On Ethical Product Differentiation with Asymmetric Distance Costs

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On Ethical Product Differentiation with Asymmetric Distance Costs

Summary

In our model of ethical product differentiation two duopolists, a profit maximizing producer (PMP) and a "socially responsible" (SR) producer, compete over prices and "socially and environmentally responsible" features of their products. We show that the PMP finds it optimal to reduce his price after the SR producer's entry when his location is fixed. We also outline equilibria in a sequential game in which the SR producer is a Stackelberg leader. We show that, when consumers' perceived costs of ethical distance are high enough, equilibria have three main features: minimum price differentiation, ethical imitation and non minimal ethical differentiation.

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Introduction

The ongoing process of globalization and economic integration generated by innovations in the fields of electronics and telecommunications, coupled by the progressive reduction of transportation costs, has reduced distances among different cultures.[2] This phenomenon has increased interdependence among countries and enhanced problems related to the provision of global public goods. As a consequence, the sensitivity of the public opinion towards social responsibility issues such as the preservation of the environment and the fight against poverty in less developed countries is getting higher than before.[3]

This increased awareness has generated a series of "grassroot" welfare initiatives which focus on socially responsible (or socially concerned) saving and consumption.

One of the most important is promoted by zero profit importers, distributors and retailers (called *fair traders*) of food and textile products which have been partially or wholly manufactured by poor rural communities in developing countries. To be labelled as such, fair trade[4] products need to respect a series of social and environmental criteria.

These criteria, defined by the Fair Trade Federation (FTF)[5], are: i) paying a fair wage in the local context; ii) offering employees opportunities for advancement (including investment in local public goods); iii) providing equal employment opportunities for all people, particularly the most disadvantaged; iv) engaging in environmentally sustainable practices; v) being open to public accountability; vi) building long-term trade relationships; vii) providing healthy and safe working conditions within the local context; viii) providing technical and financial assistance (price

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[1] Quote from "La Repubblica" 18 December 2002.

[2] Some interesting (non strictly economic) definitions of globalization are "death of distance" (Cairncross, 1997) "intensification of social relationships linking distant places in the world so that what happens locally is affected by what happens thousands of chilometers away" (Giddens, 2000), "intensification of the conscience of the world as a whole" (Robertson, 1992). It is also well known that the process of global integration is not new, it was intense at the beginning of the 20th century, it experienced a sudden inversion between the two world wars and had a sudden acceleration in the last thirty years (Debenedictis-Helg, 2002).

[3] The increased sensitivity is revealed by the growth of socially responsible consumption (see the 2003 EFTA report downloadable at www.eftafairtrade.org). In a recent survey the "2003 Corporate social responsibility monitor" (downloadable at http://www.bsdglobal.com/issues/sr.asp) finds that the amount of consumers considering social responsibility in their choices jumped from 36 percent in 1999 to 62 percent in 2001 in Europe.

[4] Notice the different use here of the term "fair trade" with respect to the traditional one in the economic literature, were fair trade indicates "arguments that relate to certain conditions under which trade, and the production of traded goods, should minimally take place" (Maseland & Vaal, 2002). In this framework fair trade generally refers to the absence of duties, controls and dumping practices in international trade. For a similar use of the term see also Mendoza - Bahadur (2002), Bhagwati (1996) Stiglitz (2002) and Suranovic (2002).

[5] Further information on Fair Trade may be found, among others, on the following websites www.eftafairtrade.org (European Fair Trade Association) and www.fairtradefederation.com (Fair Trade Federation). Additional relevant information may be found in the Oxfam Report forwarded by Amarthya Sen, Oxfam honorary president, on the following website: http://www.maketradefair.org/default.asp?lang=english

stabilization, insurance services and prefinancing arrangements which reduce financial constraints) to producers whenever possible.

Adriani-Becchetti (2004) have recently shown how most of these criteria may be seen as bottom-up solutions of specific market failures. The fair wage/price criterion states that, in the price paid to producers in the South, a higher share of the value of the product must be transferred to them than the one usually transferred in the traditional trade channels. If we assume, as it often is, that raw or intermediate material producers in the South are in a monopsonistic market[6], the fair trade price may be ideally viewed as the market price which would prevail if the two counterparts would have equal bargaining power and may therefore be considered as a non governmental minimum wage provided by private citizens in developed countries.[7] Adriani-Becchetti (2004) also show that using prices as a policy instrument to transfer resources to the South cannot be considered as a market distortion. It is instead a market creation since fair traders open in the North a new market in which "contingent socially responsible" products (combining physical products and values) are sold.

Fair trade is just a small part of the market for socially responsible consumption (and savings) which is growing considerably. Fair trade products are beginning to achieve non negligible market shares. To provide just some figures, in 2005 sales of products certified as fair trade ones were estimated at € 1.1 billion worldwide, a 37 % year-to-year increase (FLO, 2006). In the same period market shares reached remarkable peaks. The Fair Trade in Europe Report 2005 (EFTA, 2005) documents that European FT net sales grew by 20 percent per year in the last five years and that, in 2005, FT products achieved significant market shares in specific sectors such as the banana market in Switzerland (47%) and the ground coffee (20%), tea (5%) and banana (5.5%) market in the UK. The existence of positive market shares for these products, whose price is often higher than that of traditional products, is revealed a preference argument for the relevance of SR consumption and for the existence of SR or fairness arguments in consumers' utility function.[8]

The diffusion of forms of socially responsible consumption such as fair trade is being accompanied by a wide range of imitating strategies enacted by traditional producers. Many more companies are starting to advertise not only price and quality, but also the SR features of their products.[9] Corporate responsibility is gradually becoming an important competitive feature in real and financial markets.[10]

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[6] Manning (2003) argues that "our understanding of labour markets will improve if we think of employers having some monopsony power over their workers". This is because thin labour markets, intended as markets in which there are few job opportunities available at any moment in the geographical area, in which the worker is located, are likely to be not an exception both in developed and in developing countries. Empirical evidence in support of this point is provided by Manning (2003), which documents the existence of wage dispersion for identical workers and by the positive relationship between wages and commuting distance. Recent empirical papers confirm that, when workers are unskilled and easily replaceable, labor markets tend to be monopsonistic or oligopsonistic. Card and Krueger (2000) find that minimum wage introduction has positive effects on output and employment in the fast-food market in New Jersey and Pennsylvania. Ross (2000) interprets this result as being the typical effect of the introduction of a minimum wage measure in a monopsonist labour market.

[7] Minimum wages under perfect competition may have perverse welfare effects reducing labour demand and increasing unemployment (Basu, 2000). This is obviously not the case in a monopsonistic labour market when the wage rises from its equilibrium level to the perfect competition level.

[8] There is a growing interest for socially responsible savings and consumption also in the institutions. In 1999 the United Nations launched the Global Compact, a coalition of large businesses, trade unions and environmental and human rights groups, brought together to share a dialogue on corporate social responsibility. In the same year the European Commission issued a document on Fair Trade (29.11.1999 COM(1999) 619. In its introduction it is stated that "Fair trade" is an example of development occurring through trading relationships and improved commercial opportunities to bridge the gap between developed and developing countries and to facilitate the better integration of developing countries in the world economy. "Fair trade" initiatives give consumers the opportunity to contribute towards sustainable economic and social development in developing countries through their purchasing preferences. The Commission provided financial support for research and education on fair trade to NGOs within the EU (3,7 millions of Euros in 1998). More recently, in July 2001, the Commission issued a Green Book COM(2001) 366 to promote firm social responsibility in the European framework. Large part of the Green Book deals with fair trade.

[9] Corporate perception by consumers (90 percent of respondents) is by far the most selected item (against ethical values of managers, tax incentives and relationship with stakeholders) when a sample of interviewed socially responsible

The aim of this paper is to provide a theoretical background for this emerging kind of competition. We do so by adopting a product differentiation approach by reinterpreting product location segment[11] in terms of products' socially responsible characteristics.

The paper is divided into five sections (introduction not included). In the first section we introduce the model by defining the two producers, the market space, consumers' preferences and the ethical features in the market. We then present a first simplified version of the model by assuming that the PMP location is fixed and show that the entry of a SR producer leads to a reduction of the incumbent price. Ex post, the optimal price of the latter is halfway between his zero profit price and the zero profit fair trader price plus a component which depends on the consumer cost of buying from a producer who is more ethical than him (that is, buying a product which incorporates a higher ethical content than that preferred by the consumer). In the third section we remove the assumption of incumbent fixed location and analyse his simultaneous price-SR reaction to the incumbent entry. This choice leads to maximum ethical differentiation (and therefore coincides with the equilibrium found when PMP's location is fixed), if consumers' marginal costs of ethical distance, when they are more ethical than the PMP, are smaller than the incumbent's marginal costs of ethical mimicking. When the opposite occurs, we obtain a nice result of minimum price differentiation together with ethical imitation. These results are crucially affected by three differences between the traditional Hotelling game and the ethical differentiation game: i) the presence of a zero profit entrant; ii) the asymmetry in costs of ethical distance; iii) the lack of independence between ethical location and prices under the reasonable assumption that there are no "free lunches" in social responsibility (in a framework without informational asymmetries the decision to be socially responsible must imply some additional costs to the firm).

In the fourth section we finally analyse the sequential game in which the Fair Trader is a Stackelberg leader and chooses his location by knowing the reaction strategy of the PMP in both price and location. We find that the equilibria of this game are conditional to value ranges of the consumers' perceived cost of ethical distance.

1. The model

Most of the hypotheses in the model which follows are standard assumptions in the product differentiation literature. Some of them are original and are given by the specific nature of ethical competition. We outline model features by defining producers, market space and consumers.

The production side
The incumbent (profit maximizing producer). The profit maximizing producer transforms raw materials received from unskilled producers in the South paid with a wage (w). He has two potential choice variables to maximize profits: the choice of the price P_A and of the position (a) on the SR segment.

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companies is asked about reasons for their socially responsible behaviour in the "2003 Corporate social responsibility monitor". This finding is consistent with our hypothesis that ethical imitation is a relevant competitive feature in product markets today.

[10] According to the "2003 Corporate social responsibility monitor", more than one in five consumers reported having either rewarded or punished companies based on their perceived social performance and more than a quarter of share-owning Americans took into account ethical considerations when buying and selling stocks. The Social Investment Forum reports that in the US in 1999, there was more than $ 2 trillion worth of assets invested in portfolios that used screens linked to the environment and social responsibility.

[11] For a reference to the product differentiation literature see Hotelling (1929), D'Aspremont, Gabsewicz and Thisse (1979), Economides (1984) and Dasgupta and Maskin (1986) for horizontal differentiation models and Shaked-Sutton (1983) for vertical differentiation models.

The Fair Trader. We assume in this benchmark model that "there are no free lunches in ethical responsibility" and we abstract from asymmetric information on the quality of FT product. The Fair Trader's criteria of action are those described in the introduction. We "stylize" these features by assuming that the entrant sells his product at zero profit[12] and transfers an additional percentage $\bar{s}$ of the wage w [13] (after paying the wage) which is needed to comply with all the Fair Trade criteria (provision of local public goods, premium on the wage, creation of a long term partnership through the provision of export services, etc.).[14] The zero profit condition of the entrant is therefore: $P_B = w(1+s)$ and coincides with the maximum content of social responsibility when the FT location is considered exogenous (sections 2 and 3). When the FT behaviour is endogenized, he chooses his location on the SR segment to maximize transfers to the South (section 4).

The market space

The space of product characteristics is represented by an "ethical" segment which we assume to have unit length for simplicity and without lack of generality (Figure 1). Location on the left extreme corresponds to the choice of no transfer to South producers ($s = 0$) in addition to the wage paid to them, while location on the right extreme corresponds to the choice of a transfer exogenously fixed when the Fair Trade criteria mentioned in the introduction are fully complied ($\bar{s}$ = 1). Within these two extreme choices we observe that both producers dispose of a set of strategies in social responsibility - $a\bar{s}$ where $a \in [0,1]$ - allowing them to locate in any point of the segment if they want.

The demand side

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[12] Fair trade associations usually have zero or negligible profits. This condition is often statutory since most of them take the form of cooperatives. For simplicity we assume here that they are zero profit. The assumption of small positive profits would not change the substance of our model based on the assumption that profit maximization is not the goal of FT producers. The diffusion of producers which create private and social value without being profit maximizers is confirmed by the fact that fair trade producers exist and are growing. In the year 2000 there were 97 fair trade importers from 18 countries and 2740 no profit retailers of fair trade products only in Europe according to the Fair Trade Association. In 2000, in the U.S. and Canada, 600 outlets wholesaled Fair Trade products, while at least 2575 offered retail. In 2001, at least 7000 provided retail.

[13] We take the fair trader as an example of socially responsible producer and identify social responsibility in the resources transferred to producers in the South. Our model may be generalized and applied also to "environmentally concerned" producers by assuming that the adoption of environmentally responsible production processes increases costs exactly as in our fair trader's example.

[14] Fair Trade criteria of action imply a series of initiatives in support of producers in the South (prefinancing, provision of local public goods, a premium as a minimum wage measure against monopsonistic labour markets, export services, price stabilization mechanisms, training and counselling etc.). On the premise that these initiatives are not costless, we stylise all of them in the model into an additional cost component (the transfer "s") that the FT send to the producer in the South. Hence, the transfer s is not related to the minimum wage only and the reason of its existence does not disappear, even in case of end of the monopsony on the labour markets.

Second, the FT dimension with respect to world markets and the multiple directions of his action make that the decision of a single FT to send "s" does not reduce its need in the future for further producers. A very effective and concentrated action in one area may reduce the monopsony problem, but it does not eliminate the other reasons for the transfer. Hence, it is not unreasonable to consider that the individual FT decision to send "s" does not eliminate the aggregate problem of the inclusion of small uncollateralized producers with low bargaining power in the South. These considerations led us to focus on the interaction between FT and incumbent without modelling the effects of the s transfer in the South.

Consumers have inelastic, unit demands and have heterogeneous preferences on social responsibility. Therefore they are uniformly distributed across the line segment [0,1] (a standard feature in horizontal differentiation models).[15]

The specificity of this horizontal differentiation model is that a different position in the interval for consumers does not imply differences in physical distance, but in product ethical characteristics.[16] The consideration of ethical instead of physical distance makes a difference at least in two ways. First, consistently with our concept of ethical distance, the cost of moving along the line segment is positive, but it is higher for those going from a more ethical to a less ethical position, than for those moving in the opposite way. This implies two reasonable assumptions: i) consumers do not necessarily approve the ethical content of the product (it may be considered excessive to them, perceived as a subsidy which does not create the right incentives in local producers, etc.); ii) too much ethical content should be considered less negatively than too few ethical content.[17] This justifies the difference in (left and rightward) cost of distance slopes for consumers in Figure 1.

We assume that consumers' utilities are decreasing in product price and also in the distance between consumer's ethical stance and the ethical value incorporated in the purchased product. The psychological cost of buying a product which is below (above) one's own ethical standards is t_1 (t_2) times the ethical distance so that consumer's welfare is[18]

$$\begin{cases} W_c = R_p - P_i - t_1(x-a) & \text{if } x-a \geq 0 \\ W_c = R_p - P_i - t_2(a-x) & \text{if } x-a < 0 \end{cases} \tag{1}$$

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[15] Import duties, value added taxes and transportation costs are obviously part of total costs of importers of agricultural products from the South. In this paper, though, they do not affect our results and therefore are omitted from the model for simplicity.

[16] In this model we abstract from considerations of asymmetric information and divergences between consumers' and sellers' perception of the ethical value of the good by assuming that they coincide. To reduce distance from reality it may be interesting, in an extension of this model, to analyse market equilibria under asymmetric information and considering the role of ethical labelling.

[17] The rationale for these assumptions is that moving to the left implies choosing a product below one's own ethical standards (which is psychologically costly), while moving to the right implies choosing a product above one's own ethical standards (which may be even considered "too much" and therefore we assume it gives a psychological cost to the buyer as well). Empirical support for our hypothesis on the heterogeneity of individual attitudes towards social responsibility is confirmed by descriptive evidence from the World Value Survey database - 65,660 (15,443) individuals interviewed between 1980 and 1990 (1990 and 2000) in representative samples of 30 (7) different countries. - In both surveys around 45 (49) percent of sample respondents declare that they are not willing to pay in excess for environmentally responsible features of a product. The same survey documents that the share of those arguing that the poor are to be blamed is around 29 percent in both surveys. This simple evidence confirms heterogeneity in the willingness to pay for social and environmental responsibility, rejecting the assumption that more of SR may be better for all individuals.

Even though we believe that the chosen one is the most faithful formalization of consumers' preferences on SR, the simmetry/asymmetry of distance costs may be open to debate. A choice of symmetric costs of ethical distance would have placed the model definitely into the horizontal differentiation field and a choice of asymmetric costs of ethical distance with no costs when the consumer moves rightward places it closer to the vertical differentiation literature. A feature which distinguishes the model from both fields is the asymmetric cost of ethical distance.

[18] The way we design consumers' preferences is consistent with empirical evidence and consumers surveys in which values are shown to be a determinant of choices together with prices and therefore affect their marginal utilities (see footnote 3 on 2003 Corporate social responsibility monitor). From a theoretical point of view this point has been remarkably analysed, among others, by Sen (1993) showing that people choose also on the basis of their values and, for this reason, they do not always choose what they would strictly prefer on the basis of prices. Lexicographic preferences are ruled out here but may be considered a limit case of our model when costs of ethical distance go to infinity.

where P_i is the price of the product sold by the *i*-th seller, *a* is the PMP location (see Production side in this section), R_p is the common consumers' "conditional"[19] reservation price and *x* denotes generic consumer location.

We assume that the prices applied by the producers are always less than the reservation price or

$$P_i < R_p \qquad (2)$$

After the specification of the FT's behaviour and of consumer's position on the segment the cost of ethical distance has a clear monetary counterpart. This cost represents the distance in monetary terms between the transfer, which is considered fair by the consumer (indicated by his location on the segment) and the transfer provided by the producer (indicated by the producer's location on the segment). The coefficients t_1 and t_2 map this objective measure into consumers' preferences indicating whether their impact on consumers' utility is proportional ($t_i = 1$), more than proportional ($t_i > 1$) or less than proportional ($t_i < 1$) to its amount in monetary terms.

Given that it is more expensive for a consumer to buy a product from a producer located to the left than to the right, we assume that

$$0 < t_2 < t_1 \qquad (3)$$

The ethical features of the model

Given the model characteristics, it is clear that the SR feature coincides with the application of the set of specific FT criteria along the value chain. These criteria promote a series of actions to foster inclusion of South producers with low bargaining power in international markets. Hence, SR is related to what happens in the productive process and in the overall value chain behind the product more than to the intrinsic features of the product sold.

2. The entry of the socially responsible producer when the PMP location is fixed

Section framework: the profit maximizing producer is set at the extreme of the ethical segment (he chooses the strategy a = 0). An "orthodox" Fair Trader which fully complies with exogenous FT criteria, enters the market and places himself at $\bar{s} = 1$.[20] The PMP ethical location is fixed and his reaction can be only in prices.[21]

After FT's entry consumers may choose between two products which differ in prices and socially responsible features. Their indifference condition is equal to[22]

$$\begin{cases} P_A + t_1(x-a) = P_B + t_2(1-x) & \text{if } x - a \geq 0 \\ P_A = P_B + t_2(1-a) & \text{if } x - a < 0 \end{cases} \qquad (4)$$

and the condition for a nonzero market share for the FT is that, for some *x*,

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[19] We call it conditional reservation price as it is the reservation price when consumer and producer ethical locations coincide.

[20] The case of FTs with non endogenous location in the SR segment is consistent with their international criteria, which fix, in the market of agricultural commodities such as coffee, cocoa, etc., a standard contingent premium on market prices adopted by all local organizations. In cocoa and coffee markets for the last 20 years the premium reached a maximum of twice the market price in market downturns, and a minimum of 5% in market upturns (EFTA 2003 Fair Trade Report).

[21] The assumption will be removed in section 3 of the paper.

[22] The second equation can be derived from the following

$P_A + t_2(a-x) = P_B + t_2(1-x)$ if $x - a < 0$

$$t_1(x-a) - t_2(1-x) > P_B - P_A \qquad (5)$$

More specifically, the incumbent market share is:

$$x = \frac{[P_B - P_A + at_1 + t_2]}{t_1 + t_2} = \frac{P_B - P_A + t_2(1-a)}{t_1 + t_2} + a \qquad (6)$$

The new entry therefore shrinks the incumbent market share in proportion to the price gap and to the costs of ethical distance (t_j, with $j = 1, 2$) perceived by consumers.

Proposition 1. When the incumbent location is fixed the PMP reduces his price after the fair trader entry. His optimal price is halfway between his zero profit price and the zero profit fair trader's price plus half the consumers' cost of buying from a firm located on his right.

From a general point of view, after the FT's entry the incumbent maximizes his profit with respect to a and P_A:

$$\pi(a, P_A) = [P_A - w(1 + as)] \left[\frac{P_B - P_A + t_2(1-a)}{t_1 + t_2} + a \right] \qquad (7)$$

In this specific case we assume $a = 0$, hence the PMP maximizes the following expression only with respect to P_A :

$$\overline{\pi}(P_A) = \pi(0, P_A) = [P_A - w] \left[\frac{P_B - P_A + t_2}{t_1 + t_2} \right] \qquad (8)$$

Evaluating the first order condition, and substituting for the FT's zero profit condition $P_B = w(1 + s)$, we obtain

$$\overline{\pi}'(P_A) = -\frac{2P_A}{t_1 + t_2} + \frac{P_B + t_2 + w}{t_1 + t_2} = 0 \qquad (9)$$

and

$$P_A^* = \frac{P_B + t_2 + w}{2} = w\left(1 + \frac{s}{2}\right) + \frac{t_2}{2} \qquad (10)$$

The incumbent price is obviously increasing in the FT's transfer to the South. To understand the price strategy of the incumbent after the FT's entry we observe that his optimal price is halfway between his zero profit price and the zero profit FT's price plus half the distance cost t_2. ∎

The interpretation of this findings is that, when the PMP reacts only in prices, the incumbent price reduction reply to FT's entry will be softer the higher the consumer costs from buying products, which incorporate more ethical content than what considered fair by them.

The FT's entry determines these effects on prices by introducing a new element of competition. Given that, in this case, the incumbent cannot react on location, he must use prices to compete with the entrant and to defend his market share.

Solving for the incumbent market share we get:

$$x^* = \frac{sw + t_2}{2(t_1 + t_2)} \qquad \text{when } \frac{sw + t_2}{2(t_1 + t_2)} \le 1$$

$$x^* = 1 \qquad \text{when } \frac{sw + t_2}{2(t_1 + t_2)} > 1.^{23}$$

The share is increasing in the FT's transfer, in the wage paid to the producers in the South and decreasing in the perceived costs of buying below one's own ethical standard (t_1).

More specifically, if we normalize the producer unit cost ($w = 1$), and assume a transfer equal to that wage ($\bar{s} = 1$), we obtain that $x^* = \frac{1 + t_2}{2(t_1 + t_2)}$. This implies that the incumbent's share shrinks in proportion to the increase of the parameter t_1, measuring consumers perceived costs of ethical distance from left-located producers, with $\lim_{t_1 \to \infty} x^* = 0$.

3. The simultaneous price-ethical location choice of the incumbent

Section framework: the profit maximizing producer is set at the extreme of the ethical segment (he chooses the strategy a = 0). [24] *An "orthodox" Fair Trader enters and places himself at $\bar{s}$ = 1. The PMP's ethical location is not fixed and he can react both in prices and ethical location.*

The study of the simultaneous game between the PMP and the FT presented in this section may be an important reference illustrating strategies and equilibria in presence of the joint decision to create a new FT world shop and a new supermarket in a given commercial area.

Remember that we have reasonably assumed that there are no "free lunches" in social responsibility and no asymmetric information in the model. Hence, in order to move to the right in the ethical location, the incumbent must transfer a positive sum to the producers in the South as well as the FT does. Since $a \in [0,1]$, we argue that $a\bar{s}$ is the total incumbent transfer, where $\bar{s}$ is the exogenous FT's transfer and a the incumbent's location choice. This parametric choice ensures that, if the incumbent chooses an ethical location exactly alike to the FT's one ($a = 1$), he transfers the same amount to the South.

Here a third crucial difference between ethical and traditional horizontal differentiation clearly emerges: ethical location and price are not two independent variables. This difference adds to the two already mentioned: distance costs apply differently in the two directions and one of the duopolists (the fair trader) does not maximize profits.[25]

The solution of this model leads us to formulate the following proposition.

Proposition 2. If the PMP jointly maximizes price and ethical location after the socially responsible entry, the market moves from an equilibrium with maximum ethical differentiation with no imitation

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[23] This means that the FT has a nonzero market share only if consumers are not too "averse to social responsibility" (low t_2) or when marginal costs of ethical distance ($t_1 + t_2$) are more than half the marginal costs of transfer to the South ($\bar{s}w$) plus t_2.

[24] This assumption is reasonable if we assume that the PMP is initially uninformed about consumers' ethical preferences (or he has to pay a cost higher than advantages from being more ethical to verify whether these consumers exist) and the FT's entry with his market share reveals the existence of these consumers to him.

[25] The specific nature of the two players in our game, the relationship between the (ethical) space and price variables and the asymmetry and linearity in the costs of ethical distance are all features which differentiate our game from the traditional horizontal differentiation game in which equilibria may be found only when price and location are chosen sequentially and not simultaneously (Anderson, 1987; Lambertini, 1997).

to an equilibrium with ethical imitation and minimum price differentiation, when consumers' marginal costs of ethical distance to buy from a producer located to the left, switch from a value which is lower, to one which is higher than producer costs of ethical imitation.

In the simultaneous price-location model the incumbent maximizes

$$\max_{\{a,P_A\}} \pi(a,P_A) = \max_{\{a,P_A\}} \left[P_A - w(1+as) \right] \left[\frac{P_B - P_A + t_2(1-a)}{t_1 + t_2} + a \right]$$

s.t.

$$0 \le a \le 1$$

$$w(1+as) \le P_A \le P_B + t_2 + t_2 a$$

$(11)^{26}$

First order conditions are

$$\begin{cases} \dfrac{\partial \pi(a,P_A)}{\partial P_A} = \dfrac{P_B - P_A + t_2(1-a)}{t_1 + t_2} + a - \dfrac{1}{t_1 + t_2}\left(P_A - w(1+as) \right) = 0 \\[3mm] \dfrac{\partial \pi(a,P_A)}{\partial a} = -sw\left[\dfrac{P_B - P_A + t_2(1-a)}{t_1 + t_2} + a \right] + \left[P_A - w(1+as) \right]\dfrac{t_1}{t_1 + t_2} = 0 \end{cases}$$

(12)

The Hessian matrix of the problem is

$$H = \begin{pmatrix} -\dfrac{2swt_1}{t_1 + t_2} & \dfrac{sw + t_1}{t_1 + t_2} \\[3mm] \dfrac{sw + t_1}{t_1 + t_2} & -\dfrac{2}{t_1 + t_2} \end{pmatrix}$$

$$\det H = -\frac{(sw - t_1)^2}{(t_1 + t_2)^2} < 0$$

(13)

This means there are no internal solutions.
We therefore look for a solution along the boundary of the *feasible set*, a triangle delimited by: i) $0 \le a \le 1$, ii) $P_A = w(1 + a\bar{s})$, iii) $P_A = P_B + t_2(1 + a)$ (see Figure 2). We find only two feasible solutions: $a^* = 0$ and $a^{**} = \frac{1}{2}$. These values give the following pair of equilibria $E_1 = [0, (t_2 + sw)/2 + w]$ and $E_2 = [1/2, w(1 + s) + t_2 - t_2/2 - \varepsilon]$.
To find the highest value attained at points E_1 and E_2 we must insert them into the profit function:

$$\pi(E_1) = \frac{(sw + t_2)^2}{4(t_1 + t_2)} \quad \text{and} \quad \pi(E_2) = \frac{sw + t_2}{4}$$

(14)

Comparing $\pi(E_1)$ and $\pi(E_2)$, we have that, when $t_1 < \bar{s}w$, the solution E_1 (which hits the constraint $a^* = 0$) has the highest value, since ethical imitation reduces profits. On the contrary,

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[26] In the last constraint we can notice that PMP's price can never be equal to the total cost paid by consumers when they buy from the FT. In fact, if $P_A = P_B + t_2(1-a)$, the PMP's market share would be undetermined. So the maximum price he can choose is $P_B + t_2(1-a) - \varepsilon$, with ε small enough.

when $t_1 > \bar{s}\,w$, ethical imitation is convenient up to the satisfaction of the nonzero sales price constraint and, therefore, the solution E_2 yields the highest value. By comparison with profits in the other extreme points of the feasible set of the values, it is clear that these two solutions are also the absolute maxima under the two different cases (E_1 when $t_1 < \bar{s}\,w$ and E_2 when $t_1 > \bar{s}\,w$). ∎

Hence, the equilibrium of the simultaneous price-ethical location choice yields maximum differentiation if marginal (consumers) costs from being "more ethical" than the producer are smaller than marginal (incumbent) costs of ethical imitation. When the opposite occurs we obtain a nice result of ethical imitation and minimum price differentiation (remember that, in this case, $P_A = P_B + t_2(1 + a) - \varepsilon$).[27]

From this solution we can notice again the positive effect of t_1, the consumers' marginal cost of leftward ethical distance, on ethical imitation, which is obviously related to the fact that the incumbent gains more market share by increasing the socially responsible features of his product.[28]

It is interesting to notice that our result of PMP partially imitative behaviour is consistent with the reality of competition in SR in the food industry after the first creation and diffusion of FT outlets.

With this respect, one of the most relevant facts occurs on October the 7th, 2000 when the BBC announces that "Nestle has launched a fair trade instant coffee as it looks to tap into growing demand among consumers." The BBC comments the news saying that "Ethical shopping is an increasing trend in the UK, as consumers pay more to ensure poor farmers get a better deal." and reports the comment of Fiona Kendrick, Nestle's UK head of beverages arguing that "Specifically in terms of coffee, fair trade is 3% of the instant market and has been growing at good double-digit growth and continues to grow".

Other examples of this kind may be found in the EFTA (Advocacy Newsletter n° 9) announcement that, in 2005, i) Procter & Gamble began offering Fair Trade certified coffee through one of its specialty brands; ii) following Procter & Gamble's decision to start selling a Fair Trade coffee, also Kraft Foods committed itself to purchasing sustainably grown coffee.[29]

4. The two-stage price-location game when the Fair Trader is a Stackelberg leader.

Section framework: two-stage game in which the Fair Trader is a Stackelberg leader in ethical location and chooses location in the first stage by maximizing transfers to the South, while the PMP chooses price and location in the last stage of the game maximizing profits.

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[27] We call this situation "minimum price differentiation" because the PMP's price can not be higher than that value, otherwise he would lose his market share entirely. Hence, the difference $P_B - P_A$ is the minimum possible one.

[28] We find that the PMP alone, if free to choose both prices and ethical location, behaves exactly as when the FT is on the market under the assumption that the FT exogenously sets $P_B = Rp$. Shall we conclude that the FT is not at the root of the partial SR choice of the PMP? We say no for two reasons. First, it may be assumed, as it has happened in the reality, that information on consumers' tastes is *ex ante* incomplete, that the existence of consumers' preferences in favour of specific products such as FT products is revealed only once these products have been present in the market. The PMP could have costly invested in information to know these about preferences, by paying a sunk cost without certainty of the result *ex post*. If the sunk cost (and the expected value of the outcome determined by his guess *a priori* on the probability of finding SR consumers) is high enough, the PMP does not choose $s > 0$, when he is alone in the market, even in presence of high levels of t_1 (high consumers' cost of leftward ethical distance). Second, but this goes behind this specific model, it may be reasonably assumed that consumers' sensitivity to the SR issues grows in SR consumption habits. Recent evidence of it in the empirical analysis of the determinants of FT expenditure may be found in Becchetti and Rosati (2007). In a related paper which incorporates the law of motion of consumers' tastes for SR Becchetti, Giallonardo and Tessitore (2005) find that, under reasonable parametric conditions, the PMP alone chooses a significantly lower level of SR with respect to the case in which he reacts to FT's entry.

[29] (http://www.macfrut.com/ita/conv_2003/relazioni/162benvenuti_f2.pdf).

We discuss this version of the competitive race between the FT and the PMP because we observe that competition between them has some characteristics of the Stackelberg model (i.e. historical evidence that FT products have been created by fair traders, FT's decision to entry in the market based on the knowledge of the strategies of the incumbent PMP). It is therefore interesting to see what happens if we assume that FT producers take their decisions on the basis of the behaviour of the PMP. The inspection of this game leads us to formulate the following proposition

Proposition 3. The equilibrium of the two-stage game in prices and ethical location in which the FT is a Stackelberg leader in location yields

    i)   *PMP's choice of minimum price differentiation, ethical imitation and non minimal ethical differentiation when consumers' costs of ethical distance, which arise from buying from a producer located to the left, are high enough ($t_1 > w$).*

    ii)   *PMP's choice of no ethical imitation when consumers' costs of ethical distance, which arise from buying from a producer located to the left, are relatively low ($t_1 < w$).*

    iii)   *FT's choice of locating at the extreme right of the ethical segment only if the unit production cost is below a given threshold ($w \leq 2t_1 + t_2$).*

In the second stage of the game the PMP maximizes his profit function by choosing his optimal price, given by (11).[30]

Again, the possible solutions are $E_1 = [0, (t_2 + sw)/2 + w]$ and $E_2 = [1/2, w(1 + s) + t_2 - t_2/2 - \varepsilon]$.

In the first stage game the FT chooses his location by maximizing transfers to the South[31] and by taking into account PMP's reaction in the second stage.

FT's maximization problem is the following

$$\max_{s} T(s) = \max_{s} s(1 - x^*) = \max_{s} s\left\{1 - \left[\left(\frac{w(1+s) - P_A + t_2(1-a)}{t_1 + t_2}\right) + a\right]\right\} \tag{15}$$

First order conditions are

$$\frac{dT}{ds} = 1 - \left[\left(\frac{w(1+s) - P_A + t_2(1-a)}{t_1 + t_2}\right) + a\right] - \frac{sw}{(t_1 + t_2)} = 0 \tag{16}$$

The second derivative ensures the existence of a maximum

$$\frac{d^2 T}{ds^2} = -\frac{2sw}{t_1 + t_2} < 0 \tag{17}$$

Let us consider now PMP's choices in order to solve this equation and evaluate *s*. The FT now has to maximize the following function $\overline{T}(s)$:

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[30] We solve the model by backward induction. We start from the solution of the second stage (price and location of the PMP as a function of FT's location). We then pass to the solution of the first stage (location of the FT as a function of PMP's choices).

[31] We also assume that the FT is not completely altruistic as he maximizes his own transfers and not total transfers to the South. This assumption is closer to the actual behaviour of FTs and may imply that FTs care for their survival or disregard partial imitation.

$$\overline{T}(s) = \begin{cases} T_{E_1}(s) = \dfrac{s}{2}\left\{\dfrac{2t_1 + t_2 - sw}{t_1 + t_2}\right\} & \text{if } s \geq \dfrac{t_1}{w} \\[4mm] T_{E_2}(s) = \dfrac{s}{2} & \text{if } s < \dfrac{t_1}{w} \end{cases} \tag{18}$$

FT's choice will depend only on parameters t_1 and w. In fact, if $t_1 > w$, we have always $s < t_1/w$ so that the FT will maximize the function $T_{E_2}(s)$ in eq. (18) for every $s \in [0,1]$, choosing $s = 1$. This is because the FT knows that the PMP will imitate, choosing solution E_2.

All this is true if we consider that $t_1 > w$ implies that $t_1 > sw$ for every $s \in [0,1]$. Hence, according to *Proposition 2*, the PMP necessarily prefers to imitate.

On the contrary, if $t_1 < w$, the FT faces a function changing shape in $s = t_1/w$. It will be a straight line ($T_{E_1}(s)$) until $s = t_1/w$ and a concave parabola ($T_{E_2}(s)$) after that point. At $s = t_1/w$ both functions attain the same value $t_1/2w$ (see Figure 3). The maximum of the parabola is at $s = \dfrac{t_1}{w} + \dfrac{t_2}{2w}$. Then, at $s = \dfrac{t_1}{w} + \dfrac{t_2}{2w}$, $\overline{T}(s)$ attains the maximum and coincides with the FT's choice, if $\dfrac{t_1}{w} + \dfrac{t_2}{2w} < 1$, that is, $2t_1 + t_2 \leq w$. On the contrary, if $2t_1 + t_2 > w$, the FT will maximize choosing again $s = 1$, the maximum value s can assume.

Given $s = \dfrac{t_1}{w} + \dfrac{t_2}{2w}$, the FT knows that the PMP will choose not to imitate (E_1), being $sw = t_1 + \dfrac{t_2}{2} > t_1$. Similarly, given $s = 1$, he knows that the PMP will also choose not to imitate (E_1), being $sw = w > t_1$.

We therefore have three situations:

i) when $w < t_1$, the FT chooses $s = 1$ and the PMP chooses E_2 (minimum price differentiation, ethical imitation and non minimal ethical differentiation).

ii) when $t_1 \leq w \leq 2t_1 + t_2$, the FT chooses $s = 1$ and the PMP chooses E_1;

iii) when $w > 2t_1 + t_2$, the FT chooses $s = \dfrac{t_1}{w} + \dfrac{t_2}{2w}$ and the PMP chooses E_1. $\square$

The interpretation of these findings is that both firms are influenced by the consumers' cost of buying from a less ethical producer (t_1). If that cost is relatively high with respect to the production cost w, the FT chooses the maximum ethical position on the segment and the PMP imitates, applying the maximum price he can, without losing his market share in order to undercut the FT (minimum price differentiation). On the contrary, if the consumers' ethical cost is relatively low with respect to the production cost, the FT continues to locate himself at the extreme right of the ethical segment, only if the unit production cost is not higher than the expression $2t_1 + t_2$, otherwise choosing to reduce his ethical position. However, even in the latter case, the FT's choice does modify the PMP's decision of no imitation, choosing a price which maximizes his profits (non minimum price differentiation), because costs of SR are too high for him.

5. Conclusions

The increased sensitivity for social and environmental issues has recently led to the diffusion of various forms of socially responsible consumption and has transformed social responsibility in an additional crucial competitive factor.

In this paper we formalize this new form of competition by devising a duopolistic product differentiation model in which physical distance is reinterpreted as ethical distance.

Our analysis of competition in a simple duopoly with ethical differentiation shows that increased price competition is the outcome when the incumbent is assumed not to move towards social responsibility (fixed location). When we leave him free to imitate, we find that the socially responsible entrant generates significant "ethical" indirect effects by inducing the incumbent to imitate him, when consumers' costs of ethical distance are sufficiently high. The extent of imitation is limited by the different nature of the two (profit maximizing and zero profit/transfer maximizing) competitors.

We then show that the sequential game in which location and prices are simultaneously chosen and the fair trade producer is a Stackelberg leader in location has three main features: minimum price differentiation, ethical imitation and non minimal ethical differentiation. Moreover, the entrant will choose to be at the extreme of the ethical segment only if the unit production cost is below a given threshold of consumers' costs of ethical distance.

Our results support the intermediate point of view between the two extreme opinions on this new type of competition. The first considers it completely marginal arguing that the behaviour of a socially concerned producer has no effects on social responsibility of traditional producers. This perspective is contradicted by the large diffusion of socially oriented advertising which is consistent with our theoretical results documenting the existence of ethical imitation. The second argues that traditional producers, with their larger scale, may easily replicate the behaviour of socially responsible producers eliminating them from the market. We show that this extreme point of view is also incorrect. In our model we never get a result of minimal ethical differentiation and we show that, in absence of asymmetric information, ethical imitation from traditional producers is extremely costly and limited.

We believe that, after this first exploration, additional research effort should be exerted in the future in different directions (asymmetric information, joint consideration of geographical and ethical distance) to evaluate the robustness of our conclusions to changes in the assumptions of the model.

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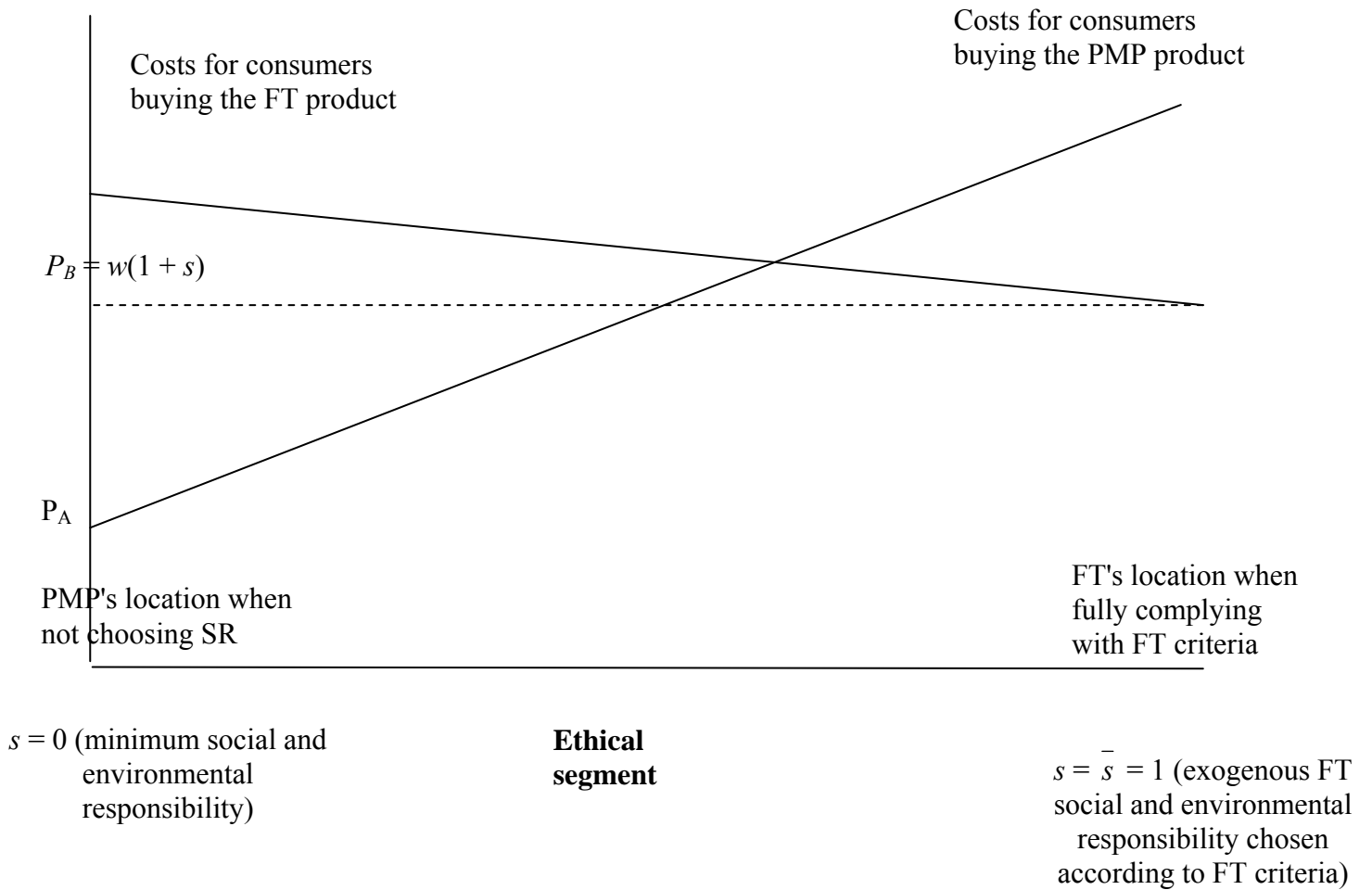
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Figure 1. The Hotelling game of ethical imitation and the asymmetric costs of ethical distance

Costs for consumers buying the PMP product

Costs for consumers buying the FT product

$P_B = w(1 + s)$

P_A

PMP's location when not choosing SR

FT's location when fully complying with FT criteria

$s = 0$ (minimum social and environmental responsibility)

Ethical segment

$s = \bar{s} = 1$ (exogenous FT social and environmental responsibility chosen according to FT criteria)

Legend: Buying a product at one's left in the ethical segment implies choosing a product below one's own ethical standards while buying a product at one's right implies choosing a product above one's own ethical standards. We assume that marginal costs of distance are higher in the first than in the second case.

Figure 2. The feasible set in the simultaneous price-ethical location choice of the incumbent
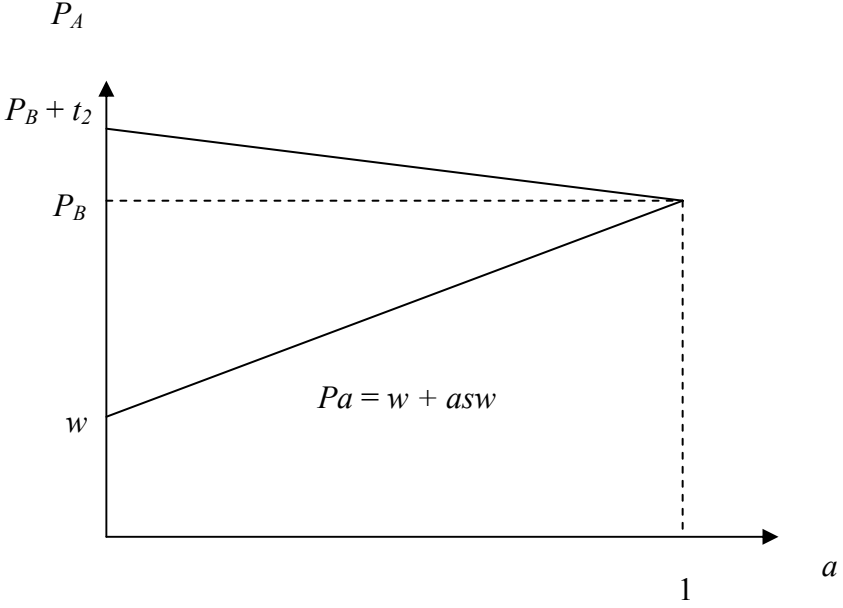
Figure 3. FT's maximizing function when $t_1 < w$.