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Model with Monopsony Power**

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Fairtrade Labelling in a Bertrand Competition Model with Monopsony Power

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Abstract

This model examines the impact of a fairtrade labelling scheme on global and country-specific welfare in a two-stage north-south trade framework. In the first stage (the producer market) two northern processors buy a commodity from a group of small-scale agricultural producers in the south producing the commodity under perfect competitive market conditions. One of the processors buys a conventional produced commodity and uses its monopsony power to cut the commodity's price. The second processor is a fairtrade processor, i.e. meets the necessary requirements for being awarded a fairtrade label like paying a minimum price for the commodity to the producers and a license fee to the labelling organization. In the second stage (the consumer market) both firms are processing the commodity and selling their products to the northern consumers. The price is determined by Bertrand competition. Consuming a labelled product is assumed to generate additional utility on behalf of a warm glow effect. I show how changes of certain parameters crucial to the fairtrade system influence welfare in both the northern and the southern country.

Keywords: Fairtrade, Bertrand Competition, Duopsony, Warm Glow

JEL-Code: F13, L13, L31

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1 Introduction

In the end of 2006 *The Economist* (2006) published an article about ethical food pointing out that fairtrade is not really fair but principally makes non-fairtrade producers poorer. Moreover it is argued in the article that fairtrade is an inefficient way to transfer money to the south because only a small part of the fairtrade premium arrives at the farmer. Despite those rejections, the relevance of fairtrade is growing. Krier (2005) found that the fairtrade market is one of the fastest growing markets of the world with European turnover increasing by 154% from 2000 to 2005. Even though fairtrade is only making up a very small part of world trade. Nonetheless certain fairtrade products are reaching significant market shares in certain countries. For instance, 47% of the bananas sold in Switzerland and 20% of the coffee sold in Great Britain in 2004 were fairtrade labelled.

However, economic models dealing with the impacts of fairtrade are rare and it is therefore difficult to follow or reject the arguments put forward in *The Economist* (2006) or in a similar way by Sidwell (2008) without citing relevant economic literature. Chambolle and Poret (2006) examine the conditions under which a retailer chooses to offer a fairtrade good instead of or in addition to a conventional good and how a fairtrade certifier reacts on the retailers' decisions. In Ronchi (2006) a model framework is drafted to serve as an underpinning for an empirical analysis of the importance of market power in the trade with commodities. Milford (2002) focuses on the impacts of cooperatives in the fairtrade system while Adriani and Becchetti (2004) study the consequences of fairtrade for northern and southern labor markets and its consequential welfare effects. Though none of the existing papers tries to analyze theoretically the welfare impacts of fairtrade with the classical fairtrade products, commodities bought by northern corporations having monopsony power. This gap is closed by this paper.

In this paper I develop a model of the fairtrade labelling system which tries to reproduce the system actually executed by the Fairtrade Labelling Organization International (FLO), which is the umbrella organization for national fairtrade labelling organizations elaborating the standards necessary to obtain a fairtrade label. I analyze the welfare effects both in the north and the south resulting from changes of parameters crucial to the fairtrade system.

In the first stage two firms buy a commodity from two groups of small-scale agricultural producers growing the commodity in a southern country. One of the two producers is growing the commodity in a conventional way and the other in a fairtrade way. Producing a fairtrade commodity comes along with minimum production requirements like sustainable production and social standards. All these measures increase the fairtrade producers' production costs in comparison to a conventional tilth. The commodity is cultivated under perfect competitive conditions and both groups of farmers are facing in-

creasing marginal costs. Following Ronchi (2006), who argues that "market power is one of the most important market failures cited for agricultural markets", the conventional processor uses its market power to cut the price. To avoid very low producer prices due to monopsony power a labelling organization sets a minimum fairtrade producer price and awards a fairtrade label to processors who are willing to buy coffee at that minimum price and to pay a labelling fee to the labelling organization. In the second stage the processors use the commodity to produce the consumer good and sell it to the consumers. As the trade with many "classical" fairtrade goods like coffee or bananas is divided up by a small number of firms, I use a duopolist scenario to represent the market failure of imperfect competition which can be generalized for the case of an oligopoly.¹ The price for each good is determined in Bertrand competition. Since both goods are substitutes, the consumer demands are contingent to both consumer prices. The consumer demands follow from utility maximization with a utility function first used by Singh and Vives (1984) from which I derive demands for both products which are linear in both consumer prices. I expand the utility function by a warm glow factor which leads to a higher marginal utility for the consumption of the fairtrade product than for the conventional product.

Based on the obtained Bertrand quantities and prices I compute consumer surplus, farmers' producer surplus and processors' producer surplus to examine the effects of changes of the additional fairtrade production costs, the warm glow effect and the fairtrade labelling fee. Taking into account those effects I finally discuss possible implications for the structure of the fairtrade system.

2 What is fairtrade?

This section is closely following Nicholls and Opal (2005). Fairtrade labelling is seen as a system to overcome information asymmetries between consumers and producers of agricultural products. It is based on the fact that for some consumers it is important under which conditions a product is produced. I.e. if the farmers receive a "fair" price for their products, if employees are paid "fair" wages, if the product is ecologically sustainably produced, etc. "Fair" means in that context that the importers do not use their knowledge advantage and market power to push prices and wages below a level that would be reached in really perfectly competitive market. To resolve the information asymmetry a fairtrade labelling organization monitors whether the producers follow the fairtrade standards and awards the label to products produced that way. Thus, the consumers can observe if a product is produced "fair" or in a conventional manner, a thing they would not know without the label. The fairtrade key practices underlying the fair trade organization's monitoring include amongst others:

¹In 1998 63% of the worldwide coffee market was divided between 4 firms (van Dijk et al., 1998).

- *Agreed minimum prices and wages:* The aim of the fairtrade price or wage is to allow the producers or employees to live a life in which they do not only obtain the money to survive but also to develop their conditions of living. The minimum price which is set above the pure production costs taking into account country-specific conditions is paid to the farmers if the minimum price is higher than world market price. If the world market price is higher than the minimum price the world market price is paid. For workers in farm estates the country-specific legal minimum wage has to be paid and International Labour Organization (ILO) standards to be followed.
- *Fairtrade premium:* The fairtrade social premium is used to collectively realize development projects. Typically, the projects are realized in farmer cooperatives or workers associations.
- *Direct trade relationship with producers:* The aim of direct trade relationships is to lessen the influence of middlemen.
- *Long-term trade relationships:* The aim of long-term trade relationships is to make income a more reliable factor, enabling farmers to invest in new technologies and plantings.
- *Provision of credit:* Since northern producers have better access to credit than the farmers the northern producers are engaged to grant a prefinancing of up to 60% of a year's crop purchase.
- *Sustainable production:* All farmers must produce in a sustainable way and apply resource management agreements. Certain pesticides are prohibited.
- *No labor abuse:* Workers must be allowed to organize themselves in unions and child and slave labor is generally prohibited.

The fairtrade system therefore aims at a consumer–producer relationship in partnership. Since more and more consumers are up to pay higher prices for being sure that the bought product is not produced under inhuman conditions the system seems to work at least at a social and psychological level.

If a fairtrade system is seen as sensible, it needs an organizational framework. At the moment the framework is formed by several fairtrade organizations which promote and organize fairtrade. The key fairtrade organizations are: The Fairtrade Labelling Organization International (FLO) as umbrella organization of 19 national certification initiatives facilitating the whole process of certifications and fairtrade requirements. The International Fair Trade Association (IFAT) as a global network of fairtrade organizations meeting the basic fairtrade requirements regardless if they are dealing with certified or non-certified products and acts as fairtrade advocate mainly for the producers. The European Fairtrade Association (EFTA) as an network of 11 European fairtrade organizations which conducts research and lobby activities. The Network of European World Shops

(NEWS) linking 15 national world shop organizations representing in total about 2.500 world shops. And the Fair Trade Federation as a wholesalers, retailers and producers trade association.

The certification of fairtrade products is an important if not the most important part of the fairtrade system. Not all products produced under fairtrade standards bear a fairtrade label, i.e. the producers fulfill the fairtrade criteria but do not apply for certification. This happens because the certification process is time and money consuming what makes it especially for small producers difficult to obtain a certification. Hence, those fairtrade products without label are sold in world shops which as non-profit shops are given a certain credibility by the consumers. A further cause for the existence of non-certified products is that certification standards are available for all products and the list of certified products is only extended in small steps due to the difficulty of the certification process. Nonetheless, the fairtrade label is an important feature of the fairtrade system as the consumers pay more for a certain fairtrade product than for a conventional one and want therefore a reassurance that their money is spent well.

3 Existing literature

As already said in the introduction economic literature on fairtrade labelling is rare. Chambolle and Poret (2006) develop a theoretical model in order to examine the motivation of a retailer to offer fairtrade products and what strategies she uses. I.e. if the retailer offers fairtrade goods instead of or in addition to conventional goods and how a fairtrade certifier reacts on that strategical decisions taken by the retailer. In a model of vertical relationships and second degree price discrimination they find that the most important parameter for fairtrade is not the number of "fairtrade lovers" but the height of the fairtrade premium they are willing to pay. There also exists an equilibrium in which only the fairtrade product is sold and both the "fairtrade lovers' " and the conventional consumers' consumer surpluses are higher than in the case with only the conventional product.

Milford (2002) focuses on the impacts of cooperatives in the fairtrade system and assesses that in a framework of a large number of small-scale farmers trading with one monopsonistic processor or some oligopsonistic processors the foundation of cooperation enhances the members' incomes in the short run.

Adriani and Becchetti (2004) study the consequences of fairtrade for northern and southern labor markets and its consequential welfare effects. They state that the introduction of trade generates a Pareto improvement for both the southern producers and the northern consumers if the consumers do not have a preference for the northern product and if the ex ante share of the conventional product was high enough.

Maseland and De Vaal (2002) used two models, a Heckscher–Ohlin model of trade and a model where economies of scale play a role, to examine whether free trade, fairtrade or protectionism is for the advantage of the least well off in society. In both models they found out that fairtrade is not always a good option as well as free trade and protectionism are not in all cases. The advantageousness of the trade regime is highly dependent on the characteristics of the sector in question respectively the goods traded. In the Heckscher–Ohlin model Fairtrade is always superior to protectionism. Compared to free trade, the superiority of fairtrade depends on the price elasticity of demand of the treated product.

By contrast Hayes (2006) uses the theory of competitive equilibrium to analyze the economic efficiency of fairtrade and concludes that fairtrade is economically efficient in any plausible circumstances and therefore an essential complement for any free trade policy with concern for the welfare of the poor.

Marette et al. (1999) and Andersson et al. (2003) examine the general effects of food labelling in the context of asymmetric information. While Marette et al. find out that the introduction of a label for high quality products unambiguously improves welfare, Andersson et al. show that with a modified model and less low quality firms than high quality firms the welfare impact of a labelling scheme is negative. But Andersson et al. also claim that an increase of the number of high quality firms under a labelling scheme increases welfare.

In Ronchi (2006) a model is drafted to serve as an underpinning for an empirical analysis of the importance of market power and cooperatives in the Costarican coffee market but does not examine the theoretical model in detail. In the empirical analysis she identifies the failures of market power and low producer capacity as one of the main reasons for the low share of producers' coffee returns in developing countries. In respect of those market failures fairtrade is an effective countermeasure. At least for Costa Rica, the support of the fairtrade system for cooperatives is approved as a measure that helps to minimize those market failures.

Further empirical analysis was conducted by Loureiro and Lotade (2005) who surveyed in a face-to-face study in Colorado, USA, the willingness-to-pay for fairtrade, organic and shade grown coffee. They found out that the consumers are willing to pay higher premiums for fairtrade or shade grown coffee compared to organic coffee. Female respondents with higher income who are conscious about environmental issues are more likely to pay a premium while older people are less likely to pay a premium. Moreover, the educational background influences the willingness to pay for differentiated products. Higher levels of education positively influence the willingness to pay a premium for fairtrade and shade grown coffee, while for organic coffee Loureiro and Lotade obtain insignificant results.

De Pelsmacker et al. (2005) take a quite similar approach to investigate consumers' purchase intention when buying fairtrade coffee. Following the study with 808 Belgian

citizens the brand is the most important attribute of coffee followed by flavor and the existence of a fairtrade label. 10% of the sample were willing to pay the actual fairtrade premium in Belgium (27%). The 11% of the sample identified as "fairtrade lovers", i.e. persons to which the fairtrade attribute is the most important feature of coffee, were aged between 31 and 45 years. The authors estimate the share of potential fairtrade consumers as 50% of the Belgian consumers if the consumers were better informed and if substantial marketing efforts are undertaken.

In cooperation with a coffee shop Arnot et al. (2006) examine the consumers preferences for brewed coffee in an experimental design taking place in an actual market setting. In that study fairtrade coffee revealed a lower own-price elasticity than similar conventional coffee. I.e. the probability a consumer buys a fairtrade product is less influenced by changes of its price than the probability for buying conventional coffee. They derive from this finding that the ethical attribute of coffee is the most important factor for fairtrade consumers.

Bacon (2005) investigated the impact of fairtrade and organic coffee certification schemes on the livelihood of small-scale coffee farmers in northern Nicaragua. Surveying 228 farmers the results allow the assumption that participating in fairtrade or organic networks reduces the vulnerability of farmers' livelihood.

Moreover, some articles like Kurjanska and Risse (2006) deal with more normative considerations on fairtrade and fairness issues which are quite interesting for a further understanding of the fairtrade system. Other articles like Leclair (2002) or Raynolds (2002) approach the fairtrade system in a descriptive manner, i.e. give an review of previous research and functionality of the fairtrade system, and therefore only can serve as a first introduction to the field of fairtrade labelling. An extensive overview of fairtrade labelling is given by Nicholls and Opal (2005).

Since human altruism in the form of a warm glow effect is one of the driving sources behind fairtrade a short look on the relevant literature should be taken. Fehr and Fischbacher (2003) reviewed much of the literature concerning human altruism and can therefore be seen as a general overview on that topic. A well-known theoretical paper concerning Warm-Glow Giving by Andreoni (1990) models the warm glow by introducing the amount of the gift directly into the utility function. A paper more specifically concerning fairtrade was written by Hogarth et al. (2006) who conducted an experimental approach study to examine how consumers behave if a good involves an ethical dimension. They show that consumers are willing to pay an ethical premium no matter if they knew about the height of the additional costs the ethical producer was facing or not.

4 The model

Taking into account the existing theoretical literature concerning fairtrade labelling only Adriani and Becchetti (2004) model explicitly the consumers' demand for fairtrade goods. They explain the higher willingness to pay for "fair" products by incorporating two parameters into the utility function: one indicating if labor used for production was remunerated equal or less to the value of its marginal product and one indicating if the consumers prefer the northern or southern product. The focus of their paper lies on the impacts of fairtrade on northern consumer surplus for a product which can be produced both in the north and the south. The necessary input for production is only labor so that the variable influenced by monopsony power is the southern wage rate.

In contrast to Adriani and Becchetti (2004) the following model concentrates on "classical" fairtrade goods. For those goods the raw commodity is produced in the south, imported to the north and there, processed to the final consumer good. The following figure explains the main features of the model.

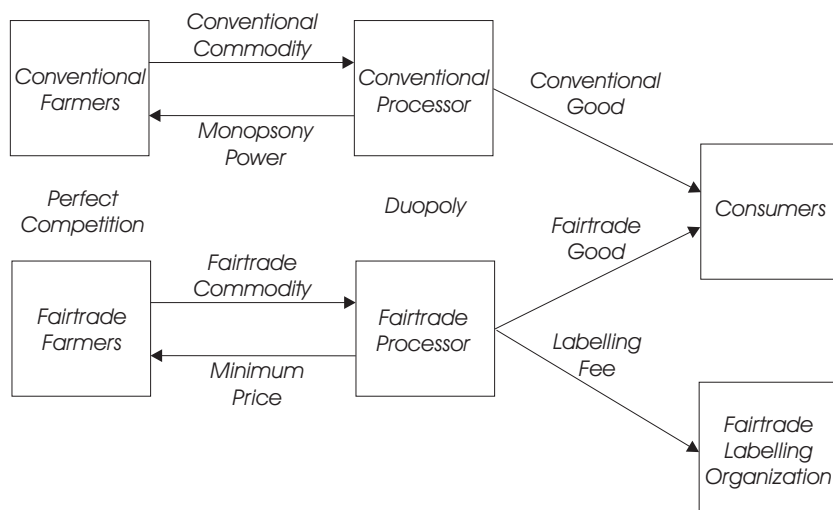


Figure 1: Model structure

The commodity is produced under perfect by two big groups of small-scale farmers, one of them producing competition in a conventional and one in a fairtrade way. The commodity is bought either by a conventional or by a fairtrade processor who set the price in Bertrand competition. Since for the fairtrade commodity a minimum price applies, the fairtrade processor can not use its monopsony power resulting from its market position while the conventional processor cuts the price because of its monopsony power. Both processors sell the processed good to the consumers which gain a higher utility by consuming the fairtrade good due to a warm glow effect compared to the consumption of the conventional good. Therefore, the fairtrade processor can charge a higher price for a

more or less similar good as the consumers take into account ethical considerations but has also to pay a fairtrade labelling fee per unit of sold good. Below the model will be explained in detail.

Consider a large number of small-scale farmers in the south producing a commodity like coffee under perfect competition. For reasons of simplicity, assume that the number of farmers is a continuum with mass one. One group of those farmers produces in a conventional manner, the other group in a fairtrade manner, i.e. the second group fulfills the standards necessary to obtain a fairtrade label. The costs of conventional production are $C_C(y_C) = y_C^2$ with y_C standing for the amount of the conventional good produced.² With q_C as producer price of the conventional good and μ as ratio of the number of fairtrade farmers to the total number of farmers, the total conventional farmers' inverse supply function is given by

$$q_C(y_C) = \frac{2}{1-\mu}y_C. \quad (1)$$

As the minimum requirements for a fairtrade label include environmentally conscious production, the reduction of the use of agrochemicals, the application of labor standards and much more, applying those requirements increases the farmers' production costs. To capture that effect, I multiply the conventional farmers's cost function with $c > 1$, i.e. changing to fairtrade production increases the production costs by c . Hence, the fairtrade farmers' cost function is $C_F(y_F) = cy_F^2$ and the consequential inverse supply function

$$q_F(y_F) = \frac{2c}{\mu}y_F. \quad (2)$$

The consumers buy the processed raw good and their demands are the result of utility maximization. Following Singh and Vives (1984) I use their utility function and modify it by including a warm glow effect. The the representative consumer's utility of consumption of the two types of the commodity is $u(x_C, x_F) = \alpha x_C - \frac{x_C^2}{2} + \omega(\alpha x_F - \frac{x_F^2}{2}) - x_C x_F$ with $\alpha > 0$. Total utility then is $V(x_C, x_F, z) = u(x_C, x_F) + z$ with z as a competitively produced numéraire good. As the consumers of fairtrade products care for the working and living conditions of the farmers the consumption of the fairtrade good yields a *warm glow of giving*, i.e. an additional utility caused by the fact that altruistic consumer needs are satisfied. The warm glow is captured by the parameter $\omega \geq 1$ which increases the utility of consumption of the fairtrade good in comparison to the conventional good. I.e. the utility of consumption for a specific amount of the fairtrade good is ω times higher than the utility of consumption of the same amount of the conventional good. Hence $\omega - 1$ represents the relative utility gain of the consumption of a fairtrade good compared to a conventional good. Thus for $\omega = 1$ the marginal utility of consumption of the conventional

²An example for the application of a quadratic cost function can be found in Green (1996).

and the fairtrade good are equal and therefore perfect substitutes. The consumers' utility is expressed in a money metric what avoids problems with the computation of consumer surplus when ω is changing.

The representative consumer's maximizes

$$V(x_C, x_F, z)$$

choosing x_C , x_F and z subject to

$$p_C x_C + p_F x_F + z = M$$

with x_i being the processed commodity i , p_i the corresponding consumer price and M the available income. The inverse demand functions resulting from utility maximization are

$$p_C = \alpha - x_C - x_F$$

$$p_F = \omega(\alpha - x_F) - x_C$$

The inverse demands can be rewritten as direct demands

$$x_C^D = \frac{1}{\omega - 1} [p_F - \omega p_C] \quad (3)$$

$$x_F^D = \alpha + \frac{1}{\omega - 1} [p_C - p_F] \quad (4)$$

Because the goods are substitutes with $\omega \geq 1$ we observe cross price effects $\frac{\partial x_C^D}{\partial p_F^D} = \frac{\partial x_F^D}{\partial p_C^D} = \frac{1}{\omega - 1} > 0$.

The demand for the numéraire good is of no further interest since the expenditures for z always equal the corresponding utility so that the consumer surplus on behalf of the z good is always zero.

The raw commodity is imported by a conventional and a fairtrade processor (e.g. coffee roasters) in the north who process it and finally sell it to the consumers. As the processors buy as much from the farmers as they can sell to the consumers, the processors' demands for the commodity is depending on the consumers' demand for the processed good. Both processors have monopsony power in the commodity market and process the commodity without cost and according to the production function $x_i = f(y_i) = y_i$ with $i \in [C, F]$. Therefore we can substitute y_i by x_i in the following. In the raw commodity market the conventional processor buys the commodity using its monopsony power. That means that by determining the consumer price and therefore the sold quantity of the good, it can influence the commodity price q_C it has to pay to the farmers.

The second firm, the fairtrade processor, however has to pay a minimum producer price

\bar{q}_F for the commodity which cuts its monopsony power. Additionally, it has to pay the labelling organization a labelling fee of l per unit. Therefore the conventional processor's profit function is

$$\pi_C = [p_C - q_C(x_C^D(p_C, p_F))] x_C^D(p_C, p_F) \quad (5)$$

and the fairtrade processor's

$$\pi_F = [p_F - \bar{q}_F - l] x_F^D(p_C, p_F). \quad (6)$$

As there are two firms in the market competing with each other, the two firms form a duopoly influencing the consumers' demands by setting their prices in Bertrand competition. Besides taking into account the influence of the fairtrade consumer price p_F on the sold quantity of the conventional product x_C , the conventional processor also accounts for its influence on the producer price q_C (the price it has to pay to the farmers). Keeping in mind the influence of its consumer price p_C (the price it charges in the consumer market) on the fairtrade consumer price described by the fairtrade reaction function $p_F(p_C)$, the conventional processor chooses its consumer price which together with the fairtrade consumer price determines the quantity of the conventional good x_C and sequentially the conventional producer price q_C . This influence of the conventional processor on the conventional producer price is meant by monopsony power. As for the fairtrade commodity a fairtrade minimum producer price \bar{q}_F applies, the fairtrade producer can not use its monopsony power which it also would have because of its market position to cut the fairtrade producer price.

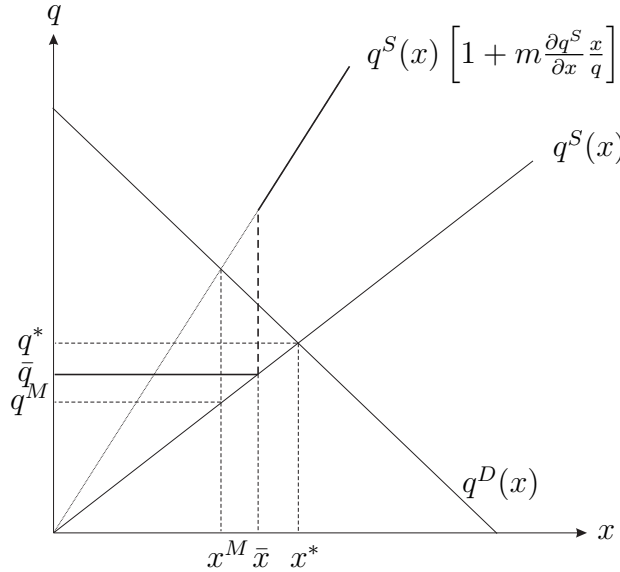


Figure 2: Monopsony with minimum price

Figure 2 helps to understand how a monopsonist facing a minimum price would

act. The parameter m serves as a measure of monopsony power. With $m = 0$ the $q = q^S(x) \left[1 + m \frac{\partial q^S}{\partial x} \frac{x}{q} \right]$ simplifies to $q = q^S(x)$ leading to equilibrium in perfect competition. With $m = 1$ we model a pure monopsony. Without a minimum price the monopsonist would choose to demand the quantity x^M at the price q^M . x^M is lying below the competitive equilibrium quantity x^* and q^M below q^* . For a minimum price $\bar{q} < q^M$ the monopsonist would not change its decision. If a minimum price $q^M < \bar{q} < q^*$ applies the monopsonist would demand the quantity $\bar{x} = x^S(\bar{q})$, i.e. the supply function is determining the quantity. For a minimum price $\bar{q} > q^*$ the reverse effect would occur, i.e. the demand curve would determine the quantity. In the latter two cases the quantity and price is not set freely by the monopsonist but determined by the minimum price which is set by the labelling organization.

To calculate the corresponding q^* for the discussed model we calculate the Bertrand quantities and prices for the situation in which the conventional producer has monopsony power and the fairtrade producer not. The resulting Bertrand quantities are x_C^B and x_F^B with the corresponding Bertrand producer prices q_C^B and q_F^B as well as the Bertrand consumer prices p_C^B and p_F^B . In the following the fairtrade producer price q_F^B will be called benchmark fairtrade producer price and is the minimum fairtrade producer price leading to the highest achievable welfare for the given setup, i.e. the price to which the fairtrade labelling organization should try to set the minimum price. The calculation of those quantities and prices is shown in the appendix.

By deriving q_F^B with respect to the different parameters we examine the effects of changes in the parameters on the benchmark fairtrade producer price. As $\partial q_F^B / \partial m > 0$, $\partial q_F^B / \partial \omega > 0$ and $\partial q_F^B / \partial c > 0$, the benchmark producer price is increasing with the monopsony power of the conventional processor m , the warm glow for the fairtrade good ω and the additional costs of producing fairtrade products c . The effect of a change of the labelling fee l is reverse as an increase of that parameter reduces the benchmark producer price.

If the minimum producer price is not set exactly to q_F^B , the calculation of the benchmark quantities and prices differs from the way described before as it changes the fairtrade processor's reaction function. Since the the conventional processor faces the same profit function as before, its reaction function will remain the same in both cases, i.e. for $\bar{q}_F \leq q_F^B$ and $\bar{q}_F > q_F^B$.

Applying these considerations, with a minimum price $\bar{q}_F \leq q_F^B$ the fairtrade processor buys the quantity the fairtrade farmer is selling at the minimum producer price \bar{q} and by maximizing its profit it sets the consumer price such that the whole output will be sold. For a minimum price $\bar{q}_F > q_F^B$ the quantity is determined the other way around, i.e. the fairtrade processor maximizes its profit which is determining its demand function in the producer market contingent to the minimum price. Hence, the quantity is determined by

its demand.

For the following welfare analysis we need to calculate global welfare consisting of consumer surpluses for both goods, the farmers' producer surpluses and the processors' producer surpluses. The consumer surplus is

$$CS = V(x_C, x_F, z) - (p_C x_C + p_F x_F + z) = u(x_C, x_F) - (p_C x_C + p_F x_F). \quad (7)$$

the farmers' producer surplus

$$PS^S = PS_C^S + PS_F^S = q_C^B x_C^B - \int_0^{x_C^B} q_C(y_C) dy_C + q_F^B x_F^B - \int_0^{x_F^B} q_F(y_F) dy_F \quad (8)$$

and the processors' producer surplus

$$PS^N = PS_C^N + PS_F^N = [(p_C^B - q_C^B)x_C^B] + [(p_F^B - q_F^B - l)x_C^B]. \quad (9)$$

Overall welfare is consequently given by $W = CS + PS^S + PS^N$ and the welfare level in the north by $W^N = CS + PS$.

5 Welfare analysis of Fairtrade Labelling

In the former section we prepared the ground for the following welfare analysis. We now can plot different welfare measures contingent on the minimum fairtrade producer price adjusting certain parameters to examine the impact of changing those parameters. The fairtrade minimum producer price is chosen as independent variable because it is the variable which primarily constitutes the fairtrade system and influences the farmers' income. Furthermore the minimum price can be easily adjusted by the labelling organization so that a description of the whole minimum price range leading to economically sensible results helps to evaluate the labelling organization's policy options.

In the following I will distinguish between short and long run effects. Short run effects are the effects on the considered welfare measure without a change of the share of fairtrade producers μ since a change of the way of production takes some time. If the per farmer producer surpluses of fairtrade and conventional producers differ some farmers will choose to change their way of production in the long run leading to adjustments of μ till the per farmer producer surpluses in both sectors are equalized. By observing how the conventional and fairtrade per farmer producer surplus changes are affected by a change of the surveyed parameters, I derive the direction of the change of μ . I.e. if the impact of a parameter change is decreasing conventional per farmer producer surplus and increasing fairtrade per farmer producer surplus it needs some conventional farmers to

change to to the group of fairtrade farmers to equalize the per farmer producer surpluses. Analytically spoken, after adjusting the parameter μ is chosen thus that the equation $PS_F^S/\mu = PS_C^S/(1 - \mu)$ holds. The initially chosen values of the parameters we are using in the graphical analysis are shown below.

Name	Parameter	Value
Monopsony Power	m	0.1
Warm Glow	ω	1.25
Fairtrade Labelling Fee	l	1
Additional Fairtrade Production Costs	c	2
Axis Intercept	α	100
Fairtrade Producer Share	μ	0.25

Since for minimum fairtrade producer prices below $\bar{q}_F^0 = \alpha\omega - l + \frac{\alpha\omega(1-\mu)}{(1-\mu)-2\omega(2+m-\mu)}$ the sold fairtrade quantity is zero the upper bound of the minimum price range for which we plot the measures is \bar{q}_F^0 . \bar{q}_F^0 is increasing with m , ω , μ and decreasing with l .

The first group we want to look at are the farmers, the group the fairtrade labelling organization is concerned about. In the first place the labelling organization wants to increase the per farmer producer surplus of its members, the fairtrade farmers. In the second place it is interested in an increase of overall farmer producer surplus. Along this two objectives I will discuss the policy implications for the fairtrade labelling organization. The figure below shows the producer surplus per farmer contingent on the minimum fairtrade producer price \bar{q}_F . The solid graphs represent the producer surpluses for the conventional and fairtrade farmers at a warm glow level of $\omega = 1.25$, the dashed graphs of $\omega = 1.5$.

Figure 3 shows that that an increase of the warm glow leads to a higher per farmer producer surplus in the fairtrade sector (PS_F^S/μ) for a minimum fairtrade producer price above the benchmark price q_F^B and a decrease in the conventional sector ($PS_C^S/(1 - \mu)$) for the whole range of minimum fairtrade producer prices. The higher warm glow effect causes an increase of fairtrade demand respectively a decrease of conventional demand. As an effect of the higher earnings of the fairtrade farmers some conventional farmers will change to produce in a fairtrade way what increases the share of fairtrade farmers μ . The change of conventional producers happens as long as the per farmer producer surpluses are equalized at a fairtrade producer share $\tilde{\mu}$. Hence, the fairtrade labelling organization should intend to increase the warm glow effect. Since ω is part of the representative consumer's utility function it is correlated with share of consumers willing to buy fairtrade

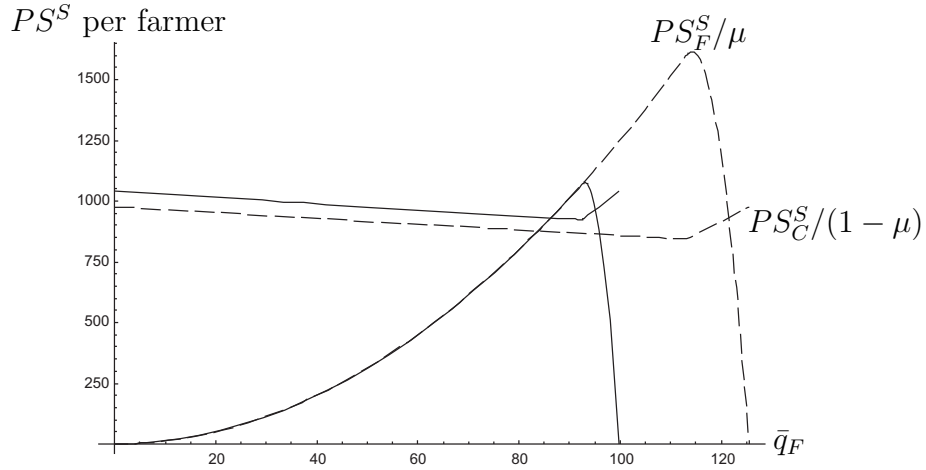


Figure 3: Producer surplus per farmer with varying warm glow

products which can be increased by fostering publicity and knowledge about the effects of fairtrade labelling.

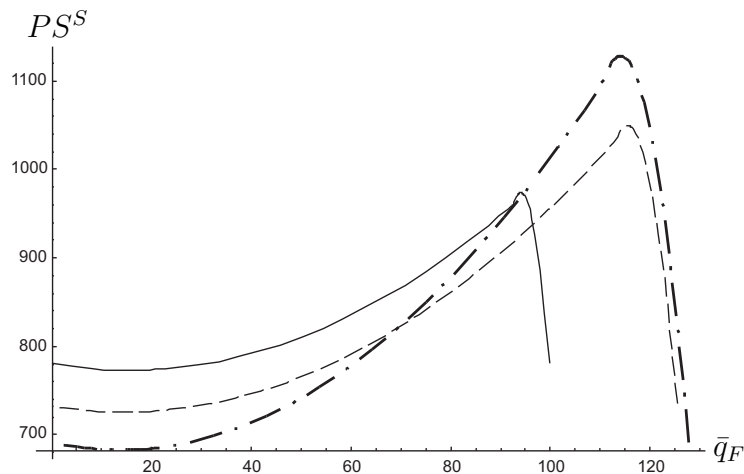


Figure 4: Total farmer producer surplus with varying warm glow

Figure 4 shows the effects of an increase of the warm glow ω on total farmer producer surplus, i.e. the producer surplus both groups of farmers have together. As the aim of fairtrade labelling is to make all farmers better off, total farmer producer surplus is an important measure for evaluating the effectiveness of the fairtrade policy. The solid graph represents as before $\omega = 1.25$, the dashed one $\omega = 1.5$. Starting from the dashed graph the thicker dot-dashed graph represents an increase of the fairtrade farmer share from $\mu = 0.25$ to $\mu = 0.35$. The increase of warm glow increases in the short run total farmer producer surplus for minimum prices well above the original benchmark fairtrade price.

Taking into account the increase of the share of fairtrade farmers in the long run the higher warm glow leads to a further increase of producer surplus for higher minimum prices lowering the lower limit of minimum prices under which total farmer surplus increases. Though, an increase of ω also fulfills the second objective of the fairtrade labelling

organization to help all farmers as a whole.

RESULT 1 *An increase of the warm glow of the northern consumers leads to a shift of producer surplus from the conventional to the fairtrade farmers. The fairtrade farmer share raises at cost of the conventional farmer share. Total farmer producer surplus increases except for low minimum fairtrade producer prices.*

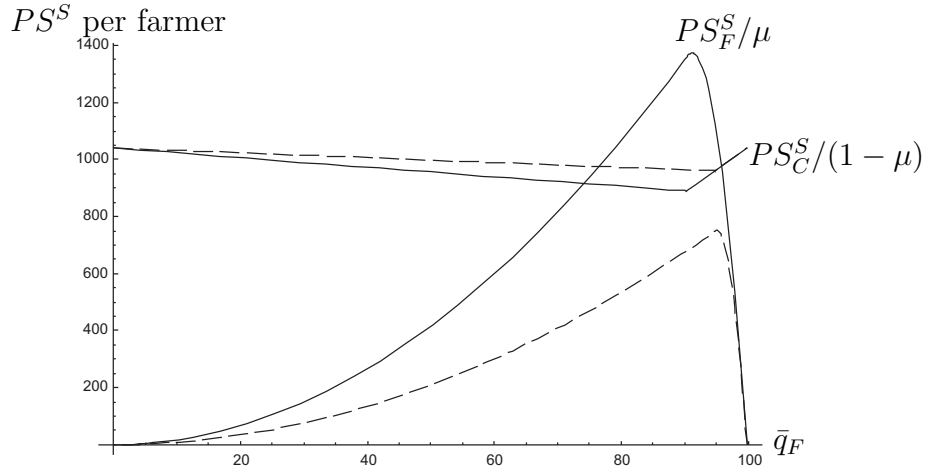


Figure 5: Producer surplus per farmer with varying additional fairtrade production costs

Figure 5 shows the per farmer producer surpluses contingent on the minimum fairtrade producer price with the solid graphs representing a level of additional fairtrade production costs of $c = 1.5$ and the dashed graphs of $c = 3$. For minimum fairtrade producer prices below the new benchmark fairtrade producer price q_F^B , i.e. the minimum price taking into account the higher additional fairtrade production costs, the effect on the fairtrade farmers' producer surplus is clear. For a given fairtrade producer price the fairtrade farmers supply falls because of higher production costs so that their producer surplus decreases. The lower supply leads to a higher fairtrade consumer price allowing the conventional processor to increase its product's price and sold quantity and therefore to increase the conventional producer surplus. For minimum fairtrade producer prices above q_F^B the supplied fairtrade quantity is only determined by the demand side which is not directly influenced by the additional fairtrade production costs. That is why the additional fairtrade production costs do not affect the conventional and fairtrade product quantities and their consumer prices. Because of that the conventional producer surplus is not affected by the raising additional fairtrade production costs. Since the fairtrade farmers receive a fixed price for a fixed quantity the additional fairtrade production costs lower their producer surplus. The decrease of the fairtrade farmers' producer surplus leads then a lower share of fairtrade farmers increasing the share of conventional farmers until the benchmark share of fairtrade farmers $\tilde{\mu}$ is reached. So the fairtrade labelling

organization should see to it that the additional fairtrade production costs become lower. One way to do so would be to provide e.g. capacitation and credit for a more efficient way of production, another way to lower fairtrade production standards. Since the credibility of fairtrade products and therefore the willingness to pay for fairtrade products is strongly influenced by the fairtrade standards, to lower standards would most probably be counter-productive.

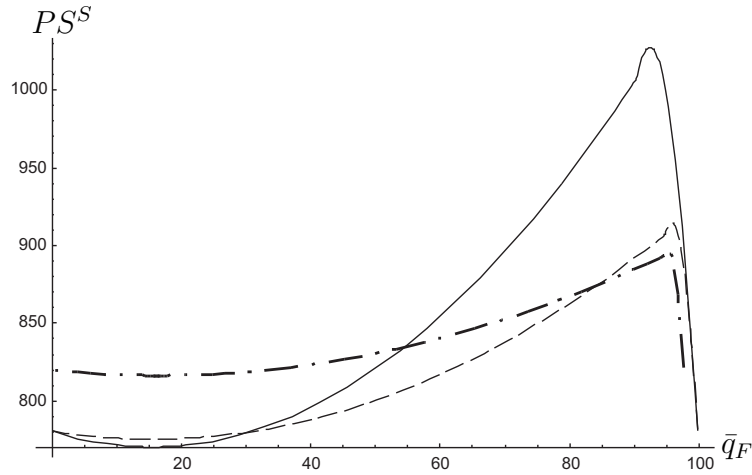


Figure 6: Total farmer producer surplus with varying additional fairtrade production costs

The effects of an increase of c on total farmers' producer surplus is shown in figure 6. The solid graph represents $c = 1.5$, the dashed one $c = 3$ and the thicker dot-dashed graph $c = 3$ in combination with an decreased fairtrade farmer share of $\mu = 0.15$. It can be seen that an increase of the additional fairtrade production costs lowers in the short run, i.e. with constant μ , total farmer producer surplus except for very low minimum fairtrade producer prices.

In the long run μ will decrease effecting higher total farmers' producer surplus for low minimum prices and a further decrease for minimum prices next to and above the benchmark fairtrade producer price. Therefore lowering additional fairtrade production costs is also in the interest of the whole farming community.

RESULT 2 *An increase of the additional fairtrade production costs c leads to a decrease of the per farmer fairtrade producer surplus. The fairtrade farmer will fall at the benefit of the conventional farmer share. Total farmer producer surplus decreases except for very low minimum fairtrade producer prices.*

In figure 7 the solid line represents a fairtrade labelling fee of $l = 1$ and the dashed line of $l = 5$. Looking at the graphs it becomes clear that a change of the fairtrade labelling fee only affects the farmers' producer surplus for minimum prices above the optimal producer price q_F^B . That happens because in this range the benchmark quantity is determined by

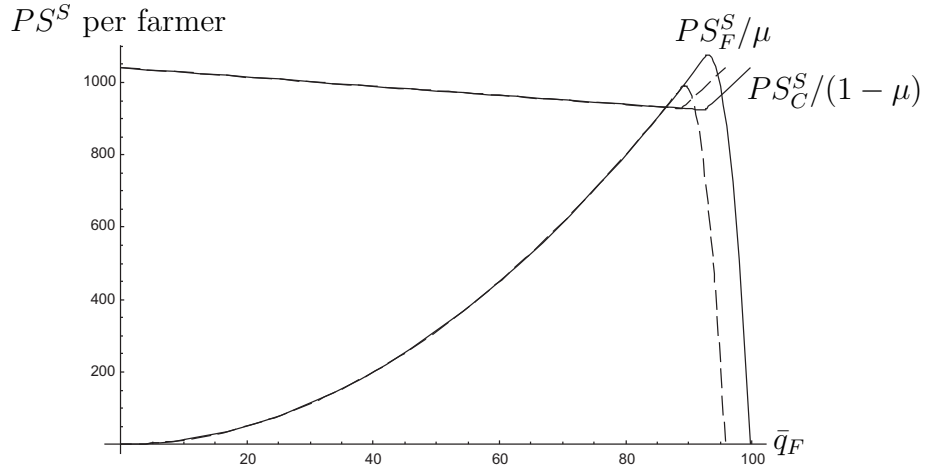


Figure 7: Producer surplus per farmer with varying fairtrade labelling fees

the consumers' demand and the higher fairtrade labelling fee is passed to the fairtrade consumers via an increase of the fairtrade consumer price what leads to a decrease of demand in the fairtrade sector. On the other hand, a higher fairtrade consumer price leads to a higher demand for the conventional product and higher conventional consumer prices inducing a higher producer surplus for the conventional farmers.

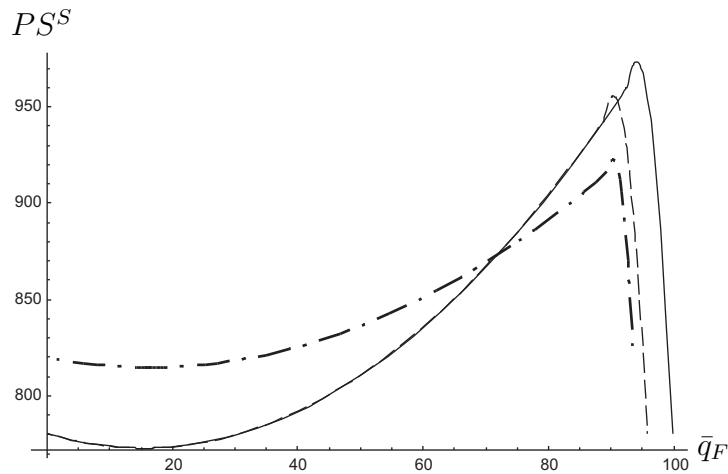


Figure 8: Total farmer producer surplus with varying fairtrade labelling fee

Overall, increasing the fairtrade labelling fee in the short run only reduces the total farmers' producer surplus for fairtrade producer minimum prices above the benchmark fairtrade producer price and stays stable below the minimum price as can be seen in figure 8.

In the long run the diminishing fairtrade farmer share leads to an increase for low minimum fairtrade producer prices and to a decrease for all other minimum prices.

That means that if the fairtrade labelling organization does not use the labelling fee income to support the farmers (and this is not captured by the model) it should keep the labelling fee as low as possible, i.e. so high that it can carry out its work.

RESULT 3 *An increase of the fairtrade labelling fee l leads to a shift of producer surplus from the fairtrade to the conventional farmers for minimum fairtrade producer prices above the benchmark fairtrade producer price. In the long run it decreases the total farmers' producer surplus except for low minimum prices.*

Let us now turn to the northern country to examine the effects of a change in the strength of the warm glow, the additional fairtrade production costs and the labelling fee on the consumer surplus and processors' producer surplus. The changes of the parameters are the same as before.

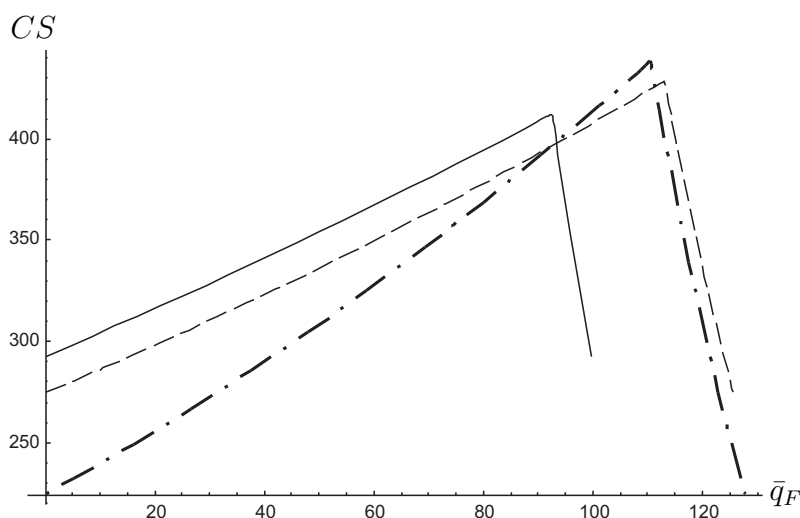


Figure 9: Consumer surplus with varying warm glow

Figure 9 shows the change in consumer surplus for a variation of ω . As an increase of ω means a higher relative additional utility of the consumption of a fairtrade good one would expect the consumer surplus to increase with increasing warm glow. But it can be seen that an increase of the warm glow does not lead to an unanimous increase of producer surplus. It exists a range of low minimum producer prices in which an increase of the warm glow leads to a short-run decrease of consumer surplus. In that case the increase of the warm glow brings forth a decrease of demand for the conventional product. The loss of consumer surplus because of decreasing conventional demand overcompensates the benefit of the increased demand for the fairtrade product, and therefore total consumer surplus almost paradoxically decreases in the short run.

As in the long run the fairtrade farmer share raises (represented by the dot-dashed graph), the consumer surplus for very low and very high minimum prices diminishes further while for minimum prices around the benchmark price it further increases. Comparing the long run consumer surplus with the initial consumer surplus an increase of the warm glow leads definitely to an increase of consumer surplus for minimum prices above the initial benchmark price.

RESULT 4 *In combination with a low minimum fairtrade producer price an increase of the warm glow effect ω can lead to a decrease of total consumer surplus. For minimum prices above a certain price level it clearly increases total consumer surplus.*

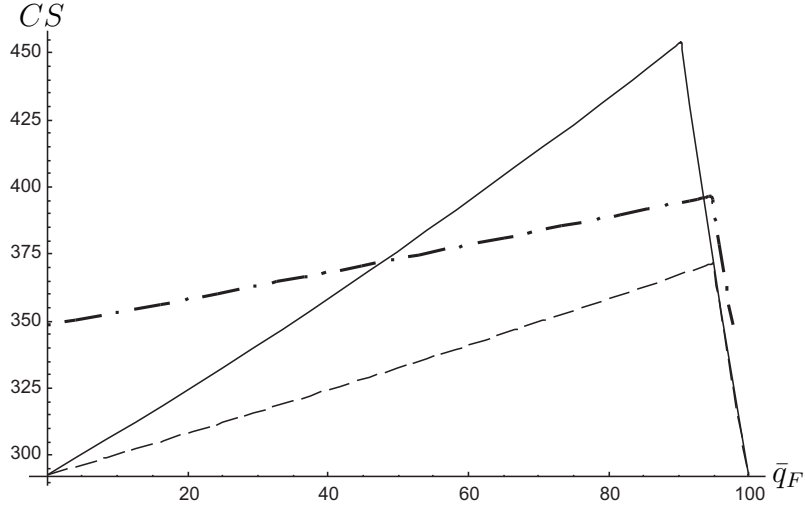


Figure 10: Consumer surplus with varying additional fairtrade production costs

Figure 10 shows the effect of increasing additional fairtrade production costs on the consumer surplus. For minimum fairtrade producer prices below the new benchmark price, an increase of c lowers the fairtrade farmers' supply and the fairtrade consumer price in the short run so that the fairtrade producer surplus is decreasing. Despite the higher fairtrade consumer price allows the conventional producer to charge a higher price for its product, the lower supply of the fairtrade good leads to an increase of demand for the conventional product and increases the conventional consumer surplus. For very low minimum fairtrade producer prices the level of consumer surplus coming from the consumption of fairtrade goods is already quite low so that the effect of a lower supply does not have a big relative impact on overall consumer surplus. If on the other hand the demand for the conventional product is quite high an increase of conventional demand has an big relative impact on conventional and overall consumer surplus. In that case the increase of conventional consumer surplus is overcompensating the decrease of fairtrade consumer surplus.

Since for $\bar{q}_F > q_F^B$ the fairtrade good supply is only determined by the fairtrade demand side the fairtrade consumer surplus is not affected by a change of the additional fairtrade production costs while the conventional consumer surplus is increasing with c as before. I.e. for $\bar{q}_F > q_F^B$ the overall consumer surplus therefore increases clearly with c .

In the long run the fairtrade farmer share μ is decreasing. Therefore the consumer surplus compared to the short run situation increases. Due to that shift the minimum price range for which the consumer surplus decreases in comparison with the initial situation

is getting smaller. For minimum prices above the new long run benchmark price the consumer surplus is even slightly increasing.

RESULT 5 For very small minimum fairtrade producer prices and for minimum fairtrade producer prices above the benchmark fairtrade producer price the consumer surplus increases with increasing additional fairtrade production costs.

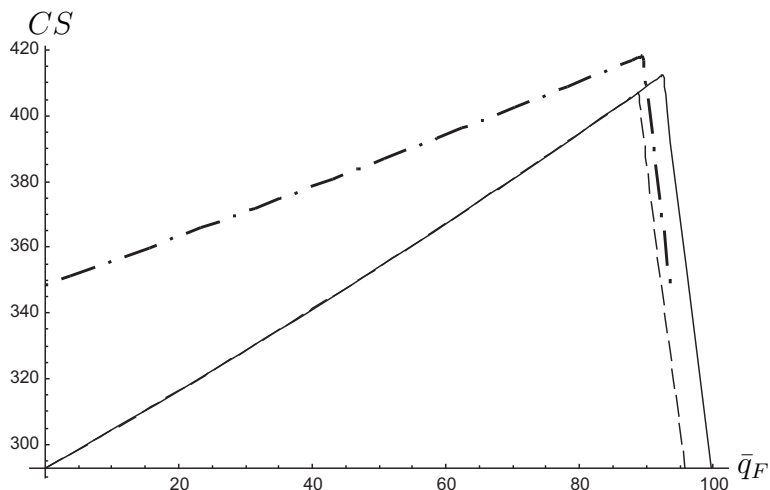


Figure 11: Consumer surplus with varying fairtrade labelling fee

Figure 11 shows that for fairtrade producer prices below the level of the new benchmark fairtrade producer price, the consumer surplus remains unchanged in the short run as the supplied quantities and consumer prices are independent of the labelling fee. For these minimum fairtrade producer prices the higher labelling fee is fully paid by the fairtrade processor. For minimum prices above the new benchmark fairtrade producer price, the fairtrade consumer surplus decreases due to a falling fairtrade quantity and an increasing price while the conventional price and quantity are increasing causing an increasing conventional consumer surplus. Because by raising the labelling fee the supplied fairtrade quantity decreases much stronger than the conventional supply increases the overall consumer surplus is falling.

The decrease of the fairtrade farmer share caused by the higher labelling fee increases the consumer surplus in the long run. I.e. for the minimum price range below and slightly above the new benchmark fairtrade producer price an increase of the fairtrade labelling fee implies a higher producer surplus in the long run. For minimum prices above the benchmark level a higher labelling fee still leads to a lower consumer surplus in the long run compared to the initial situation but not as low as in the short run.

RESULT 6 For minimum fairtrade producer prices below the benchmark fairtrade producer price an increase of the fairtrade labelling fee does not affect the consumers in the short run

but skims part of the fairtrade processor's producer surplus. In the long run it increases the consumer surplus in the lower price range and decreases it for prices above the benchmark fairtrade producer price.

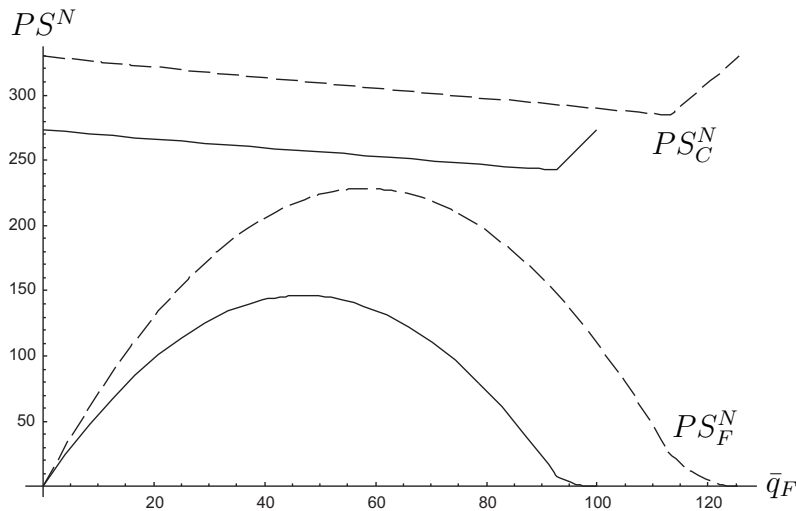


Figure 12: Processors' producer surplus with varying warm glow

Looking at the effects of a higher warm glow effect on the processors' consumer surplus we see in figure 12 that the warm glow effect increase is unanimously producer surplus enhancing for both processors. The conventional producer profits of the increase of warm glow. It can charge a higher producer price because of a higher fairtrade consumer price. The additional conventional producer surplus (PS_C^N) caused by a higher conventional consumer price overcompensates the loss of profit because of the sunken conventional product quantity. For the fairtrade processor raising price and quantity clearly leads to a higher fairtrade processor producer surplus (PS_F^N). Taking all together, an increase of the warm glow effect increases overall processors' producer surplus (PS^N) in the short run.

Comparing the short run and the long run effects we see in figure 13 that the increase of the warm glow effect causes an increase of the processors' producer surplus for minimum fairtrade producer price in a middle price range and a decrease for minimum prices below and above that price range. Compared to the initial situation the higher warm glow increases the total processors' producer surplus except for combinations of a high warm glow increase and very low minimum prices.

RESULT 7 *In the short run an increase of the warm glow effect is clearly to the benefit of the fairtrade processor as well as of the conventional processor. In the long run the increasing fairtrade farmer share lowers the conventional processor's producer surplus so that for very low prices a decrease of total processors' producer surplus can be observed.*

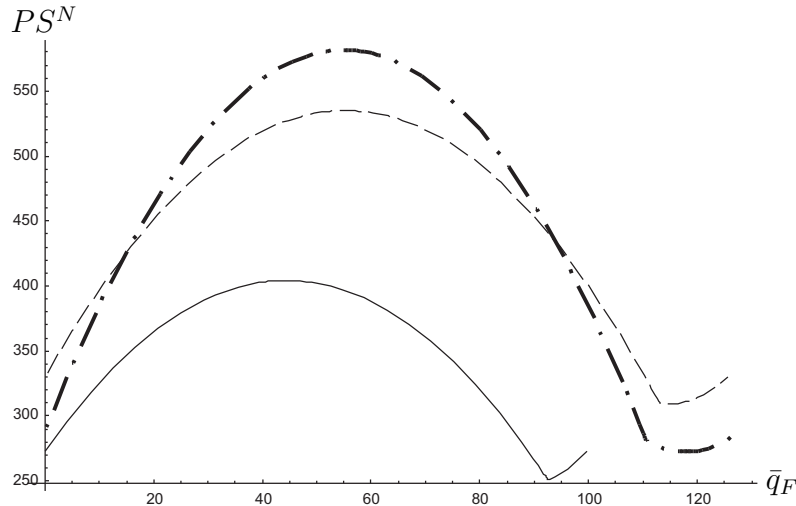


Figure 13: Total processors' producer surplus with varying warm glow

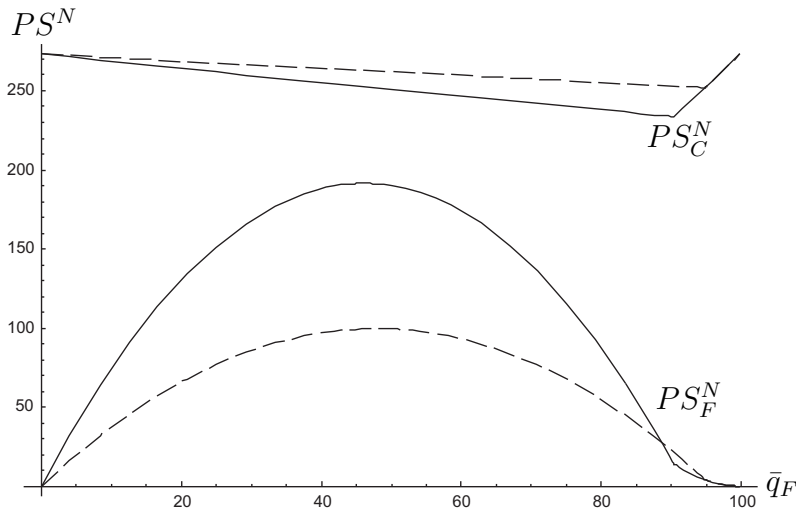


Figure 14: Processors' producer surplus with varying additional fairtrade production costs

The short run effects of higher additional fairtrade production costs c on the processors' producer surplus are shown in figure 14. As an increase of c increases the conventional product's quantity and price, the conventional processor's producer surplus is increasing for minimum fairtrade producer price below the new benchmark fairtrade producer price q_F^B . For the same minimum price range, the fairtrade processor's producer surplus is decreasing because a strongly decreasing fairtrade quantity is overcompensating the positive effect of an increasing fairtrade consumer price. For a minimum price above q_F^B the additional fairtrade production costs do not influence the products' prices and quantities and therefore also not the producer surpluses.

Examining the effects on total processors' producer surplus in figure 15 it is eye-catching that for a small range of minimum prices around the original minimum fairtrade

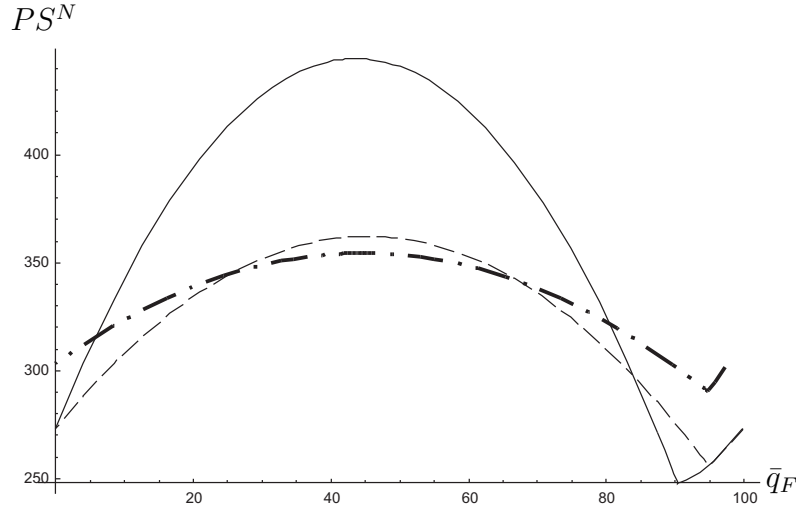


Figure 15: Total processors' producer surplus with varying additional fairtrade costs

producer price, an increase of the additional fairtrade production costs acts producer surplus enhancing. In the long run the decrease of the fairtrade farmer share increases processors' producer surplus compared to the short run situation. Therefore the former minimum price range for which an increase of the additional fairtrade production costs enhances processors' producer surplus is widened. Additionally, for very low minimum prices an increase of the additional fairtrade production costs also increases processors' producer surplus in the long run.

RESULT 8 An increase of the additional fairtrade production costs leads to a decrease of the processors' producer surplus for most minimum fairtrade producer prices but. For a small price range around the original minimum fairtrade producer price higher additional fairtrade production costs can also be producer surplus increasing. In the long run the increase of additional fairtrade production costs raises total processors' producer surplus for very low and very high minimum prices.

In figure 16 we examine the effects of an increase of the labelling fee on the processors' producer surplus. For minimum prices below the benchmark fairtrade producer price the consumer prices and demanded quantities remain unchanged. Because the fairtrade processor has to pay the labelling fee fully on his own its producer surplus decreases as the labelling fee is increased. The conventional processor is however not affected by the labelling fee so that its producer surplus does not change. For minimum prices above the benchmark level the fairtrade consumer price increases with an increasing labelling fee because part of the additional labelling fee is passed on to the consumers. The increased price lowers the fairtrade quantity and increases the conventional price and quantity. Therefore the conventional processor's producer surplus increases while fairtrade proces-

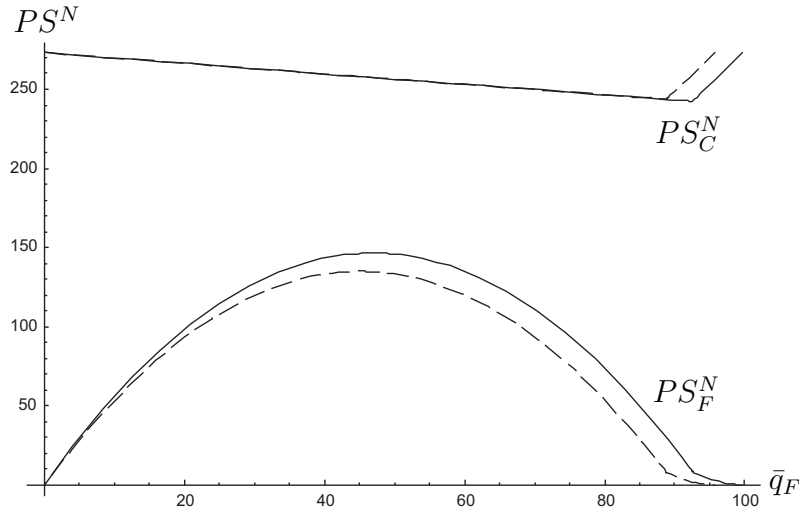


Figure 16: Processors' producer surplus with varying fairtrade labelling fee

processor's producer surplus decreases.

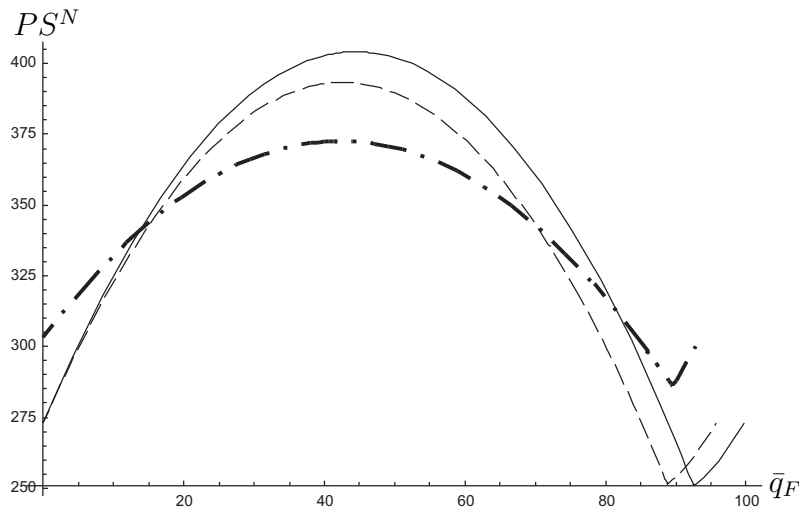


Figure 17: Total processors' producer surplus with varying labelling fee

The short run overall producer surplus decreases below the new benchmark fairtrade producer price and for minimum prices little above the benchmark price while for minimum prices clearly above the benchmark price overall producer surplus increases. In the long run the decreasing fairtrade farmer share leads to an increase of overall processors' producer surplus for very low and very high minimum prices including the benchmark fairtrade producer price and to a further decrease for a mid price range.

RESULT 9 *An increase of the fairtrade labelling fee lowers the fairtrade processor's producer surplus while the conventional processor profits of it for very high minimum fairtrade producer prices. Overall processors' producer surplus increases for very high and very low*

minimum fairtrade producer prices and decreases for the middle price range in the long run.

In the following we take a look on the effects of parameter changes on northern welfare, i.e. on the sum of processors' producer surplus and consumer surplus. Northern welfare is an important measure for the examination of fairtrade labelling as it is the welfare measure a northern government is primarily interested in. If changes in the fairtrade framework lead to increasing northern welfare the support of the northern governments should more easily be obtained. The only parameter the northern government can influence is the warm glow, i.e. the perception of fairtrade goods in the northern country.

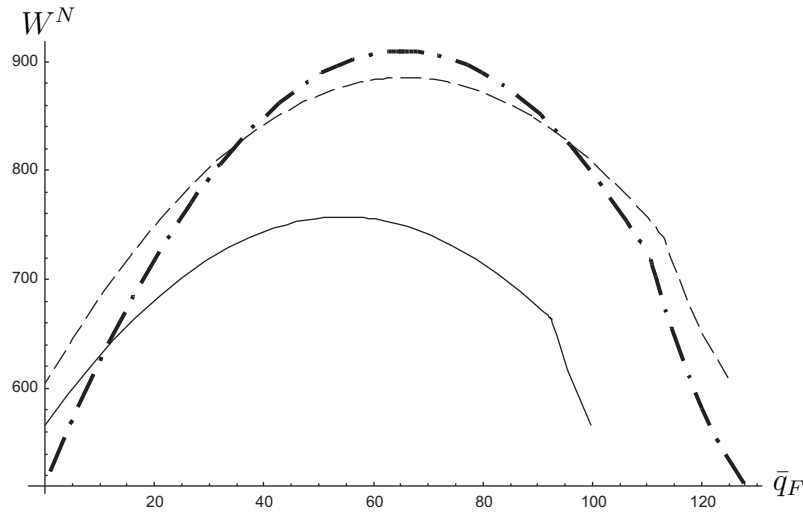


Figure 18: Northern welfare with varying warm glow

In figure 18 we see that the warm glow parameter leads to an unambiguous short run increase of northern welfare. Following the argument for the effects on processors' producer surplus the increase occurs because of the unanimous increase of processors' producer surplus and the increase of consumer surplus for higher minimum prices.

In the long run for a very low minimum prices northern welfare is falling compared to the initial situation. On the other hand, an increasing warm glow increases northern welfare further for minimum prices in a mid price range.

Therefore also the northern government should seek to increase warm glow by fairtrade campaigns.

RESULT 10 *A higher warm glow effect increases northern welfare unambiguously in the short and except for very low minimum fairtrade producer prices in the long run.*

Figure 19 shows that an increase of additional fairtrade production costs lowers northern welfare for minimum fairtrade producer prices below the new benchmark minimum

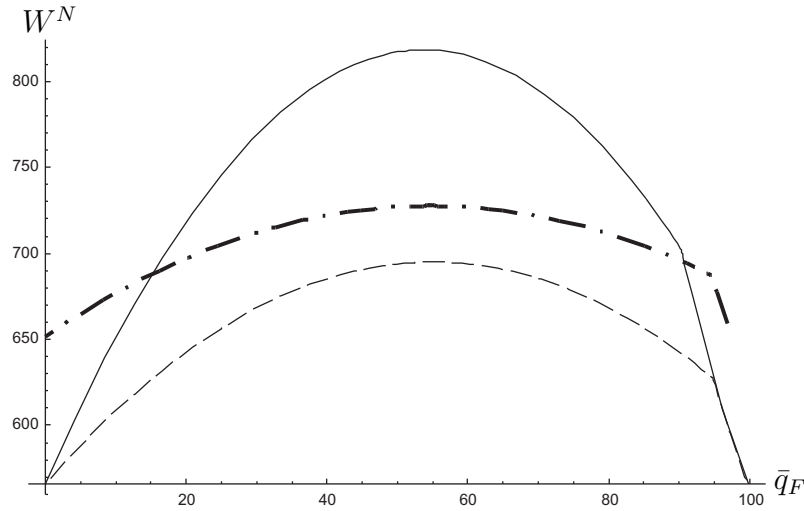


Figure 19: Northern welfare with varying additional fairtrade production costs

price since for minimum prices above the benchmark minimum price the prices and quantities are not influenced by the additional fairtrade production costs.

In the long run the decreasing fairtrade farmer share leads to an increase of northern welfare compared to the short run situation. In comparison to the initial situation northern welfare increases in the long run for very low and very high minimum producer prices and decreases for all other minimum prices.

RESULT 11 *Higher additional production costs decrease northern welfare for minimum fairtrade producer below the new short run benchmark fairtrade producer and increases northern welfare for very low and very high minimum prices.*

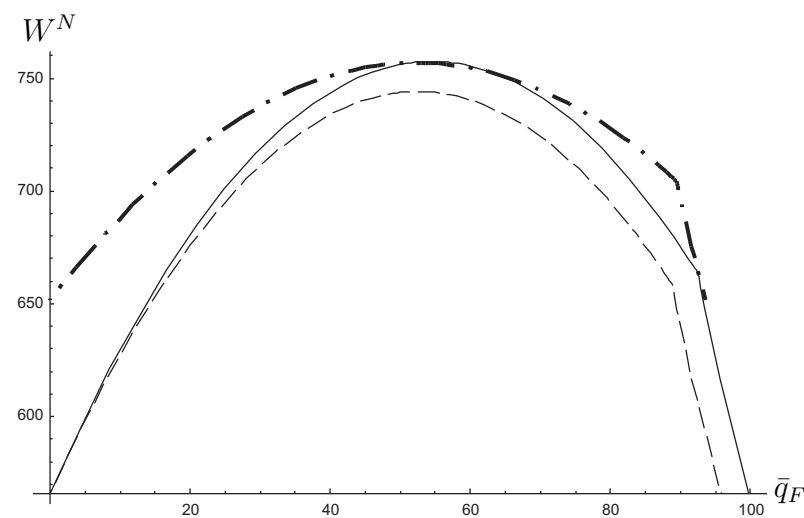


Figure 20: Northern welfare with varying fairtrade labelling fee

The effects of an increase of the fairtrade labelling fee on northern welfare are shown

in figure 20. Below the benchmark fairtrade producer price the consumer surplus is not affected by changes of the labelling fee and processors' producer surplus is decreasing in the short run. That's why northern welfare is decreasing for that price range. Above the benchmark price both consumer and processors' producer surplus decrease. That is why an increase of the labelling fee decreases short run northern welfare for all minimum fairtrade producer prices.

Since by raising the labelling fee the fairtrade farmer share decreases, the short run effect can be reversed in the long run. For a high enough decrease of the fairtrade farmer share northern welfare increases above the initial level for minimum prices below the new benchmark fairtrade producer price and weakens the decreases of northern welfare for prices above the benchmark price.

RESULT 12 Higher labelling fees decrease northern welfare unanimously in the short run. For a sufficiently high decrease of the fairtrade farmer share northern welfare can even increase for minimum fairtrade producer prices below the benchmark fairtrade producer price.

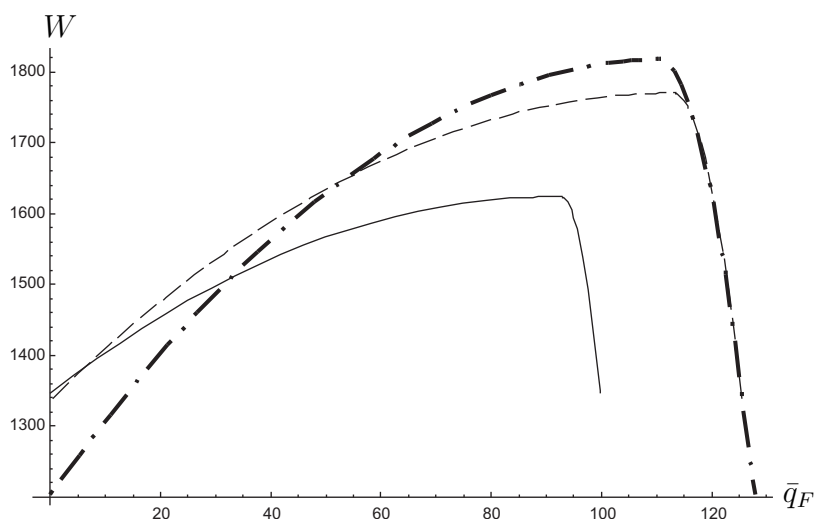


Figure 21: Overall welfare with varying warm glow

Figure 21 shows the overall welfare effects of an increase of the warm glow effect. In the short run global welfare increases except for very low minimum fairtrade producer prices. That changes in the long run because the increasing fairtrade farmer share widens the price range for which global welfare decreases compared to the initial situation. For minimum prices in a mid price range overall welfare increases further and stays constant for minimum prices above the short run benchmark fairtrade producer minimum price welfare decreases. A social planner concerned about global welfare therefore would increase the warm glow.

RESULT 13 *An increase of the warm glow effect increases global welfare except for lower fairtrade producer minimum prices.*

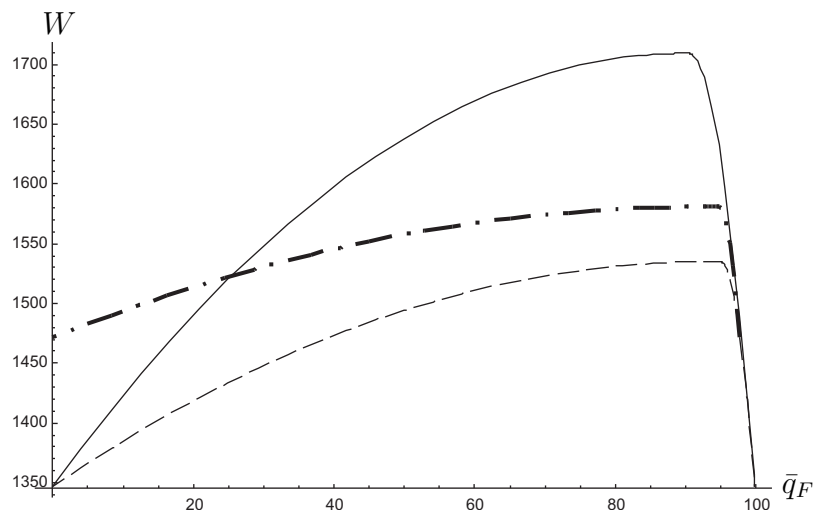


Figure 22: Overall welfare with varying additional fairtrade production costs

Increasing the additional fairtrade production costs like it is shown in figure 22 decreases total welfare except for very high minimum fairtrade producer prices. In the long run the fairtrade farmer share decreases what leads to an increase of overall welfare for very low minimum prices compared to the initial situation and lessens the loss of total welfare observed in the short run. Thus the social planner would lower the additional fairtrade production costs.

RESULT 14 *An increase of the additional fairtrade production costs lessens long run global welfare for a middle minimum fairtrade producer price range and increases it for very low minimum prices.*

The effects of an increase of the fairtrade labelling fee are shown in figure 23. In the short run overall welfare diminishes unambiguously with an increasing fairtrade labelling fee. In the long run the decreasing fairtrade farmer share leads to an increase of global welfare for a broad range of minimum fairtrade producer prices from zero to a price a bit below the long run benchmark fairtrade producer price. A social planner who neglects how the labelling fee revenue is used therefore would lower the labelling fee if the fairtrade minimum price is near the benchmark price and increase it otherwise. I.e. for the case that the labelling organization is not successful in setting the fairtrade minimum price next the benchmark price the social planner would for the first time act in another way than the labelling organization would do.

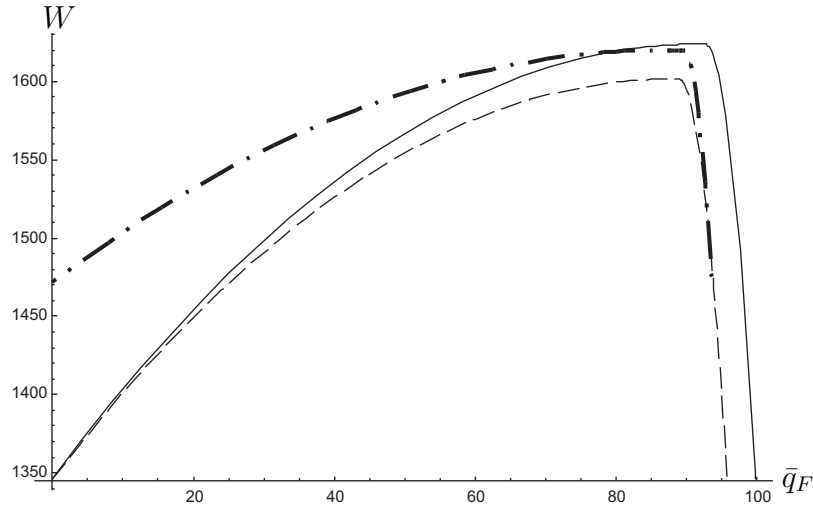


Figure 23: Overall welfare with varying fairtrade labelling fee

RESULT 15 Increasing the fairtrade labelling fee increases long run overall welfare for most prices below the benchmark fairtrade producer price.

6 Conclusion

In this paper I developed a model trying to reproduce the actual fairtrade system with commodity producing small-scale farmer as accurately as possible. However, the focus of that paper was not to show if the introduction of fairtrade labelling is welfare enhancing or not. Under the given assumptions of oligopolistic processors, monopsony power and the consumption of fairtrade goods creating a warm glow of giving it is straightforward that the introduction of fairtrade labelling for fairtrade goods will create a welfare surplus if the minimum price is not too far away from the benchmark level. Because the market for fairtrade goods is growing the fairtrade system becomes more and more important for global welfare. Therefore an analysis of factors influencing the outcome of the fairtrade system helps to come to a further understanding of how to shape that system for reaching a result as good as possible. This paper is a first step in doing so focusing on the labelling fee, the additional fairtrade production costs and the warm glow of giving. For the labelling fee it is self-evident that it can be influenced by the fairtrade labelling organization since the labelling organization decides about the amount of it. The additional fairtrade production costs can be influenced by the labelling organization and the northern government by facilitating capacitation, providing credit for more efficient technologies, etc. For the warm glow ω the possibility of influence is not as clear from the beginning. Though ω is part of the utility function of all consumers a higher ω can be seen as a higher share of consumers willing to pay the fairtrade premium. It is evident that that does not work

one-to-one but should be true by approximation. The share of fairtrade buyers eventually can be raised by the promotion and information about the effects of of fairtrade labelling. Since on a global level no institution exists I assume a social planner who is able to influence all three parameters.

Since the different actors in the fairtrade system follow different intents how to shape fairtrade it makes sense to subdivide the policy implications for the different actors. The fairtrade labelling organization is mainly interested in making the fairtrade farmers better off, followed by an interest in the well-being of all farmers. Therefore the welfare measure the labelling organization will look at is the farmers' producer surplus. Since all welfare measures reach their maximum value for a minimum fairtrade producer price set equally to the benchmark fairtrade producer price the labelling organization would be well advised set the minimum price alike. Therefore the labelling organization has to adjust the minimum price constantly as due to the influence of other actors the the warm glow and additional fairtrade production costs are constantly changing. Certainly this is difficult task which never can be fulfilled perfectly anyhow the labelling organization should try to do so as good as possible.

Looking at the warm glow the labelling organization would increase it and should at the same time adjust the minimum price to a higher level. Doing so, the fairtrade farmers' producer surplus increases in the short run. As a consequence of the increase of the fairtrade farmers' producer surplus the fairtrade farmers' share raises till the conventional and per farmer fairtrade producer surplus equalize on a level higher than before leading to a higher overall farmers' producer surplus.

Since an increase of additional fairtrade production costs would lower the fairtrade farmers' per farmer producer surplus in the short run and total farmers' producer surplus in the long run it is in the interest of the labelling organization to lower additional fairtrade production costs. Another possibility than described before for doing this could be to lower fairtrade standards. But it is doubtful if this would really lead to higher farmer income or would, on the other hand, lower the willingness to pay a premium for the fairtrade product and therefore lower ω leading to a loss of farmers' producer income.

An increase of the labelling fee would lead to an increase of fairtrade per farmer producer surplus in the short run for prices above the benchmark fairtrade producer price. Hence, in the long run total farmer's surplus would decrease and therefore lead to a lower fairtrade per farmer producer surplus which is not in the interest of the labelling organization. If, on the other hand, the labelling organization uses the increased revenue to finance campaigns promoting fairtrade and therefore increasing the fairtrade consumer share or to lower additional fairtrade production costs an increase of the minimum fairtrade producer price could have an positive effect on fairtrade farmers' producer surplus. However, this not part of the model.

The northern government will evaluate its actions accordingly to the impacts on northern welfare. An increase of the warm glow, i.e. of the fairtrade consumers share, would in the short run as well as in the long run increase northern welfare if the minimum price is not set at a too low level. Since the fairtrade labelling organization wants to generate a fairtrade farmers producer surplus as high as possible it will set the price preferably to the benchmark fairtrade producer price so that an increase of the warm glow will lead to an increase of northern welfare.

Looking at government politics in Germany one can see that this result is actually implemented. The German Federal Ministry for Economic Cooperation and Development is financing a PR campaign promoting fairtrade products with the help of celebrities (see www.fair-feels-good.de) and organizes every year a "fair week" in cooperation with fairtrade initiatives. Aim of that campaign is to increase the fairtrade consumers share what is in line with the results of the model for both the northern government and the labelling organization. A decrease of additional fairtrade production costs causes an increase of northern welfare in the short and the long run for minimum fairtrade producer prices around the benchmark level so that the northern government should help to lower those costs.

A social planner looking at global welfare would also try to increase the warm glow effect and decrease additional fairtrade production costs since both measures would increase global welfare. Thus in this model framework with oligopolistic processors having monopsony power and a fairtrade labelling organization setting minimum fairtrade producer prices near the benchmark fairtrade producer price, lowering additional fairtrade production costs and raising the fairtrade farmer share, is in the interest of all institutions. Looking at the labelling fee the implications are not so clear since it is not part of the model how the fairtrade labelling organization would use the additional revenue. Ignoring the use of the revenue a social planner would like to lower the labelling fee if the labelling organization makes a good job in setting the minimum fairtrade consumer price near to the benchmark price and to increase it if not. In this context a social planner would partly decide differently compared to the fairtrade labelling organization.

Recapitulating the results it can be said that at least in that model framework an increase of the fairtrade consumers share and a decrease of additional fairtrade production would be in the interest of all while for the labelling fee no unambiguous answer can be given. Of course, some simplifying assumptions were made to make the model more comprehensible and manageable. Nonetheless, it gives some insights into the functionality of the fair trade system and how to shape it. Since the question how to overcome poverty is one of the most pressing questions of our times more work on the fairtrade system is necessary to evaluate if it is an efficient component in the struggle against poverty.

A Calculation of the Bertrand quantities and prices

Both firms maximize their profits so that the first order condition for the conventional producer yielded by differentiating equation (5) with respect to p_C is

$$[1 + \epsilon_C] x_C^D(p_C, p_F) = \left[1 + \frac{m}{\eta}\right] \frac{\partial x_C}{\partial p_C} q_C(x_C^D(p_C, p_F))$$

and for the fairtrade producer by differentiating equation (6) with respect to p_F

$$[1 + \epsilon_F] x_F^D(p_C, p_F, \omega) = \frac{\partial x_F}{\partial p_F} (\bar{q}_F + l),$$

with $\epsilon_i = (\partial x_i^D / \partial p_i) p_i / x_i$ being the price elasticity of consumer demand for good i and $\eta = (\partial y_F / \partial q_F) q_F / y_F$ the price elasticity of supply for the conventional produced commodity. $m = (\partial y / \partial y_C) y_C / y$ serves as a measure of monopsony power with $m = 0$ in perfect competition and $m = 1$ in a pure monopsony.

With a minimum producer price below the competitive benchmark fairtrade producer price (e.g. the price in which the demand equals the supply under the condition of an imperfect market in the conventional producer market) the benchmark quantity is determined by the market supply and above the competitive benchmark fairtrade producer price by the market demand. That is why we need to calculate that competitive fairtrade producer price to be able to differentiate between the cases of a price below and above the benchmark price.

In order to calculate the benchmark price we calculate the the fairtrade processor's first order conditions with the given demand and supply functions and substitute \bar{q}_F for the inverse fairtrade farmers production function (2). Solving that equation for p_F yields the fairtrade processor's reaction function with respect to p_C ,

$$p_F(p_C) = \frac{\mu l (\omega - 1)}{2(c + \mu(\omega - 1))} + \frac{2c + \mu(\omega - 1)}{2(c + \mu(\omega - 1))} [\alpha(\omega - 1) + p_C].$$

Solving the conventional processor's first order condition for p_C yields the reaction function for the conventional processor contingent to the fairtrade price,

$$p_C(p_F) = \frac{(3 + 2m - \mu)\omega - (1 - \mu)}{2\omega [(2 + m - \mu)\omega - (1 - \mu)]} p_F.$$

Since with asymmetric firms and demands the equilibrium equations become complex I just describe the approach how to yield the equilibrium. By inserting the conventional processor's reaction function in the fairtrade processor's reaction function and solving it for p_F we get the Bertrand price for the fairtrade good p_F^B . The Bertrand price for the conventional good follows from inserting p_F^B in the conventional processor's reaction

function.

Those prices lead us by equation (3) and (4) to the Bertrand quantities for the conventional good $x_C^B = x_C^D(p_C^B, p_F^B)$ and for the fairtrade good $x_F^B = x_F^D(p_C^B, p_F^B)$ which by insertion into equation (1) and (2) determine the equilibrium fairtrade producer prices q_C^B and q_F^B .

For a fairtrade minimum producer price $\bar{q}_F < q_F^B$ the sold quantity in the producer market is determined by the fairtrade producer's supply function and the fairtrade processor wants to sell the whole quantity in the consumer market. That is why the fairtrade processor's reaction function is the result of the equalization of the fairtrade producer's commodity supply $x_F = (\mu/2c)\bar{q}_F$ and the demand for the fairtrade good, equation (6):

$$p_F(p_C) = \alpha(\omega - 1) - \frac{0.125(\omega - 1)}{c}\bar{q}_F + p_C.$$

The conventional processor's reaction function remains the same as before. The Bertrand quantities and prices for that case are calculated as described afore.

For $\bar{q}_F > q_F^B$ we yield the fairtrade processor's reaction function by solving the first order condition of the fairtrade processor's profit function (6)

$$p_F(p_C) = 0.5(\alpha(\omega - 1) + l + \bar{q}_F + p_C). \quad (10)$$

Again, we calculate the Bertrand equilibrium prices and quantities by following the steps executed before.

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