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The Fairtrade Value Chain

The Impact of Ethical Consumers in the North on Producers and Communities in the South

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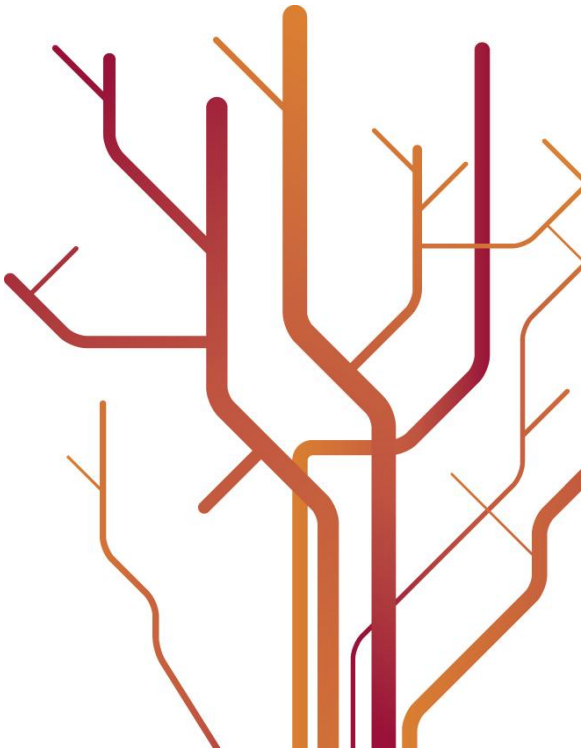

Preface

Two years ago I nervously started my master's degree, wondering if I had the skills and patience to carry through. Now I'm at the finish line, looking back at two challenging, but wonderful years. The last year I shared an office with my classmates. We have had many an evening and night together with reading and take home exams. Spending late evenings at the office is no problem with you guys all around me. Thank you for being you.

Writing this thesis was the biggest challenge of all. In no small part thanks to my supervisor, associate professor Jan Yngve Sand, my work resulted in a thesis I'm pleased with. Despite being busy with family, lectures and travels, Jan Yngve was available when I needed guidance.

And of course, I would never have gotten so far if it hadn't been for my dear friends and family, who believe in me and are always there for me. A special thank you goes to Lars Tveiten for proof reading my thesis.

Lastly I want to thank all the staff here at Tromsø University Business School for all the lectures, seminars, discussions and help I've received since I started here.

Tromsø, 2011-05-29

Sindre Myhr

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Summary

In this thesis, the value chain for Fairtrade labeled goods is examined from ethical consumers in the north to producer organizations in the south. From there, the analysis studies how the income can be shared between producers, stakeholders and communities in different scenarios. Profit functions are used in a principal-agent setting to analyze participation constraints as well as incentive compatibility constraints when the producers bear private effort costs.

One scenario where individual effort is observable is examined, then one where only the average effort of all producers delivering to a cooperative is observable, first in a single period setting, then in a multi period setting.

What is found is different constraints for how big a fraction FLO can require producers to pass on to stakeholders or community projects and still wanting to be part of the Fairtrade cooperative and apply an efficient effort level. This fraction depends on how much more consumers in the north are willing to pay for Fairtrade labeled goods and, when only average effort is observable, the size of the cooperative. In the multi period setting the constraints are also dependent on the discount rate of producers.

Keywords: Fairtrade, fair trade, Max Havelaar, cooperatives, development

Parameters and variables

Explanation

α A parameter describing the relative market power of the Fairtrade cooperative when bargaining a price with the importer.

b The total extra willingness to pay for a certified product. Assumed to be βe_i.

β The marginal willingness to pay for a certified Fairtrade product.

d_1 The outside option of the Fairtrade cooperative in their bargaining with the importer. Assumed equal to δe

d_2 The outside option of the importer when bargaining with the Fairtrade cooperative.

δ The cooperative's share of the marginal willingness to pay for the general quality of a product.

D The total willingness to pay in the market for conventional goods, $d_1 + d_2$.

e_i The effort of producer i.

σ The fraction of the income not going directly to the producers for their crops. Interpreted as income going to stakeholders or communal projects.

q_i The total quality measured as a quantity, of the good produced by producer i. Assumed to be equal to e_i.

r Discount rate in the multi period model.

Notation

O Used when social optimum is required by FLO.

P Used when producer maximum is required by FLO or is realized without FLO.

E Used in producer equilibrium, the situation a cooperative ends up in without FLO involvement (Only used when this situation is not equal to the producer maximum).

D Used to denote equations regarding deviation among the producers.

A Used for the equations where only average effort is observable (when they are not equal to their adversaries in the individual effort observable section).

MP Used to denote results in the multi period model.

FT Used to denote profits and efforts realized when goods are sold as Fairtrade certified ($\beta_s = \beta$ and $\sigma_s = \sigma$).

C Used for profits and efforts realized when goods are sold as conventional goods ($\beta_s = 0$ and $\sigma_s = 0$).

i Equations regarding one producer i.

TOT The sum of all periods in the multi period model.

$producer$ Used for the profit functions of the producers – profit going directly to each producer.

coop Used for profit going to stakeholders, communal projects or other ends, which is assumed not to give producers any utility.

Concepts and actors

fair trade: The concept of paying above-market prices for goods from developing countries.

Fairtrade: A certification label whose use is commissioned by FLO and FLO-CERT.

Fairtrade Labelling Organizations International (FLO): Provides training and support for producers, and sets the Fairtrade standards. www.fairtrade.net

Fairtrade minimum price: A minimum price that traders have to pay producers for their crops. The minimum price is set by FLO after a process where the costs of sustainable production for the product are considered.

Fairtrade premium: An additional premium has to be paid in addition to the price negotiated between the producer organization and the trader or importer. This is paid to the producer organization, and not directly to the producers, and its use has to be democratically decided by the organization.

Fairtrade standards: A set of rules made by FLO which describes how production and trading of Fairtrade products has to be conducted.

FLO-CERT: Certifies agents and verifies that producers and traders follow the standards set by FLO. www.flo-cert.net

Max Havelaar: The name of many national Fairtrade initiatives, originating from the first Fairtrade label launched in the Netherlands in 1988. The name is based on a fictional Dutch character that fought against the exploitation of coffee pickers in the then Dutch colony Java.

Producer organizations: A joint body of producers. Often cooperatives. Could also be associations or other types of organizations.

Trader: A buyer of products for resale or export.

1. Introduction

Fairtrade is a reaction to the alleged exploitation of producers of agricultural goods and handicraft in developing countries. Producers get a lower price for their work than what is considered fair by many consumers in the north. A market for Fairtrade labeled products has developed during the last decades, with increasing sales every year.

Farmers in the south face a multitude of problems, whose consequences can be severe for the already marginalized farmers. Fluctuating prices, poor infrastructure and imperfect markets are among the problems causing not only producers, but many communities in the south to have a lower welfare level than what consumers purchasing Fairtrade certified products prefer.

Fairtrade initiatives try to increase the welfare of these producers and their communities. Supported by altruistic consumers in the north they aim to give producers a higher income for their goods, to create ripple effects throughout their communities and to secure a more sustainable production.

There are extensive rules which need to be followed, both for traders and producers of Fairtrade certified goods, concerning prices, wages, democratic processes and environmental production. These rules, or standards, are meant to ensure that the extra price ethical consumers in the north pay has positive effects for the producers and in the communities for which it is intended.

During the last decade, the growing interest for Fairtrade certified goods has spawned impact studies, theoretical articles and a multitude of debates arguing for or against the effects Fairtrade claims to have.

Among the arguments trying to debunk Fairtrade as an ineffective way to increase welfare in the south is the claim that it stimulates overproduction, that it gives incentives to keep on producing a product when the land or labor could be used for something more efficient and that little of the extra price consumers in the north pay for Fairtrade certified goods actually reaches the producers it is intended for.[1]

[1] For a more comprehensive discussion about the arguments in the Fairtrade debate, see http://en.wikipedia.org/wiki/Fair_trade_debate, accessed 2011-05-28.

Many impact studies have been performed using both cross-sectional and longitudinal data.[2] A 2009 literature study commissioned by the Fairtrade Foundation (Nelson & Pound) reviewed over 80 studies published between 2000 and 2007, and ended up with 23 reports with a total of 33 separate case studies that contained evidence of the impact of the Fairtrade label. According to the study, there is strong evidence suggesting that Fairtrade participation has a positive effect on the level and stability of producers' income. They also found that non monetary impacts were as important or even more important for the producers than the monetary benefits of Fairtrade.

There are also more recent impact studies. A 2009 study that analyzed the effect of Fairtrade certification on banana producers in northern Peru (Fort & Ruben) found that Fairtrade producers received a higher net income than conventional producers. Interestingly enough, they also found that the introduction of Fairtrade in the community increased the price local conventional producers received for their crops.

Another study collected data in 2005 and 2006 from the biggest Fairtrade coffee cooperatives in Nicaragua (Valkila & Nygren, 2010). They conclude that in 2001-2004, when world market prices were very low, the economic benefits of Fairtrade certification were significant. However, with high prices in the coffee market producers could often get the same price in the conventional market as in the Fairtrade market. They also note access to credit and the social premium earmarked for development of the community as benefits of Fairtrade in Nicaragua.

Some theoretical frameworks concerning Fairtrade have also been developed in the last decade,[3] both at a macroeconomic and microeconomic level. Chau, Goto, & Kanbur (2009) study a geographical framework with transportation costs where farmers are located in increasingly rural areas. They find that when NGO's are introduced in the model, the threshold for which producers has access to the world market, with higher prices than on the domestic market, is pushed back to more rural areas than before.

Milford (2004) uses a model that focuses on the market power of cooperatives and investor owned firms under different circumstances. She finds that subsidized cooperatives can

[2] For an overview of recent impact studies, see http://www.european-fair-trade-association.org/efta/Doc/Impact-studies-09-2010.pdf, accessed 2011-05-28.
[3] For a comprehensive list of journal articles, books and reports related to Fairtrade, see http://www.fairtrade-institute.org/db/publications/index, accessed 2011-05-28.

influence the price of both its members and non-members positively, but depending on their membership policy.

In a macroeconomic framework, Maseland & de Vaal (2002) compare the fairness of Fairtrade with free trade and protectionism. They find that it cannot be said in general which of the trading regimes are best, but that it depends highly on the attributes of the analyzed sector in the economy.

In this thesis, the extra willingness to pay for Fairtrade certified products by ethical consumers in the north is linked to the welfare of producers, stakeholders and communities in the south. How much of the higher price that is pay for bananas and coffee actually reaches the producers and communities they are meant for? How can it be used to make both producers and other stakeholders better off? How will the incentive problems inherit in organizing as a democratic cooperative influence the results? These are some of the questions that will be address. A simple principal-agent model is used to analyze the relationship between producer organizations, producers and the Fairtrade institutions.

Chapter two begins with a brief history of Fairtrade. The notion of a just price throughout history is discussed, as well as the origins and evolution of the fair trade movement, ending as the Fairtrade label we know today. A review of the Fairtrade standards is also included.

Chapter three discusses different problems facing producers and communities in the south, causing inefficient production, slow development and low welfare. Some possible impacts from Fairtrade on these problems are also included. Chapter four contains a look at the Fairtrade value chain, from producers to consumers.

Some theory used in the model is discussed in chapter five including moral hazard in teams, which can cause problems in organizations when the effort of each agent cannot be observed. An asymmetric Nash bargaining game is also reviewed and will be used to determine the price in the trade between Fairtrade cooperatives and Fairtrade importers. In chapter six the assumptions of the model are discussed and the income from consumers going to the cooperatives, which will be used in the analysis, is determined.

The relationship between producers, producer organizations, assumed to be cooperatives, and the Fairtrade institutions is analyzed in chapter seven and eight. In the two chapters, the analysis studies how the income can be shared between producers, stakeholders and communities in different scenarios. Profit functions are used in a principal-agent setting to

analyze participation constraints, which is just a way of saying that the inside option must be better than the outside option, as well as incentive compatibility constraints, which is to say that it must be more lucrative to act according to the principal's requirements than to deviate.

One scenario where individual effort is observable is examined, then one where only the average effort of all producers delivering to a cooperative is observable, first in a single period setting in chapter seven, then in a multi period setting in chapter eight.

What is found is different constraints for how big a fraction FLO can require producers to pass on to stakeholders or community projects and still wanting to be part of the Fairtrade cooperative and apply an efficient effort level. This fraction depends on how much more consumers in the north are willing to pay for Fairtrade labeled goods and, when only average effort is observable, the size of the cooperative. In the multi period setting the constraints are also dependent on the discount rate of producers.

In chapter nine some possible extensions to the model is discussed, before the results from the analysis are reviewed in chapter ten.

2. About Fairtrade

2.1 The just price

The notion of a just price for goods and services is an old one. The term is discussed throughout history, and has probably existed for as long as there have been economic exchanges. A stele[4] from ancient Babylon was found that contained the expression (Baldwin, 1959). Later, Aristotle argue that the gains from an exchange should be split equally between the buyer and seller (Aristotle, 2000 [n.d.], p. 88). In the middle ages, a just price was often seen as a price that covered the material costs of production, plus "a reasonable wage to maintain the craftsman or merchant in his appropriate station of life." (Baldwin, 1959, p. 7).

In modern society, the general view is that the relative scarcity of a good should determine its price. This will ensure that the consumers willing to pay the most for a scarce resource will be able to buy it. It also implies that abundant resources will fetch a low price.

[4] A carved board or slab of stone or wood.

According to the Fairtrade Labelling Organizations International (FLO), some trade is not fair. A fair price in FLO's view is one that "aims to ensure that producers can cover their average costs of sustainable production".[5]

2.2 History of Fairtrade

Although the discussion about the right price for a resource is old, the concept of fair trade as it is known today started sometime in the middle of the last century, when concerned community- and church organizations in the north started trading directly with organizations in developing countries (FLO, 2006).

Exactly when and where the notion of fair trade started is not known, but according to the American organization Ten Thousand Villages, the fair trade movement started with them, when they started trading needlework with artisans in Puerto Rico in 1946.[6]

After that, it took some forty years before the first seeds of what are now known as Fairtrade Labelling Organizations International (FLO) and FLO-Cert started to grow. In 1988 Max Havelaar, the first Fairtrade certification label, was launched in the Netherlands.[7] According to Kocken (2004), the idea to make a label for fairly traded products came from a priest who at the time were working with Mexican coffee farmers. The label was a success, and coffee marked with the Max Havelaar label achieved a market share of 3% in the Netherlands within a year.

During the next decade, several other national initiatives were established before they in 1997 were united under one common organization: FLO. Today, FLO is split into two organizations. One is named FLO, and provides training and support for producers[8] and sets the Fairtrade standards. The other is called FLO-Cert, and verifies that producers and traders follow the standards set by FLO[9].

While Fairtrade started as alternative trading networks, they have now moved on to use the same networks for trade as are used for conventional goods, and Fairtrade goods are to a high degree sold in the same shops as their conventional adversaries. While there are about

[5] "What is Fairtrade", http://www.fairtrade.net/what_is_fairtrade.0.html, accessed 2011-04-21.
[6] "Our History: Roots of a Global Movement", http://www.tenthousandvillages.com/php/about.us/about.history.php, accessed 2011-05-11.
[7] "History of Fairtrade", http://www.fairtrade.net/history_of_fairtrade.0.html, accessed 2011-04-21.
[8] "Support for Producers", http://www.fairtrade.net/support_for_producers.0.html, accessed 2011-04-21.
[9] "About us", http://www.flo-cert.net/flo-cert/main.php?id=4, accessed 2011-04-21.

112.000 supermarkets worldwide selling Fairtrade certified products, there are about 4000 non-profit Fairtrade outlets called worldshops (Krier, 2008).

Although Fairtrade sales have been growing rapidly for many years, no Fairtrade product holds a significant market share internationally. Some Fairtrade products, like coffee and quinoa, hold an about 1% market share, while most goods have lower relative sales (FLO, 2010, p. 4).[10,11]

In some countries in the north, however, Fairtrade enjoys a somewhat better position in the national markets for some goods. In Norway in 2007, Fairtrade certified coffee had about a 2% market share (Krier, 2008). About 80% of organic bananas were certified (Krier, 2008) but in 2009 only 2% of bananas in total were Fairtrade certified (Fairtrade Max Havelaar Norge, 2010)[12].

More notably, coffee and bananas enjoy retail value market shares of 24% and 30% respectively in the UK. In the huge market for coffee in the US, worth about USD 12 billion, Fairtrade holds about 7% of the market. Switzerland is the country in the world with the highest Fairtrade consumption per capita, and in 2006 Fairtrade certified bananas held 55% of the banana market in the country (Krier, 2008).

2.3 Fairtrade standards

2.3.1 Buyers of Fairtrade

Fairtrade initiatives aim to provide producers with a fair price for their goods, but also what they see as fair working conditions and incentives to have sustainable production (FLO, 2009, 2011a).

Agents who buy Fairtrade products are obliged to pay at least a minimum price for the goods[13]. The aim of this price floor is to cover the costs of sustainable production. They also

[10] In tonnes. Total production data from FAOStat, http://faostat.fao.org/site/339/default.aspx, accessed 2011-03-22.
[11] Note that these figures are derived from two different sources and may be somewhat skewed. However, the result that Fairtrade goods do not hold any significant share of the world market in any category still holds.
[12] In tonnes. Total import data from FAOStat, http://faostat.fao.org/site/535/DesktopDefault.aspx?PageID=535, accessed 2011-03-22.
[13] Note that not all products have minimum prices. In some cases, this applies to new product groups in the Fairtrade system, and is called "Easy Entrance" (FLO, 2011b, p. 2). In these cases, FLO urges the parties to negotiate a price that covers the costs of sustainable production.

need to pay what is called the Fairtrade premium. This premium is not paid directly to producers and workers, but to governing organizations or joint bodies.

Buyers of Fairtrade must also provide long term sourcing plans so producers can predict more accurate which volumes they might want to buy. They are also obliged to provide pre-finance for 60% of the contract value on the producers' request, in addition to some other requirements concerning traceability and documentation.

2.3.2 Producers and producer organizations

The receivers of Fairtrade benefits also have some obligations. All producer organizations have to be democratically organized, with strict rules concerning open and voluntary membership, democratic control and member participation.

FLO allows no discrimination of members or potential members regarding the right to participate, vote, get elected, get access to markets and get technical support or any other benefits membership in the producer organization may yield. The anti-discrimination standards also apply for workers being hired by the producer organization or its members.

The producer organizations receive the Fairtrade premium from traders. This income and its use are accounted for in accounts separate from other income. The Fairtrade premium income is to be used for "investments in the social, economic and environmentally-sustainable development of the organization and its members and through them, their families, workers and the surrounding community." (FLO, 2009, p. 10).

FLO also has standards concerning the use of agrochemicals, waste management, soil and water pollution and GMO's, to secure an environmentally sustainable production.

When hiring workers, producer organizations and its members must as far as possible meet ILO[14] conditions, and must heed the workers' right to collective bargaining, freedom from discrimination and freedom of labour. They must not use child labour, pay an at least regional average wage and secure a safe working environment.

[14] International Labour Organization, http://www.ilo.org.

3. Problems facing producers in the south

Producers and communities in low-income countries in the south meet many challenges in their everyday life. Producers of agricultural goods sell their goods in markets with fluctuating and often low prices, which makes it hard to predict future income.

Poor infrastructure makes production inefficient and transport of goods expensive. Small producers lack access to markets and often rely on local exporters with oligopsony market power. Savings and investments can be a challenge, with small formal credit markets and poorly developed legal systems.

3.1 The agricultural markets and prices

Many agricultural markets have long been hallmarked by fluctuating and periodically low prices (FAO, 2009). Low elasticity of both supply and demand causes fluctuations in price following shocks. In addition to short term fluctuations, the market situation can also cause devious long term price cycles, where a period with a high price is followed by an, often longer, period of low prices (Ponte, 2001). To explain why this happens, consider a disease or natural disaster striking a large amount of crops. This causes the price of the good to increase drastically to compensate for the supply shortage. Farmers observe this price, and then decide to plant new crops. The amount of crops planted is often more than optimal, with the result being overproduction and low prices when the crops mature.

Five years ago, the fall of 2006, was the start of a big rise in commodity prices. The price of wheat, for example, quadrupled over the course of 18 months[15], with a consequently fall afterwards. However, ever since the increase in price in 2006, the volatility in many agricultural markets has been higher than before. Hailu & Weersink (2010) discuss possible causes of this change. They point out that the volatility makes it more expensive for farmers to hedge themselves against price risk, even though the average price is higher. What is interesting is whether this situation will continue, or if it is a temporary problem. They consider commodity index traders to be one source of the high volatility, but with increasing demand as an underlying cause. And with inelastic supply, demand shocks can cause disturbances in the market.

[15] Data from the Chicago Board of Trade (CBOT), retrieved from http://futures.tradingcharts.com/hist_CW.html, 2011-05-04.

With an ever increasing world population and climate change in the future, it is not impossible that the volatility in the commodity markets will prevail.

In times with low world market prices, the Fairtrade minimum price and long term contracts can secure a more stable income for Fairtrade producers (Nelson, et al., 2009; Valkila, et al., 2010).

3.2 Imperfect credit markets

Most industrial countries have well developed financial systems and property rights. These are tools which are used to overcome imperfect information problems in credit markets and promote economic growth (Mishkin, 2010). This is also one of many reasons why many transition-[16] and developing countries have low economic growth. The 2001 World Bank report "Finance for Growth: Policy Choices in a Volatile World" states that "Ensuring robust financial sector development with the minimum of crises is essential for growth and poverty reduction, as has been repeatedly shown by recent research findings." (p. 1).

A UNDP[17] report, "Creating Value for All: Strategies for Doing Business with the Poor" (2008) describes market infrastructure and financial systems in poor regions as limited, nonexistent and nonworking, and with unreliable police and legal systems.

With limited legal systems and market infrastructure, it could understandably be difficult to get loans in the formal lending market. Without enforceable contracts, lenders will have difficulties holding borrowers accountable for their loans. This has led to a relatively big informal lending sector in many poor regions.

In two surveys done by Banerjee & Duflo (2007), they asked poor households whether they had outstanding debt, and if so, where they had lent the money. The surveys were conducted in Udaipur, a poor district in India and in "slums" in Hyderabad, a city experiencing high population growth. In the two surveys, only 6.4 and 5 percent of the loans were from formal institutions like commercial banks. About one fourth of the loans were from relatives and neighbors. Loans in the informal sector tend to be expensive, as monitoring and enforcement costs drives moneylenders' costs up.

[16] Countries changing from a central planned economy to a market economy.
[17] United Nations Development Programme, http://www.undp.org/.

Fairtrade certified traders are required to provide pre-financing on up to 60% of the contract value at the producers' request (FLO, 2011a). Although there are some exceptions,[18] it is reasonable to assume that this standard will ease the credit constraints facing producers. The interest on the pre-financing must not exceed the producer's current borrowing costs.

3.3 Savings and investments

Marginalized farmers might not earn much more than the cost of living. People living on under $8 a day use on average 58% of their income on food (UNDP, 2008), so there might not be much room for savings. This might cause producers to forsake investments that could increase welfare in the long run. Of course, this can be related to the imperfect credit markets discussed in the previous section, since they have a limited ability to make loan financed investments.

Another problem is that, even if a household earn enough money to put away some of it for later use, they might not have a good way of doing so. Inflation and the risk of thievery make saving cash in their homes rather risky. Also, having the money close at hand could make it harder not to use it spontaneously.

Hyperbolic, or time-inconsistent, discounting (Frederick, Loewenstein, & O'Donoghue, 2002) makes people more impatient when it comes to choices in the short term than in the long term. Ashraf, Karlan, & Yin (2006) studies the effect of savings accounts with a commitment time in the Philippines, and find that savings increases when consumers are able to commit to saving for a given period.

In Banerjee & Duflo's (2007) data, under 14% of households living on under $1 a day have savings accounts in most countries, and in Panama and Peru this fraction is lower than 1%.

With limited access to loans, with less than optimal savings conditions and with a limited income to start with, it is no mystery if investments among poor producers are lower than what would be optimal in the long run. The situation could cause less investment in health, education and production than what households would choose with better working credit markets.

[18] If a producer has been categorized as a high risk borrower by a third party lender, the pre-finance requirements are invalid.

3.4 Infrastructure, productivity and human development

Many developing countries lack basic infrastructure like roads, irrigation and electricity, especially in rural areas far away from the capital (The World Bank, 2010).[19] This deficiency is linked to lower productivity, growth and to poverty.

Ali & Pernia (2003) discusses studies on the effects of roads, irrigation and electricity and finds that better infrastructure has a positive effect on both agricultural and non-agricultural productivity, and indirectly on poverty.

In a recent econometric study, Kusharjanto & Kim (2011) study the effects of electricity, clean water, roads and schools in Java, Indonesia. They find that regions with better infrastructure have on average a higher human development index (HDI) score.

There is little doubt that increasing the standard of infrastructure will increase productivity and welfare. This means that the Fairtrade premium paid by buyers of Fairtrade certified products to producer organizations and joint bodies may have a positive effect on the welfare, not only among Fairtrade producers, but also in the community as a whole.

In 2009, a total of €52 million was paid in Fairtrade premiums (FLO, 2010). Most of the premium money was spent in projects in the communities, education, health and investments in business and production.

An example (Lyon, 2007) of the use of premium income is from a Fairtrade cooperative of about 116 members in Guatemala. It is located in a community with about 5000 people. In 2002, Fairtrade premium income helped initiate a weekly trash collection in the community. In 2006, there was also an ongoing reforestation project where seedlings were planted by cooperative members and their extended family.

3.5 Social norms and discrimination

The arguments against discrimination can be divided into two groups. One is the ethical argument. The "Universal Declaration of Human Rights" rejects differentiating an individual's rights and freedom based on "race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status."[20] This declaration is a

[19] For a brief summary of the World Bank's findings, see http://www.youtube.com/watch?v=54PvCQzMUik, accessed 2011-05-28.
[20] http://www.un.org/en/documents/udhr/index.shtml, article 2, accessed 2011-04-27.

part of international law, and widely accepted. Even an alternative to this declaration, the "Cairo Declaration on Human Rights in Islam"[21], that was adopted in 1990 by the then 45 members of OIC[22] includes a similar phrase.[23]

According to these formulations, discrimination is wrong by definition. The other reason to avoid discrimination is because it is inefficient. To exclude someone based on other factors than their abilities limits the latitude of agents and will thus often lead to suboptimal results.

Women are often the scope of studies regarding development. For example, Gladwin (2002) notes that reallocation of some productive inputs from men to women in African households could increase output by 10-20%. Aly & Shields (2010) finds that female farmers in Nepal are less effective, because they lack access to the most fertile land and to new technology.

Lyon (2007) and references therein finds that even though Fairtrade producer organizations have taken steps to promote gender equality, the impact of these steps have yet to be documented empirically.

3.6 Trader market power

In many low-income countries, the access to the world market is limited. Producers are thus often at the mercy of a few local intermediaries. Poor infrastructure and low education may make it hard to gain access to other prices than the ones in the local market. If so local traders can operate with oligopsony and cartel prices (Milford, 2004). The market power of local middlemen makes it possible for them to capture a big fraction of the rent from the export price. This does, of course, leave less for the producers.

Fairtrade certified producers are more appealing trading partners, and gain access to international traders and brand owners (Lyon, 2007). They can also bring valuable price information to local non-certified producers, as well as a threat for non-certified producers to use when bargaining a price with local middlemen (Milford, 2004).

Lyon notes that large northern Fairtrade traders often assist producers in increasing the quality of their crops and goods, to secure a stable long-term supply. This will in turn increase the value of their crops as well as human capital in the producer organization.

[21] http://www1.umn.edu/humanrts/instree/cairodeclaration.html, accessed 2011-04-27.
[22] Organization of the Islamic Conference.
[23] It rejects discrimination based on "race, colour, language, belief, sex, religion, political affiliation, social status or other considerations." (article 1).

4. The Fairtrade value chain

4.1 Producers and producer organizations

Fairtrade products start with producers in the south, who "have been economically disadvantaged or marginalized by the conventional trading system." (FLO, 2009, p. 3). Producers who want to sell their products wearing the Fairtrade label need to form a producer organization. These are usually cooperatives, but can also be other types of organizations or associations. The producer organization collaborates in the bargaining with traders.

To become and stay certified, producer organizations pay fees to FLO based on their number of members and products.[24] They also need to comply with the standards described in section 2.3.2. This enables them to sell products carrying the Fairtrade label when they reach retailers in the north.

However, being Fairtrade certified does not guarantee that all products can be sold as Fairtrade goods. Because of limitations in the ethical markets in the north, Liebrich (2002, p. 35) states that "Obwohl alle Produkte auf einer Plantage oder bei einem kleinen Produzenten den Kriterien von Max Havelaar genügen müssen, werden oft nur 25-30% in Fairtrade-kanälen verkauft." This means that in some cases only 25-30% of the goods produced in a Fairtrade organization are sold as Fairtrade certified, even though all products must be produced according to Fairtrade standards. The rest are sold in the same markets as conventional goods.

4.2 Traders

Fairtrade traders are typically brand owners who after refining and packaging the products sell it to retailers. As an example, the Norwegian coffee roaster "Kaffehuset Friele" imports Fairtrade coffee beans from cooperatives in Guatemala, which is then refined, packaged and sold to Norwegian supermarkets.[25]

[24] "CERTIFICATION FEES", http://www.flo-cert.net/flo-cert/main.php?id=29, accessed 2011-05-15.
[25] "Friele Fairtrade kaffe" , http://www.friele.no/produkter/friele_fai/, accessed 2011-05-15.

Just as producer organizations, certified traders must also pay fees[26] to become and stay certified, as well as follow the standards described in section 2.3.1.

4.3 Retailers

Fairtrade products are sold to customers either via supermarkets, or other retailers selling Fairtrade goods alongside conventional goods, or in so-called worldshops, non-profit outlets that specializes in Fairtrade products. In Norway there is only one worldshop, called "Friends Fair Trade",[27] so the bulk of Fairtrade products are sold via the mainstream supermarkets. In other countries there is a bigger share of worldshops, with Germany in the lead with 836 Fairtrade outlets (Krier, 2008).

In addition to purchasing Fairtrade certified products from brand owners and traders, worldshops also trade directly with Fairtrade producer organizations. The Norwegian worldshop, for example, is a certified trader of Sports balls.[28]

4.4 Consumers

The fair trade movement was spawned by concerned consumers in the US and in Europe. They felt that conventional trade was unfair, and thus wanted a fair alternative.

This preference for ethical goods is often described as a "warm glow effect" (Chau, et al., 2009, p. 4) which increases the utility of the good. Just knowing the good you are consuming is produced and traded in an ethical way gives you some extra utility. Maseland & de Vaal (2002) splits the arguments for trading Fairtrade goods into two crude categories, based on information from Fairtrade brochures and web pages.

The first type of argument is concern for the conditions for trade, and the conditions under which production of the goods take place. For example, consumers may object to child labor being used or workers handling pesticides without safety gear. In the other group are arguments regarding which consequences trade has. It is unfair, the advocates for Fairtrade says, that trade rewards differently not based on effort, but based on social and natural differences.

[26] "Trade Certification Fee System" (2011), http://www.flo-cert.net/_admin/userfiles/file/TC%20Appendix3TCFeeList%20ED%2080%20en.pdf, accessed 2011-05-15.
[27] "Friends Fair Trade", http://fft.no, accessed 2011-05-26.
[28] "List of certified operators", http://www.flo-cert.net/flo-cert/operators2.php, accessed 2011-05-15.

Consumers only concerned with the first group of arguments would find Fairtrade goods to be morally superior, and thus be willing to pay a premium, regardless of which consequences Fairtrade may have on the monetary welfare of producers and their communities. The other group will want to know what effect paying a Fairtrade premium will have on stakeholders in the south.

Of course, most consumers will probably belong to both groups to different degrees. Either way, the result is an extra willingness to pay for ethical goods. A 2005 Harvard study[29] conducted by Professor of Government Michael J. Hiscox found that marking towels and candles as Fairtrade certified increased sales even when prices went up 10 percent, and even more when prices went up 20 percent.

In 2004, chief executive Paul Rice of Transfair USA, the American national Fairtrade initiative, stated that "(…) on average [Fairtrade] retail cost is 10% to 15% more than comparable goods in the U.S."[30]

In Figure 1[31] an example of what the Fairtrade value chain might look like is illustrated. Of course, the value chain will differ somewhat for different products and locations.

[29] "Fair Trade Draws Buyers, Study Says" (2006), http://www.thecrimson.com/article/2006/3/21/fair-trade-draws-buyers-study-says/, accessed 2011-04-21.
[30] "What Price Virtue? At Some Retailers, 'Fair Trade' Carries A Very High Cost" (2004, 2011-03-23), http://www.globalexchange.org/campaigns/fairtrade/coffee/2064.html, accessed 2011-04-21 [Originally published in the Wall Street Journal 2004-06-08: A1-2].
[31] Parts of the figure are based on figure 2.4 in Milford (2004, p. 9).

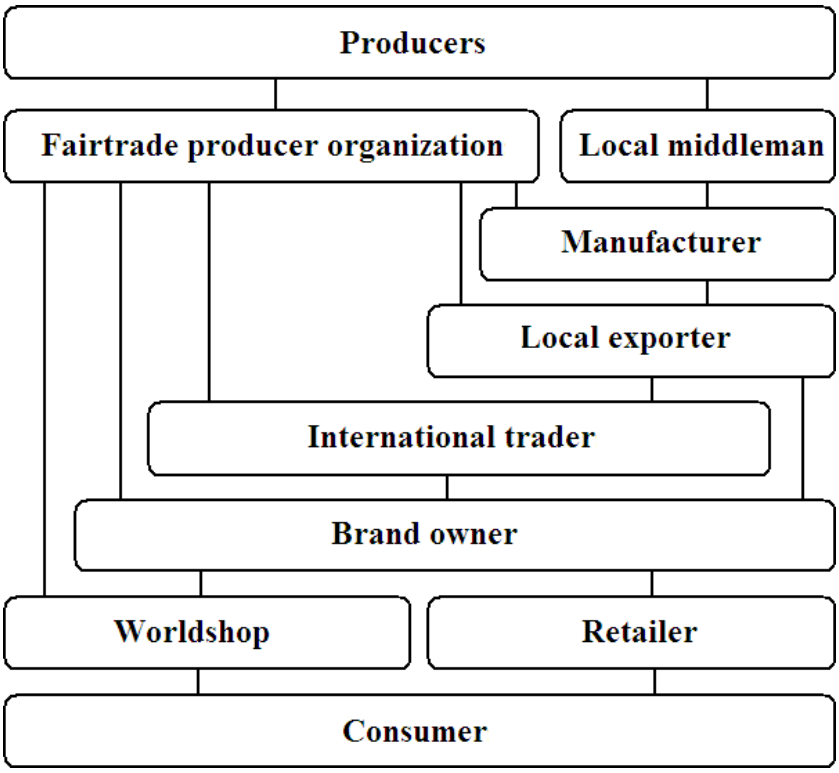

Figure 1: An example of a Fairtrade producer value chain

5. Theory

5.1 Moral hazard in teams

In this section, some issues that present themselves when agents organize in a team and when their individual effort is unobservable and perfect substitutes are discussed. The discussion is based on Holmstrom's paper "Moral Hazard in Teams" (1982).

A number of agents, *n*, produces their output *x*. Output, $x(a)$, is the total output of all agents, and is a function of the sum of the agents' private effort, $a = \sum_{i=1}^{n} a_i$. While each agent's effort is unobservable the total effort, a, can be observed. An agent's costs of applying effort are given by a strictly convex and differentiable function $v_i(a_i)$. The utility of agents is assumed to be separable in income and effort costs, and linear in income. Thus an agent's utility function will be $u_i(m_i, a_i) = m_i - v_i(a_i)$ where m_i is his income.

The question is if there exists a sharing rule $s_i(x)$ such that $\sum_{i=1}^{n} s_i(x) = x$ that will achieve an efficient effort level from each of the agents. Holmstrom (1982) proves that this cannot be the case. Since the individual effort levels are unobservable, there cannot be credible punishments for deviating from optimum.

However, if there is a principal in addition to the agents in the team, which can take part in the total income, an efficient solution can be achieved. More specifically, this will slacken the budget constraint to $\sum_{i=1}^{n} s_i(x) \leq x$ since the agents will no longer necessarily share the whole income. The principal can enforce a sharing rule:

$$s_i(x) = \begin{cases} b_i \text{ if } x \geq x(a^*) \\ 0 \text{ if } x < x(a^*) \end{cases} \tag{5.1}$$

where a^* is the total effort level maximizing total profit. For this to work, agents must get a lower utility from free riding on other agents' efforts than what he will get if everyone acts efficiently and the production goal is reached.

5.2 Nash bargaining

This section is based on the axiomatic Nash bargaining model (Nash, 1950) and an extension that relaxes the assumption of symmetry between the participants (Osborne & Rubinstein, 1990).

Consider a bargaining game between two participants. Both parties can choose either to trade with the other agent, or an outside option. This could be to trade with some other agent, or to do nothing at all. This means that each of the agents will get an extra value from the trade equal to

$$u_i - d_i \tag{5.2}$$

where u_i is each participant's gains from the trade and d_i their outside option.

For this trade to take place, the trade must yield some extra value compared to the sum of the outside options. Also, both parties should get more utility from the trade than their respective outside options. A third axiom needed for a solution is that it should be pareto efficient. If both participants could get more utility from a different solution, it is not efficient.

Lastly, some term for the relative bargaining power is needed. Nash (1950) assumes the agents to be symmetric, and thus to have equal bargaining power. Osborne and Rubinstein (1990) considers an asymmetric solution in which this equality is not present. The solution to the problem will maximize

$$\max_{u1,u2} (u_1 - d_1)^{\alpha} (u_2 - d_2)^{(1-\alpha)} \tag{5.3}$$

subject to

$$u_i \geq d_i \text{ and } u_i \in S, \quad i = 1,2$$

where α is an expression for relative bargaining power and S the feasible solution set.

In Figure 2[32] the solution to an asymmetric Nash bargaining game is illustrated. The circle represents all feasible outcomes of the trade, while the horizontal and vertical lines represent the two agents' outside options. The solution is found where equation (5.3) touches the feasible set of outcomes. If the two agents were symmetric, with equal bargaining power, the solution would have been where the 45 degree line crosses the rim of the solution set. The function in the graph shows a situation where agent two has a relatively higher bargaining power, and thus nets a profit further from his outside option.

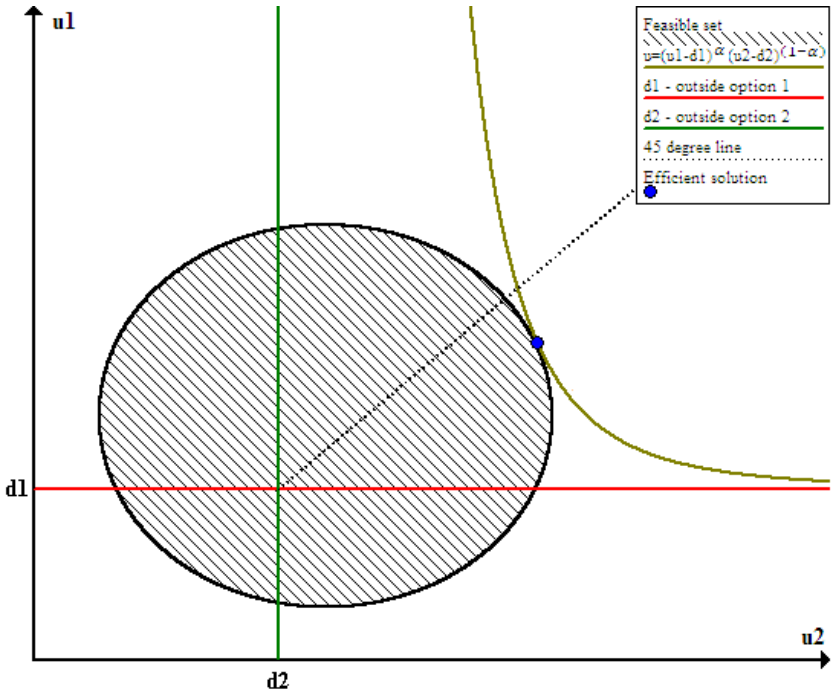

Figure 2: The solution to an asymmetric Nash bargaining game

[32] Parts of the figure are based on figure 2.2 in Osborne & Rubinstein (1990, p. 16).

6. The model

6.1 The agents and the commodity chain

Consider a region with symmetric producers who can either deliver their goods to a conventional cooperative or a Fairtrade cooperative. Each producer generates one unit per period, but can increase the value of this unit by putting in quality increasing effort. The value of each unit when not putting in any effort is assumed to be zero.

The Fairtrade cooperative are subject to rules set by the Fairtrade Labelling Organization (FLO) concerning the use of their income from selling goods to an importer in the north. FLO will want some of the income to go to stakeholders in the cooperative, and to social projects in the community. If the conditions set by FLO are not satisfied, producers cannot sell their goods as Fairtrade certified.

The cooperatives will be democratically organized, with the decisions being made by a body consisting of producers.

The conventional cooperative sells its goods to a conventional importer, while the Fairtrade cooperative can sell either to a certified importer or a conventional one. The price is decided in a Nash bargaining game. The price agreed upon is for simplicity assumed to exceed the Fairtrade minimum price. The importers then sell the goods to their respective markets, as described in the next section.

The effort level maximizing total profit to the south will be denoted as the effort level in social optimum, and the one maximizing producer profit as the producer maximum. The situation a cooperative ends up in without FLO setting any restrictions on effort will be called the producer equilibrium when it differs from the producer maximum.

6.2 The Fairtrade market

Two separate markets will be assumed. One consists of Fairtrade goods, the other of conventional goods. Fairtrade consumers receive some extra utility from consuming ethical goods, so they are willing to pay a premium of $b(q)$, where q is the general quality of the product. It is reasonable that a consumer is willing to pay a bigger premium for a latte at a coffee shop than a bag of ground coffee in the grocery store.

The willingness to pay for conventional goods is assumed to be $D(q) = d_1(q) + d_2(q)$. $d_1(q)$ and $d_2(q)$ are the income to the cooperative and importer respectively, for conventional goods. The importer's gross income from the Fairtrade market will thus be $D(q) + b(q)$.

6.3 Fairtrade importer and cooperative – The Nash bargaining solution

Some notation is dropped in this section for convenience. The Fairtrade importer and the cooperative needs to decide how to split the gains from selling Fairtrade goods in the market. The outside option for the importer is to buy conventional goods for d_1 and selling it in the market for conventional goods for D, thus gaining a net of d_2. The cooperative may sell their Fairtrade goods to a conventional importer for d_1.

The relative size of d_1 and d_2 can for example be determined in a bargaining game where the outside option is to do nothing, gaining zero profit.

If we call the fraction of the total gains from the market, $d_1 + d_2 + b$, going to the cooperative s, and thus the fraction going to the importer $1 - s$, the solution will maximize

$$\max_s [s(d_1 + d_2 + b) - d_1]^{\alpha} [(1 - s)(d_1 + d_2 + b) - d_2]^{1-\alpha} \qquad (6.1)$$

Differentiating this with respect to s, setting it equal to zero and solving for $s(d_1 + d_2 + b)$ will yield the total income to the cooperative, paid by the importer. If we call the first parentheses A and the other B, the first order condition is

$$\frac{\alpha A^{\alpha} B^{1-\alpha}(d_1 + d_2 + b)}{A} - \frac{(1 - \alpha) A^{\alpha} B^{1-\alpha}(d_1 + d_2 + b)}{B} = 0 \qquad (6.2)$$

which simplifies to

$$\alpha[(1 - s)(d_1 + d_2 + b) - d_2] = (1 - \alpha)[s(d_1 + d_2 + b) - d_1]$$

Finally, dissolving parentheses and rearranging yields the cooperative's income

$$s(d_1 + d_2 + b) = d_1 + \alpha b \qquad (6.3)$$

The importer will thus net

$$(1 - s)(d_1 + d_2 + b) = d_2 + (1 - \alpha) b \qquad (6.4)$$

6.4 The cooperative, the producers and FLO

The gains to the cooperative from the bargaining game, (6.3), are what can be distributed among producers, stakeholders and the community in the south. The size of the variables in equation (6.3) depends on the quality of the good, q, which again is dependent on the effort the producers put in, e.

The quality q will be the sum of the quality from the units each producer generates, and the total effort the sum of the effort from each producer,

$$q(e) = \sum_{i=1}^{N} q_i(e_i) \tag{6.5}$$

where N is the number of producers delivering to the cooperative. Putting in effort is costly for the producers, and each producer's cost function will be a convex function $c_i(e_i)$.

Profit maximizing producers will want to keep the income from the sale, but may be forced to leave some for the cooperative as a condition for staying certified, so the total profit in the south from the Fairtrade cooperative's sale can be divided into two parts.

$$\pi_{FT}^{south} = \pi_{FT}^{coop} + \pi_{FT}^{producers} =$$

$$\left[\sigma\big(d_1(q) + \alpha b(q)\big)\right] + \left[(1-\sigma)(d_1(q) + \alpha b(q)) - \sum_{i=1}^{N} c(e_i)\right] \tag{6.6}$$

where $0 \leq \sigma \leq 1$ is the fraction kept by the cooperative. The profit going to the cooperative can either be interpreted as gains to the stakeholders other than the producers themselves, or as a social gain to the community through social projects involving health, education or infrastructure. For simplicity, it will be assumed that producers gain no utility from the cooperative's income.

In a conventional cooperative the producers will keep all the income, but their goods will not get any ethical premium b from the sale in the market, so the gains from a conventional cooperative will be

$$\pi_C^{south} = \pi_C^{producers} = d_1(q) - \sum_{i=1}^{N} c(e_i) \tag{6.7}$$

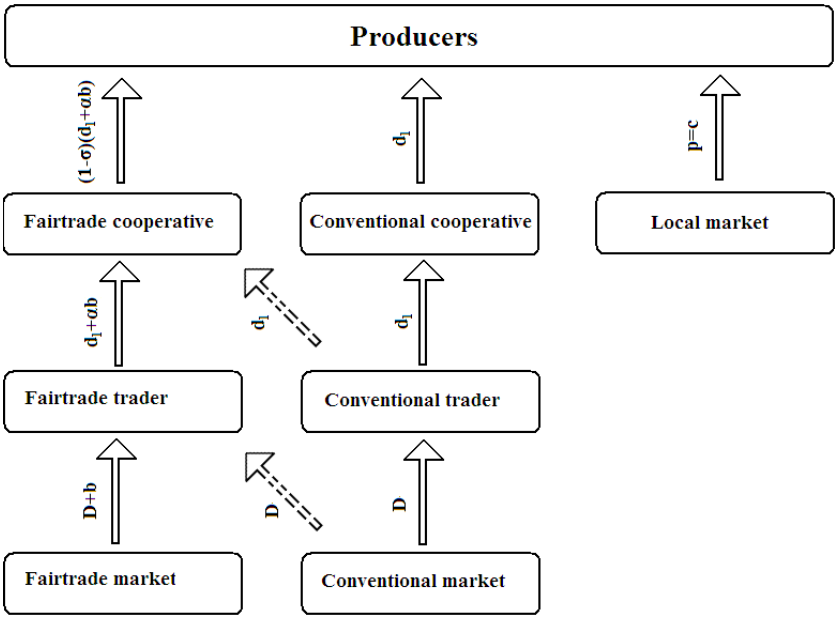

Figure 3: The value chain for Fairtrade and conventional income in the model.

Before we go further, we need to make some assumptions about the function forms. First, quality is assumed to be increasing in a one to one relation with effort. Consequently,

$$q = e = \sum_{i=1}^{N} e_i \tag{6.8}$$

d_1 is increasing in quality, and thus in effort. The linear relationship $d_1 = \delta e$ is assumed. Also, b is assumed to have a linear relationship with quality, $b = \beta e$. Lastly, the convex cost function for each producer will be $c(e_i) = \frac{e_i^2}{2}$. Putting this into (6.6) and (6.7) yields

$$\pi_{FT}^{south} = \sigma(\delta + \alpha\beta)e + (1-\sigma)(\delta + \alpha\beta)e - \sum_{i=1}^{N} \frac{e_i^2}{2} \tag{6.9}$$

and

$$\pi_C^{south} = \pi_C^{producers} = \delta e - \sum_{i=1}^{N} \frac{e_i^2}{2} \tag{6.10}$$

From now on,

$$\sigma_s = \begin{cases} \sigma \text{ if delivering to the Fairtrade cooperative} \\ 0 \text{ if delivering to the conventional cooperative} \end{cases} \tag{6.11}$$

will be used to denote the fraction of the income going to the cooperative, and

$$\beta_s = \begin{cases} \beta \text{ if delivering to a Fairtrade cooperative} \\ 0 \text{ if delivering to a conventional cooperative} \end{cases} \tag{6.12}$$

to avoid writing every equation twice. Functions concerning Fairtrade and conventional goods will be denoted with FT and C respectively.

The producer will try to maximize his profit by choosing his effort level. However, the democratic body of the cooperatives and/or Fairtrade may set some restrictions for membership. It will be assumed that the producers have to be a member in one of the two cooperatives to sell his goods, or equivalently, that he will get a price equal to his costs otherwise.

FLO has two objectives. One is to increase the welfare of stakeholders and the community and the other is to, if possible, achieve the social optimum. Of course, FLO also wants happy producers, but since the producers themselves choose which cooperative to deliver goods to any producers delivering to the Fairtrade cooperative will be better off than if FLO were not present. If FLO wants the producer profits to be higher, they can set σ lower than they need to do to keep the producers in the Fairtrade cooperative.

7. A single period model

In the single period model, the game between the producers and FLO will take place in three stages. In the first, FLO decide which conditions they require for the goods to be sold as Fairtrade certified. In other words, they decide the size of σ, the fraction of income paid to the cooperative, and how much effort, e, producers need to put in to sell their goods in the Fairtrade market. Then, in the second, producers decide which cooperative they want to deliver to, and how much effort to put in. In the last stage, the goods delivered to the Fairtrade cooperative are sold as Fairtrade certified if the requirements set in the first stage are complied with. If not, the producer delivers the goods to the conventional cooperative.

7.1 Effort observable

Assume that the cooperative and FLO can observe the effort of each producer. Alternatively, they can observe the quality of the goods from each producer, and know the relation between

effort and quality. A producer keeps a fraction $(1-\sigma_s)$ of the income his good fetches in the bargaining with the importer, so a producer i delivering to a cooperative will gain a net of

$$\pi_i^{producer} = (1-\sigma_s)(\delta + \alpha\beta_s)e_i - \frac{e_i^2}{2} \tag{7.1}$$

while the profit to the cooperative from this one producer, interpreted as gains to either stakeholders or community, will be

$$\pi_i^{coop} = \sigma_s(\delta + \alpha\beta_s)e_i \tag{7.2}$$

7.1.1 The social optimum

The social optimum is what maximizes the total profit to the south. Each producer yielding effort e_i will contribute with a total profit of

$$\pi_i^{south} = (\delta + \alpha\beta_s)e_i - \frac{e_i^2}{2} \tag{7.3}$$

By differentiating with respect to e_i and setting this equal to zero, we find the effort maximizing social profit,

$$e_i^o = \delta + \alpha\beta_s \tag{7.4}$$

This is equal to the size of the marginal income of effort. That the optimal effort is increasing in this marginal income is logical, since an increase in one of these parameters would increase the value of a unit of effort.

When $\sigma_s = 0$ producers will choose this effort level since they get all the income, and thus their profit will be equal to the total social profit of the sale. But when the producers only receive a fraction of the income, they will choose a suboptimal effort level from society's point of view. To find the respective profits in social optimum, the optimal effort e_i^o (7.4) is inserted into $\pi_i^{producer}$ (7.1) and π_i^{coop} (7.2). This yields:

$$\pi_i^{o,producer} = \left(\frac{1}{2} - \sigma_s\right)(\delta + \alpha\beta_s)^2 \tag{7.5}$$

and

$$\pi_i^{o,coop} = \sigma_s(\delta + \alpha\beta)^2 \quad (7.6)$$

As one would expect, both profits are increasing in the marginal income of effort and in the share going to each of the parties.

7.1.2 The producer maximum

A producer maximizing his profit will maximize $\pi_i^{producer}$ (7.1). Differentiating, setting equal to zero and rearranging yields:

$$e_i^p = (1 - \sigma_s)(\delta + \alpha\beta_s) \quad (7.7)$$

This effort is lower than in social optimum, since the producer only gets a fraction of the marginal benefits from effort, and bears all the costs. The effort level is thus dependent on which σ FLO set in the first stage. The producer maximizing effort gives these profits.

$$\pi_i^{p,producer} = \frac{1}{2}(1 - \sigma_s)^2(\delta + \alpha\beta_s)^2 \quad (7.8)$$

and

$$\pi_i^{p,coop} = \sigma_s(1 - \sigma_s)(\delta + \alpha\beta_s)^2 \quad (7.9)$$

With a positive σ_s, it is clear that the cooperative's profit for a given σ_s is lower here than in the social optimum. In social optimum, the only effect of increasing σ_s was that the cooperative got a bigger share of a constant income. In this case, the producer will respond to a higher σ_s with a lower effort.

An increase will thus have two effects on the cooperative's profit. It will increase as its fraction of the total income escalates, but decrease as the producer responds with a lower effort, thus decreasing total income. When σ_s reaches 0.5, the negative effect will surpass the positive, and the cooperative's profit will reach its maximum. In other words, it will never be optimal to set a higher σ_S than this, even if it satisfies the producer's participation constraint.

The producer profit, however, will logically be higher here since he maximizes his profit given the sharing rule. With $(\delta + \alpha\beta)^2$ normalized to one, the producer profit will look like Figure 4 in the two cases.

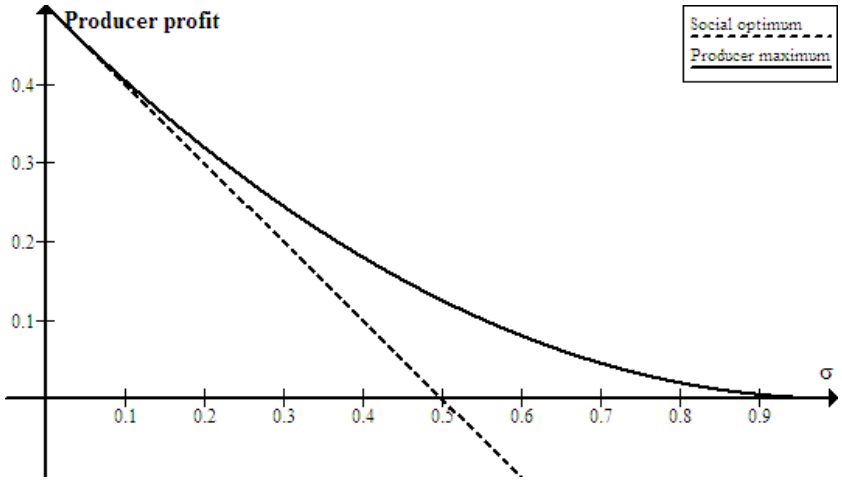

Figure 4: Fairtrade producer profit for given values of σ as a multiple of $(\delta + \alpha\beta)^2$

The total profit to the south, however, will of course be biggest in the social optimum.

7.1.3 Achieving the social optimum

Since the cooperative serves the will of the producers, they will end up in the second solution if they are forced to share income, but can choose their effort levels without consequence.

FLO can set the conditions for delivering to the Fairtrade cooperative, but the producers may choose to deliver to the conventional cooperative instead, thus getting different conditions.

There is one tool FLO can use to reach their objectives and keep producers in the Fairtrade cooperative. Since they decide who gets to be certified, and thus deliver to the Fairtrade market, they decide who gets to take part in the extra willingness to pay for ethical goods in the north.

More formally, FLO can change the budget constraint that the sharing rule between the cooperative and the producers is based on. While the conventional producers only share the income among themselves, FLO can change the Fairtrade producers' income if they do not act according to the set rules. One way is to make the share of the income going to the producers, σ, dependent on the effort level, the other is to do the same with β – in other words, make participation in the cooperative dependent on the effort level. Both methods, however, are dependent on the existence of the extra willingness to pay in the north.

Consider the following scheme.

$$\beta_s = \begin{cases} \beta \text{ if } e_i = \delta + \alpha\beta \\ 0 \text{ if } e_i \neq \delta + \alpha\beta \end{cases} \tag{7.10}$$

This is a condition saying that if a producer does not apply effort according to what maximizes total income, he will not take part in the extra willingness to pay. The producer then chooses between these profits:

$$\pi_i^{O,producer,\prime} = \begin{cases} \left(\frac{1}{2} - \sigma\right)(\delta + \alpha\beta)^2 \text{ if } e_i = \delta + \alpha\beta \\ \frac{1}{2}\delta^2 \text{ if } e_i \neq \delta + \alpha\beta \end{cases} \tag{7.11}$$

This is equation (7.5) for a producer in a Fairtrade cooperative and a conventional one respectively. The producer will always sell to the conventional cooperative if $\beta_s = 0$, since he will not choose to share income with the cooperative without getting anything in return.

For the producer to choose to stay in the Fairtrade cooperative, producer profit from applying optimal effort and deliver to the Fairtrade cooperative must be higher than that from delivering to the conventional cooperative:

$$\left(\frac{1}{2} - \sigma\right)(\delta + \alpha\beta)^2 \geq \frac{1}{2}\delta^2 \tag{7.12}$$

Solving this for σ yields:

$$\sigma^o \leq \frac{1}{2}\left(1 - \frac{\delta^2}{(\delta + \alpha\beta)^2}\right) \tag{7.13}$$

If there is no extra willingness to pay in the north, i.e. $\beta = 0$, the right side of the inequality becomes zero and FLO cannot induce producers to share their income with stakeholders and the community. The more willingness to pay for Fairtrade certified goods, the higher σ^o can be set. The bargaining power between the Fairtrade cooperative and the importer, α, affects how much an increase in β influences the producer's profit.

Lastly, an increase in δ, the marginal value of effort for Fairtrade goods and conventional goods alike, will lessen the effect of an increase in β, since it will reduce the relative marginal value of effort for ethical goods compared to conventional goods.

7.1.4 Achieving the producer maximum

If FLO for some reason are unable to dictate the effort level of Fairtrade producers, they could let the producers choose the effort that will maximize their profit given a certain σ. Although this will lead to a lower total profit to the south since the total profit is maximized in social optimum. The total profit in producer maximum must necessarily be lower than that.

To keep the producers in the cooperative, their profit $\pi_{i,FT}^{p,producer}$ must be higher than in the conventional cooperative, $\pi_{i,C}^{p,producer}$.[33]

$$\frac{1}{2}(1-\sigma)^2(\delta+\alpha\beta)^2 \geq \frac{1}{2}\delta^2 \tag{7.14}$$

Solving this for σ yields

$$\sigma^P \leq 1 - \frac{\delta}{\delta+\alpha\beta} \tag{7.15}$$

So as in social optimum, a higher β relative to δ will make it easier for FLO to make producers stay in the Fairtrade cooperative. Both σ^P (7.15) and σ^O (7.13) will start in 0 when $\beta = 0$, but σ^P will have a steeper slope, and thus be higher than σ^O for $\beta > 0$.[34]

7.2 Average effort observable

Until now, each producer has been paid based on the value he brings to the cooperative. However, it may not be reasonable for the goods from each producer to be inspected and classified. What if FLO and the cooperative can only observe some average quality of the goods delivered in a period? If they also know the relation between quality and effort, they can observe the average effort of the producers, but not the effort of each producer.

The number of producers delivering to the Fairtrade cooperative and to the conventional cooperative will play a role in this section, so the number of producers will be denoted as:

$$N_s = \begin{cases} N \text{ for the Fairtrade cooperative} \\ M \text{ for the conventional cooperative} \end{cases} \tag{7.16}$$

[33] Both from equation (7.8), but for Fairtrade certified goods and conventional goods respectively.

[34] Setting $x = \frac{\delta}{(\delta+\alpha\beta)}$ we need to show that $(1-x) \geq \frac{1}{2}(1-x^2) \Rightarrow x^2 - 2x + 1 \geq 0 \Rightarrow (x-1)^2 \geq 0$ q.e.d.

Since the producers are symmetrical, it is natural for them to be paid $1/N$ of the fraction of the income going to all producers. With the same cost function as before, the profit of each producer will be

$$\pi_i^{A,producer} = \frac{1}{N_s}(1-\sigma_s)(\delta+\alpha\beta_s)\sum_{j=1}^{N_s} e_j - \frac{e_i^2}{2} \tag{7.17}$$

This means that what the cooperative get from a producer on average is

$$\pi_i^{A,coop} = \frac{1}{N_s}\sigma_s(\delta+\alpha\beta_s)\sum_{j=1}^{N} e_j \tag{7.18}$$

As mention in the theory section 5.1, when the effort of different producers are perfect substitutes, individual effort is not observable, and no principal can take part in the profits there can be no sharing rules that will make producers choose an efficient effort level. This includes the average income sharing rule we assume here. As we will see, however, FLO can use β, the marginal willingness to pay for Fairtrade certified goods in the north, to alter the budget constraint the sharing rule is based on, and thus achieve an efficient solution.

7.2.1 The social optimum

Now, since nothing has changed about the cost function or the marginal income from the importer, the effort in social optimum will still be e_i^O (7.4). The importer may not know the quality of the good from each producer, but he knows the average quality, and thus the total quality of the goods from the cooperative. This means that the payment for the whole batch will still be the same given the same effort levels as before. The profits here will also be the same as before.

Contrary to the situation with observable effort, however, we now have the additional problem with incentives to free ride off the effort of the other producers in the cooperative.

7.2.2 The producer equilibrium

The producers will as usual seek to maximize their profit. Without any intervention from FLO this means finding the maximum of their profit function $\pi_i^{A,producer}$ (7.17) with respect to their effort. Differentiating and rearranging yields

$$e_i^{A,E} = \frac{1}{N_s}(1-\sigma_s)(\delta + \alpha\beta_s) \tag{7.19}$$

In addition to the decrease in effort from having to share the income with the cooperative, effort will also decrease as the number of producers delivering to the cooperative increases. This is because each producer's contribution to the average quality of the goods will count relatively less. If a producer yields a higher effort than this, other producers will free ride off his effort.

With symmetrical producers, all producers will provide this effort level, so the total effort for all producers will actually be the same as the producer profit maximizing effort for one producer when effort is observable. Inserting $e_i^{A,E}$ (7.19) into the profit function of the producer, $\pi_i^{A,producer}$ (7.17), and the cooperative, $\pi_i^{A,coop}$ (7.18), yields:

$$\pi_i^{A,E,producer} = \frac{2N_s - 1}{2N_s^2}(1-\sigma_s)^2(\delta + \alpha\beta_s)^2 \tag{7.20}$$

and

$$\pi_i^{A,E,coop} = \frac{1}{N_s}\sigma_s(1-\sigma_s)(\delta + \alpha\beta_s)^2 \tag{7.21}$$

If there is only one producer delivering to the cooperative the profit will be the same as with observable effort, since there are no free rider incentives. As the number of producers increase, both the effort and both profits will decrease.[35] When N_s goes towards infinity, both profits goes toward zero.

Note that while the problem with suboptimal effort only applied to the Fairtrade cooperative before, the free rider incentive problems will apply to both the Fairtrade- and conventional cooperative.

7.2.3 Achieving the social optimum

Now, FLO and the cooperative cannot point out any one producer deviating from the optimal effort level. Since only the average effort level is observable, this has to be what the reward to the producers is dependent on.

[35] Differentiating the producer profit with respect to N_s yields $(\frac{2}{N_s^3} - \frac{2}{N_s^2})(1-\sigma_s)^2(\delta + \alpha\beta_s)^2$ which is negative for $N_s > 1$.

Here is where the results by Holmstrom (1982) discussed in section 5.1 comes into play. Since the producers in the conventional cooperative only share the income amongst themselves, there will be no way for them to make a credible punishment if the goal of an optimal average effort level is not reached.

Without FLO involvement in the decision making, each of the producers will get a profit of some share γ_i of the total income going to producers, $(1-\sigma_s)(\delta+\alpha\beta_s)\sum e_j$, minus their private effort costs.

$$\pi_i^{A,producer,\prime} = \gamma_i[(1-\sigma_s)(\delta+\alpha\beta_s)\sum_{j=1}^{N_s} e_j] - c(e_i) \tag{7.22}$$

Holmstrom (1982) shows that with the budget constraint

$$\sum_{i=1}^{N_s}\{\gamma_i[(1-\sigma_s)(\delta+\alpha\beta_s)\sum_{i=1}^{N_s} e_i]\} = [(1-\sigma_s)(\delta+\alpha\beta_s)\sum_{i=1}^{N_s} e_i) \tag{7.23}$$

there is no way to make a sharing rule that will achieve an efficient effort level. This is a general result applying to all possible sharing rules among agents with effort being perfect substitutes as in this case.

Although, if the budget constraint is relaxed to an inequality

$$\sum_{i=1}^{N_s}\{\gamma_i[(1-\sigma_s)(\delta+\alpha\beta_s)\sum_{i=1}^{N_s} e_i]\} \leq [(1-\sigma_s)(\delta+\alpha\beta_s)\sum_{i=1}^{N_s} e_i) \tag{7.24}$$

there will exist an efficient solution.

FLO decide who gets to sell Fairtrade certified goods, and thus take part in the extra willingness to pay for ethical goods, β. This means that they can change the total income available to producers based on whether a specified average effort level is reached or not.

If FLO wants the social optimal solution achieved in the Fairtrade cooperative, they can set up the following reward scheme.

$$\beta_s = \begin{cases} \beta \text{ if } \sum e_j = N(\delta+\alpha\beta) \\ 0 \text{ if } \sum e_j \neq N(\delta+\alpha\beta) \end{cases} \tag{7.25}$$

The social optimum will then be achieved if

1. The producer profit in social optimum is higher than in the conventional cooperative
2. The producer profit going to a producer deviating from the optimal solution given that all other agents yield optimal effort, is lower than what he will get in the social optimum.

If social optimum is achieved, a Fairtrade producer will get a profit equal to $\pi_{i,FT}^{O,producer}$(7.5). In the conventional cooperative, producers will achieve the producer equilibrium, $\pi_i^{A,E,producer}$ (7.20) for a conventional cooperative delivery, which is:

$$\pi_{i,C}^{A,E,producer} = \frac{2M-1}{2M^2}\delta^2 \tag{7.26}$$

So the inequality that needs to hold for the first condition to be satisfied is:

$$\left(\frac{1}{2}-\sigma\right)(\delta+\alpha\beta)^2 \geq \frac{2M-1}{2M^2}\delta^2 \tag{7.27}$$

Solving this for σ yields:

$$\sigma^{A,O} \leq \frac{1}{2}\left(1-\frac{2M-1}{M^2}\frac{\delta^2}{(\delta+\alpha\beta)^2}\right) \tag{7.28}$$

So $\sigma^{A,O}$ is the maximum σ FLO can set and keep producers in the Fairtrade cooperative when demanding social optimum to be reached, and when only average effort is observable. This is identical to the inequality from the section with observable effort, σ^O (7.13), except for the fraction $(2M-1)/M^2$ being present in this case. As in equation (7.20), this fraction will be monotonely falling for $M > 1$. That means that the free rider problem will make it easier for FLO to avoid producers delivering to the conventional cooperative, if there is already a producer there.

In Figure 5, maximum values of $\sigma^{A,O}$ is shown in the z-axis. As we see, the maximum value goes towards 0.5 when the number of producers in the conventional cooperative increases, or when β, the marginal willingness to pay for ethical goods, gets big compared to δ, which is related to the marginal willingness to pay for all goods in general. The fraction $\delta/(\delta+\alpha\beta)$ is used on the x-axis because the interesting value is the size of β relative to δ, and not the absolute value of β. If both δ and β increases by the same percentage, the outside option and the inside option will increase proportionally, and the results will not change.

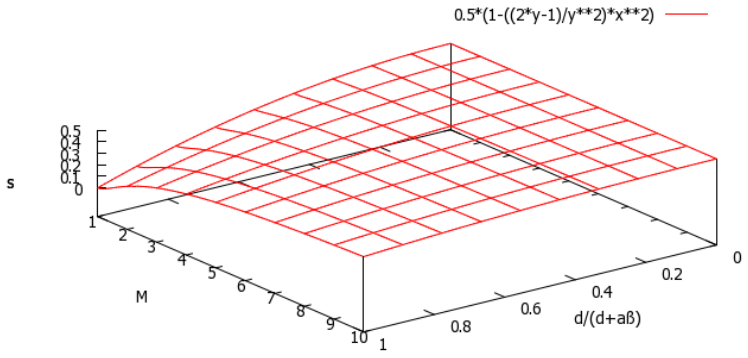

Figure 5: Maximum $\sigma^{A,O}$ for different values of M and β.

Now, let us take a look at the other condition. In general, a deviating producer's profit will be

$$\pi_i^{A,D,producer} = \frac{1}{N_s}(1-\sigma_s)(\delta+\alpha\beta_s)[e_i+(N_s-1)e_{-i}] - \frac{e_i^2}{2} \qquad (7.29)$$

Here e_{-i} denotes the effort of every other (symmetric) producer than the deviator i.

Since the whole batch will be sold as conventional goods if the average quality goal is not reached, the effect would be as if the whole cooperative lost certification, instead of isolated producers. If this is the case, there will be as many producers in this new conventional cooperative as it would be in the Fairtrade cooperative if no producers deviated. This means that $N = M$ can be assumed when deriving the inequality for the second condition.

If one producer deviates from the optimal effort, while all the other producers complies with FLO, his effort will be $e_{i,C}^{A,E}=\delta/N$ (7.19), because he knows that the batch they produce will not be sold as Fairtrade certified goods, since the aim for average quality will not be reached because of him. With one producer yielding that effort, and the others yielding the effort which would achieve social optimum, e_i^O (7.4), the deviator's profit will be

$$\pi_i^{A,O,D,producer} = \frac{1}{2N^2}\delta^2 + \frac{(N-1)}{N}\delta(\delta+\alpha\beta) \qquad (7.30)$$

Note that the term $\alpha\beta$ is present here because all producers other than the deviator will base their effort on the assumption that they will get the Fairtrade income.

For every producer to comply with the social optimum, this profit must be lower than the producer profit in social optimum, $\pi_{i,FT}^{O,producer}$(7.5):

$$\left(\frac{1}{2}-\sigma\right)(\delta+\alpha\beta)^2 \geq \frac{1}{2N^2}\delta^2+\frac{N-1}{N}\delta(\delta+\alpha\beta) \tag{7.31}$$

Solving this for σ yields:

$$\sigma^{A,O,D} \leq \frac{1}{2}\left(1-\frac{1}{N^2}\frac{\delta^2}{(\delta+\alpha\beta)^2}-2\frac{N-1}{N}\frac{\delta}{(\delta+\alpha\beta)}\right) \tag{7.32}$$

So $\sigma^{A,O,D}$ is the maximum σ FLO can set when only average effort is observable, to keep producers from deviating from the optimal effort level, and thus free ride off the high effort of the other producers.

The second term in the parenthesis is related to the deviator's own effort and costs, while the third relates to the other producers' efforts, and thus the free rider incentive.

When $N=1$, the condition is the same as σ^o (7.13), since there are no free rider incentives. When N gets big the second term gets insignificantly small, because the deviator himself will put in very little effort and therefore the income from his own sale and his own costs will become insignificant.

The third term, on the other hand, will increase with the number of producers. In fact, it will go towards $2\frac{\delta}{\delta+\alpha\beta}$ for a large number of producers. This is because the effort of all the other producers increases the average quality of the goods. With many producers, the average quality will draw near what it would be in social optimum, because the one deviator's deviation will have relatively little effect.

The implication of this is that β needs to reach a certain size for it even to be feasible for FLO to keep the producers from deviating. With a large number of producers, β must be bigger than δ/α for FLO to be able to prevent deviation. Since $0<\alpha<1$, this means that the marginal willingness to pay for an ethical good must be bigger than the marginal willingness to pay for a good in general.

In Figure 6 the maximum $\sigma^{A,O,D}$ for different number of producers, N, and different values of the fraction $\delta/(\delta+\alpha\beta)$ is drawn in a 3d-plot. Where there are discontinuities in the lines, there are no positive σ's which will make inequality (7.32) hold.

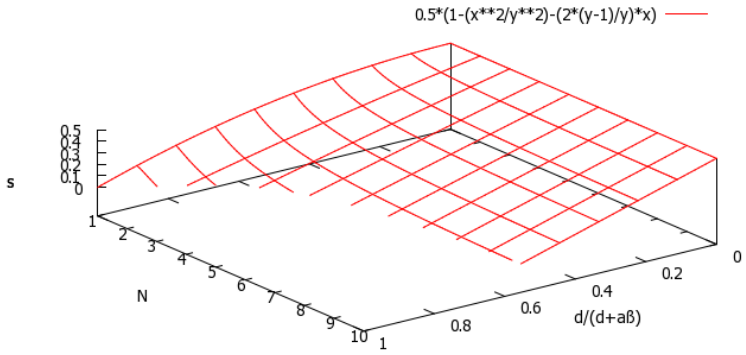

Figure 6: Maximum $\sigma^{A,O,D}$ for different values of N and β.

But if FLO relaxes the demand for the social optimum to be reached, avoiding deviation may be easier. What they do then is to forsake some efficiency in one dimension, to avoid inefficiency in another.

First, note that when the second condition from this section is fulfilled, the first will always be. In other words, it is easier to get producers to stay in the Fairtrade cooperative than to avoid deviation. To prove it, we need to show that the maximum possible σ for avoiding producers leaving the Fairtrade cooperative, $\sigma^{A,O}$ (7.28), always will be higher than the maximum possible σ for avoiding deviation, $\sigma^{A,O,D}$ (7.32).

$$\frac{1}{2}\left(1-\frac{2M-1}{M^2}\frac{\delta^2}{(\delta+\alpha\beta)^2}\right) \geq \frac{1}{2}\left(1-\frac{1}{N^2}\frac{\delta^2}{(\delta+\alpha\beta)^2}-2\frac{N-1}{N}\frac{\delta}{(\delta+\alpha\beta)}\right) \tag{7.33}$$

That is, σ can be set higher for the first condition to be fulfilled than for the second. This comparison could be problematic since it in the right hand side of the inequality is assumed that $N = M$, but the result will apply for all values of M on the left hand side, so there should be no problem. This means that it will apply even if there is no free rider problem in the outside option cooperative.

Setting $x = \delta/(\delta + \alpha\beta)$ and rewriting yields

$$\frac{x}{N^2}+2\frac{N-1}{N} \geq \frac{2M-1}{M^2}x \tag{7.34}$$

Since this should apply for all values of M, the fraction $(2M-1)/M^2$ can be set equal to its maximum, 1.[36] To show that

$$\frac{x}{N^2} + 2\frac{N-1}{N} \geq x \tag{7.35}$$

just note that it applies for $N = 1$ and that for $N \geq 2$ the second term is bigger than one, while the first is non-negative. Since $x \leq 1$ by the definition of δ, α and β, the inequality holds.

To conclude, when FLO set σ in such a way as to avoid deviation, they automatically set it at a level that will hold producers in the cooperative.

7.2.4 Achieving the producer maximum

Say FLO only wants to solve the free rider problem, and thus give the producers their joint maximum, and demand effort thereafter. This will reduce total income to the south, but will be the best the producers can do jointly if σ has already been decided. Given a certain σ, the producers would actually be jointly best off by choosing the effort level each producer would choose with individual effort observable. They would seek to maximize their joint profit:

$$\pi^{producers} = (1-\sigma_s)(\delta + \alpha\beta_s)\sum_{i=1}^{N} e_i - \frac{1}{2}\sum_{i=1}^{N} e_i^2 \tag{7.36}$$

with respect to each of their efforts, e_i. Maximizing the function and solving for e_i yields e_i^P (7.7). This means that for $\sigma = 0$, the producer profit in social optimum and producer maximum will be exactly the same. So in that case β will have to have exactly the same value as when FLO requires social optimum to be achieved, to avoid deviation.

However, for values of σ above zero it will take less to avoid deviation is this case. There are still two conditions that need to be satisfied to keep producers in the Fairtrade cooperative, and to avoid deviation. The first is that the producer profit in the producer maximum, $\pi_{i,FT}^{P,producer}$ (7.8) is better than what can be achieved in the conventional cooperative, $\pi_{i,C}^{A,E,producer}$(7.26):

$$\frac{1}{2}(1-\sigma)^2(\delta+\alpha\beta)^2 \geq \frac{2M-1}{2M^2}\delta^2 \tag{7.37}$$

[36] Differentiating the fraction yields $\frac{2}{M^2}\left(\frac{1}{M}-1\right)$which is positive for $M < 1$ and negative for $M > 1$.

Solved for σ, this inequality yields

$$\sigma^{A,P} \leq 1 - \sqrt{\frac{2M-1}{M^2}} \frac{\delta}{\delta + \alpha\beta} \tag{7.38}$$

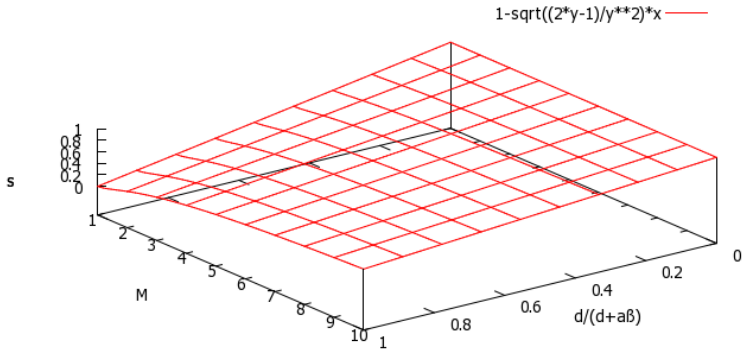

Figure 7: Maximum $\sigma^{A,P}$ for different values of M and β.

This is the highest σ FLO can set and still avoid that producers would be better off in a conventional cooperative when only average effort is observable, and is shown graphically in Figure 6. As when individual effort is observable, this σ can be shown to be higher than when the social optimum effort is required.[37] But as in the previous section, this will be a weaker condition than the one necessary to keep producers from deviating.

The profit of a deviator in this case will be similar to when social optimum is dictated, $\pi_i^{A,O,D,producer}$ (7.30), the only difference being that the effort of producers following the rules will be somewhat lower. Inserting e_i^P (7.7) and the deviator's effort level, $e_{i,C}^{A,E}$ (7.19) into the general deviator profit, $\pi_i^{A,D,producer}$ (7.29) yields:

$$\pi_i^{A,P,D,producer} = \frac{1}{2N^2}\delta^2 + \frac{(N-1)}{N}\delta(1-\sigma)(\delta + \alpha\beta) \tag{7.39}$$

Note that here, as in the social optimum section, N is assumed to be equal to M, since a deviation will mean that the whole cooperative loses certification.

The first term, which is the profit stemming from the deviator's own effort and costs, is identical to the first term in the social optimum deviator's profit. The second term is

[37] Setting $x = \sqrt{\frac{2M-1}{M^2}} \frac{\delta}{\delta+\alpha\beta}$ we get exactly the same inequality as that under individual effort observable (see footnote 34), which was shown to hold for all values of x.

multiplied by $(1-\sigma)$ since the effort of the other producers, e_{-i}, will be modified by this factor.

If no producer deviates they will get the profit from the producer maximum, $\pi_{i,FT}^{P,producer}$ (7.8).

This profit must be higher than that of a deviator to achieve the producer maximum, so the inequality

$$\frac{1}{2}(1-\sigma)^2(\delta+\alpha\beta)^2 \geq \frac{1}{2N^2}\delta^2 + \frac{N-1}{N}\delta(1-\sigma)(\delta+\alpha\beta) \qquad (7.40)$$

must hold. This is a second order equation in σ. After some tedious algebra, we find the condition:[38]

$$\sigma^{A,P,D} \leq 1 - \frac{1}{N}\left(N-1+\sqrt{1+(N-1)^2}\right)\frac{\delta}{\delta+\alpha\beta} \qquad (7.41)$$

If there is only one producer in the system, and thus no free rider problem, the parenthesis reduces to 1, and the condition will be the same as the previous, $\sigma^{A,P}$ (7.38). They will also be equal to the condition preventing producers from leaving the Fairtrade cooperative when individual effort is observable, σ^{P} (7.7). This is logical, since a deviation when there is only one producer will be the same as leaving the Fairtrade cooperative for the conventional.

As the number of producers grows, the last term gets bigger until it reaches a maximum of $2\frac{\delta}{\delta+\alpha\beta}$. So with a β sufficiently big, it will always be possible to avoid deviation and set a positive σ.

[38] Note that the solutions to the second degree inequalities in this thesis are really intervals between a negative number and a positive. But since σ is a fraction, and thus greater than zero, only the positive solution is relevant.

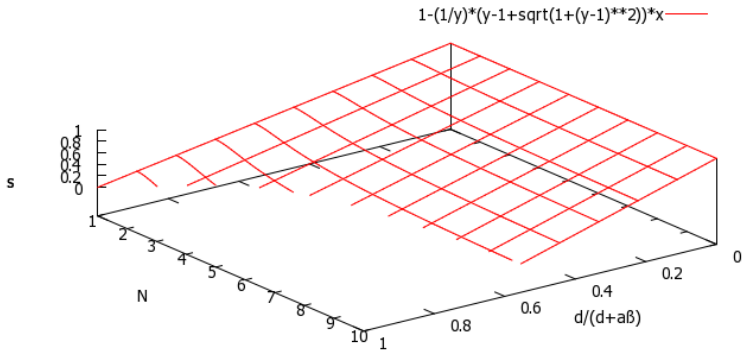

Figure 8: Maximum $\sigma^{A,P,D}$ for different values of N and β.

Figure 8 shows graphically the maximum value of $\sigma^{A,P,D}$, the maximum σ possible which will prevent producers from deviating. When the number of producers increase the free rider problem increases, so deviating will be more tempting. It can be avoided, however, if β is high, and thus the fraction $\delta/(\delta+\alpha\beta)$ low, or when σ is set to a low level.

As was the case when trying to reach the social optimum, the maximum σ in the no deviation inequality will be lower than in the inequality regarding leaving the Fairtrade cooperative for the conventional. Comparing the two maximum σ' s, $\sigma^{A,P}$ (7.38) and $\sigma^{A,P,D}$ (7.41), we get the inequality

$$1-\sqrt{\frac{2M-1}{M^2}}\frac{\delta}{\delta+\alpha\beta} \geq 1-\frac{1}{N}\left(N-1+\sqrt{1+(N-1)^2}\right)\frac{\delta}{\delta+\alpha\beta} \tag{7.42}$$

As in the previous section, this will hold for all values of M, so we set M to its maximum, which is 1. The inequality now actually reduces to

$$(N-1)^2 \geq 1 \tag{7.43}$$

which is clearly the case. This means that the conditions for avoiding deviation will be stronger than the ones for not leaving the Fairtrade cooperative both in social optimum and in producer maximum. We can thus disregard the no leaving conditions since they will always be fulfilled when the other condition is.

7.3 Results so far

So far we have studied two different situations. In the first one, producers were rewarded according to their individual effort. However, a fraction of the income went to some third party, so the effort level maximizing total profits and the effort level maximizing producer profit was different.

FLO could make a deal with the producers saying they would only get access to the Fairtrade market if they provided a certain effort. To stay in the Fairtrade cooperative, producers must be better off with this deal than if they leave for a conventional cooperative. If β, the extra marginal income from selling goods with the Fairtrade label, was not big enough for this FLO could lower σ, the fraction of the income going to a third party.

To keep producers in the cooperative when FLO demanded effort according to social optimum, we had the following relation between σ and β:

$$\sigma^O \leq \frac{1}{2}\left(1 - \frac{\delta^2}{(\delta + \alpha\beta)^2}\right)$$

Not surprisingly, this condition is increasing in β, in addition to in the bargaining power, α, which reduces the effect of β when it is low. When people are willing to pay a high price for Fairtrade labeled goods relative to conventional goods, and when the cooperative gets a large fraction of this extra willingness to pay from the importer, FLO can set a high σ.

If FLO let producers choose their effort they would maximize their profit given σ. For positive σ's their effort, and thus total profit to the south, was lower than in social optimum. The condition keeping the producers in the Fairtrade cooperative in this case was:

$$\sigma^P \leq 1 - \frac{\delta}{\delta + \alpha\beta}$$

This maximum σ will be higher than the one in social optimum for specific values of δ, α and β.

In the second situation an additional problem revealed itself. In this scenario producers were only rewarded by the average quality of the goods delivered to the cooperative, and thus their average effort. In addition to the incentive problem from having to share their income with a third party, producers now had an incentive to free ride off the effort of other producers. FLO

now had to both keep the producers from leaving the Fairtrade cooperative, and from free riding. We found that when σ were set at a level that would cause no deviation, the condition for not leaving would always hold.

When trying to achieve social optimum, the no deviation condition was:

$$\sigma^{A,O,D} \leq \frac{1}{2}\left(1 - \frac{1}{N^2}\frac{\delta^2}{(\delta + \alpha\beta)^2} - 2\frac{N-1}{N}\frac{\delta}{\delta + \alpha\beta}\right)$$

For $N = 1$, this condition is equivalent to σ^O, but as N increases it gets harder to satisfy because of the free rider problem.

When maximizing joint producer profit for a given σ, the condition that needed to hold to avoid deviation was:

$$\sigma^{A,P,D} \leq 1 - \frac{1}{N}\left(N - 1 + \sqrt{1 + (N-1)^2}\right)\frac{\delta}{\delta + \alpha\beta}$$

For $N = 1$ this reduces to σ^P since, again, there is no free rider problem. And when N increases, it gets harder to satisfy.

8. A multi period model

In the previous chapter we studied a single period model where the producers could either get the Fairtrade payoff or the conventional payoff based on whether they acted according to the requirements set by FLO. But it might be that producers may be able to deviate for a period of time without losing their certification. Especially is this true if the cooperative has no incentives to report suboptimal effort levels. Even if a producer or a trader is suspended from Fairtrade, contracts signed before the notice of suspension may still be valid for six months (FLO, 2011a) if both buyer and seller agrees.

In this model it will be assumed that the producers will enjoy Fairtrade benefits for one period before losing their certification. A producer will still have to let the cooperative keep a part of the income from the sale, σ, since this is income paid directly to the cooperative.

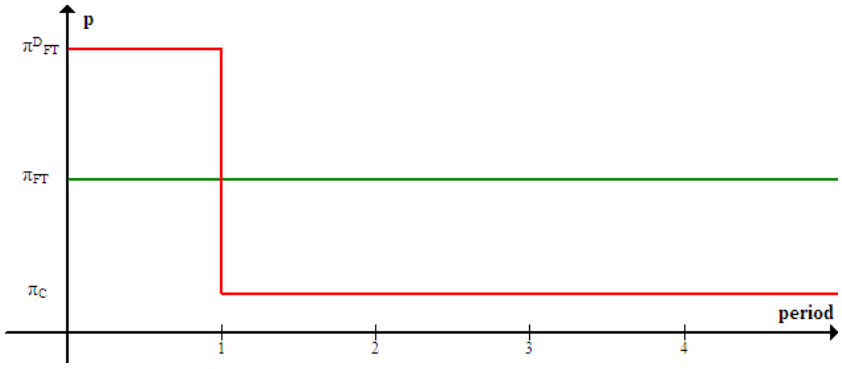

Figure 9: An illustration of the income streams in the multi period model.

It is reasonable to assume that producers value income today more than income in the future. Future income will be discounted by a rate of r. After the first period, the producers will get either the Fairtrade income stream or the conventional income stream in perpetuity based on their actions in the first period.

There will now be four stages in each period. First, FLO decides the requirements for being certified. Then, in the second stage, producers apply effort. In the third stage producers sell their goods, and in the last stage FLO checks if goods sold with the Fairtrade label were produced according to the requirements. If not, the goods will not be sold as Fairtrade certified in the subsequent periods.

8.1 Effort observable

As in the single period model, FLO and the cooperative are able to observe each producer's individual effort and the producers are rewarded according to this. The producers get a fraction $(1-\sigma)$ of the income from the sale of their goods, and the cooperative gets the residual fraction, σ. Profit to the cooperative is still interpreted as going to stakeholders other than the producers or social projects in the community.

Effort from a given period only affects the quality in the same period, so the optimal effort level for any given period will be the same as in the single period model. However, since producers are now able to enjoy Fairtrade benefits for a period before leaving if they deviate from the standards, the producers' participation constraints will change.

Since agents now consider future periods, the discount rate will influence this condition, in addition to the extra marginal willingness to pay for Fairtrade certified products, β, and σ.

Note that if the producers are given incentives not to deviate they will also want to stay in the Fairtrade cooperative instead of leaving, because if the no deviation condition is satisfied, it will always be more profitable to deviate than to just outright leave.[39]

8.1.1 The social optimum

In the first period, each producer's income will either be $\pi_{i,FT}^{O,producer}$ (7.5) or $\pi_{i,FT}^{P,producer}$ (7.8), both with the extra ethical marginal willingness to pay, β, in place. The latter profit is the highest profit the producer can get for a given σ, and the first is the one achieved if applying the effort FLO requires to stay certified, e_i^O (7.4). In all subsequent periods, their profit will still be $\pi_{i,FT}^{O,producer}$ (7.5) if they choose this profit in the first period, and if they choose the other path, their profit will be the producer maximizing producer profit without any β or σ, which is just $\pi_{i,C}^{P,producer} = \frac{1}{2}\delta^2$ (7.8). This means that each producer can choose between these two income streams:

$$\pi_{i,TOT}^{O,producer} = \pi_{i,FT}^{O,producer} \sum_{t=0}^{\infty} \frac{1}{(1+r)^t} = (1+\frac{1}{r})\pi_{i,FT}^{O,producer} \tag{8.1}$$

and

$$\begin{aligned} \pi_{i,TOT}^{P,D,producer} &= \pi_{i,FT}^{P,producer} + \pi_{i,C}^{P,producer} \sum_{t=1}^{\infty} \frac{1}{(1+r)^t} \\ &= \pi_{i,FT}^{P,producer} + \frac{1}{r}\pi_{i,C}^{P,producer} \end{aligned} \tag{8.2}$$

8.1.2 The producer maximum

If FLO does not require any specific effort, each producer will choose producer maximizing effort, since there is no free rider problem when individual effort is observable. A producer will have no incentive to deviate from this effort. However, the profit from staying in the Fairtrade cooperative must still be bigger than if they leave. This condition will be the same as the one in the single period model, σ^P (7.15).

[39] If there are no incentives to deviate, it means that π_{FT} in Figure 9 must be higher than π_C, and thus it will be more profitable to stay in the Fairtrade cooperative than to leave.

8.1.3 Achieving the social optimum

To keep producers from deviating, their total profit from staying in the Fairtrade cooperative must be higher than the one from getting extra profit in one period, then settling for a lower in all subsequent periods.

Inserting $\pi_{i,FT}^{O,producer}$ (7.5), $\pi_{i,FT}^{P,producer}$(7.8) and $\pi_{i,C}^{P,producer}$ (7.8) into the total income streams yields:

$$\pi_{i,TOT}^{O,producer} = \left(1 + \frac{1}{r}\right)\left(\frac{1}{2} - \sigma\right)(\delta + \alpha\beta)^2 \tag{8.3}$$

and

$$\pi_{i,TOT}^{P,D,producer} = \frac{1}{2}(1-\sigma)^2(\delta + \alpha\beta)^2 + \frac{1}{2r}\delta^2 \tag{8.4}$$

The condition for no deviation can now be presented as an inequality where (8.3) must be larger than (8.4). This is a second degree inequality in σ, whose characteristic equation is:

$$\sigma^2 + \frac{2}{r}\sigma - \frac{1}{r}\left(1 - \frac{\delta^2}{(\delta + \alpha\beta)^2}\right) \leq 0 \tag{8.5}$$

Its solution is

$$\sigma^{MP,O} \leq \sqrt{\frac{1}{r^2} + \frac{1 - \delta^2/(\delta + \alpha\beta)^2}{r}} - \frac{1}{r} \tag{8.6}$$

As expected, the inequality reduces to $\sigma^{MP,O} \leq 0$ when there is no β, since then, FLO would have no carrot to make them stay in the Fairtrade cooperative. When β increases, the square root gets bigger, and the largest possible σ gets larger. When β gets bigger FLO's carrot gets more tempting, and they can give more income to the cooperative without producers deviating.

An increase in r will reduce the size of all terms, and reduce possible σ's. As the discount rate increases producers care more about the higher income prospect in the first period than the lower income they will get in all subsequent periods and FLO must reduce σ to compensate.

In Figure 10, these results are presented graphically for different values of the discount rate r and the fraction $\delta/(\delta + \alpha\beta)$.

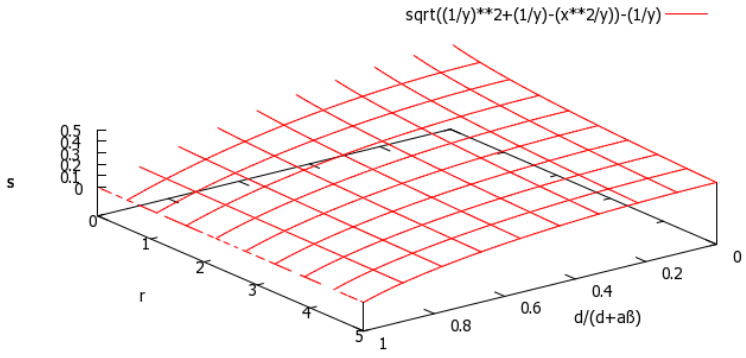

Figure 10: Maximum $\sigma^{MP,O}$ to keep producers from deviating in the multi period model, individual effort observable.

8.1.4 Achieving the producer maximum

As mentioned, the condition for staying in the Fairtrade cooperative in this case will be the same as in the single period model, since producers have no incentives to deviate from the effort they provide. The only condition that must hold is that producers must be better off in the Fairtrade cooperative than the conventional cooperative, which was also the problem when we only analyzed one period.

$$\sigma^P \leq 1 - \frac{\delta}{\delta + \alpha\beta} \tag{7.15}$$

This condition is independent of the discount rate r, since they will either choose to provide producer profit maximizing effort in the Fairtrade cooperative or in the conventional cooperative for every period. r will then be dropped from the inequality.[40]

8.2 Average effort observable

As in the last part of the single period model chapter, the producers will now only be rewarded according to the average quality in any given period. The same scheme as in the single period model will be used – if the average effort specified by FLO is not reached, the whole cooperative will lose certification.

The difference between this situation and the one in the single period model is that in this case deviating producers will free ride off other producer's Fairtrade income, instead of just

[40] The condition will be $\left(1+\frac{1}{r}\right)\frac{1}{2}(1-\sigma)(\delta+\alpha\beta)^2 \geq \left(1+\frac{1}{r}\right)\frac{1}{2}\delta^2$ instead of just $\frac{1}{2}(1-\sigma)(\delta+\alpha\beta)^2 \geq \frac{1}{2}\delta^2$, which will yield the same result.

conventional income, for one period. However, a producer must also take into account that if he deviates, he will have to settle for the producer equilibrium in all subsequent periods.

8.2.1 The social optimum

The effort that maximizes total profit to the south in each period will still be the same as it ever was. That means that given social optimum effort from all other producers, a producer may choose the profits which are achieved when all producers produce according to social optimum for perpetuity. This is the same profit stream as when individual effort is known, $\pi_{i,TOT}^{O,producer}$ (8.1).

The alternative is choosing a deviator's profit in the first period, and then the conventional producer equilibrium profit in subsequent periods:

$$\begin{aligned}\pi_{i,TOT}^{A,O,D,producer} &= \pi_{i,FT}^{A,O,D,producer} + \pi_{i,C}^{A,E,producer}\sum_{t=1}^{\infty}\frac{1}{(1+r)^t} \\ &= \pi_{i,FT}^{A,O,D,producer} + \frac{1}{r}\pi_{i,C}^{A,E,producer}\end{aligned} \tag{8.7}$$

A deviating producer will apply effort $e_{i,FT}^{A,E}$ (7.19) for the first period and then $e_{i,C}^{A,E}$ (7.19) after that. The first period profit of a deviator when other producers apply effort according to social optimum, e_i^O(7.4), will then, based on $\pi_i^{A,D,producer}$(7.29), be:

$$\pi_{i,FT}^{A,O,D,producer} = \left(\frac{1}{2N^2}(1-\sigma)^2 + \frac{N-1}{N}(1-\sigma)\right)(\delta+\alpha\beta)^2 \tag{8.8}$$

The first term is the deviator's share of the income from the sale of his own goods, minus his costs, and the second is his share of the sale of everyone else's goods.

8.2.2 The producer equilibrium

When left to themselves the profit maximizing producers will, if rewarded according to average effort, end up in the same situation as in the single period model, with a profit of $\pi_i^{A,E,producer}$ (7.20). In any given period, their best strategy will be to maximize their profit in that period. This is, of course, based on the assumption that the producers will not be able to credibly make a deal to maximize their joint maximum.

8.2.3 Achieving the social optimum

For producers to follow the standards and not deviate, it must be more profitable for them than deviating in the first period, and then end up in the producer equilibrium after that. Inserting the profit functions $\pi_{i,FT}^{O,producer}$(7.5), $\pi_{i,FT}^{A,O,D,producer}$ (8.8) and $\pi_{i,C}^{A,E,producer}$ (7.20) in the total profit streams yields:

$$\pi_{i,TOT}^{O,producer} = \left(1+\frac{1}{r}\right)\left(\frac{1}{2}-\sigma\right)(\delta+\alpha\beta)^2 \tag{8.3}$$

and

$$\begin{aligned}\pi_{i,TOT}^{A,O,D,producer} = &\left((1-\sigma)\frac{1}{2N^2}+\frac{N-1}{N}\right)(1-\sigma)(\delta+\alpha\beta)^2 \\ &+\frac{1}{r}\frac{2N-1}{2N^2}\delta^2\end{aligned} \tag{8.9}$$

Note that since the whole cooperative loses certification after a deviation, we can assume $M = N$ in $\pi_{i,C}^{A,E,producer}$ (7.20). To find the maximum σ giving a higher profit for following the rules than for deviating, we compare the two total income streams in an inequality, which is then solved for σ. This will be a second degree inequality in σ. Its characteristic equation is

$$\begin{aligned}&\sigma^2+2\left(\frac{N^2}{r}+N-1\right)\sigma \\ &\quad+\left(\left(1-\frac{1}{r}\right)N^2-2N+1+\frac{2N-1}{r}x^2\right)\leq 0\end{aligned} \tag{8.10}$$

where $x = \delta/(\delta+\alpha\beta)$. Its solution is:

$$\begin{aligned}\sigma^{MP,A,O} \leq &\sqrt{\left(\frac{N^2}{r}+N-1\right)^2+\left(\frac{1}{r}-1\right)N^2+2N-1-\frac{(2N-1)x^2}{r}} \\ &-\left(\frac{N^2}{r}+N-1\right)\end{aligned} \tag{8.11}$$

When $N = 1$ there is no free rider problem, so this condition will then be equivalent to the one where individual effort is observable, $\sigma^{MP,O}$ (see Figure 10).

As N increases, the maximum σ FLO can set and still avoid deviation will get smaller for most values of the other variables, and for values of r larger than one it may get negative.

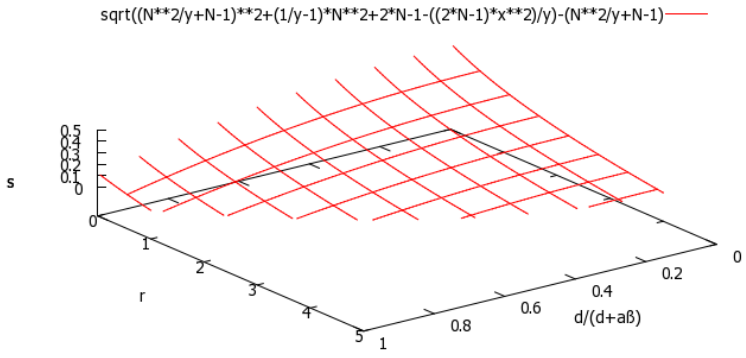

Figure 11: Maximum $\sigma^{MP,A,O}$ to keep producers from deviating in the multi period model, average effort observable, N=2.

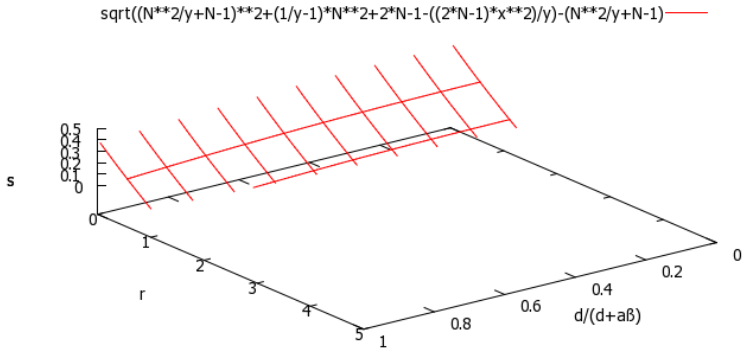

Figure 12: Maximum $\sigma^{MP,A,O}$ to keep producers from deviating in the multi period model, individual effort observable, N=10

As Figure 11 and Figure 12 shows, it will be impossible to keep producers from deviating when the number of producers gets big and their discount rate is higher than one.[41] This is because when the discount rate reaches a certain point, the deviator's profit from the first period surpasses the producer's valuation of the profit from all periods when following the rules.

However, a discount rate higher than one translates to valuing income in the next period less than half as much as the profit from the current period. This seems an unlikely scenario, and would only seem to be true if some producers were truly desperate for some reason, which is probably not the case for producers in a Fairtrade cooperative.

[41] Specifically, if $r \geq \left(\frac{N}{N-1}\right)^2$. This goes towards one when N goes towards infinity.

For low discount rates producers value their future income high, and the maximum σ increases to a maximum of 0.5.

8.2.4 Achieving the producer maximum

As usual the producer maximum will also be analyzed, where the producers maximize joint profit for a given σ. The joint profit in each period will be the same as in the one period model: $\pi^{producers}$ (7.36) which is maximized by yielding e_i^P (7.7).

Now, producers choose between

$$\pi_{i,TOT}^{P,producer} = \pi_{i,FT}^{P,producer} \sum_{t=0}^{\infty} \frac{1}{(1+r)^t} = (1+\frac{1}{r})\pi_{i,FT}^{P,producer} \tag{8.12}$$

which is the producer maximizing profit in every period, or the profit of a deviator when everyone else apply effort according to producer maximum in the first period, then producer equilibrium effort in subsequent periods:

$$\begin{aligned} \pi_{i,TOT}^{A,P,D,producer} &= \pi_{i,FT}^{A,P,D,producer} + \pi_{i,C}^{A,E,producer} \sum_{t=1}^{\infty} \frac{1}{(1+r)^t} \\ &= \pi_{i,FT}^{A,P,D,producer} + \frac{1}{r}\pi_{i,C}^{A,E,producer} \end{aligned} \tag{8.13}$$

We find $\pi_{i,FT}^{A,P,D,producer}$ from $\pi_i^{A,D,producer}$(7.29). Since this is the first period, β and $(1-\sigma)$ will be in place, so differentiating with respect to the deviator's effort will give an effort of $e_{i,FT}^{A,E}$ (7.19) just like in the previous section. All other producers yield the producer maximizing effort, $e_{i,FT}^{P}$ (7.7). With these effort levels inserted, the profit becomes:

$$\pi_{i,FT}^{A,P,D,producer} = \left(\frac{1}{2N^2} + \frac{(N-1)}{N}\right)(1-\sigma)^2(\delta+\alpha\beta)^2 \tag{8.14}$$

When inserting this profit and $\pi_{i,C}^{A,E,producer}$ (7.20) into the total income stream we get:

$$\begin{aligned} \pi_{i,TOT}^{A,P,D,producer} &= \left(\frac{1}{2N^2} + \frac{N-1}{N}\right)(1-\sigma)^2(\delta+\alpha\beta)^2 \\ &+ \frac{1}{r}\frac{2N-1}{2N^2}\delta^2 \end{aligned} \tag{8.15}$$

Note that as in the social optimum section, $M = N$. When $N = 1$, the first term is the producer maximum profit for a Fairtrade producer and the last term the producer maximizing profit from a conventional cooperative. This is as expected, since it then would be no free rider incentives.

When inserting $\pi_{i,FT}^{P,producer}$(7.8), the first income stream is equal to:

$$\pi_{i,TOT}^{P,producer} = (1 + \frac{1}{r})\frac{1}{2}(1-\sigma)^2(\delta + \alpha\beta)^2 \tag{8.16}$$

To avoid deviation, $\pi_{i,TOT}^{P,producer}$ (8.16) must be bigger than $\pi_{i,TOT}^{A,P,D,producer}$ (8.15). If we set this up as an inequality and rewrite we get:

$$\left(\frac{1}{r} - 1 + \frac{2N-1}{N^2}\right)(1-\sigma)^2 \geq \frac{1}{r}\frac{2N-1}{N^2}\frac{\delta^2}{(\delta+\alpha\beta)^2} \tag{8.17}$$

Now, the right side in the inequality will never be negative. The number of producers, N, cannot be smaller than one, and all other values are positive. The left hand side can be negative for values of the discount rate, r, higher than one if N is large,[42] and thus never hold. The reason for this is that, as in social optimum, a deviator will value his profit from the first period higher than the producer maximizing profit for perpetuity, independent of the size of the producer equilibrium profit he will get from period two and onwards.

Assuming that the discount rate is sufficiently small, this inequality can be solved for σ as

$$\sigma^{MP,A,P} \leq 1 - \sqrt{\frac{(2N-1)x^2}{(1-r)N^2 + (2N-1)r}} \tag{8.18}$$

As usual, $x = \delta/(\delta + \alpha\beta)$. When $N = 1$, this condition will be the same as σ^P (7.5)[43]. As N increases, two things happen. It gets more lucrative to deviate in the first period, but the producer equilibrium in subsequent periods will get worse. When the discount rate is low, it turns out the last negative effect will outweigh the first positive effect, and it gets easier to avoid deviation.

[42] As in section 8.2.3, it gets negative when $r \geq \left(\frac{N}{N-1}\right)^2$.

[43] Since in the first period what FLO requires is the same effort that will maximize his profit, and in subsequent periods, he will apply producer maximizing effort for a Fairtrade producer and conventional producer respectively.

A bigger discount rate will, everything else constant, make it harder to avoid deviation, and the same is true for a smaller marginal willingness to pay for Fairtrade certified goods, β, which will cause a higher x in the inequality.

In Figure 13, the maximum $\sigma^{MP,A,D}$ is shown for different values of x and N, with the discount rate set constant at 0.5. A higher discount rate (lower than one) will cause a slower ascent along the N-axis, while a lower discount rate will make the ascent faster. When N goes towards infinity, however, the result will be the same, with a maximum $\sigma^{MP,A,D}$ of one for all values of r[44] and x. When N gets large, the profit in producer equilibrium will approach zero, so the producer only compares the deviator's profit in the first period with the producer maximum profit for all periods. Since both of these are equally dependent on σ, the only necessary condition for producer maximum is a discount rate below one.

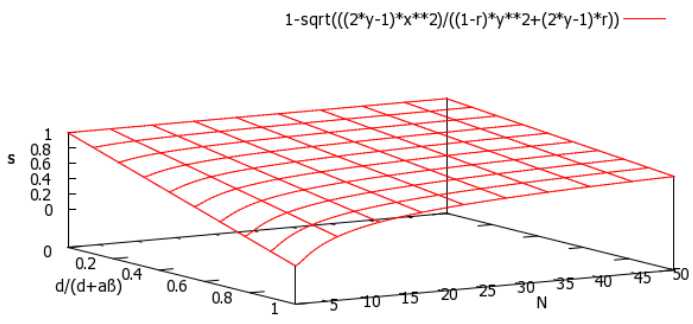

Figure 13: Maximum $\sigma^{MP,A,P}$ to keep producers from deviating in the multi period model, average effort observable, r=0.5

To illustrate the point that the discount rate must be sufficiently low, consider Figure 14 and Figure 15. When the discount rate reaches $r = \left(\frac{N}{N-1}\right)^2$, avoiding deviation will be impossible for any value of β. This is shown by the discontinuities of the lines in the figures.

[44] Less than one.

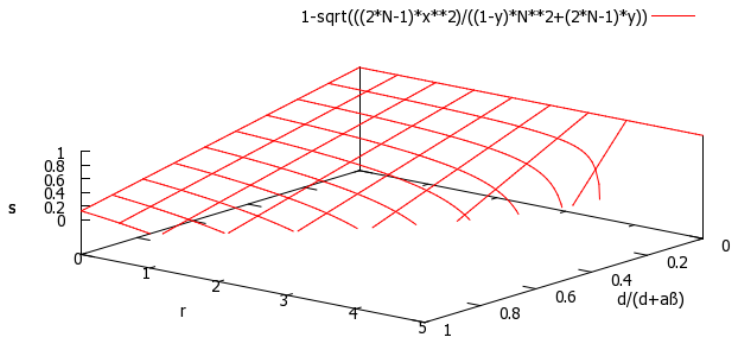

Figure 14: Maximum $\sigma^{MP,A,P}$ to keep producers from deviating in the multi period model, average effort observable, N=2 (max r=4)

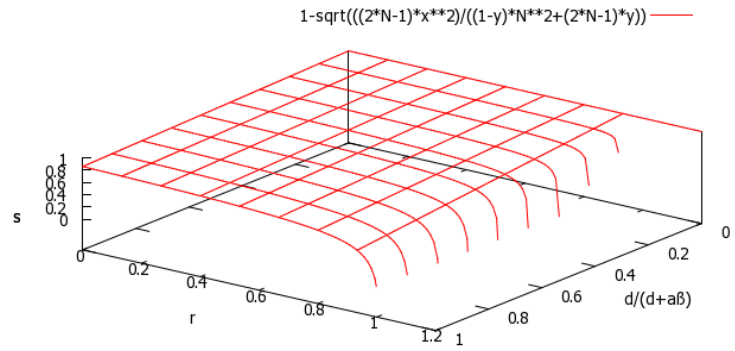

Figure 15: Maximum $\sigma^{MP,A,P}$ to keep producers from deviating in the multi period model, average effort observable, N=100 (max r=1.02)

From the last figures it is also easy to see that the negative effect on the producer equilibrium in period 2 and onwards is larger than the positive effect from a stronger free rider incentive when N increases. In Figure 15 there are a large number of producers, so there is almost no profit in producer equilibrium. Therefore, producers do not need much of the income to act according to the requirements.

8.3 Results so far

As in the one period model, two scenarios were analyzed. One where individual effort was known, and thus producers were rewarded according to their individual effort, and one scenario where only average effort was observable.

But in contrast to the one period model, this model continues for perpetuity after the first period. Here, producers could pass their goods off with the Fairtrade label for one period even if they did not comply with the effort requirements set by FLO. However, since a deviation caused loss of certification for all subsequent periods, producers needed to take this into account when they chose their actions in the first period.

When individual effort was observable and FLO wanted to achieve social optimum, the effort level maximizing total profit to the south, producers needed to be better off choosing this effort each period, than choosing the producer maximizing effort in the first period, then losing certification. The maximum σ FLO could set and achieve this was:

$$\sigma^{MP,O} \leq \sqrt{\frac{1}{r^2} + \frac{1 - \delta^2/(\delta + \alpha\beta)^2}{r}} - \frac{1}{r}$$

The maximum σ was found to be increasing in α, the bargaining power in the price negotiations with the importer, and β, the extra marginal willingness to pay for Fairtrade labeled goods. An increase in the discount rate r was found to decrease the maximum σ.

When FLO let the producers choose their producer profit maximizing effort, there was no incentive problem since this is the best a producer can do given a certain σ. The only problem was that the producers needed to be better off choosing this effort each period than leaving the Fairtrade cooperative for the conventional. The condition for this turned out to be the same as in the single period model:

$$\sigma^{P} \leq 1 - \frac{\delta}{\delta + \alpha\beta}$$

It starts out in zero when there is no extra willingness to pay for Fairtrade goods, and increases when β, or α, increases relatively to δ, which is a function of the general willingess to pay for all goods.

When we assumed only average effort to be observable, things got a little more complicated. Now, producers could free ride off other peoples' Fairtrade income, but then ended up in the inefficient producer equilibrium from the second period and in perpetuity. When FLO required social optimum achieving effort, the producer would be willing to part with a fraction:

$$\sigma^{MP,A,O} \leq \sqrt{\left(\frac{N^2}{r} + N - 1\right)^2 + \left(\frac{1}{r} - 1\right)N^2 + 2N - 1 - \frac{(2N-1)x^2}{r}} - \left(\frac{N^2}{r} + N - 1\right)$$

where $x = \delta/(\delta + \alpha\beta)$, of his income, and still apply the optimal effort. This fraction was found to be negative for some values of r, α, β and N. A large value of producers combined with a discount rate above one would for example make deviation unavoidable no matter the size of β. The fraction was found to be decreasing in r, increasing in β, and α, and as the number of producers in the cooperative increased, it would be harder to avoid deviation in most cases. With $N = 1$ this condition was found to be the same as $\sigma^{MP,O}$, from the multi period individual effort observable section.

When FLO wanted to achieve the maximum joint profit for producers for a given level of σ, deviation was somwhat easier to avoid, since the lower effort from other producers made the free rider incentives weaker. The condition in this case was found to be:

$$\sigma^{MP,A,P} \leq 1 - \sqrt{\frac{(2N-1)x^2}{(1-r)N^2 + (2N-1)r}}$$

where x, again, is equal to $\delta/(\delta + \alpha\beta)$. With $N = 1$, and thus no free rider problem, this condition is equivalent to σ^P. As when social optimum effort was required, the combination of a large discount rate, r, and a large number of producers, N, would cause deviation to be unavoidable. The maximum fraction σ was found to be increasing in α, the bargaining power, and β, the ethical willingess to pay, and decreasing in the discount rate r.

Surprisingly enough it was increasing in the number of producers, as long as the discount rate was below one. The intuition behind this was that the negative effect on the producer equilibrium from more producers was bigger than the positive effect from a higher deviator's income in the first period.

9. Extensions

In the analysis a model was set up based on a simple profit function, and participation constraints were derived in several different scenarios. Most of the assumptions in the model are straightforward, and there are many possible extensions that will make the model more comprehensive or highlight different scenarios.

9.1 Bargaining power

9.1.1 Bargaining power and the size of the cooperative

In the model, the bargaining power between the Fairtrade cooperative and the Fairtrade importer, α, is assumed to be a given value. This means that no matter the size of the cooperative, the importer is still just as eager to trade with you. In the cases with free rider problems, it would then be optimal to make many small cooperatives to avoid the problems. We got around this fact in the model by assuming that there were only two cooperatives the producers could participate in, and if they were not in one of those two, they would not earn any profits at all.

Another solution could be to make α dependent on the size of the cooperative, N. Then, increasing number of producers in the Fairtrade cooperative would have a positive effect on income, not only the negative free rider effect.

9.1.2 Bargaining power and the quality of the goods

It is reasonable that the bargaining power is also dependent on the quality of the goods from a cooperative. As an example, Milford[45] noted that exporters of coffee in Chiapas, Mexico were very interested in buying Fairtrade certified coffee from cooperatives because of its superior quality.

Making bargaining power dependent on quality would make the marginal income from effort rise, thereby increasing the equilibrium effort levels.

9.2 Cost functions

9.2.1 Cost functions in Fairtrade cooperatives versus in conventional cooperatives

The relationship between effort and quality was assumed to be the same in the Fairtrade cooperative and the conventional cooperative. The cost functions may differ for several reasons.

One reason is that there are costs connected with becoming and staying Fairtrade certified. Producer organizations pay an annual fee based on the number of producers and products in

[45] Personal e-mail correspondence with Anna Milford, 2011-03-29.

the organization, in addition to fees to initiate the certification process and introducing new products.[46]

On the other hand, reorganizing to Fairtrade production might lower the costs of producing quality products in the long run if the production by Fairtrade producers is more sustainable than that of conventional producers. This could also go the other way: to take environmental factors and externalities into account when deciding how to produce your goods might make it more expensive.

Also, the trading partners of Fairtrade producers tend to be helpful with information and training in how to make high quality goods, and what are expected of the products in the north (Lyon, 2007). A reasonable assumption is that this help will lower the costs of quality.

Another factor that could alter the cost functions of the producers is the social norms and prejudices a producer may have. Since FLO standards prohibits discrimination (FLO, 2009) Fairtrade producers may be forced to hire or trade with women or people from other cultural or religious groups. This could raise non-monetary costs for the producers, and might make it harder to make them stay in the Fairtrade cooperative. Of course, it could lower monetary costs if trading with or hiring these persons is more effective than not to do so.

If the costs of producing quality goods is higher in one cooperative than the other, it might alter the effort levels in equilibrium. The higher annual costs for staying Fairtrade certified will only alter the participation constraints.

9.2.2 Cost functions and the size of the cooperative

In addition to a higher bargaining power, it could be that the size of a cooperative could have a positive effect on the cost function. This is especially intuitive in a scenario where the cooperative have some common costs. This effect could be that common means of production will be cheaper per producer if there are many producers.

The effects of marketing is natural to assume is concave in the money put in, so a big number of producers would mean a lower marketing cost per producer.

[46] CERTIFICATION FEES, http://www.flo-cert.net/flo-cert/main.php?id=29, accessed 2011-05-04.

9.3 The democracy of the cooperatives

Producers were assumed to have all the power in the cooperative democracy, so a cooperative with no involvement from FLO will give all income from the sales on to the producers. It could be that stakeholders have some power in this democracy, which can then give a positive σ even without FLO involvement. If some of the income in a conventional cooperative goes to stakeholders it would be easier to increase the fraction going to stakeholders in the Fairtrade cooperative, because the producers' outside option would be less attractive.

9.4 Uncertainty

9.4.1 In production

This model is deterministic. All producers know how much quality their effort will yield, and quality is perfectly correlated with effort. In reality, there are many factors that may affect how the product turns out, like weather, natural disasters and disease. These are factors partly outside the control of the producer, and if they are present, they make it less efficient to reward producers based on the quality of their goods.

A way to introduce these elements in the model could be to add a random variable to the quality, making it correlate less with effort.

9.4.2 In price

In the model, it is assumed that the willingness to pay to the north is constant and independent of the quantity supplied. As discussed in section 3.1 the price in many agricultural markets are highly volatile with devious price cycles. An extension to the model could therefore be to include a random term in the willingness to pay.

This could give the Fairtrade cooperative an advantage, because of the Fairtrade minimum price. However, that is dependent on whether the importer is actually willing to buy the Fairtrade goods for a price above the Fairtrade minimum price when the world market prices are low. If producers are risk averse, they would prefer a less volatile price if that is feasible.

9.5 External effects

9.5.1 Fairtrade and the community

In the model, profit to the south comes either from the fraction of income going to the stakeholders, or to social projects, or from the profits going to the producers. There are surely both positive and negative external effects present in the market.

In agriculture production irrigation, the use of fertilizers and burning of forests could among other things cause adverse effects to the environment and other people in the community. The costs of these actions are borne by the whole community, while the gains fall to the producers. Fairtrade standards contain rules concerning sustainable production that can reduce these negative external effects (FLO, 2009).

In the model, these effects will reduce the total profits to the south for conventional producers, and create additional incentives for FLO to make producers stay in the Fairtrade cooperative, if their goal is to maximize profits to the south.

The presence of Fairtrade could also give some positive external effects, in addition to preventing some of the negative external effects from production. For example, a Fairtrade cooperative may be a "barometer of exploitation" (Milford, 2004, p. 27) for other producers in the community, by setting a price for the goods that other producers can reference to in their bargaining with traders or exporters.

In the model, this will increase the outside option of producers, and could actually make it harder to make them stay in the Fairtrade cooperative.

9.5.2 Fairtrade producers and the "warm glow effect"

Another positive external effect from Fairtrade is that the producers could get a "warm glow effect" (Chau, et al., 2009, p. 4), an extra utility from being part of a Fairtrade cooperative, and thus contributing to social projects or having a less negative impact on the environment.

This effect would show as an extra term in the producers' profit function. The effect from contributing to social projects could show up as a function of the amount of income going to these projects. An extra profit like this will make it easier for FLO to make producers stay in the Fairtrade cooperative.

In this extension, a producer's profit could look like this:

$$\pi_i^{W,producer} = (1 - \sigma_s)(\delta + \alpha\beta)e_i + u(\sigma_s(\delta + \alpha\beta)e_i) \quad (9.1)$$

Here, the last term is added from the external "warm glow" effect from contributing to the community.

9.6 Tit for tat

In the multi period model, it was assumed that if a producer, or the cooperative, deviated and thus lost certification, they would be conventional producers for all future periods. Another possibility could be that they could get certified again at a later point. They would have to pay the certification fees again, and there would thus be some extra costs, but the results from deviating would be less extreme than in the grim trigger strategy used in the model.

With a less extreme consequence of deviation, it would naturally be harder to keep producers from deviating.

9.7 Non-linear functions

It was assumed that the income from the consumer markets was linear in quality. A more reasonable income function would probably be concave in quality. Also, increasing quality should probably be harder as quality increases, instead of the one to one relationship with effort assumed in the model.

These complicating assumptions would make it much harder to analyze the model, and would probably not change any of the basic results.

9.8 Common cooperative costs

In the analysis it was assumed that income from the sales to the importer would go either to the producer or to the cooperative, in the form of social projects or profits to stakeholders. Another possibility could be that a fraction of the income has to be paid to the cooperative to cover common costs for marketing products, administrative costs or other similar costs. If so, the producers would get some utility from this income, but not necessarily proportional to their contribution. If we assume that all the income goes either directly to the producers, with individual effort observable, or to cover common costs, a producer's profit function could look like this:

$$\pi_i^{CC} = u\left(\gamma(\delta + \alpha\beta_s)\sum_{j=1}^{N} e_j\right) + (1-\gamma)(\delta + \alpha\beta_s)e_i - \frac{e_i^2}{2} \qquad (9.2)$$

The first term is the utility from the common costs. It will be the utility of the total income paid to the cooperative by all producers. The second term is the fraction going to the producers and the third the private effort costs.

To complicate further, the second term could also be split up in income to the producers, and income going to a third party, like stakeholders and community projects.

Another scheme for covering common costs could be a lump sum fee paid by all members. This would only shift the participation constraint.

10. Summary and conclusions

The model started out with concerned consumers in the north, willing to pay an above market price for goods labeled with the Fairtrade certification mark. A part of this extra price was conveyed onwards from the Fairtrade certified importer in the north, to the Fairtrade cooperative in the south, in a Nash bargaining game.

It was assumed that FLO wanted this income shared to some degree between the producers producing the goods, and stakeholders or social projects in the communities of the producers. This resulted in incentive problems for producers since the effort level they wanted to put in did not match the effort level that would give the maximum profit to the south as a whole.

When FLO and the cooperative could only observe the average effort level of all producers delivering goods to a cooperative, producers also had an incentive to free ride off other producers' effort. Producers could not be rewarded according to their own unobservable effort, so all producers were rewarded based on the average income from the sale of all units in a period. With many producers delivering goods to a cooperative, one producer's effort had little effect on the average quality, which caused free rider incentives and thus a low equilibrium effort for producers.

To overcome the incentive problems and still keep producers in the Fairtrade cooperative FLO used the extra willingness to pay conveyed from the Fairtrade market in the north. They said that producers only got to take part in this extra income if they applied a certain effort

level. When only average effort was observable, the cooperative as a whole needed to provide a certain effort level, or all producers in the cooperative would lose certification.

What were found in the analysis were producer participation constraints, as well as incentive constraints regarding deviation. These constraints illustrated what fraction of the income, if any, FLO could require producers to pass on to a third party for different values of the willingness to pay in the north, the bargaining power coefficient, the number of producers delivering to the cooperative and, in the multi period model, the discount rate of producers.

Participation- and incentive constraints were derived both for a situation where FLO tried to achieve the social optimum, which was the effort level maximizing total profit to the south, and producer maximum, which maximized profit to producers given a predetermined σ.

Some conclusions can be drawn from these results. Since some of the extra willingness to pay for Fairtrade certified goods in the north is conveyed to Fairtrade cooperatives in the south, this extra income can be used as a carrot by FLO to achieve different objectives. In chapter 6, these goals were pointed out. One was to raise welfare levels in communities in the south; another was to achieve more efficient effort levels than would be achieved without FLO.

Fairtrade also targets the producers themselves. Since they can choose whether they want to deliver their goods to the Fairtrade cooperative, they will always be better off there than in their outside option. So the introduction of a Fairtrade cooperative in the community will not under any circumstances reduce producer welfare in this model.

When individual effort was observable and FLO set σ as high as they could, producers would be indifferent between delivering to the Fairtrade cooperative and the conventional cooperative. If FLO set a σ lower than this, producers would be best off in the Fairtrade cooperative. Also, when only average effort was observable, we found that the incentive constraint that had to hold to avoid deviation to be stricter than the participation constraint keeping producers in the cooperative. This means that when the incentive constraint held, producers were strictly better off in the Fairtrade cooperative.

With the carrot from ethical consumers in developed countries in hand, FLO can make both producers and communities in low-income countries better off. However, some of this extra price in the north disappears along the way. This analysis considers only distribution mechanisms in the Fairtrade value chain. It does not compare the efficiency of these mechanisms to other measures that could alleviate poverty in low-income countries, like for

example direct aid, micro finance or dismantling of protective duties and agricultural subsidies in the north.

This, in addition to the extensions discussed in chapter 9, could be the topic of further research.

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