take place and the NGO would not enter.

[18] Note that assumption 1 ensures that we have interior solutions for q^e. If this assumption was violated, there would be a minimum cost level c_{min} below which no dirty production would take place and the NGO would not enter.

[19] Note that the three cases are not mutually exclusive: $\bar{c}_g = \bar{c}_1 = \bar{c}_N$ is possible as well as $\bar{c}_g = \bar{c}_0 = \bar{c}_N$.

Proposition 4. *Assume that assumption 1 holds and that* $\pi_0 > 1/10$. *Let* $x^*(c, \pi_1, \pi_0, \Delta)$ *as defined in equation (11) then*

i) The globalization cutoff $\bar{c}_g$ *is given by:*

$$\bar{c}_g = \bar{c}_1 \quad \textit{if} \quad x^*(\bar{c}_1, \pi_1, \pi_0, \Delta) \geq X + y \qquad \textit{(Case 1)} \tag{14}$$

$$\bar{c}_g = \bar{c}_N \quad \textit{if} \quad x^*(\bar{c}_0, \pi_1, \pi_0, \Delta) \geq X + y \geq x^*(\bar{c}_1, \pi_1, \pi_0, \Delta) \qquad \textit{(Case 2)} \tag{15}$$

$$\bar{c}_g = \bar{c}_0 \quad \textit{if} \quad x^*(\bar{c}_0, \pi_1, \pi_0, \Delta) \leq X + y \qquad \textit{(Case 3).} \tag{16}$$

ii) Further, the globalization equilibrium is characterized in the following way:

iia) For $\bar{c}_g < c < c_H$, *there is no NGO and no offshoring.*

iib) When $\bar{c}_g \geq \bar{c}_0$ *(cases 1 and 2) and* $c \leq \bar{c}_g$ *there is offshoring with NGO monitoring and the clean technology is used with probability* q_1^e.

iic) When $\bar{c}_g \leq \bar{c}_0$ *(case 3) we have the following: for* $\bar{c}_N < c \leq \bar{c}_g$ *there is offshoring without NGO and the clean technology is used with probability* q_0^e; *for* $c \leq \bar{c}_N$, *there is offshoring with NGO monitoring and the clean technology is used with probability* q_1^e.

Proof. Proof see appendix. □

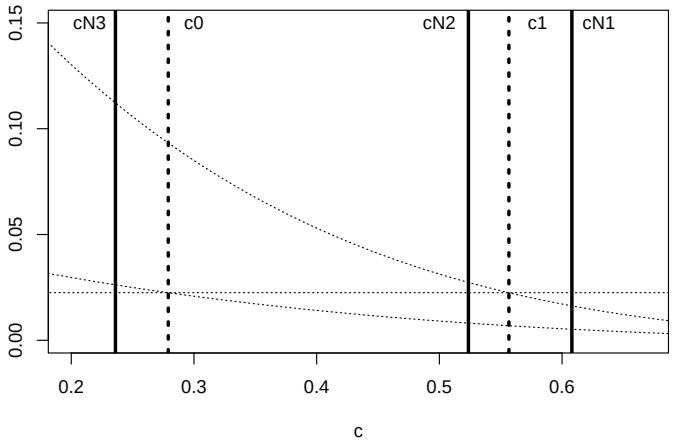

Figure 3: Three possible cases: depending on the parametrization, the NGO cutoff can be above, between or below the firm cutoffs $\bar{c}_1$ and $\bar{c}_0$. Thin dotted lines: expected profits with and without and NGO and under autarky from Figure 1. Thick dotted lines: offshoring cutoffs $\bar{c}_1$ and $\bar{c}_0$. Three solid vertical lines: cases 1, 2 and 3 with low, medium and high NGO funding requirements implying three different NGO cutoffs $\bar{c}_{N1}$, $\bar{c}_{N2}$ and $\bar{c}_{N3}$.

Figure 3 provides a graphical illustration of the three different cases. As before, the thin

dotted lines represent expected profits with and without and NGO and under autarky from Figure 1. The thick dotted lines are the corresponding cutoffs $\bar{c}_1$ and $\bar{c}_0$.

The graph considers three different funding requirements for the NGO, implying three different NGO cutoffs. These are represented by the three solid vertical lines. In case 1 ($\bar{c}_{N1}$) the funding requirement is relatively low, so that ($\bar{c}_{N1}$) $> \bar{c}_1$. Conditional on offshoring of the firm, at $\bar{c}_{N1}$ the NGO would be able to raise sufficient funds to operate setting $\nu = 1$. But at this high cost level we have $\Pi_H > E(\Pi_1) > E(\Pi_0)$ so that it does not pay for the firm to offshore even in the presence of an NGO. In case 1 the globalization cutoff $\bar{c}_g$ is therefore at $\bar{c}_1$, as at this cost level the firm offshores and the NGO enters activating only a fraction $\nu < 1$ of potential donors.

In case 2 ($\bar{c}_{N2}$) the funding requirement for the NGO is higher and the difference between $\tilde{W}_1$ and $\tilde{W}_0$ is only large enough to finance the NGO for a cost level below $\bar{c}_1$. As in this cost range the firm only offshores if an NGO exists, the globalization cutoff is given by $\bar{c}_g = \bar{c}_{N2} < \bar{c}_1$.

In case 3 the funding requirement is so high that an NGO emerges only very late in the process of globalization. At this point the firm has already started offshoring even in the absence of an NGO.

4.4 Complementarity of NGO and Offshoring

In this model the presence of an NGO makes it less attractive for the firm to choose the lowest cost technology, namely dirty production and offshoring. Nevertheless, the NGO does not impede offshoring, but actually makes it possible even for relatively high trade costs.

Proposition 5. *Assume that assumption 1 holds.*

(i) When $\min\{\bar{c}_1, \bar{c}_N\} > \bar{c}_0$ *(cases 1 and 2, where offshoring is associated with NGO entry) there is complementarity between the NGO and offshoring i.e. the endogenous emergence of the NGO enables the firm to offshore at higher cost levels c (at higher trade costs) than in a world without the possibility of NGO emergence. (ii) A better NGO detection technology* π_1 *and a lower cost advantage of dirty production* Δ *both induce offshoring for higher levels of trade costs.*

Proof. See the appendix. □

The reason why the presence of the NGO eases the offshoring of the firm lies in the preferences. As consumers care about the production technology used, the firm can never benefit

fully from the potential cost advantages of offshoring (i.e. choosing the dirty technology with probability one), as an increased probability of dirty production is punished by consumers with lower demand.

If the cost of clean production abroad is lower than the cost of (clean) production at home, there is scope for realizing the 'standard' gains from globalization. The difficulty for the firm is that in a globalized context there is no effective regulation. As the firm cannot credibly commit to using the clean technology, consumers react to offshoring by lowering demand.

The NGO provides an imperfect remedy to this problem. It increases the detection probability and therefore the expected punishment of dirty production, reducing the incentive of the firm to cheat. Consumers take this into account and increase demand. Perhaps paradoxically, the presence of the NGO makes it more likely that the firm can benefit from the gains from globalization.

When the NGO technology is more efficient (represented by a higher detection probability π_1), this increases both the firm cutoff $\bar{c}_1$ and the NGO cutoff $\bar{c}_N$. Conditional on NGO entry, the firm faces a more efficient NGO, implying a more efficient technology to overcome the commitment problem of the firm. At the same time the service the NGO provides to consumers is more valuable to them, increasing the willingness to donate and therefore leading to 'earlier' NGO entry. When both cutoff levels increase the actual globalization cutoff also increases, which is the minimum of the two.

As outlined before, a stronger cost advantage of dirty production Δ has similar effects as a deterioration in the detection probability. Even for a relatively high detection probability, firms have a strong incentive to be dirty, leading to a lower willingness to donate and therefore to later NGO entry. The firm also suffers from this magnification of its commitment problem, leading to later offshoring.

5 Welfare Analysis

Total welfare in our model is defined as the sum of expected firm profits and expected consumer surplus net of NGO fixed costs, which are incurred by consumers. We define net expected

consumer surplus as:

$$E(W)_{net} = \begin{cases} W_H & \text{if production in Home} \\ E(W_1) - X & \text{if offshoring with NGO} \\ E(W_0) & \text{if offshoring without NGO.} \end{cases}$$

Expected consumer surplus $E(W)$ is defined in the same way, just without the NGO fixed costs X in the case of offshoring with an NGO.

Proposition 6. *Assume that assumption 1 holds. When* $\min\{\bar{c}_1, \bar{c}_N\} > \bar{c}_0$ *(cases 1 and 2, where offshoring is associated with NGO entry), expected consumer surplus* $E(W)$ *and net expected consumer surplus* $E(W)_{net}$ *are non-monotonic in further trade integration (i.e. a reduction in the cost level c). In particular, in case 1 and 2 it is possible that for a range of costs below the globalization cutoff* $\bar{c}_g$*, expected and net expected consumer surplus* $E(W)$ *and* $E(W)_{net}$ *are below the autarky level of consumer surplus* W_H*.*

Proof. See the appendix. □

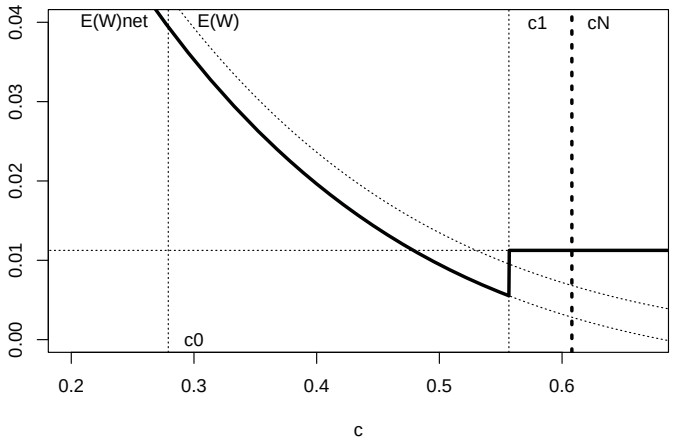

Figure 4: Pattern of expected consumer surplus $E(W)_{net}$ (thick solid line) for different levels of offshoring costs c in case 1. Offshoring takes place at the cost level $\bar{c}_g = \bar{c}_1$ and can take place at the expense of the consumers, who face a non monotonic pattern of $E(W)_{net}(c)$ with a range of offshoring cost levels leading to expected consumer surplus below the autarky level (horizontal dashed line). Thin vertical dashed lines: cutoff levels $\bar{c}_1$ and $\bar{c}_0$. Bold vertical dashed line: NGO cutoff $\bar{c}_N$.

Figure 4 provides a numerical example for the pattern of consumer surplus in case 1. Again the thin vertical dashed lines represent the cutoff levels $\bar{c}_1$ and $\bar{c}_0$. The bold vertical dashed

line is the NGO cutoff $\bar{c}_N$. As we have $\bar{c}_N > \bar{c}_1$, we are in case 1. The horizontal dashed line represents consumer surplus in autarky and the bold solid line depicts net expected consumer surplus $E(W)_{net}$ for the different values of c considered.

By definition, for all cost levels below $\bar{c}_1$ it is profitable for the firm to offshore. We can see from the graph that this is not in line with the interest of consumers. Upon offshoring at $\bar{c}_1$, net expected consumer surplus jumps below its autarky level and only gradually increases for lower cost levels. It is only to the left of the intersection of autarky surplus (dashed horizontal line) and net expected surplus that consumers also gain from offshoring of the firm. This implies that the firm offshores 'at the expense' of the consumers, who see their expected surplus decrease.

This negative effect on net expected consumer surplus can be decomposed into two components. The two dashed curves in the graph depict the function $E(W_1)$ and $E(W_1) - X$. We can see that at the cutoff $\bar{c}_1$ the expected surplus conditional on offshoring with an NGO $E(W_1)$ represented by the upper curve is below autarky welfare. In addition, the firm uses its first mover advantage and imposes the burden of financing the NGO onto the consumer, so that $E(W_1) - X$ is even lower (lower dashed line).

While the latter effect is quite simple, the former is somewhat less obvious. Technically it stems from the fact that the first term on the r.h.s. of equation (7) includes a $q^e < 1$, while it is not present in the corresponding term in equation (5). The reason for this is that when a firm chooses the dirty technology, it is compensated for the risk of facing zero demand with probability π_i by the fact that it benefits from a cost reduction of Δ. This cost advantage, however, is not passed on to consumers, as a dirty firm mimicks the price setting of the clean firm. This implies that the consumer is not compensated for the possibility that her surplus drops to zero when the good is revealed to be dirty. This is reflected by the presence of the term q^e in the first term of the r.h.s. of equation (7).

Before we analyze how this misalignment of firm and consumer interests affects overall welfare effects of offshoring, consider Figure 5, which provides an illustration of case 2. In case 2 we have $\bar{c}_g = \bar{c}_N < \bar{c}_1$, so that the binding constraint is the possibility of NGO emergence. This is reflected by the fact that the bold dashed line is now to the left of $\bar{c}_1$. In this numerical example we obtained this by increasing the NGO funding requirement X.

In this example we still get a fall in net consumer surplus. The comparison to the upper dashed curve shows that this is due to the fact that consumers have to finance the NGO. If the bold dashed line representing the NGO cutoff was to the left of the point where autarky and

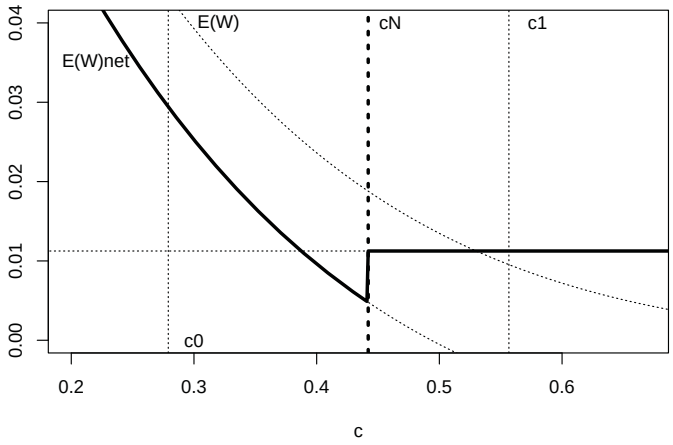

Figure 5: Pattern of expected consumer surplus $E(W)_{net}$ (thick solid line) for different levels of offshoring costs c in case 2. Offshoring takes place at the cost level $\bar{c}_g = \bar{c}_N$ and can take place at the expense of consumers, who face a non monotonic pattern of $E(W)_{net}(c)$ with a range of offshoring cost levels leading to expected consumer surplus below the autarky level (horizontal dashed line). Thin vertical dashed lines: cutoff levels $\bar{c}_1$ and $\bar{c}_0$. Bold vertical dashed line: NGO cutoff $\bar{c}_N$.

net expected surplus intersect, there would be a positive jump in net consumer surplus upon offshoring.

Total welfare is given by the sum of net expected consumer surplus and firm profits. The discrete fall (or increase) in net expected consumer surplus also translates into the pattern observed for total welfare.

Proposition 7. *Assume that assumption 1 holds. When* $\min\{\bar{c}_1, \bar{c}_N\} > \bar{c}_0$ *(cases 1 and 2, where offshoring is associated with NGO entry), expected total welfare is non-monotonic in further trade integration (i.e. a reduction in the cost level c). In particular, in case 1 and 2 it is possible that for a range of costs below the globalization cutoff* $\bar{c}_g$*, expected social welfare* W^* *is below its autarky level.*

Proof. See the appendix. □

Figure 6 illustrates the pattern in case 1, where offshoring takes place at $\bar{c}_1$. Like in Figure 4 we observe the downward jump in net expected consumer welfare given by the bold dashed curve. The dotted line above represents expected profits. As in case 1 offshoring takes place at $\bar{c}_g = \bar{c}_1$ with $E(\Pi_1)(\bar{c}_1) = \Pi_H$, there is no discontinuity at the cutoff. This in turn implies that the fall in net expected consumer surplus is reflected by a fall in total expected welfare (given by the solid line) at $\bar{c}_1$. Due to the fact that the firm offshores at the expense of consumers also

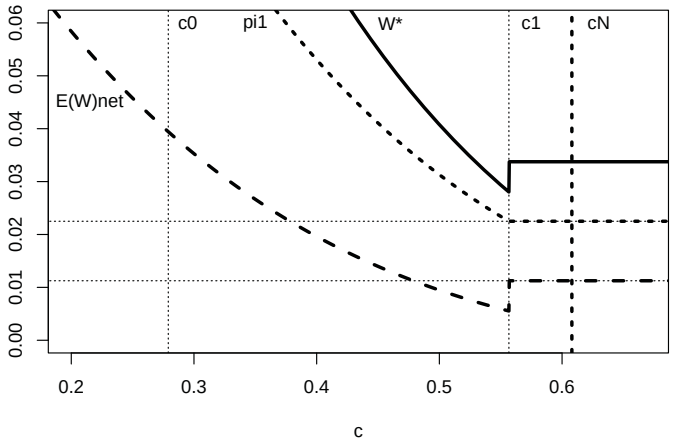

Figure 6: The solid line depicts total expected welfare W^* as the sum of expected consumer surplus $E(W)_{net}$ and firm profits under offshoring π_1 for different levels of the offshoring cost c ind case 1. As in case 1 expected profits are continuous, the discontinuity in expected consumer surplus translates into a corresponding discontinuity in expected total welfare.

total expected welfare falls when the firm offshores at $\bar{c}_1$. This effect is compensated for lower values of c as on the one hand expected profits increase and on the other hand lower costs are passed on to consumers increasing expected consumer surplus.

Figure 7 illustrates an example of case 2 where the NGO cutoff $\bar{c}_g = \bar{c}_N$ is relatively close to the cutoff $\bar{c}_1$. In this case we still observe a discrete fall in net expected consumer surplus. At the same time there is a discrete increase in expected profits due to the fact that conditional on NGO existence, the firm would want to offshore already at $\bar{c}_1$. In the numerical example chosen here, the overall effect on expected welfare is still negative. For lower values of $\bar{c}_N$ (e.g. due to a higher NGO funding requirement X) the overall effect on expected welfare can also be positive.

As outlined above, the firm has the first mover advantage. If the firm offshores it anticipates whether this will lead to NGO emergence. From the viewpoint of the NGO this has a somewhat paradoxical implication. The aim of the NGO is to minimize dirty output. One way to achieve this would be preventing the firm from offshoring in the first place by keeping the globalization cutoff $\bar{c}_g$ as low as possible. So if the NGO could commit to not entering for a cost level above $\bar{c}_0$, the firm could only offshore at $\bar{c}_0$. But as there is no such commitment device for the NGO, the firm can 'force the NGO into being' for cost levels below the NGO cutoff $\bar{c}_N$, as, conditional on offshoring, it will be optimal for the NGO to start working and for $c < \bar{c}_N$ it will also be able to raise sufficient funds. This implies that due to the possibility of NGO emergence for the cost

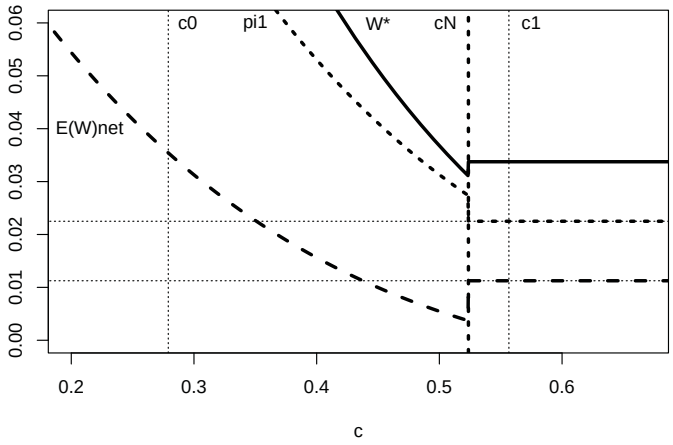

Figure 7: Numerical example in which the fall in total expected welfare W^* is preserved also in case 2 where $\bar{c}_g = \bar{c}_N$.

range between $\bar{c}_0$ and $\bar{c}_1$, expected dirty output is higher than in a world without any possibility of NGO emergence.

The situation for consumers is somewhat different. They also suffer from the fact that the firm can use its first mover advantage taking into account that conditional on offshoring, consumers may be willing to finance an NGO. Consumer interests are, however, not perfectly aligned with the objective of the NGO. While the NGO only cares about dirty output, consumers also care about prices. Figures 4 and 5 illustrate cases where consumers lose from offshoring when trade costs fall such that the overall costs c fall from just above $\bar{c}_g$ to just below. In both cases, however, consumer surplus is above the autarky level for cost levels well above $\bar{c}_0$. In these situations, the price decreases due to the standard gains from globalization more than compensate consumers for the presence of some dirty products.

6 Endogenous public regulatory systems and NGOs

In our context, the rationale for the existence of NGO monitoring comes from the limits imposed by globalization on national regulatory powers. Governments can directly impose their own regulations (reflecting to some extent the preferences of their citizens as well as their capacity constraints) only within their sovereign jurisdictions. National asymmetries in these regulatory systems and the fact that international trade creates incentives for firms to locate in lower cost jurisdictions in order to satisfy the preferences of consumers in other jurisdictions is at the root

of the demand for credible private regulation. Hence, the non existence of efficient regulatory systems in southern countries with weak regulatory trade capacity induces the emergence of NGOs financed by northern consumers to monitor international trade in credence goods.

In this section, we show that when national regulatory capacities can be endogenously affected by governments, the causality can also go the other way around. Indeed the expectation of the emergence of international civil society organizations may actually crowd out incentives for southern governments to implement regulatory systems. The reason for this is simple. A southern government may just anticipate that by not investing into the necessary monitoring capacity infrastructures, caring consumers in export markets will be ready to finance NGOs to play that role. When this happens, there is an incentive for the southern authorities to shift the cost of trade regulation to these consumers. The existence of NGOs as private international regulatory mechanisms may therefore crowd out the implementation of effective public regulations in exporting countries.

To illustrate our point, we extend our previous framework in the following way. Consider now that the firm (from North) can offshore to South where the government may invest at some cost K in some effective regulatory mechanism. Such capacity ensures that the offshoring firm has no choice but to produce in the South with the clean technology. Assume also that the southern government cares about total local employment which in the context of our constant return to scale technology is simply proportional to the firm local output. Formally the objective function of the southern government writes as:

$$W^S(Q, I) = \lambda Q - K \cdot I$$

where I is an indicator variable taking the value of one if the government invests in regulation and a value of zero otherwise. $\lambda > 0$ is a parameter reflecting the intensity with which the southern government cares about local production.[20] We consider the following timing. In an additional first stage 0, the southern government decides about investing or not in trade regulatory capacity, maximizing its expected objective function. After that, the game follows as before. First the firm decides whether to locate to South; then the NGO raises funds and decides about entry; after that the firm decides about its optimal technology and the NGO monitors; finally consumers express their demands given the NGO reporting and at last effective production

[20] λ could also reflect local wages, in which case the southern government cares about the wage bill generated by the trade activity of the firm.

and consumption occur. As usual the game is solved by backward induction.

When the southern government decides to invest (i.e. $I = 1$), the firm is facing perfect public monitoring in the South. Whenever it delocalizes production, it is then obliged to use the clean technology at local cost c. Given this, there is no demand by northern consumers for private regulation and therefore no funding for an NGO. Because $c_H > c$, the firm always delocalizes and produces the monopoly output level $Q^M = \frac{1-c}{2}$. The southern government objective function writes simply as:

$$W^R(c) = W^S(Q^M, 1) = \lambda \frac{1-c}{2} - K$$

When the southern government does not invest, (i.e. $I = 0$), the game is exactly as before. When there is delocalization by the firm in the South, expected local production is given by

$$E(Q_i) = \pi_i q_i^e \frac{(1-c)}{2} + (1-\pi_i)\frac{(q_i^e - c)}{2} \tag{17}$$

with $\pi_i = \pi_0$ when there is no NGO and $\pi_i = \pi_1$ when there is the NGO. Correspondingly, the probability q_i^e of the firm choosing the clean technology is given by

$$q_i^e - c = \frac{1}{\Delta} \cdot \frac{(1-c)^2}{2} \cdot \frac{\pi_i}{1-\pi_i}.$$

Equation (17) reflects the fact that with probability π_i, consumers get knowledge about the true technology of the firm. When that happens to be the clean technology (with probability q_i^e), there is monopoly production $(1-c)/2$. On the other hand with probability $(1-\pi_i)$, nothing is revealed to consumers. As a consequence, realized output under both the clean and the dirty technology is given by $(q_i^e - c)/2$.

From this, one can write the expected utility of the southern government under a given monitoring probability π_i with $i \in \{0, 1\}$:

$$W^{NR}(\pi_i, c) = \lambda E(Q) = \lambda \pi_i q_i^e(\pi_i, c)\frac{(1-c)}{2} + \lambda(1-\pi_i)\frac{(q_i^e(\pi_i, c) - c)}{2}$$

with $q_i^e(\pi_i, c)$ given by

$$q_i^e(\pi_i, c) = c + \frac{1}{\Delta} \cdot \frac{(1-c)^2}{2} \cdot \frac{\pi_i}{1-\pi_i}$$

After substitution this rewrites as

$$W^{NR}(\pi_i, c, \Delta) = \lambda \pi_i \frac{(1-c)}{2}\left[c + \frac{1}{\Delta} \cdot \frac{(1-c)^2}{2} \cdot \frac{\pi_i}{1-\pi_i}\right] + \lambda \frac{\pi_i}{\Delta} \cdot \frac{(1-c)^2}{2}. \tag{18}$$

Under our parameter restrictions and assumption 1, it can be shown that $W^{NR}(\pi_i, c, \Delta)$ is a decreasing convex function of the local cost c and is an increasing function of the monitoring probability π_i (see the appendix).

To highlight in the starkest way our mechanism of regulatory cost shifting, we assume that:

Assumption 2 : For all $c \in [\Delta, c_H]$, $W^{NR}(\pi_1, c, \Delta) > \lambda \frac{(1-c)}{2} - K > W^{NR}(\pi_0, c, \Delta) \geq 0$.

The first part of assumption 2 ensures that it is not optimal for the southern government to invest in regulatory capacity provided that there is firm offshoring and NGO entry (with a monitoring probability π_1). The second part of assumption 2 conversely ensures that it is optimal to invest provided that there is firm delocalization and no NGO (with therefore a reduced probability of monitoring $\pi_0 < \pi_1$). In the appendix it is shown that for given values Δ and c_H, such assumption can be satisfied when the NGO technology is good enough (i.e. π_1 high enough); the problem of observability of the firm technology by consumers is severe enough (π_0 small enough), and the cost of regulatory capacity K is low enough. We then get the following immediate result that simplifies the description of our equilibrium:

Proposition 8. *Under assumptions 1 and 2, for all local cost $c \in [\Delta, c_H]$ we have the following:*

i) When there is NGO entry, the southern government does not invest in trade regulatory capacity.

ii) When there is no NGO entry, the southern government invests in trade regulatory capacity.

We can now characterize completely the equilibrium of the game with endogenous southern trade regulatory capacity. Taking into account the equilibrium of the game without trade capacity in the South, we need to consider as before the three cutoff regimes as described in section 4.3. We then get the following characterization of the globalization equilibrium:

Proposition 9. *Under assumptions 1 and 2, we have the following:*

i)When $\min\{\bar{c}_1, \bar{c}_N\} > \bar{c}_0$ (cases 1 and 2, where offshoring occurs with NGO entry), the equilibrium is described in the following way: i1) When $\min\{\bar{c}_1, \bar{c}_N\} < c < c_H$, the South invests in trade regulatory capacity, there is no NGO and there is offshoring with the clean technology; i2) for $c \leq \min\{\bar{c}_1, \bar{c}_N\}$, the South does not invest in trade regulatory capacity, there is NGO entry and offshoring with the clean technology occurs with probability q_1^c.

ii) When $\min\{\bar{c}_1, \bar{c}_N\} < \bar{c}_0$ *(case 3 where globalization can occur without NGO entry), the equilibrium is described in the following way: ii1) when* $\bar{c}_N < c < \bar{c}_0$*, the South invests in trade regulatory capacity, there is no NGO and there is offshoring with the clean technology; ii2) when* $c \leq \bar{c}_N$*, the South does not invest in trade regulatory capacity, there is NGO monitoring and offshoring with the clean technology with probability* q_1^e*.*

Proof. See the appendix. □

Proposition 9 basically states that the existence of international civil society mechanisms (NGOs) helps monitoring international trade flows in credence goods, but at the same time it may crowd out the incentives of exporting countries to invest in trade regulatory capacity. Moreover, this is most likely to happen when northern consumers are more likely to ask for such regulatory mechanisms. When the severity of direct non observability of credence good characteristics is high (i.e. π_0 low), the NGO technology is efficient at dealing with the problem (i.e. π_1 is high) and when there are important potential gains from trade with globalization (i.e. when c is small enough). Indeed, whenever $c < \min\{c_g, \bar{c}_N\}$, South does not invest in trade regulatory capacity, although it would be ready to do so without the possibility of NGO emergence. The reason is that southern governments with weak institutions have an incentive to shift the cost of international regulation of credence goods to other more caring northern consumers/donors. This suggests an interesting two-way relationship between the demand for private regulation on global markets and cross-country institutional asymmetries in terms of regulatory capacities for standards and norms that apply to traded credence goods.

Proposition 9 also has implications in terms of differential incentives for regulatory capacity investment across southern exporting countries. The closer the production cost in South c is to the production cost in North c_H, the stronger the incentive of South to invest into monitoring capacity and the less likely the emergence of private regulation by an NGO. By the same token, a large difference in c and c_H implies a stronger incentive for South to free ride on NGO monitoring financed by donations from northern consumers.

Note also that our interpretation of local costs c includes trade costs. The previous discussion therefore implies that trade liberalization and easier market access through tariff reductions (i.e. a reduction of c) may also have consequences for the pattern of monitoring institutions of international trade in credence goods. Indeed, increased market access to northern consumers may dramatically alter investment in trade regulatory capacity in a given southern exporting country, as it also enhances the incentives to shift the cost of regulation to these consumers.

7 Conclusion

In this paper we constructed a simple model of international trade allowing for the joint endogenous emergence of offshoring and NGO activism. We emphasize the fact that when individuals are sensitive to credence characteristics of goods, multinationalization of firms interacts with cross country regulatory asymmetries, and creates a "governance deficit". This deficit triggers a demand for international non governmental regulatory frameworks emerging from the civil society: NGOs.

Globalization of production chains and internationally active NGOs are therefore jointly interacting phenomena of the globalization process. NGOs resolve to some extent the asymmetric information problems and credibility issues related to international trade in credence goods generating a complementarity between NGOs and globalization.

Our analysis suggests, however, that the emergence of NGOs triggered by globalization is not sufficient to obtain a first-best situation. On the one hand NGOs have to spend costly resources on fundraising in order to convince consumers to donate and overcome the free rider problem of public goods provision. On the other hand NGOs may not fully resolve the asymmetric information problem in the international context.

In our model NGOs emerge when consumers have a sufficient willingness to provide funds to the NGO. Increasing transparency, the NGO provides a service to consumers. At the same time it reduces the commitment problem of the firm, allowing the firm to capture gains from globalization that would otherwise be unattainable. Somewhat paradoxically, this can lead to situations in which the firm only outsources because it knows that this will induce consumers to finance an NGO. In these cases the possibility of NGO emergence - and its eventual emergence - leads to a reduction in consumer surplus and social welfare compared to production in Home.

While institutional regulatory asymmetries across countries are at the heart of the demand for international civil society mechanisms, our analysis also indicates that there may be two-way relationships between these asymmetric structures and the existence of international NGOs. Indeed, when national governments have to invest costly resources to improve their regulatory capacities on dimensions that are of more concern to foreign consumers than to their own nationals, the possibility of NGO emergence may actually crowd out the incentives to invest in such capacities. By facilitating international trade to foreign markets sensitive to the credence nature of traded goods, international NGOs may increase the incentives of institutionally weak countries to shift the cost of the necessary regulations onto the foreign consumers/donors con-

cerned about these credence good dimensions. As a consequence NGOs are not only a substitute to the limits of national regulatory capacities of the importing countries due to globalization, but may also contribute to the pattern of cross country regulatory asymmetries that is at the source of this "governance deficit".

Clearly, to illustrate those points our analysis abstracted from several elements that would be interesting to take into account in future research. First, we assumed that the regulatory system in the northern country is perfect and costless while it is fully ineffective or costly in the southern country. This allowed us to contrast in the simplest way the issue of institutional asymmetry across nations. An extension would be to have the northern government choosing its domestic regulatory capacity. The cost of such capacity would need to be financed by taxes on northern consumers or on the firm. This approach could raise interesting redistributive and political economy tradeoffs between the firm that is potentially internationally mobile (and therefore able to escape taxation) and consumers who are not.

In our model, the NGO contributes positively to globalization as it acts as an agent providing truthful information to concerned consumers. In reality, NGO entrepreneurs may not be so benevolent. They may receive private benefits or have ideological biases that induce them to manipulate the information they obtain on the corporate sector. This in turn may affect consumers' expectations on the true characteristics of the credence goods. Investigating how such features may distort the likelihood of emergence of the NGO sector and the likely impact on globalization would be a interesting line of research.

Our analysis focused on the channel of consumer/donor demands for private regulatory mechanisms. Clearly, multinational firms also have an interest in finding mechanisms that would ex-ante increase their credibility on credence good dimensions consumers care about. They face, however, a time consistency problem reflecting the potential conflict between the ex-ante willingness to do commit to such schemes, and the ex-post incentives to conceal information once globalization is engaged. Building up reputational or goodwill capital through repeated CSR actions could be one possibility to solve the problem. Firms could also pay for some certification process through an independent rating agency. This would then shift the cost of the credibility issue to that agency. In this respect being a not-for-profit organization like an NGO may be an advantage compared to being a for-profit agency (Glaeser and Shleifer (2001)). Alternatively, the rating agency could be a *private regulator* financed by national governments. The financing and monitoring associated with that organization could be undertaken unilaterally by the concerned

governments, cooperatively through bargaining in some international institution, and/or with the help of civil society organizations. These topics and their interactions with globalization are interesting issues to discuss in future study. We hope that the framework developed in this paper will be a useful building block to research in that direction.

Appendix A: Proofs for the baseline model

Proof of Proposition 1

(i) is obvious.

To prove (ii), note that $\bar{c}_i(c_H, \pi_i, \Delta)$ is determined by equation:

$$\begin{aligned} \frac{(1-c_H)^2}{4} &= \pi_i \frac{(1-\bar{c}_i)^2}{4} + (1-\pi_i) \frac{(q_i^e - \bar{c}_i)^2}{4} \\ &= (1-\pi_i)\left[\frac{(q_i^e - \bar{c}_i)^2}{4} + \Delta \frac{(q_i^e - \bar{c}_i)}{2}\right] \end{aligned}$$

where

$$(q_i^e - \bar{c}_i) = \frac{1}{\Delta} \cdot \frac{(1-\bar{c}_i)^2}{2} \cdot \frac{\pi_i}{1-\pi_i}$$

Substitution provides then the alternative condition characterizing $\bar{c}_i(c_H, \pi_i, \Delta)$:

$$\frac{(1-c_H)^2}{4} = \pi_i \frac{(1-\bar{c}_i)^2}{4} + \frac{(1-\bar{c}_i)^4}{16} \frac{1}{\Delta^2} \frac{\pi_i^2}{(1-\pi_i)}. \tag{19}$$

which gives

$$\bar{c}_i(c_H, \pi_i, \Delta) = 1 - \sqrt{\frac{1-\pi_i}{\pi_i} 2 \Delta^2 \left[\left(1 + \frac{(1-c_H)^2}{1-\pi_i} \frac{1}{\Delta^2}\right)^{\frac{1}{2}} - 1\right]}$$

The comparative statics immediately follows from the fact that: a) the RHS of (19) is decreasing in $\bar{c}_i$, b) the RHS of (19) is increasing in π_i and is decreasing in Δ, c) the LHS of (19) is decreasing in c_H. **QED.**

Proof of Proposition 2

(i) follows directly from the participation constraint of the donor together with the expressions for consumer surplus with and without an NGO given by equation (8).

(ii) to show that $\pi_0 > 0.1$ is a sufficient condition for $\frac{\partial x^*}{\partial c} < 0$, we start by rewriting equation (11) as:

$$x(c)^* = \frac{(1-c)^2}{8}\left[c(\pi_1 - \pi_0) + (1-c)^2 T_1\right] \tag{20}$$

with T_1 being an exogenous constant:

$$T_1 = \frac{1}{4\Delta}\left[\frac{\pi_1^2}{1-\pi_1} - \frac{\pi_0^2}{1-\pi_0}\right]\left(2+\frac{1}{\Delta}\right).$$

The partial derivative is then:

$$\begin{aligned}\frac{\partial x^*}{\partial c} &= -\frac{1-c}{4}\left[c(\pi_1-\pi_0)+(1-c)^2T_1\right] + \frac{(1-c)^2}{8}\left[(\pi_1-\pi_0)-2(1-c)T_1\right] \quad (21)\\ &= \frac{(1-c)^2}{2}\left[(\pi_1-\pi_0)\left(\frac{1}{4}-\frac{c}{2(1-c)}\right)-(1-c)T_1\right]. \quad (22)\end{aligned}$$

Next, note that as $\pi_1 > \pi_0 > 0$, we can express π_1 as $\pi_1 = \rho\pi_0$ with $\rho > 1$. We can therefore write:

$$\frac{\pi_1^2}{1-\pi_1} - \frac{\pi_0^2}{1-\pi_0} = \pi_0\left[\frac{\rho\pi_1}{1-\pi_1} - \frac{\pi_0}{1-\pi_0}\right] > \pi_0\left[\frac{\pi_1}{1-\pi_1} - \frac{\pi_0}{1-\pi_0}\right] > \pi_0(\pi_1-\pi_0). \quad (23)$$

Using (22), the definition of T_1 and (23) we have:

$$\frac{2}{(1-c)^2}\frac{\partial x^*}{\partial c} = (\pi_1-\pi_0)\left(\frac{1}{4}-\frac{c}{2(1-c)}\right) - (1-c)\frac{1}{4\Delta}\pi_0\left[\frac{\rho\pi_1}{1-\pi_1} - \frac{\pi_0}{1-\pi_0}\right]\left(2+\frac{1}{\Delta}\right) < 0. \quad (24)$$

By (23) a sufficient condition for the inequality in (24) to hold is:

$$\left(\frac{1}{4}-\frac{c}{2(1-c)}\right) - \pi_0\frac{(1-c)}{4\Delta}\left(2+\frac{1}{\Delta}\right) < 0.$$

Rearranging delivers the following sufficient condition for $\frac{\partial x^*}{\partial c} < 0$:

$$\underbrace{\frac{c}{2(1-c)}}_{T_2} + \underbrace{\pi_0\frac{(1-c)}{4\Delta}\left(2+\frac{1}{\Delta}\right)}_{T_3} > \frac{1}{4}. \quad (25)$$

Note that both T_2 and T_3 are positive and only T_3 depends on π_0. Furthermore, note that $T_2 > \frac{1}{4}$ if $c > \frac{1}{3}$. This implies that $c > \frac{1}{3}$ is a sufficient condition for $\frac{\partial x^*}{\partial c} < 0$.

For $c \leq \frac{1}{3}$, π_0 has to be sufficiently high for the inequality to hold. We now establish a sufficient condition on π_0. For analytical tractability, we ignore the positive term T_2 and derive a sufficient condition for $T_3 > 1/4$. (The numerical analysis outlined below takes the term T_2 into account.) Note that $\frac{\partial T_3}{\partial \Delta} < 0$ so that a higher Δ makes it less likely that condition (25) is satisfied. As even under dirty production the cost of production cannot be less than zero, we

must have $\Delta \leq c$. This implies that:

$$\pi_0 \frac{(1-c)}{4\Delta}\left(2+\frac{1}{\Delta}\right) \geq \pi_0 \frac{(1-c)}{4c}\left(2+\frac{1}{c}\right). \tag{26}$$

We can therefore state the following sufficient for condition (25) to hold:

$$\pi_0 > \frac{c}{1-c}\ \frac{1}{2+1/c}. \tag{27}$$

Note that the r.h.s. increases monotonically in c implying that the condition requires higher values of π_0 for higher values of c. Recall that $c > 1/3$ is a sufficient condition for $\frac{\partial x^*}{\partial c} < 0$. This implies that the highest relevant value for condition (27) is $c = \frac{1}{3}$. This directly implies that $\pi_0 > 0.1$ is a sufficient condition for $\frac{\partial x^*}{\partial c} < 0$ to hold over the full range of $c \in (0,1)$. This proves *(ii)*.[21]

(iii) follows directly from partially differentiating equation (11) with respect to π_1, π_0 and Δ, which delivers $\frac{\partial x^*}{\partial \pi_1} > 0$, $\frac{\partial x^*}{\partial \pi_0} < 0$ and $\frac{\partial x^*}{\partial \Delta} < 0$. **QED**.

Proof of Proposition 3

(i) follows from the definition of the NGO cutoff level c_N.

To prove *(ii)*, differentiate (13) for any variable $\alpha = \pi_1, \pi_0, \Delta$. Thus,

$$\frac{d\bar{c}_N}{d\alpha} = -\frac{\frac{\partial E(W_1)(\bar{c}_N)}{\partial \alpha} - \frac{\partial E(W_0)(\bar{c}_N)}{\partial \alpha}}{\frac{\partial E(W_1)(\bar{c}_N)}{\partial \bar{c}_N} - \frac{\partial E(W_0)(\bar{c}_N)}{\partial \bar{c}_N}} = -\frac{\frac{\partial x^*(\bar{c}_N)}{\partial \alpha}}{\frac{\partial x^*(\bar{c}_N)}{\partial \bar{c}_N}}.$$

By proposition 2, we have $\frac{\partial x^*(\bar{c}_N)}{\partial \bar{c}_N}$ is negative (under the maintained sufficient condition of $\pi_0 > 0.1$). This implies that:

$$sign\left[\frac{d\bar{c}_N}{d\alpha}\right] = sign\left[\frac{\partial x^*(\bar{c}_N)}{\partial \alpha}\right]. \tag{28}$$

It now follows directly from proposition 2 *(iii)* that $\frac{\partial \bar{c}_N}{\partial \pi_1} > 0$, $\frac{\partial \bar{c}_N}{\partial \pi_0} < 0$ and $\frac{\partial \bar{c}_N}{\partial \Delta} < 0$. **QED.**

[21] A stronger sufficient condition can be found numerically substituting Δ by c in condition (25), solving for π_0 and numerically determining the maximum. Our algorithm delivers $\pi_0^{max} = 0.01894899$, so that we can state $\pi_0 > 0.019$ as a sufficient condition on numerical grounds. This procedure delivers a much lower condition as it allows us to include the term T_2 in the analysis, which had been dropped in the algebraic proof.

Proof of Proposition 4

By (12) at the NGO cutoff, we have $x^*(\bar{c}_N, \pi_1, \pi_0, \Delta) = X + y$. Given that $x^*(c, \pi_1, \pi_0, \Delta)$ is decreasing in c, case 1 occurs if and only if $\bar{c}_N \geq \bar{c}_1$ which is equivalent to $x^*(\bar{c}_1, \pi_1, \pi_0, \Delta) \geq X + y$. Similarly case 2 if and only if $\bar{c}_0 \leq \bar{c}_N \leq \bar{c}_1$, which is equivalent to $x^*(\bar{c}_1, \pi_1, \pi_0, \Delta) \leq X + y \leq x^*(\bar{c}_0, \pi_1, \pi_0, \Delta))$. Finally case 3 occurs if and only if $\bar{c}_N \leq \bar{c}_0$ which is equivalent to $x^*(\bar{c}_0, \pi_1, \pi_0, \Delta) \leq X + y)$. **QED.**

Proof of Proposition 5

Note that in cases 1 and 2 the cost level at which offshoring takes place is the globalization cutoff $\bar{c}_g = \min\{\bar{c}_1, \bar{c}_N\}$. To prove *(i)*, we need to show that $\bar{c}_g > \bar{c}_0$. As we consider case 1 and 2, we always have $\bar{c}_N > \bar{c}_0$. The fact that $\bar{c}_1 > \bar{c}_0$ follows from equation (6) together with the fact that at the cutoffs we must have $\Pi_H(c_H) = E(\Pi_1(\bar{c}_1))$ and $\Pi_H(c_H) = E(\Pi_0(\bar{c}_0))$. As the l.h.s. of the two expressions is the same and as $\pi_1 > \pi_0$, it follows that $\bar{c}_1 > \bar{c}_0$. This proves *(i)*.

To prove *(ii)* we need to show that both cutoff levels $\bar{c}_N$ and $\bar{c}_1$ increase in π_1 and decrease in Δ. It follows from the fact that the l.h.s. of the condition $\Pi_H(c_H) = E(\Pi_1(\bar{c}_1))$ is constant, and the r.h.s. increases in π_1 (decreases in Δ), that an increase in the detection probability π_1 (a decrease in Δ) must lead to an increase in the cutoff level $\bar{c}_1$. Moreover, we know from Proposition 3 that for the NGO cutoff level $\bar{c}_N$ we have $\frac{\partial \bar{c}_N}{\partial \pi_1} > 0$ and $\frac{\partial \bar{c}_N}{\partial \Delta} < 0$. This proves *(ii)*. **QED**.

Proof of Proposition 6

In case 1 we have $c_g = \bar{c}_1$. By definition, at $\bar{c}_1$, we have $E(\Pi_1)(\bar{c}_1) = \Pi_H$. Note that in autarky consumer surplus is just half of profits: $W_H = \frac{1}{2}\Pi_H$. To show the discrete fall in in expected consumer surplus, it is sufficient to show that $E(W_1)(\bar{c}_1) < \frac{1}{2}E(\Pi_1)(\bar{c}_1) = \frac{1}{2}\Pi_H$. This follows directly from equation (7) (for $i = 1$) and the fact that in an interior solution we have $q^e < 1$. The discrete fall in net expected consumer surplus then follows directly from the fact that if an NGO exists we have $E(W)_{net} = E(W_1) - X$. This proves *(i)*.

In case 2 we have $c_g = \bar{c}_N$ with $\bar{c}_N \in [\bar{c}_0, \bar{c}_1]$. In case 2 outsourcing takes place only with NGO emergence, so that we have a discrete fall in expected consumer surplus upon outsourcing iff $E(W_1)(\bar{c}_N) < W_H$. We know from *(i)* that this is the case when $\bar{c}_N = \bar{c}_1$. As the function $E(W_1)(c)$ is continuous in c, the difference $E(W_1)(c) - W_H$ must be negative for all values of $\bar{c}_N \in (\tilde{c}, \bar{c}_1]$ with $\tilde{c}$ close enough to $\bar{c}_1$. The same argument holds for net expected consumer

surplus $E(W)_{net}$ which falls upon outsourcing as long as $E(W_1)(\bar{c}_N) - X < W_H$, which is the case for all $c_N \in (\tilde{c'}, \bar{c}_1]$ with $\tilde{c} > \tilde{c'}$ as long as $X > 0$. **QED.**

Proof of Proposition 7

For case 1, the result simply follows from noting that total welfare is the sum of net expected consumer surplus and firm profits. The former component is described in Proposition 6. Expected profits are either given by $E(\Pi_i)$ in equation (6) or by autarky profits Π_H. In case 1 the firm offshores at the cutoff $\bar{c}_1$ at which we have $E(\Pi_1)(\bar{c}_1) = \Pi_H$ this implies that upon offshoring there is no discrete jump in expected profits. As Proposition 6 implies that there is a discrete negative jump in net expected consumer surplus, we must have a negative jump in the sum of the two, namely total welfare.

As for case 2, note that $E(\Pi_1)$ decreases continuously in c and $E(\Pi_1)(\bar{c}_1) = \Pi_H$. Therefore, in case 2, where offshoring takes place at $\bar{c}_g = \bar{c}_N < \bar{c}_1$, we must have $E(\Pi_1)(\bar{c}_g) > \Pi_H$. This implies that in case 2 we always have a discrete upward jump of expected profits upon offshoring. The fact that $E(\Pi_1)$ decreases continuously in c also implies that the magnitude of the upward jump is the lower the closer the globalization cutoff $\bar{c}_g = \bar{c}_N$ is to $\bar{c}_1$. As it goes to zero for $\bar{c}_g$ going to $\bar{c}_1$, Proposition (ii) implies that in case 2 when $\bar{c}_g$ is sufficiently close to $\bar{c}_1$ there is a discrete fall in total welfare. **QED.**

Appendix B: A Micro-founded model of NGO behavior

In this appendix, we provide a less extreme microfounded model of an NGO entrepreneur and we generalize to that setting the result that NGO entry occurs when the local cost of production c is below a cutoff level $\bar{c}_N$.

Consider an intrinsically motivated agent that contemplates creating an NGO in case there is a positive probability of production with a dirty technology. Assume that the motivated agent cares only about the possibility of dirty production in itself. When she faces a situation where the probability of dirty production $(1 - q_i^e)$ is positive, she gets utility V from 'fighting dirty production' i.e. from creating an NGO. This utility is independent of the actual level of the probability of dirty production: as soon as it is above zero, the motivated agent is ready to start monitoring the firm.

NGO creation requires both a monetary fixed cost X and an effort level $e \in [0, e_{\max}]$ with

a linear disutility of effort ke. We impose $V - ke_{max} > 0$ which implies that the motivated agent is willing to create an NGO as soon as sufficient funds can be raised. The technology of fundraising requires two inputs: money and effort and is described in the following way. With fundraising expenditures m and some effort level e, the motivated agent succeeds to activate $\nu(m,e)$ donors who feel convinced to "make a difference" when donating. The function $\nu(m,e)$ has the usual properties:

$$\begin{aligned} \text{for all } (m,e) &\in \mathbb{R}^+ \times [0, e_{\max}]\,,\ \nu(m,e) \in [0,1]\ \ \nu(0,e) = 0,\ \nu(m,0) = 0,\ \nu'_m(m,e) \geq 0,\ \nu'_e(m,e) > 0, \\ \nu^{"}_{mm}(m,e) &< 0,\ \nu^{"}_{ee}(m,e) < 0,\ \nu^{"}_{me}(m,e) \geq 0,\ \lim_{m\to 0} \nu'_m(m,e) = +\infty;\ \lim_{m\to\infty} \nu'_m(m,e) = 0. \end{aligned}$$

Now the problem of the NGO entrepreneur is:

$$\max_{e,m,x} V - ke$$

under the constraints:

$$\nu(m,e)x - m \geq X \tag{29}$$

$$x \leq x^*(c, \pi_1, \pi_0, \Delta) = E(W_1) - E(W_0). \tag{30}$$

The first constraint is the fund raising constraint to have the capacity to create the NGO. The second constraint implies that the surplus gain the NGO gives to a donor must be larger or equal to the amount donated. The necessary conditions for m, e and x are simply given by:

$$\begin{aligned} -k + \mu\nu'_e(m,e)x &= 0 \\ \mu\left[\nu'_m(m,e)x - 1\right] &= 0 \\ \mu\nu(m,e) - \xi &= 0 \end{aligned}$$

where $\mu \geq 0$ and $\xi \geq 0$ are the lagrange multipliers of the constraints (29) and (30). Simple inspection shows that $\mu > 0$ and $\xi > 0$. Therefore, (29) and (30) are binding and the solution has to satisfy:

$$\begin{aligned} x &= x^*(c, \pi_1, \pi_0, \Delta) \\ \nu(m,e)x - m &= X \\ \nu'_m(m,e)x &= 1. \end{aligned}$$

Now the third equation defines $m^*(e,c) > 0$. Substitution in the second equation provides the solution for the NGO effort e^*, solution of:

$$\Gamma(e,c) = \nu(m^*(e,c),e)x^*(c,\pi_1,\pi_0,\Delta) - m^*(e,c) = X.$$

This defines the solution of the NGO entrepreneur when $e^* \leq e_{\max}$. Note that because of the envelope theorem applied to m, we have:

$$\Gamma'_e(e,c) = \nu'_e(m^*(e,c),e)x^*(c,\pi_1,\pi_0,\Delta) > 0 \text{ and } \Gamma'_c(e,c) = \nu(m^*(e,c),e)\frac{\partial x^*}{\partial c}(c,\pi_1,\pi_0,\Delta) < 0.$$

Thus, the NGO will enter if and only if:

$$\Gamma(e_{\max},c) = \nu(m^*(e_{\max},c),e_{\max})x^*(c,\pi_1,\pi_0,\Delta) - m^*(e_{\max},c) > X.$$

This relationship determines implicitly an NGO entry cutoff $\bar{c}_N$ such that $\Gamma(e_{\max},\bar{c}_N) = X$. The envelope theorem gives also:

$$\frac{\partial \bar{c}_N}{\partial \alpha} = -\frac{\frac{\partial x^*}{\partial \alpha}}{\frac{\partial x^*}{\partial \bar{c}_N}} \text{ for all parameters } \alpha = \pi_1, \pi_0, \Delta.$$

Therefore the comparative statics of Proposition 3 are preserved. **QED.**

Appendix C: Endogenous public regulatory systems and NGOs

Proof that $W^{NR}(\pi_i,c,\Delta)$ is decreasing convex in $c \in [\Delta, c_H]$:

Differentiation of $W^{NR}(\pi_i,c,\Delta)$ in equation (18) provides:

$$\begin{aligned}
\frac{\partial W^{NR}(\pi_i,c,\Delta)}{\partial c} &= -\frac{\lambda\pi_i}{2}\left[c + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{2}\cdot\frac{\pi_i}{1-\pi_i}\right] + \lambda\pi_i\frac{(1-c)}{2}\left[1 - \frac{1}{\Delta}\cdot(1-c)\cdot\frac{\pi_i}{1-\pi_i}\right] \\
&\quad -\lambda\frac{\pi_i}{\Delta}\cdot(1-c) \\
\frac{\partial^2 W^{NR}(\pi_i,c,\Delta)}{\partial c^2} &= -\lambda\pi_i\left[1 - \frac{1}{\Delta}\cdot(1-c)\cdot\frac{\pi_i}{1-\pi_i}\right] + \lambda\pi_i\frac{(1-c)}{2}\left[\frac{1}{\Delta}\cdot\frac{\pi_i}{1-\pi_i}\right] + \lambda\frac{\pi_i}{\Delta} \\
&= \lambda\pi_i\frac{1-\Delta}{\Delta} + \frac{\lambda}{\Delta}\cdot(1-c)\cdot\frac{\pi_i^2}{1-\pi_i} + \lambda\pi_i\frac{(1-c)}{2}\left[\frac{1}{\Delta}\cdot\frac{\pi_i}{1-\pi_i}\right] > 0.
\end{aligned}$$

Thus $\frac{\partial W^{NR}(\pi_i,c,\Delta)}{\partial c}$ is increasing in c. Also $\frac{\partial W^{NR}(\pi_i,1,\Delta)}{\partial c} = -\frac{\lambda\pi_i}{2} < 0$. Hence

$$\frac{\partial W^{NR}(\pi_i,c,\Delta)}{\partial c} < 0$$

and $W^{NR}(\pi_i,c,\Delta)$ is decreasing convex in $c \in [\Delta, c_H]$. **QED.**

Proof that assumptions 1 and 2 can be satisfied for an non empty set of parameters $(c_H, \Delta, \pi_1, \pi_0, K)$:

Fix the two parameters Δ and c_H with $\Delta < c_H$. Consider then the function $\Theta(\pi_i,c,\Delta) = W^{NR}(\pi_i,c,\Delta) - \lambda\frac{(1-c)}{2} + K$. As $W^{NR}(\pi_i,c,\Delta)$ is convex in c, $\Theta(\pi_i,c,\Delta)$ is also convex in c. It is a simple matter to see that for $\pi_1 \leq \overline{\pi}_1 = 2\Delta/(1+\Delta)$, assumption 1 is satisfied for all $c \in [\Delta, c_H]$.

Moreover,

$$\begin{aligned}\Theta\left(\overline{\pi}_1,c,\Delta\right) &= \lambda\frac{\Delta}{(1+\Delta)}(1-c)\left[c+\frac{(1-c)^2}{(1-\Delta)}\right]+\lambda\frac{(1-c)^2}{(1+\Delta)}-\lambda\frac{(1-c)}{2}+K \\ &= \lambda\frac{\Delta}{(1+\Delta)}(1-c)\left[c+\frac{(1-c)^2}{(1-\Delta)}\right]+\lambda\frac{(1-c)}{(1+\Delta)}\left[1-c-\frac{1+\Delta}{2}\right]+K.\end{aligned}$$

We then observe that:

$$1-c-\frac{1+\Delta}{2} > 1-c_H-\frac{1+\Delta}{2} > 1-c_H-\frac{1+c_H}{2} = \frac{1-3c_H}{2}.$$

Thus, for $\Delta < c_H < 1/3$, one has that for all $c \in [\Delta, c_H]$, $\Theta\left(\overline{\pi},c,\Delta\right) > 0$. Hence for π_1 close enough to $\overline{\pi}$, one can ensure that for $\Delta < c_H < 1/3$,

$$\text{for all } c \in [\Delta, c_H],\ W^{NR}(\pi_1,c,\Delta) > \lambda\frac{(1-c)}{2} - K.$$

Similarly,

$$\begin{aligned}\Theta(\pi_i,c,\Delta) &= \lambda\pi_i\frac{(1-c)}{2}\left[c+\frac{1}{\Delta}\cdot\frac{(1-c)^2}{2}\cdot\frac{\pi_i}{1-\pi_i}\right]+\lambda\frac{\pi_i}{\Delta}\cdot\frac{(1-c)^2}{2}-\lambda\frac{(1-c)}{2}+K \\ &< \lambda\pi_i\frac{(1-c)}{2}\left[c+\frac{1}{\Delta}\cdot\frac{(1-c)^2}{2}\cdot\frac{\pi_i}{1-\pi_i}\right]+\lambda\frac{\pi_i}{\Delta}\cdot\frac{(1-c)^2}{2}-\lambda\frac{(1-c_H)}{2}+K.\end{aligned}$$

Hence in such a case when π_0 close enough to 1/10, one has:

$$\begin{aligned}\Theta(\pi_0, c, \Delta) &< \lambda\frac{1}{10}\frac{(1-c)}{2}\left[c + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{2}\cdot\frac{\frac{1}{10}}{1-\frac{1}{10}}\right] + \lambda\frac{\frac{1}{10}}{\Delta}\cdot\frac{(1-c)^2}{2} - \lambda\frac{(1-c_H)}{2} + K + \varepsilon \\ &< \lambda\frac{(1-c)}{20}\left[c + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{18}\right] + \frac{\lambda}{\Delta}\cdot\frac{(1-c)^2}{20} - \lambda\frac{(1-c_H)}{2} + K + \varepsilon\end{aligned}$$

with ε some positive small number. Now

$$\lambda\frac{(1-c)}{20}\left[c + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{18}\right] + \frac{\lambda}{\Delta}\cdot\frac{(1-c)^2}{20} - \lambda\frac{(1-c_H)}{2} + K + \varepsilon < 0$$

when

$$c_H < 1 - \frac{2K}{\lambda} - \frac{(1-c)}{10}\left[c + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{18}\right] - \frac{1}{\Delta}\cdot\frac{(1-c)^2}{10} - \varepsilon.$$

Denote

$$\sigma(\Delta) = \frac{2K}{\lambda} + \max_{c\in[0,1]}\left[\frac{(1-c)}{10}\left[c + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{18}\right] + \frac{1}{\Delta}\cdot\frac{(1-c)^2}{10}\right].$$

Then for $c_H < 1 - \sigma(\Delta) - \varepsilon$, and π_0 close enough to 1/10, for all $c \in [\Delta, c_H]$, $\Theta(\pi_0, c, \Delta) < 0$. Note that a non empty interval $[\Delta, c_H]$ with $c_H < 1 - \sigma(\Delta) - \varepsilon$ exists when $\Delta < 1 - \sigma(\Delta) - \varepsilon$ or $\sigma(\Delta) < 1 - \Delta - \varepsilon$. Now $\sigma(\Delta) < \frac{2K}{\lambda} + \frac{1}{10}\left[1 + \frac{1}{\Delta}\cdot\frac{1}{18}\right] + \frac{1}{\Delta}\cdot\frac{1}{10} < 1 - \Delta - \varepsilon$ when $\frac{K}{\lambda}$ is small enough and Δ larger than some $\overline{\Delta}$.

It follows finally that for $\overline{\Delta} < \Delta < c_H < \min\{1/3; 1 - \sigma(\Delta) - \varepsilon\}$, $\pi_1 < \overline{\pi}$ but close enough to $\overline{\pi}$ and π_0 close enough to 1/10, one has:

$$\text{for all } c \in [\Delta, c_H],\ \Theta(\pi_1, c, \Delta) > 0 > \Theta(\pi_0, c, \Delta)$$

and both assumptions 1 and 2 can be satisfied for a non empty set of parameters.

Proof of Proposition 9:

(i) Consider first the case where $\min\{\bar{c}_1, \bar{c}_N\} > \bar{c}_0$ (complementarity between globalization and NGO entry).

(i1) When $\min\{\bar{c}_1, \bar{c}_N\} < c < c_H$, we know that under this cost configuration, the firm does not offshore if there is no NGO. Hence without southern regulatory capacity, there is no offshoring. At the same time assumption 2 implies that $\lambda\frac{(1-c)}{2} - K > \lambda\frac{(1-c_H)}{2} - K > 0$. It is optimal for the South to invest in regulation capacity to induce the firm to offshore internationally. Consequently there is international offshoring with the clean technology.

(i2) When $c \leq \min\{\bar{c}_1, \bar{c}_N\}$, without southern trade regulatory investment, the firm does offshore and there is NGO entry. In such a case, from assumption 2 and Proposition 8, the southern government prefers not to invest in efficient regulatory institutions. There is therefore international offshoring, NGO entry but the firm chooses the clean technology only with probability q_1^e.

(ii) Consider now the case where $\min\{\bar{c}_1, \bar{c}_N\} < \bar{c}_0$ (case 3, where offshoring can occur without NGO entry). It is very similar to previous one except that one substitutes $\bar{c}_N$ for $\bar{c}_1$.

(ii1) follows from the fact that under this cost configuration, the firm offshores without NGO entry. Proposition 8 implies that it is then in the interest of South to invest in regulatory capacity to optimize its objective function.

(ii2) when $c \leq \bar{c}_N$, without trade regulatory investment, the firm does offshore and there is NGO entry. According to Proposition 8, the southern government then prefers not to invest in efficient regulatory institutions. There is therefore offshoring but the firm chooses the clean technology only with probability q_1^e. **QED.**

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