

Separating the Good, the Bad and the Ugly

A game theoretic approach to evaluating the role of intrinsic motivation as an enabler of CSR certificates to function as market signals

Johanna Andrén (23158) and Gustav Gray (23156)

Abstract

Corporate social responsibility (CSR) has in recent times gone from a topic rarely touched upon to a moral obligation. Companies certify themselves with various CSR certificates in order to signal their social performance while buyers struggle to distinguish those truly providing a social good from those only taking symbolic action – greenwashing. In this thesis, we examine whether intrinsic motivations to provide a social good can be basis for separation in a traditional signaling setting, allowing certificates to act as market signals carrying strategic weight. Using a game theoretic approach, we conduct an experiment by distributing an online survey designed to distinguish if the certificates result in a separating or pooling equilibria. Our main finding is that intrinsic motivations can enable certificates to be separating and in turn distinguish those who back symbolic claims with substantive action.

Keywords: Corporate social responsibility, Certificates, Greenwashing, Signaling, Intrinsic Motivation

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Discussant:	Moa Hedell and Théodore Montel
Examiner:	Karl Wärneryd

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Table of Contents

Acknowledgement	1
1. Introduction.....	3
2. Background.....	4
2.1 CSR, Greenwashing, and Certificates.....	4
3. Theoretical Framework and Previous Research	6
3.1 Asymmetric Information and Signaling Theory	6
3.2 Elements of Signaling	6
3.3 Certificates as Market Signals	8
3.4 Certificates as Incomplete Contracts and Dishonest Signaling.....	9
4. Research Question.....	10
5. The Certification Game.....	10
5.1 Player: Buyer.....	12
6. Experiment	16
6.1 Developed Hypotheses.....	16
6.2 Experimental Design.....	17
6.2.1 Determining Preferences for Pro-social Behavior	18
6.2.2 A Trust-based Certification Game.....	18
6.2.3 Constructing a Virtual Market.....	20
7. Data and Results	21
7.1 Descriptive Statistics	21
7.2 Normal Distribution and Nonparametric Methods.....	21
7.3 The Pro-social Separation Hypothesis	22
7.4 The Pro-social Performance Hypothesis.....	23
8. Conclusion	24
8.1 Findings.....	24
8.2 Limitation of Research.....	24
8.3 Suggestions for Further Research	25
9. Summary	25
References	26
Appendix I: Equations Certification Game.....	29
Appendix II: Experiment Instructions Buyer	31
Appendix III: Experiment Instructions Supplier.....	33

1. Introduction

In September 2015 one of the most extensive environmental scandals in recent times unfolded as the Environmental Protection Agency (EPA) disclosed that Volkswagen had installed a “defeat device,” a software designed to circumvent environmental testing on their diesel engines. The software made it look like the engines’ environmental performance were better than it actually was and before the scandal surfaced, Volkswagen had a massive advertisement campaign that pushed to sell their diesel cars by proclaiming the engine’s low emission. Eventually, Volkswagen admitted to wrongdoing and that roughly 11 million cars were affected. Even though the engines were being sold based on their excellent environmental performance, the actual emissions of nitrogen oxide turned out to be over 40 times above the legal limit in the US (Hotten, 2015). Volkswagen had thus been taking advantage of the fact that environmental performance is appreciated by their customers by making symbolic claims but not backing them up with substantive action, commonly referred to as greenwashing. Before the scandal, Volkswagen had also committed to several corporate social responsibility (CSR) certificates and environmental management systems (EMS) such as ISO 9001, ISO 14001, and ISO 50001 to further signal their outstanding environmental performance to their customers. The question then arises of how this act of considerable proportion could happen, despite several renowned independent organizations swearing by Volkswagen’s reported environmental performance.

A problematic aspect of CSR efforts is that the results, to a large extent, cannot be foreseen and thus not contracted on. However, attempts are made to overcome this. For example, one of the largest standardization organizations is the International Standardization Organization (ISO) that provides standardizations for companies to adopt and use for certification, but the standards are not result-based. Yet, in a testimony before the Congress of the United States, members of ISO’s technical committee argued that the institution had been designed as a mean to credibly differentiate organizations with superior environmental performance (Mazza, 1996). In traditional signaling theory several assumptions must hold for a market signal to function (Spence, 1973). One of them is that there must be very limited room for dishonest signaling. Some scholars argue in favor of CSR certificates (Noe, Rebello, 1994) while others claim that CSR certificates cannot function as market signals as the market lacks the capabilities to separate false and dishonest signals from true ones (Kracher, Johnson, 1997). Even though the role of certificates as market signals has shown ambiguous results, an ever-rising number of firms voluntarily adopt external CSR certifications and environmental standards (Social Investment Forum, 2006). In this thesis, a game theoretic approach is chosen in order to investigate whether intrinsic motivations for doing socially good, that is, motivation based on an internal reward, may be allow for certifications to work as market signals and function in the intended way. This perspective might shed a slither of light on a field that is otherwise clouded by uncertainties.

The thesis is organized as follows: Section 2 gives a background on CSR, greenwashing, and certificates. The theoretical framework and previous research is presented in Section 3. Section 4 elaborates on the research question of the thesis. Section 5 outlines a developed game and in Section 6 the hypotheses are developed and the experiment conducted. The results are presented in Section 7. The thesis is finalized by a conclusion in Section 8 and summary in Section 9.

2. Background

2.1 CSR, Greenwashing, and Certificates

A troublesome aspect of corporate social responsibility (CSR) is that there exists a variety of definitions rendering the field complicated to analyze (Lyon, Maxwell, 2008). For the sake of clarity, the definition provided by Lyon and Maxwell, (2008) will be adopted throughout this thesis thus defining CSR as “environmentally friendly actions not required by law, which are also referred to as going beyond compliance, the private provision of public goods, or voluntarily internalizing externalities.” This definition provides two conceptual features of CSR. Firstly, CSR is manifested by a behavior or output. In literature this is frequently referred to as Corporate Social Performance (CSP). Secondly, CSP exceeds the required levels set by obligatory regulations and standards enforced by law.

In recent years, the discourse of environmental sustainability has increased and consequently put pressure on corporations as they are often depicted as one of the main drivers of the problem (Hawken, 2010; Korten, 1998). Also, the public’s perception of environmental sustainability has moved “from an infrequent conversation to a moral obligation” (Lovgren, 2006). Consequently, companies take on a more active role in sustainable environmental management and CSR has become a mainstream business activity (Kitzmueller, Shimshack, 2012). The motivations for corporations to engage in sustainability activities has been found to be determined largely by pressure emanating from the corporation’s stakeholders: customers, shareholders, governments, and community groups (Miles, Covin, 2000; Henriques, Sadorsky, 1996). A study conducted by Story and Neves (2015) examined the performance of employees when the motivations for CSR differed and found that substantive performance was greatest when motivations were both intrinsic and extrinsic.

It should be noted that companies differ in their approach to social responsibility. Some take on activities beyond the scope of regulations enforced by law to decrease social and environmental externalities. Others approach the increased demand for CSR efforts in a more strategic way such as adopting strategies to engage in symbolic communication on environmental issues without backing them with substantial

actions (Walker, Wan, 2012), a strategic approach often referred to as greenwashing. In academia, greenwashing has, in the same manner as CSR become subject to an extensive variety of definitions. In this thesis, the definition by Walker and Fan (2012) has been adopted as it clearly defines the difference between symbolic and substantive action. Walker and Fan (2012) define greenwashing as “symbolic information emanating from within an organization without substantive actions. Or, in other words, discrepancy between the green talk and green walk.” In this sense, a firm that has both symbolic and substantive actions would not be characterized as a greenwasher, only a firm that demonstrates symbolic actions without the corresponding substance would be, summarized in Table 1.

Table 1: *Greenwashing Definition*

		Environmental Performance	
		Bad	Good
Communication about Environmental Performance	Positive communication	Greenwashing Firms	Vocal Green Firms
	No Communication	Silent Brown Firms	Silent Green Firms

Source: Delmas, Burbano (2011)

An empirical example of greenwashing could be found from the Department of Energy’s Voluntary Greenhouse Gas Reporting program where participants reported reductions in their greenhouse gas emissions during the period 1995–2003 while their actual emissions as a matter of fact rose (Kim, Lyon, 2011). During the same period, facilities that were not participating in the program reduced their emissions. Due to the flexibility of the program this misleading reporting behavior is not illegal but is rather characterized as greenwashing and opportunistic behavior. Within the program, participants had the possibility to choose how to report emission reductions. Specifically, firms could choose to report at a “project level” or “entity level.” The former alternative gave firms the possibility to selectively report, as they may report only on the outcomes of successful projects, while withholding information about its aggregate performance (Kim, Lyon, 2011).

The flexibility described above stems from CSR programs being subject to incomplete contracts. This is largely due to the credence qualities that CSR efforts possess. Credence qualities are characteristics that are hard to assess both ex ante and ex post a purchase or usage of a good. According to Rametsteiner (2002) information asymmetry is particularly prevalent when the product’s quality is subject to credence aspects.

3. Theoretical Framework and Previous Research

3.1 Asymmetric Information and Signaling Theory

Information is asymmetrically distributed when one party in an exchange, the informed party, possess information that could be of strategic value to the other party, the uninformed party. As asymmetric information often harms both parties in a market exchange the informed party can try to limit the asymmetry by signaling to the uninformed party. Firms use CSR certificates as a mean of signaling superior but unobservable CSR attributes (King, Lenox, Terlaak, 2005). A manager of one company was asked about the implications of the management certificate ISO9000 and answered, “it is similar to having a college diploma” (Naveh et al., 1999). The statement, whether intended or not, provides a direct connection to Spence’s (1973) theory of market signals.

“Economics of information” is the theoretical framework that concerns markets with uncertainties and asymmetric distribution of information between exchange partners, where the main assumption is that both the provision and acquisition of information is costly (Stigler, 1961). Asymmetric information can result in detrimental market effects. A classic example is the theory of the “lemons market” developed by Akerlof (1970). In such a market, trade can collapse if one side of the exchange knows only the distribution of quality and not the quality of each traded item. As a response to the “lemons market,” Michael Spence (1973) developed the theory of signaling by asking whether there is any way that an above-average quality producer could signal its quality in a competitive market.

Signaling theory was first applied to the role of education in the labor market. The model assumed that the productivity level of workers differed and that a high level of education was costlier for a less productive worker compared to a more productive worker. Hence, it would separate those that perceived the cost of education to be low enough to undertake from those who deemed the cost too high to justify the gains. Therefore, education functions as a signal to communicate otherwise unobservable qualities in a worker.

3.2 Elements of Signaling

In order to elaborate further on the signaling theory in the context of certificates, three parts of the signaling theory will be examined more in depth: the sender, the signal, and the receiver.

The senders are insiders that have information regarding something that is not available for an outsider. It could for example be information regarding an individual (Spence, 1973), a product (Kirmani, Rao, 2000) or an organization (Ross, 1977). This privately held information gives the sender a privileged position compared to the uninformed party.

Even though the sender has private information regarding both positive and negative aspects, signaling theory mainly focus on positive information that the sender decides to signal. Signals require two main characteristics for them to be efficient (Connelly et al., 2011). Firstly, signals must be observable to the receiver. Secondly, signals must be associated with a cost. The cost of signaling is one of the most central parts of signaling theory, and is often referred to as “the theory of costly signaling” (Bird, Smith, 2005). The cost of signaling is the reason why a signal can be valued by a receiver, since if there was no cost associated with the signal, everyone could send it.

Receivers are the uninformed party in the signaling model. They lack information from the sender that would be beneficial to know. It should be noted that senders and receivers can have somewhat conflicting interests. For example, a successful dishonest signal could benefit the sender on the expense of the receiver (Bird, Smith, 2005). A prerequisite for signaling to take place is that the receiver provides a benefit to the sender that otherwise would not be provided. In other words, signaling should have a strategic effect (Connelly et al., 2011). In practice, it could be a supplier that obtains a certificate and a buyer therefore favors the certificate holder over other suppliers, since it signals added quality and minimizes potential reputational costs.

Table 2: *Signaling Theory Assumption*

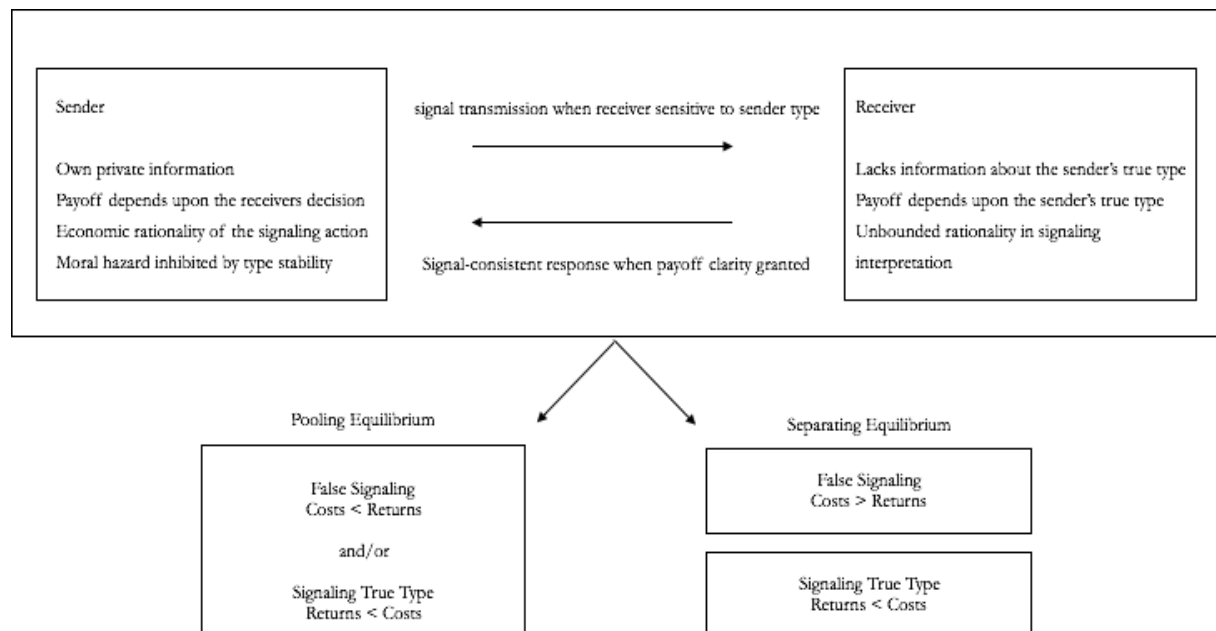
Assumption	
A.1	Interdependence between the two parties (the signaler and the receiver)
A.2	Asymmetric distribution of information; uncertainty about the informed party's true nature before the signal release (Spence, 1973)
A.3	Agents are rational and aim at maximizing returns
A.4	A moral hazard constraint (Holmström, 1979), such that the uninformed party cannot alter the conditions in the period between the release of the signal and withdrawal of payoffs.
	<i>If A.1-A.4 hold, signaling theory predicts a separating equilibrium if:</i>
A.5	The cost of false signaling is higher than the returns
A.6	The returns of signaling true behavior are higher than the cost for the sender

Source: Zerbini (2015)

Signaling theory assumes (A.1) an interdependence between the receiver and the sender, (A.2) uncertainty about the sender's true nature before signaling, (A.3) agents behave maximizing and rationally, (A.4) a moral hazard constraint such that a receiver cannot alter the conditions in the period between the release of the signal and the withdrawal of payoffs, see summary in Table 2.

When these assumptions hold, signaling theory predicts a separating equilibrium which reveals the true nature of the sender if (A.5) the cost of false signaling is higher than the returns and (A.6) the returns of signaling true behavior are higher than the cost for the sender (Zerbini, 2015). If the final conditions do not hold, signaling theory cannot predict a separation of senders' true nature, and the once separating equilibrium becomes a pooling equilibrium, see Figure 1 for a summary.

Figure 1: Summary of the signaling theory and the two possible equilibriums



Source: Zerbini (2015)

3.3 Certificates as Market Signals

The most common application of signaling theory is in a transactional setting (Kirmani, Rao, 2000). Consider a buyer that is seeking to contract with a supplier who may be of either high or low quality in terms of CSR performance. Assume that the buyer is willing to pay a premium for high-quality performance and is therefore looking for a reliable market signal that could be indicative of unobservable quality. To signal the credence qualities of CSR performance, the supplier complies to different levels of certificates, much like different levels of education that workers can obtain. Evidence show a similar

relationship between education and wage¹ as for levels of certificates and premiums paid for CSR performance (Terlaak, King, 2006). This relationship is indicative that the market views CSR certificates as a reliable market signal. Applying signaling theory to CSR certificates can thus help explain the relationship between CSR certificates and premiums paid.

Even though the empirical evidence indicates that signaling theory can be applied to certificates, the possibility for dishonest signaling may still exist due to the incompleteness of certificates. If this is the case, the once separating equilibrium of certificates no longer exists. The dishonest signaling would then lead to a pooling equilibrium, with suppliers having incentives to signal at a higher level but not complying with the associated certificates, i.e. greenwashing.

3.4 Certificates as Incomplete Contracts and Dishonest Signaling

One of the concerns regarding CSR contracts is the uncertainty of the actual output and the supplier's efforts. Another is the lack of clear definitions where vaguely stated goals and outcomes make contracts flexible with room for subjective interpretation. In terms of CSR contracts, one main area is certification with environmental management systems (EMS). The most prominent standardization initiatives for EMS is the ISO 1400 series. Many of the EMS being used for certification are not result-based standards. This contributes to the uncertainty of outcomes and impacts that investments related to the certification might have. Lannelongue and Benito (2012) argues that certification with an environmental management system only implies that the certified firm has invested in the implementation of certain processes to aid the firm in managing its environmental impact and not in any way a higher level of CSP.

Rametsteiner (2002) discusses the implications of sustainable forest certifications and the difficulties in creating and supplying credible information on the quality of forest management. Players might be tempted to act opportunistically, due to the complexity of verifying claims without rigid external institutions. This behavior has been particularly present in markets of environmentally friendly products (Rametsteiner, 2002). Even though some studies argue in favor of ethical standards as signals (Noe, Rebello, 1994), others still stress that markets lack capabilities to determine false or dishonest signals (Kracher, Johnson, 1997).

Empirical studies trying to establish a causal relationship between certificates and improvement in operational performance have been inconclusive (Dick, 2000). It has been concluded that certified companies receive a higher facility growth from certifying, which would be a representation of the premium in the signaling model (Rametsteiner, 2002). However, the premium is paid regardless of any

¹ See Spence (1973).

observable improvement. Others argue that there is a correlation between improvements in CSP and certification (Kirmani, Rao, 2000). However, longitudinal studies in scholarly journals have not found any such correlation and have in some cases even negative correlation (King, Lenox, 2001; Dick, 2000). The evidence sheds light on the limiting function of certificates serving as signals under incomplete contracts.

4. Research Question

As described in Section 3, dishonest signaling and incomplete contracts contributes to that the field of CSR certification is riddled with trapdoors. The threat of dishonest signaling is constantly prevalent but the market nevertheless appears to value certificates as market signals. While signaling theory in its traditional form is applied to CSR certificates, it mainly considers extrinsic motivations for conducting pro-social business. However, drivers of pro-social behavior can also be intrinsically motivated, even between businesses (Muller, Kolk, 2010; Swanson, 1999).

Given the possibility to signal dishonestly, we question whether intrinsic motivations may play a role in companies' differing approaches. This thesis will examine whether certificates could be separating players with varying intrinsic motivations and if intrinsic motivations to do social good can be indicative of high or low levels of CSP.

Research question: Can intrinsic motivations be enough for signals to be separating in a pro-social setting?

The prediction is that differing marginal revenues stemming from varying degrees of intrinsic motivation will make one certificate profitable for one supplier but not the other, in the same manner that differing marginal costs make a certificate too costly for one supplier but not the other in traditional signaling theory.

A game theoretical approach has been employed in order to examine the underlying dynamics as we believed this would yield superior framework for the research question at hand. Furthermore, a strictly empirical approach was beyond the scope of this thesis.

5. The Certification Game

The game has two types of players: suppliers and buyers. The two players are potential partners in a mutually beneficial exchange of goods. Suppliers vary in the degree to which they value that a social good is provided (A.5) and the buyer's goal is to do business with a supplier that acts in a socially responsible way, meaning that a supplier performs (P) and thus provides a social good. The supplier's aim is to earn

the buyer's trust as cheaply as possible and then either perform (P) or not perform ($\bar{P}$), depending on what it finds most profitable. To earn the buyer's trust the supplier can commit to a certificate of its choice in order to signal intent to the buyer. In the game, the extent to which a certificate limits the possibility for greenwashing is known as the certificates strictness (S). It is structured in such a way that the stricter a certificate is, the costlier it is to obtain (R.1). Thus, a stricter certificate is also assumed to be rewarded with higher trust from buyers (A.6)². The supplier can regardless of certificate, always choose to either perform (P) and provide a social good (Z) or to not perform ($\bar{P}$) and instead earn a larger monetary profit. In the game, there is a cost³ for the buyer when conducting business with a supplier that acts socially irresponsible (b), and consequently a buyer is expected to be careful when choosing a supplier. The buyer's choice to either trust (T) or not trust ($\bar{T}$) is thus a matter of trusting the supplier to perform. If the supplier is not trusted, there will be no exchange between the two parties. It is assumed that players within the game are rational and will strive to maximize their respective payoffs (A.3). The game will be presented step by step from the two players' different perspectives.

Table 3: Rules of the Certification Game

Rules	
R.1	Stricter certificates are costlier for the supplier to obtain
R.2	The supplier uses a certificate as a market signal to the buyer
R.3	A certificate with a high completeness of contract is a strict certificate that limits the potential for greenwashing

Table 4: Assumptions of the Certification Game

Assumption	
A.1	Interdependence between the two parties
A.2	Asymmetric distribution of information; uncertainty about the informed party's intrinsic motivations to provide a social good before the signal release
A.3	Players are rational and strive to maximize respective payoffs
A.4	The uninformed party cannot alter the conditions in the period between the signal release and withdrawal of payoffs
A.5	Suppliers vary in level of intrinsic motivation
A.6	Trust is an increasing function of certificate strictness - stricter certificates are rewarded with higher trust from buyers

² This assumption is made on the basis of that a strict contract limits the possibility to greenwash and the supplier should then be more inclined to perform.

³ The cost stems from the loss of reputation in relation to stakeholders mentioned earlier in this article.

Table 5: List of variables of the Certification Game

Variable	Definition	Type of variable
S	Certificate strictness	Endogenous
$C(S)$	Supplier's cost of certificate	Endogenous
d	A certificate's strictness effectiveness of limiting greenwashing	Exogenous
gs	Supplier's profit from exchange	Exogenous
gw	Benefit from greenwashing without limitation of strictness	Exogenous
Z	Social good produced by supplier if P	Exogenous
v	Valuation of the social good, denoted b for buyer and s for supplier	Endogenous
gb	Buyer's profit from exchange	Exogenous
b	Cost for the buyer when exchanging with a supplier that acts socially irresponsible $\bar{P}$	Exogenous
I	Buyer's initial endowment	Exogenous

5.1 Player: Buyer

The buyer has two actions to consider, either to trust (T) the supplier and enter an exchange or not trust ($\bar{T}$) and instead keep the initial investment intended for the exchange. If the buyer decides to trust a supplier that performs and provides a social good (Z), the buyer earns profit from the exchange (gb) and utility from the provided social good based on the buyer's valuation of said good ($v_B Z$).

$$\text{Payoff Trust, Perform } (T, P): (gb + v_B Z) \quad (1)$$

If the buyer decides to trust a supplier and the supplier instead decides to not perform and thus, doesn't provide the social good, the buyer instead receives the profit from the exchange (gb) and bears the cost (b) from being affiliated with a socially irresponsible supplier.

$$\text{Payoff Trust, Not Perform } (T, \bar{P}): (gb - b) \quad (2)$$

If the buyer does not trust ($\bar{T}$) that the supplier will perform, then there is no exchange and the buyer keeps the initial endowment (I) and seeks other suppliers to exchange with.

$$\text{Payoff Not Trust, Perform } (\bar{T}, P): I \quad (3)$$

$$\text{Payoff Not Trust, Not Perform } (\bar{T}, \bar{P}): I \quad (4)$$

Table 6: Payoff Matrix for Buyer in the Certification Game

		Buyer Action	
		Trust: T	Not Trust: $\bar{T}$
Supplier Action	Perform: P	$gb + v_B Z$	I
	Not perform: $\bar{P}$	$gb - b$	I

* The relationship between the payoffs follows $(gb + v_B Z) > (I) > (gb - b)$

A buyer's decision is as stated, a matter of trusting the supplier to either perform or not perform. The only information that the buyer has available is the certificate that the supplier has committed to. A stricter certification is associated with higher trust A.3. The buyer's expected payoffs for T is a function of the probability that a supplier will perform and can be illustrated as in Table 7.

Table 7: Expected Payoff of Buyer

Payoff (T, P)	$P(P) * (gb + v_B Z)$
Payoff ($T, \bar{P}$)	$P(\bar{P}) * (gb - b)$

* $P(P)$ probability that a supplier performs, $P(\bar{P})$ probability that a supplier does not perform

The maximizing strategy for the buyer is to trust if

$$(P(P)) * (gb + v_B Z) + (P(P)) * (gb - b) > (I) \quad (5)$$

And not trust if

$$(P(P)) * (gb + v_B Z) + (P(P)) * (gb - b) < (I) \quad (6)$$

5.2 Player: Supplier

From the perspective of the supplier, the game depicts a situation where the supplier strives to gain the buyer's trust, as cheaply as possible, in order to make the exchange happen. The supplier has two actions to consider, to either perform (P) or not perform ($\bar{P}$). The payoff associated with each option is dependent on whether the buyer decides to trust (T) the supplier or not ($\bar{T}$).

If the supplier performs and the buyer trusts the supplier to perform, the supplier earns profit from the exchange (gs) as well as the utility from the provided social good ($v_s Z$). Thus, $v_s Z$ is a demonstration of a supplier's intrinsic motivation for pro-social behavior. To get the buyer to trust the supplier, the supplier commits to a certificate which incurs a cost of certificate ($C(s)$) that reduces the payoff. The value of C depends on contract strictness (R.1).

$$\text{Payoff Perform } (T, P): (gs - C(S) + v_s Z) \quad (7)$$

If the supplier does not perform ($\bar{P}$) but the buyer still trusts the supplier to perform, the supplier earns profit from the exchange (gs) and additional profit from not backing its symbolic claims with substantive action i.e. greenwashing (gw). Again, to get the buyer to trust the supplier, the supplier commits to a certificate which incurs a cost of certificate ($C(S)$). The certificate also limits the possibility to greenwash dependent on how effective the certificate is ($dC(S)$).

$$\text{Payoff Not Perform } (T, \bar{P}): \left(gs - C(S) + (gw - d(C(S))) \right) \quad (8)$$

If the buyer does not trust that the supplier will perform, then there is no exchange and the supplier earns zero profit as the buyer seeks another supplier to exchange with.

$$\text{Payoff Perform } (\bar{T}, P): 0 \quad (9)$$

$$\text{Payoff Not Perform } (\bar{T}, \bar{P}): 0 \quad (10)$$

Table 8: Payoff Matrix for Supplier in the Certification Game

		Buyer Action	
		Trust: T	Not Trust: $\bar{T}$
Supplier Action	Perform: P	$gs - C(S) + v_S Z$	0
	Not perform: $\bar{P}$	$gs - C(S) + (gw - d(C(S)))$	0

Trust is an increasing function of certificate strictness (S) A.6 and the function for trust is specified as $T(S)$. The supplier's expected payoffs depends on the level of trust from the buyer, ($T(s)$), see Table 9.

Table 9: Expected Payoff of Supplier

Payoff (P, T)	$T(s) * (gs - C(S) + v_S Z)$
Payoff ($\bar{P}, T$)	$T(s) * (gs - C(S) + (gw - d(C(S))))$

* $T(S)$ is a trust function of buyer dependent on and increasing with level of strictness (S)

The maximizing strategy of the supplier's two actions ($P, \bar{P}$) is derived by calculating for what certificate strictness each payoff function is maximizing (for the complete derivation, see Appendix I). By applying the maximizing strictness ($S_{\max P}, S_{\max \bar{P}}$) to each action's payoff function, the action of a rational player can be determined.

$$\text{Payoff maximizing } P : T(S_{\max P}) * \left(gs - \left((gs - v_S Z) - \frac{T(s)}{T'(s)} * (C'(s)) \right) + v_S Z \right) \quad (11)$$

$$\text{Payoff maximizing } \bar{P} : T(S_{\max \bar{P}}) * \left(gs - \left(\frac{(gs+gw)}{1-d} - \frac{T(s)}{T'(s)} * (C'(s)) \right) + gw - d \left(\frac{(gs+gw)}{1-d} - \frac{T(s)}{T'(s)} * (C'(s)) \right) \right) \quad (12)$$

Note that the maximizing strictness for P includes the variable v . This implies that the maximizing strictness for perform varies with suppliers' valuation of the social good. However, the maximizing

strictness of P is equal for all players as gs , gw and the function of trust $T(S)$ are given and does not vary across players. Consequently, there is a set v and a conditioned $S_{\max P}$ that exceeds the maximizing utility function of P . The implication is that the certificate level should not be indicative of performance until this certain level of v .

The supplier's best strategy is to perform if

$$\text{Equation (11)} > \text{Equation (12)}$$

and not perform if

$$\text{Equation (11)} < \text{Equation (12)}$$

6. Experiment

To further examine the research question, a version of the Certification game has been applied as an experiment. The experiment aims at simulating the dynamics from the perspective of the supplier in the Certification game and as such test the effect of intrinsic motivation on the informed party in a signaling setting. This section will present the developed hypotheses and the experimental design followed by data and results in Section 7

6.1 Developed Hypotheses

In order to test if there is a dependency between intrinsic motivation and the varying degrees of certification as well as the implications of such a dependency, two main hypotheses have been developed. Firstly, the experiment aims to examine whether intrinsic motivation affect the level of certification, the Pro-Social Separation Hypothesis. Secondly, whether intrinsic motivation affects the level of performance, the Pro-Social Performance Hypothesis. In accordance with the research question, the two hypotheses investigate if a separating equilibrium can be achieved based on players varying degree of intrinsic motivation to provide a social good and if such motivations correlate with a higher level of performance.

The Pro-Social Separation Hypothesis

H_0 : *Intrinsic valuation of pro-social behavior and level of certificate are not dependent on each other*

H_1 : *Intrinsic valuation of pro-social behavior and level of certificate are dependent on each other*

Rejections of the null hypotheses of the Pro-Social Separation Hypothesis would suggest that traditional signaling theory could also be applicable to situations where firms might have differing intrinsic

motivations. However, if the null hypotheses hold, it would suggest that intrinsic motivations play a marginal role in traditional signaling, adding to the perplexity of signaling CSR efforts.

The Pro-Social Performance Hypothesis

H_0 : *Intrinsic valuation of pro-social behavior and level of performance are not dependent on each other*

H_1 : *Intrinsic valuation of pro-social behavior and level of performance are dependent on each other*

Rejections of the null hypotheses of the Pro-Social Performance Hypothesis would suggest that intrinsic motivation incentivize players to perform, or in other words back symbolic actions with substantive measures. However, if the null hypotheses hold, it would suggest that intrinsic motivations play a marginal role in affecting performance and thus adding to the complexity of greenwashing and incomplete CSR certificates.

6.2 Experimental Design

In order to test the dynamics of the game from the perspective of the supplier, an experiment structured to mirror the incentives and dynamics of said game has been conducted. Even though an experiment has the handicap of not perfectly simulating the natural environment, it is preferred as it enables us to control the settings to better measure the effects of interest. The experiment was carried out by distributing an online survey that participants answered independently. Participants were not randomly selected, they were all students at the Stockholm School of Economics and personally contacted by the authors. The experiment was carefully designed to not provide an indication of what was the expected behavior. Total anonymity among participants was ensured. However, the participants were known to us which was clear to the participants and it might have affected their decisions in the game. In total, 46 people participated but one was removed as the participants answer clearly indicated that the person had not understood the game. The participants were given extensive written instructions as well as contact information in case of any uncertainties regarding the setup of the game. Participation was voluntary and the game took approximately 15 minutes to complete.

The aim of the experiment was to illustrate the signaling mechanisms from the supplier's perspective. Therefore, the game setup in the experiment only considers the suppliers and there is no direct interaction between buyers and suppliers. The buyer's strategic consideration is however crucial for the supplier to take into deliberation. Thus, the buyer's strategy set and incentives were explained to the participants. A small subset of participants was part of creating a virtual market to calculate the final compensations to the participants.

The experiment was divided into two parts. First, in order to differentiate participants based on their value of pro-social behavior, v , donations in a version of the Dictator game was used where the receiver was a charity of the participant's choice. For the second part, the experiment was designed as closely to our game as possible. Participants entered a non-repeating, two-person investment game with the possibility to send a market signal by committing to a certificate.

6.2.1 Determining Preferences for Pro-social Behavior

To measure preferences for pro-social behavior a version of the Dictator game was used. Each participant was given an individual endowment of 100 credits, each credit corresponded to SEK 0.5. The participant was then presented with a choice to donate any amount between 0 and 100 credits from the initial endowment and personally keep the remaining amount. When deciding how to split the initial endowment the participant did not know about the subsequent certification game. All participants were informed that all decisions were anonymous and that both the participant and the charity would receive real money. If choosing to donate, the participant had the option to decide which charity to assign the donation to. Five different charities were available as options: “the Red Cross,” “Médecins Sans Frontières” and “UNICEF” are charities aiding poor and unprotected people, “WWF,” a charity working for wildlife conservation, and “Micro-loan foundation,” an organization that provides micro-loans to aid entrepreneurship in developing countries. The share of the endowment that was donated has been viewed as the participants' preference for pro-social behavior, a representation of the variable v in the certification game presented earlier.

6.2.2 A Trust-based Certification Game

Following the Dictator game, participants took part in a non-repeated version of the certification game where they were playing the role of a supplier. The participants were to choose the level of strictness to their certificate that they found the most valuable based on their perception of the market and valuation of the pledged social good. Participants were presented with identical payoff structures when the game opened. They could then alter the payoffs by either increasing or decreasing the strictness of certificate and thus realizing the varying costs associated. After choosing a certification strictness the participants were asked to decide whether to perform (P) or not perform ($\bar{P}$). Regardless of level of strictness, the action perform was associated with a donation of 50 credits. The donation would only be made if the supplier decided to perform. It should be noted that the donation was not deducted from of the supplier's payoff but pledged to the decision of perform (represented by Z in the earlier certification game). It was explained to the suppliers that buyers valued the donation and wanted to only trust a supplier that they believed would perform. The supplier's incentives for altering the certificate was presented as a way to signal intent of behavior and earn the buyer's trust. Furthermore, it was explained that the only

information that a buyer could obtain in order to form trust was how limiting the certificate was in terms of the discrepancy between the payoff for perform and not perform. See appendix II and III for the full description that was provided to the participants.

In the game, the supplier always benefitted from the trust of the buyer but to varying degrees depending on their valuation of the donation and the level of certification. Participants' valuation of the donation was not put into the actual function of the payoffs, but assumed as an intrinsic motivation. Suppliers were able to alter the payoffs for the different actions (P or $\bar{P}$) by increasing or decreasing the strictness. By increasing strictness, the payoff for $\bar{P}$ was decreased with three times the amount of the decrease of P . The rationale for this was to include the two aspects of strictness: both the increase in cost and increase in limitation of greenwashing. By altering a certificate, the supplier could reduce the gap between the supplier's payoff associated with P and the payoff associated with $\bar{P}$. The variables earlier presented in the certification game, were set to the values shown in Table 10 and the payoff structure as in Table 11 for the experiment.

Table 10: Values of Variables in Experiment

Variable	Value
gs	50
gw	100
d	2

Table 11: Payoff Matrix for Supplier in the Experiment

		Buyer Action	
		Trust: T	Not Trust: $\bar{T}$
Supplier Action	Perform: P	$gs - C =$ $50 - C$ + donation of 50 credits	0
	Not perform: $\bar{P}$	$gs - C + (gw - dC) =$ $50 - S + (100 - 2S)$ No donation	0

The participants were informed that their monetary payoff from participating in the experiment would be based on a virtual market's trust levels conditioned on the different certificates and the actions that the participant undertook. This structure was provided to simulate more accurate incentives from participants, as their actions determined the monetary compensation for participation.

6.2.3 Constructing a Virtual Market

To determine the participants' final compensation of a certain certificate and action, a virtual market was constructed to mimic the actions of buyers in a real market. The virtual market was created by assigning 14 participants the role of buyers, separate from the 45 used in the certification game as suppliers. The buyers were first confronted with the same Dictator game as the suppliers. Subsequently, the buyers were confronted with seven different payoff-matrices that were all available to the supplier. The buyers were introduced to the other end of the same game presented to the suppliers and got to decide whether to "Trust" or "Not Trust" the supplier based on the payoff-matrix. For the full description provided to the buyers see Appendix II.

7. Data and Results

7.1 Descriptive Statistics

The experiment was conducted with 59 participants in total, with 14 participants assigned as buyers to construct the virtual market and 45 participants that acted as suppliers in the main experiment. The average age among suppliers were 23.41 years and 24.21 years among buyers. The gender distribution in the suppliers group was 64.44% male, 35.55% female. In the buyer group the gender distribution was 57.14% male, 42.86% female. The sample had a mean donation share of 0.468 of the initial endowment with a standard deviation of 0.05008. On average, 60% of the participants decided to perform. The variable Perform was created as a dummy variable taking value 1 if “Perform” and 0 if “Not Perform.” See Table 12 for a summary of descriptive statistics.

Table 12: Descriptive statistics for Supplier

Variable	Definition	Unit of measurement	Obs	Mean	Std. Err.	[95% Conf. Interval]		Min	Max
<i>Donation</i>	Share of initial endowment donated	Credits 1 credit = SEK 0.5	45	46.8	5.008336	36.70636	56.89364	0	100
<i>Donation share</i>	Share of initial endowment donated	%	45	0.468	0.0500834	0.3670636	0.5689364	0	1
<i>Discrepancy</i>	Difference between the payoff for “perform” and “not perform”	Credits 1 credit = SEK 0.5	45	63.24444	4.70151	53.76917	72.71971	0	160
<i>Decision</i>	A dummy variable action taken by the supplier. 1=Perform 0=Not perform	dummy	45	0.6	0.0738549	0.4511552	0.7488448	0	1

7.2 Normal Distribution and Nonparametric Methods

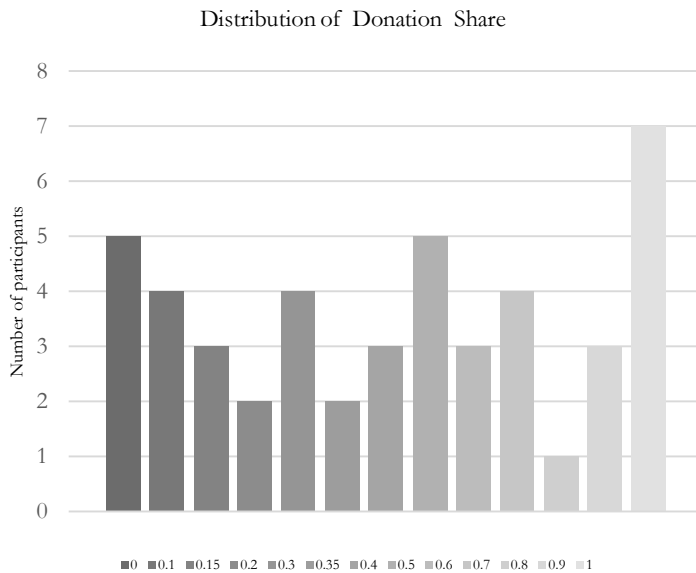
To determine normality of the sample, both an ocular inspection and normality tests were made. From an initial visual inspection, the distribution of the sample in terms of donation preferences shows no signs of normality. To further examine whether the sample is normally distributed, a Shapiro-Wilk and Shapiro-Francia test were conducted. The tests cannot reject the null hypothesis that the sample is normally distributed in regards to donation preferences. However, when conducting a Skewness-Kurtosis test the null hypothesis can be rejected, although skewness alone cannot reject the hypothesis. The conducted normality tests can be of low power which might lead to that the tests fail to reject the null hypothesis. These shortcomings are especially prevalent for smaller samples. Considering a visual inspection and the

distribution in regards to the limited sample, a normal distribution could not be assumed. The results of the experiment have, consequently, been conducted using nonparametric methods.

Table 13: *Test of Normality*

Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	z	Prob>z
Donation share	45	0.97648	1.018	0.039	0.48459
Shapiro-Francia W' test for normal data					
Variable	Obs	W'	V'	z	Prob>z
Donation share	45	0.97168	1.359	0.576	0.28223
Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2 (2)	joint Prob>chi2
Donation share	45	0.97168	1.359	0.576	0.028223

Figure 2: *Distribution of donation share of initial endowment of Suppliers*



7.3 The Pro-social Separation Hypothesis

H_0 : *Intrinsic valuation of pro-social behavior and level of certificate are not dependent on each other*

H_1 : *Intrinsic valuation of pro-social behavior and level of certificate are dependent on each other*

To test the Pro-Social Separation Hypothesis, a Spearman correlation test was conducted and presented in Table 14. From the results, it can be concluded that the correlation coefficient suggests a strong inverse relationship between discrepancy level and donation share. Discrepancy is measured as the difference between the player's payoffs for "perform" and "not perform" which is decreasing with level of strictness.

The donation share is interpreted as a valuation of pro-social behavior. The correlation represents that a higher valuation of the social good and a stricter certificate have a negative relationship. The relationship is significant at any conventional significance level and as such the H_0 can be rejected, meaning that the participants appear to have selected certificates based on their individual valuation of the donation associated with “Perform”.

Table 14: *Spearman Correlation between discrepancy and donation share*

Variable	Discrepancy	Donation share
Discrepancy	1.0000	
Donation share	-0.6347	1.0000
Sig	0.0000	

7.4 The Pro-social Performance Hypothesis

H_0 : *Intrinsic valuation of pro-social behavior and level of performance are not dependent on each other*

H_1 : *Intrinsic valuation of pro-social behavior and level of performance are dependent on each other*

To test the Pro-Social Performance Hypothesis, a Spearman correlation test was conducted as presented in Table 15. From the results, it can be concluded that the correlation coefficient suggests a strong relationship between performance level and donation share. The relationship is significant at any conventional significance level and as such the H_0 can be rejected. This implies that higher valuation of pro-social behavior appears to be associated with higher levels of performance.

Table 15: *Spearman Correlation between decision and donation share*

Variable	Decision	Donation Share
Decision	1.0000	
Donation Share	0.6505	1.0000
Sig	0.0000	

8. Conclusion

8.1 Findings

This thesis examined whether intrinsic motivations could allow certificates to separate high and low levels of CSP. The main finding is that intrinsic motivations can enable certificates to be separating and aid buyers to distinguish those who back symbolic claims with substantive action.

Given identical marginal costs, the effect of intrinsic valuation of pro-social behavior has been tested on both level of certification and level of performance in relation to certification. The results presented in Table 14 indicate that participants' intrinsic motivation affect the level of strictness that participants choose to certify at. The results suggest that increasing valuation of pro-social behavior corresponds to an increase in chosen strictness of certification and as such certificates could be separating based on intrinsic motivations. The results presented in Table 15 indicate that participants' intrinsic motivation improve the level of performance. The interpretation of the results is that higher intrinsic motivations seem to incentivize participants to perform and produce the social good pledged to the certificate.

Participants with higher levels of intrinsic motivations both certify at stricter levels and perform to a larger extent than participants with low intrinsic motivations. Consequently, the results suggest that intrinsic motivations can enable certificates to function as market signals and lead to a separating equilibrium. The implication of the findings is that the uninformed party in a signaling setting should account for certificate level when making its decision.

8.2 Limitation of Research

The experiment conducted was limited to a small number of participants. Mainly due to the lack of monetary incentives that could be provided by the authors. As the monetary incentives available constituted rather small amounts, a bias of the donation shares of the initial endowment might be present. Increasing monetary incentives has been shown to affect people's willingness to give and economic rational behavior (Engel, 2011; Smith, Walker, 1993). Furthermore, the monetary effect could be prevalent in the certification game where participants might have acted differently if larger monetary gains were at stake. Also, as the sample of the experiment was rather small there is risk for bias and that the experiment could be underpowered (Lenth, 2001). The fact that the participants were not truly anonymous likely also had an impact on their decisions and the targeting of participants is also troublesome. However, we believe that the results of the experiment are indicative of the relationship between intrinsic motivation, certification level and level of performance.

8.3 Suggestions for Further Research

The focus of this thesis has been to analyze the limitations of CSR certificates and the role of intrinsic motivations. However, there are many areas of interest in regards to the complexity of CSR certificates and the role of intrinsic motivations. Due to the scope of this thesis the experiment was structured as a one-shot game focusing on the informed player's incentives and dynamics. We would welcome future research to apply the developed game in a repeated-game setting where interaction between the supplier and buyer is allowed. This would pose interesting research questions of the dynamic interaction between the players in a competitive market. Furthermore, it would be of great interest to investigate the effect of intrinsic motivations when allowing for varying marginal cost of the participants seeking certification.

9. Summary

The aim of this thesis was to study the limitations of CSR certificates as market signals and elaborate on the possible effect of intrinsic motivations in regards to certificates efficiency in creating a separating equilibrium. Prior research has found conflicting results regarding CSR certificates possibility to separate firms of different levels of CSP. Even though the role of certificates as market signals has shown ambiguous results, an ever-rising number of firms voluntarily adopt external CSR certifications and environmental standards (Social Investment Forum, 2006).

To contribute to the understanding of CSR certificates and more specifically the potential effect of intrinsic motivations, a game and experiment was developed and conducted in this thesis. Given equal marginal cost of participants, the results from the thesis indicate two relationships. Firstly, the results indicate a positive correlation between higher intrinsic motivations and choice of strictness of certification. Secondly, the results indicate that the level of performance is positively correlating with higher intrinsic motivations.

The main finding of the thesis is that intrinsic motivations can enable certificates to be separating and thus distinguish those who back symbolic claims with substantive action. This means that the uninformed party, the buyer, need to account for the informed party's level of certification, in order to separate the good from the bad and the ugly.

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Appendix I: Equations Certification Game

Calculations for $S_{\max_P}$

$$T(s) * (gs - C + v_s Z) \quad (\text{Expected Payoff } P)$$

$$T(s) * (gs + v_s Z) \quad (\text{Expected Revenue})$$

$$T(s) * (C(s)) \quad (\text{Expected Cost})$$

Marginal revenue given by the expected revenue derived with respect to S

$$T'(s) * (gs + v_s Z) \quad (\text{Marginal Revenue})$$

Marginal cost given by the expected cost derived with respect to S. Note that C is a function of S, and will here be written as C(S)

$$T'(s) * (C(S)) + T(s) * (C'(S)) \quad (\text{Marginal Cost})$$

The maximizing cost of S for P is given when marginal cost equals marginal revenue

$$T'(s) * (gs - v_s Z) = T'(s) * (C(S)) + T(s) * (C'(S))$$

$$(gs - v_s Z) = (C(S)) + \frac{T(s)}{T'(s)} * (C'(S))$$

$$(gs - v_s Z) - \frac{T(s)}{T'(s)} * (C'(S)) = (C(S))$$

The maximizing strictness $S_{\max_P}$ for P is given when the above equation holds

Calculations for $S_{\max \bar{P}}$

$$T(s) * (gs - C(s) + gw - d * C(s)) \quad (\text{Expected Payoff } \bar{P})$$

$$T(s) * (gs + gw) \quad (\text{Expected Revenue})$$

$$T(s) * (C(s) * (1 + d)) \quad (\text{Expected Cost})$$

Marginal revenue given by the expected revenue derived with respect to S

$$T'(s) * (gs + gw) \quad (\text{Marginal Revenue})$$

Marginal cost given by the expected cost derived with respect to S. Note that C is a function of S, and will here be written as C(S)

$$T'(s) * (C(s) * (1 + d)) + T(s) * (C'(s) * (1 + d)) \quad (\text{Marginal Cost})$$

The maximizing cost of S for $\bar{P}$ is given when the marginal cost equals marginal revenue

$$T'(s) * (gs + gw) = T'(s) * (C(s) * (1 + d)) + T(s) * (C'(s) * (1 + d))$$

$$(gs + gw) = (C(s) * (1 + d)) + \frac{T(s)}{T'(s)} * (C'(s) * (1 + d))$$

$$\frac{(gs + gw)}{1 - d} - \frac{T(s)}{T'(s)} * (C'(s)) = C(s)$$

The maximizing strictness $S_{\max \bar{P}}$ for $\bar{P}$ is given when the above equation holds

Appendix II: Experiment Instructions Buyer

Thank you for participating in our experiment!

Estimated time: 10 minutes.

In this game it is possible to earn real money. Your profit will be dependent on your performance but your choices will be kept anonymous and not publicized. The game is designed in two stages. After you are finished reading these instructions, please go to Stage 1 by clicking on the “Next” button on the bottom of this page. You will be given further instructions when going through the stages. Throughout the game you will earn Credits. 1 Credit equals SEK 0.5. Your decisions from the two stages will be added up and paid to you within two days. Answer truthfully and take your time to give a well thought through answer.

If anything is unclear, do not hesitate to call us on 076 023 76 51 (Gustav) or 073 502 03 68 (Johanna)

Best regards,

Gustav Gray & Johanna Andrén

Stage 1

You receive 100 credits that can be exchanged for real money. You are given a choice to either keep the money or to donate parts of it (0-100) to a charity of your choice. At the end, you will receive 100 credits subtracting your donation (100 credits – donation). You can choose between these charities: "The Red Cross", "Doctors without borders", "The Micro-loan foundation", "UNICEF" or "World Wildlife Foundation". Your choice will be kept anonymous and both you and the charity will receive real money

Please select how much of your 100 credits, if any, you are willing to give to a receiving charity. Type a figure between 0 and 100 in the box that says "Your Donation". Then select a charity of your choice. On this stage you need to do nothing more. Please click on the “Next” button on the bottom of this page

Stage 2

You are part of a game where there are two types of players: **Suppliers** and **Buyers**. You are given the role of **Buyer**.

The **Supplier** can either **Perform** or **Not Perform**. You, the **Buyer**, can either **Trust** or **Not Trust** the **Supplier**. If you believe the **Supplier** will **Perform** your best move is to **Trust** him/her. If you on the other hand believes the **Supplier** will **Not Perform** your best move is to **Not Trust** the **Supplier**. If the **Supplier** decides to **Perform**, a donation of 50 credits is donated to a charity of the **Supplier's** choice. No donation will be made if the **Supplier** decides to **Not Perform**.

Both you, the Supplier and the charity will receive real money.

Presented to you are 7 different payoff-tables, each with a different structure. The only thing that differs between the payoff-tables is the **Supplier's** incentives to either "**Perform**" or "**Not Perform**". Based on these incentives you are to decide if you **Trust** the **Supplier** to **Perform** or not. You do this by clicking on either the "**Trust**" button or the "**Not Trust**" button next to the payoff-tables. **Remember, a donation of 50 credits will be made by the Supplier to a charity if the Supplier performs. This is not shown in the payoff-table so you need to keep this in mind.**

- If you choose to **Trust** a **Supplier** that "**Perform**" you will receive 100 credits and a donation of 50 credits will be made.
- If you choose to **Trust** a **Supplier** that "**Not Perform**" you will receive 0 credits and no donation will be made
- If you choose to **Not Trust** a **Supplier**, you receive 25 credits regardless of the **Supplier's** action and no donation will be made.

Your final profit will be calculated as [Your profit in payoff-table 1-7 divided by 7] to give an average payoff. Please remember to answer all 7 payoff-tables, they are in a row so you will need to scroll down after completing the first few.

Your choice will be kept completely anonymous. If you do not understand the game, do not hesitate to call.

Thank you!

076 023 76 51 (Gustav Gray) or 073 502 03 68 (Johanna Andrén)

Appendix III: Experiment Instructions Supplier

Thank you for participating in our experiment!

Estimated time: 10 minutes.

In this game it is possible to earn real money. Your profit will be dependent on your performance but your choices will be kept anonymous and not publicized. The game is designed in two stages. After you are finished reading these instructions, please go to Stage 1 by clicking on the “Next” button on the bottom of this page. You will be given further instructions when going through the stages. Throughout the game you will earn Credits. 1 Credit equals SEK 0.5. Your decisions from the two stages will be added up and paid to you within two days. Answer truthfully and take your time to give a well thought through answer.

If anything is unclear, do not hesitate to call us on 076 023 76 51 (Gustav) or 073 502 03 68 (Johanna)

Best regards,

Gustav Gray & Johanna Andrén

Stage 1

You receive 100 credits that can be exchanged for real money. You are given a choice to either keep the money or to donate parts of it (0-100) to a charity of your choice. At the end, you will receive 100 credits subtracting your donation (100 credits – donation). You can choose between these charities: "The Red Cross", "Doctors without borders", "The Micro-loan foundation", "UNICEF" or "World Wildlife Foundation". Your choice will be kept anonymous and both you and the charity will receive real money. Please select how much of your 100 credits, if any, you are willing to give to a receiving charity. Type a figure between 0 and 100 in the box that says "Your Donation". Then select a charity of your choice. On this stage you need to do nothing more. Please click on the “Next” button on the bottom of this page

Stage 2

You are part of a game where there are two types of players: **Suppliers** and **Buyers**. You are given the role of **Supplier**. Your objective in the game is to sell your product and maximize your utility. To do this you need to gain the **Buyer's** trust. If the buyer decides to trust you, you can either **Perform** or **Not Perform**.

Your action:

If you **Perform** you will be given the payoff associated with this choice (see payoff-table) and a **donation of 50 credits** will be made to your previously chosen charity. If you choose to **Not Perform** you will receive the payoff associated with this choice but no donation will be made.

Your certification:

You can alter the payoff table by committing to a certificate by pressing the "**Stricter**" or "**Looser**" button under "Certification". The certification is how you choose to limit your payoff associated with **Not Perform** compared to **Perform** and this is the **Buyer's** only way to know whether to trust you or not. **Stricter** decreases the payoff from **Not Perform** with 5 and the payoff from **Perform** with $\frac{1}{3}$ of that. **Looser** increases the payoff from **Not Perform** with 5 and the payoff from **Perform** with $\frac{1}{3}$ of that. A **Strict** certificate is thus costly for both **Perform** and **Not Perform** but only $\frac{1}{3}$ as costly for **Perform** as for **Not Perform**.

Since pressing **Stricter** decreases the discrepancy between the payoffs associated with **Perform** and **Not Perform** it is reasonable to believe the **Buyer** is more likely to trust you with a **Strict** certificate.

Pressing **Looser** increases the discrepancy between the payoffs associated with **Perform** and **Not Perform**, it is thus reasonable to believe the **Buyer** is less likely to trust you with a **Loose** certificate.

If the buyer does **Not Trust** you, you receive 0 regardless of your action and **no donation** is made.

Choose a certification where you are happy with the payoffs and the likelihood of the **Buyer** trusting you.

The Buyer's trust:

- If the **Buyer** believes you will **Not Perform**, he/she will **Not Trust** since this earns the **Buyer** 25 instead of 0.
- If the **Buyer** believes you will **Perform**, he/she will **Trust** since this earns the **Buyer** 100 instead of 25.
- If the **Buyer Trusts** you and you **Not Perform**, he/she will earn 0 so it is reasonable to believe they **Buyer** will be wary of this possibility.

Remember, the buyer is aware that a donation will be made only if you Perform and will take this into consideration when observing your incentives to Perform or Not Perform.

Your certificate and choice of action will be matched against a market of buyers and your final payoff will be calculated in the following manner: [Payoff of your action * percentage of market that trusts you]

Your choice will be kept completely anonymous. If you do not understand the game, do not hesitate to call.

Thank you!

076 023 76 51 (Gustav Gray) or 073 502 03 68 (Johanna Andrén)