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### **Made in Dignity: the Impact of Social Labels**

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# ‘Made in Dignity’: the Impact of Social Labels\*

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## **Abstract**

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# 1 Introduction

The recent debates about the organization of world trade stressed the need to regulate trade in order to avoid what is thought as unfair competition by countries applying low labour standards. Numerous proposals have been put forward to incorporate minimum labour-standards into international trade rules. While these proposals are partly motivated by protectionist motives against 'social dumping', they also express a genuine concern about labour conditions in some developing economies.

While at the national level, various policies are available, ranging from bondage prohibition to incentives for entrepreneurs to improve working conditions, the set of instruments at the international level is much more limited. Social labelling programs have been developed recently as an alternative to import taxes or import prohibition. By raising awareness among the public, labels are expected to trigger a change in demand patterns towards the producers complying with a code of conduct.

Social labelling programs have developed rapidly over the recent years. In 2005, global retail sales of labelled items were estimated at US\$ 1 billion. Between 2003 and 2004, Fairtrade labelled sales across the world grew by 56% to over 125,000 Metric Tones (MT), with Belgium, France, Italy and the USA fastest growing with average annual growth rates above 100% (past 5 years).<sup>1</sup> Besides their commercial success, most labelling programs are advocated by some international organisations such as ILO, UNICEF and NGO's (Oxfam, Max Havelaar, . . .).

Labels are indeed particularly attractive as they do not rely on coercion. They instead give information to the consumers on the social environment surrounding the production of a particular good. The consumer is then free to choose whether to support or not those practices, giving rise to a form of 'democracy by the consumers' (as advertised by Oxfam in a recent campaign).

Some empirical studies have however cast some doubt on the effectiveness of social labelling in promoting labour standards. For instance, an ILO report (2000a) concludes: "the impact [of labelling on child labour in India's carpet industry] does not seem to be substantial. (...) Overall, it is apparent that the labelling programmes have played a limited role in addressing the problem of child labour in the carpet industry".<sup>2</sup> Some authors have also questioned the viability of social labels:

"Seeking Fair Trade is attempting to do economics in the dark, with no regard to supply or demand. It is the market that sets

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<sup>1</sup>See [www.fairtrade.net](http://www.fairtrade.net) (february 2006).

<sup>2</sup>See also another report of ILO (2000b).

the price of goods, and any obstructions that are artificially introduced to achieve an end will not only fall short, but also foment a whole new set of problems.(...). Fair Trade is the economic equivalent of alchemy. It sets out to engineer goals under the false pretense that the market can be rigged. Unfortunately for those affected, the system cannot be manipulated for their purposes.”<sup>3</sup>

“Higher prices for coffee are unthinkable, roasters say. There is a coffee surplus and therefore coffee growers should change crop. This is impossible, the farmers say. They will have to, because the market for the fixed, high prices of fair trade coffee is too small, exporters say. So, how to end the impasse?”<sup>4</sup>

“The real problem is a world-wide coffee glut, not avaricious purchasers. Fair trade can’t solve that problem. Now on to the arguments about fair trade itself. Let’s say a retailer agrees to purchase a product from a producer who complies with whatever fair trade rules are in vogue at the moment. The cost will be higher, but in the short run at least the new producer and its workers benefit. Other coffee producers suffer lost sales, and they shed workers, who move to less-desirable jobs if they can find jobs. Overall less coffee is sold, since the new higher prices are mostly passed on to consumers.”<sup>5</sup>

In this paper, we propose a systematic analysis of social labels, and their impact on producer’s welfare. We show that labels in open access fundamentally make producers better off only when they trigger an increase in world demand so that total production is still exhausted at a higher price. To this end, labels have both to create optimism about improving effectively labour standards and also increase the marginal utility of the products they support. A failure of one of these two conditions automatically leads to a statu-quo for producers, or can even be detrimental when expectations in the North are not rational.

The literature on labelling is so far limited. Fisher and Serra (2000) stress the protectionist role of production standards, in line with the current debates on the WTO. In a paper on ecolabelling, Mattoo and Singh (1994) show that

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<sup>3</sup>Luke Thomas, 2004, Global Exchange’s myth, Digital Freedom Network, [http://unix.dfn.org/printer\\_GlobalExchangesMyth1.shtml](http://unix.dfn.org/printer_GlobalExchangesMyth1.shtml)

<sup>4</sup>Edwin Koopman, 2005, A better price for ‘good coffee’, Radio Netherlands, [www2.rnw.nl/rnw/en/specialseries/fair-trade/050315ft?view=Standard](http://www2.rnw.nl/rnw/en/specialseries/fair-trade/050315ft?view=Standard)

<sup>5</sup>Dave, 2004, fair trade: is bad information causing a market failure?, No illusions, [http://illusionfree.com/weblog/index.php/no\\_illusions/niperm/20041109\\_fairtrade/](http://illusionfree.com/weblog/index.php/no_illusions/niperm/20041109_fairtrade/)

ecolabels may lead to adverse effects on the environment (see also Nimon and Beghin (1999), Swallow and Sedjo (2000), Mason (2000), Tian (2003)). Our paper differs from the literature on eco-labelling in so far as we focus on labour standards, while ecolabels have obvious public goods implication that are not directly relevant when discussing labour standards. Moreover, those papers rely in general on a set of restrictive assumptions that strongly limits the relevance of their conclusions. Among these, the supply of both the labelled and non-labelled products is assumed to be fixed. This assumption thus excludes possible reallocations of production towards cleaner modes of production, which is the main channel behind the expected benefits of social labelling. This literature often relies on a partial equilibrium analysis and generally assumes that the label necessarily increases the demand for labelled products (which, as we shall show, is far from general).

In the abundant literature on child labour, some authors have already raised some doubts about the beneficial impact of trade sanctions. This is due to the fact that trade sanctions tend to reduce the incomes of the exporting country, which may increase the incidence of child labour (see e.g. Basu and Van (1998), Ranjan (2001), Jafarey and Lahiri (2002), Basu (2003), and Edmonds and Pavcnik (2003)). However, the impact of a labelling program differs from trade sanctions as it is expected to increase the price of 'clean' exports. Brown (1999) and Basu and al. (2002) provide some insight into the impact of a child-labour-free label on the incidence of child labour. Both papers focus on the potential role of adverse selection in the labelled sector and the presence of labelling costs and show that a label is fundamentally beneficial if the premium consumers are willing to pay for labelled items covers the cost. However, they fail to provide a clear-cut overview of the impact of labelling on the social conditions of the producers as in their model entry into the labelling sector is costly and related to the absence of child labour only.<sup>6</sup>

The paper proceeds as follows. In section , we present the fundamentals of the model, before turning in section to the first proposition of the paper, which describes the conditions under which the code of conduct in the labelled sector can in fact be complied with. We analyze in section an example of labelling programs actually implemented by some NGO's. In section , we allow for the possibility of a labelling cost, and show that labels are more likely to be ineffective with such costs. In section , we analyze the effects of a restricted label, where only part of the demand for labelled products can be satisfied, and show that such a label creates winners and losers. In

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<sup>6</sup>See also the reports of ILO (1997), and the Bureau of International Labor Affairs (1997) for an overview of the existing labelling programs targeting child labour.

section , we discuss the likely effects of a restricted label in the presence of another type of North-South transfers through which aid may be channeled. We then extend in section our basic model to investigate the impact of a child labour-free label. Section concludes.

## 2 The fundamentals and the Pre-label equilibrium

Consider an economy with two countries, North and South, denoted by  $N$  and  $S$  respectively. Each country produces one type of good, with the North producing clothes and the South producing food. The production functions are linear, with labour as the only input. In each country, there are  $L$  agents, each of whom has one unit of time that he supplies inelastically on the labour market. Productivity in the South is equal to 1, each worker in the South producing one unit of food. The total supply of food in the South is equal to  $f = L$ . Productivity in the North is equal to  $\gamma$ , and the total supply of clothes is equal to  $c = \gamma L$ .

Northern consumers care about consumption goods and the labour standards prevailing in the South. The utility function of Northern consumer has the following form:

$$U_N = U_N(c_N, f_N, \pi), \quad (1)$$

where  $c_N$  and  $f_N$  respectively represent the amount of clothes and food consumed. The third argument,  $\pi$ , is a dummy variable which takes a value 1 if the labour standards prevailing in the production of the units of food purchased are high, and a value 0 otherwise. Northern consumers prefer high labour standards, so that  $U_{N,3} \geq 0$ .<sup>7</sup>

Southern agents derive utility from improved labour standards in the production units in which they work. As consumers, however, they are indifferent towards the labour standards applying in the production of the goods they consume. Accordingly, the utility function of a Southern consumer is as follows:

$$U_S = U_S(c_S, f_S, \theta), \quad (2)$$

where  $c_S$  and  $f_S$  represent the amount of clothes and food consumed, and  $\theta$  is a dummy variable which takes a value 1 if he worked under high labour standards, and 0 otherwise. Southern households prefer high labour standards so that  $U_{S,3} \geq 0$ .

We assume that  $U_i$ ,  $i = N, S$ , is twice continuously differentiable, increasing and concave in its two first arguments:  $U_{i,1} > 0$ ,  $U_{i,2} > 0$ ,  $U_{i,11} < 0$ ,

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<sup>7</sup> $U_{i,j}$  represents the partial derivative of utility in country  $i = N, S$  with respect to the  $j^{\text{st}}$  argument.

and  $U_{i,22} < 0$ . We assume all goods to be normal. We also assume Inada end-point conditions to ensure the existence of an equilibrium:  $\lim_{c_i \rightarrow 0} U_{i,1} = \lim_{f_i \rightarrow 0} U_{i,2} = +\infty$  and  $\lim_{c_i \rightarrow +\infty} U_{i,1} = \lim_{f_i \rightarrow +\infty} U_{i,2} = 0$ . In addition, we allow for cross-derivatives to be non zero:  $U_{i,13} \gtrless 0$  and  $U_{i,23} \gtrless 0$ .

We first describe the equilibrium that prevails before labels are introduced. In their absence, we assume that production standards in the South are low, so that  $\pi = \theta = 0$ .<sup>8</sup>

We let clothing to be the numeraire, so that  $p_c = 1$ . The income of a Northern consumer,  $w_N$ , is then equal to  $\gamma$ , and his budget constraint is given by:

$$\gamma = c_N + pf_N \quad (3)$$

where  $p$  stands for the pre-label price of food. Similarly, income in the South, referred to as  $w_S$ , is equal to wages:  $w_S = p$ . The budget constraint of a Southern consumer is then given by:

$$p = c_S + pf_S \quad (4)$$

Maximizing utility given these budget constraints yields the demands for food and clothing for a Northern consumer,  $f_N(p, w_N, \pi)$  and  $c_N(p, w_N, \pi)$ , and the corresponding demands for food and clothing in the South,  $f_S(p, w_N, \theta)$  and  $c_S(p, w_N, \theta)$ .

Under the conditions above, a market equilibrium for food,  $p^*$ , is such that:

$$Lf_N^*(p^*, w_N^*, \pi) + Lf_S^*(p^*, w_S^*, \theta) = L \quad (5)$$

where  $w_N^* = \gamma$ ,  $w_S^* = p^*$  and  $\pi = \theta = 0$ . By the budget constraints, the equilibrium price  $p^*$  also constitutes an equilibrium for the clothing market, and we therefore have:

$$Lc_N^*(p^*, w_N^*, \pi) + Lc_S^*(p^*, w_S^*, \theta) = L\gamma \quad (6)$$

We now discuss the assumptions necessary for our comparative statics to be meaningful. The normality of all goods implies that, in the North,  $f_N$  is decreasing in  $p$  and in the South,  $c_S$  is increasing in  $p$ . On the market

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<sup>8</sup>Assumption 1 infra requires that  $\theta$  would be zero at a pre-label equilibrium even if it was endogenous.

for clothes, we require that the aggregate demand for clothing is strictly increasing in the food price:  $\frac{dc_N}{dp} + \frac{dc_S}{dp} > 0$  where  $\frac{dc_j}{dp} = \frac{\partial c_j}{\partial p} dp + \frac{\partial c_j}{\partial w_j} \frac{\partial w_j}{\partial p} dp$ ,  $j = S, N$ . Since the supply is fixed and equal to  $L\gamma$ , this implies that the equilibrium on the market for clothing is unique and stable. On the market for food, we assume that the aggregate demand for food is strictly decreasing in the price of food:  $\frac{df_N}{dp} + \frac{df_S}{dp} < 0$ . This requires that the wage effect in the South (being richer, the Southern household demands more food) does not dominate the substitution effect (as the relative price of food rises, the worldwide demand for food falls).

Under this assumption, the equilibrium defined by equation (5) is stable and unique.

### 3 The impact of labelling under free entry

A label on a unit of food certifies that it has been produced under high labour standards. There is no uncertainty associated with the quality of the label. Labels are costly however: to obtain a label, one has to spend  $\sigma_c \geq 0$  units of clothing, and  $\sigma_l \geq 0$  units of labour in the labelled sector in the South per unit of food produced. The first type of cost,  $\sigma_c$ , reflects the fact that Northern technology and expertise are involved in the certification process, and must be compensated at the going wage rate in the North. The second type of cost reflects the fact that improved labour standards imply higher production costs in the labelled sector, by resorting to less exploitative modes of production or spending more resources on workers' health and education. We represent the resulting lower productivity of labour in the labelled sector by the cost  $\sigma_l$ , so that a worker in the labelled sector produces only  $(1 - \sigma_l)$  units of labelled food.

Potentially, the South can now produce two types of food: labelled and unlabelled. We refer to each of them by the superscripts  $l$  and  $u$ , respectively. As a result, they are now two sectors in the South, labelled and unlabelled, referred to as  $Sl$  and  $Su$ , so that  $f_i^j$ , with  $i = N, Sl, Su$ , and  $j = l, u$  represents the amount of food of type  $j$  demanded by a consumer working in sector  $i$ , and  $p^j, j = u, l$ , stands for the price of one unit of food of type  $j$ .

In the following, we shall use the indirect utility functions of a Northern consumer (obtained by maximizing (1) under the budget constraint):  $v_N(p^l, \gamma, 1)$  if he consumes labelled food, and  $v_N(p^u, \gamma, 0)$  otherwise. The Northern consumer chooses labelled food if and only if  $v_N(p^l, \gamma, 1) > v_N(p^u, \gamma, 0)$ . Under our assumptions, a Southern consumer always consume the cheapest units of food available, so that his indirect utility is given by:  $v_S(p^m, w_S^l, 1)$  if

he works in the labelled sector, and  $v_S(p^m, w_S^u, 0)$  otherwise, where  $p^m = \min(p^l, p^u)$ .

We first investigate the implications of free entry into the labelling program. Free entry implies that any agent in the South can freely reallocate himself between the labelled and the unlabelled sector.<sup>9</sup> We restrict to the case labelling is necessary: improved labour standards are costly and require higher prices for labelled food. We therefore assume:

**Assumption 1** *At  $p^l = p^u$ ,  $v_S(p^l, (1 - \sigma_l)p^l - \sigma_c, 1) < v_S(p^l, p^l, 0)$ .*

Under Assumption 1, if  $p^l = p^u$ , all Southern workers prefer to work in the unlabelled sector: the costs of improved labour standards are higher compared to the utility gains they create. Otherwise, only labelled units of food are produced and sold. In this situation, the adoption of improved labour standards is not related to labelling as such, but to the fact that they cost little compared to the utility gains they create for the workers, so that they would be adopted even in the absence of labelling.

For both sectors to co-exist under free entry, the North has to be willing to pay the price differential between labelled and unlabelled food which leaves southern workers indifferent between working in either sector. Formally, Southern households have no preference over the sector they work for if and only if  $p^l = \underline{p}^l(p^u)$  where  $\underline{p}^l(p^u)$  is defined by:

$$v_S(p^u, (1 - \sigma_l)\underline{p}^l(p^u) - \sigma_c, 1) = v_S(p^u, p^u, 0) \quad (7)$$

Equation (7) defines all pairs of food prices  $(\underline{p}^l(p^u), p^u)$  which leave Southern workers indifferent between either sector. Following Assumption 1,  $\underline{p}^l(p^u) > p^u$ : the price in the labelled sector must compensate Southern producers for the net cost of improved labour standards.

We now assume that Northern consumers are indeed willing to pay this compensation:

**Assumption 2** *At any pair  $(\underline{p}^l(p^u), p^u)$ , Northern consumers prefer to consume labelled units of food:  $v_N(\underline{p}^l(p^u), \gamma, 1) > v_N(p^u, \gamma, 0)$ .*

If Assumptions 1 and 2 are simultaneously satisfied, then a unique equilibrium  $(p^{l*}, p^{u*})$  exists with unlabelled food being sold exclusively in the South and labelled food in the North. A failure of Assumption 2 leads to

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<sup>9</sup>By allowing for large production shifts towards the labelled sectors, these assumptions tend to bias the results of the model in favour of a large positive impact of labelling.

an equilibrium with no labelled food: to make Southern workers indifferent between the two types of production, the price of labelled food must be so high compared to the price of unlabelled food that Northern consumers prefer unlabelled food. There is no label in equilibrium. This is more likely the higher the costs of labelling ( $\sigma_l, \sigma_c$ ).

To guarantee a unique and stable equilibrium in the post-label situation, we require that  $\frac{dc_S(p, (1-\sigma_l)\underline{p}^l(p) - \sigma_c, 1)}{dp} \geq \frac{dc_S(p, p, 0)}{dp}$  in addition to the stability assumptions made in Section 2.<sup>10</sup> A pair of prices ( $p^{l*}, p^{u*}$ ) is therefore an equilibrium if it satisfies (7) and is such that the demand equals supply on each market.

Before turning to Proposition 1, we introduce a piece of notation. We first let  $\mu^*$  and  $\beta^*$  respectively stand for the optimal amounts of food and clothes the south is willing to give up in order to obtain high labour conditions at a pre-label equilibrium price  $p^*$ :

$$U_S(c_S^* - \beta^*, f_S^* - \mu^*, 1) = U_S(c_S^*, f_S^*, 0) \quad (8)$$

where  $c_S^* - \beta^*$  and  $f_S^* - \mu^*$  are an equilibrium. This allows us to write down an explicit expression for the labelled price leaving Southern workers indifferent between either sector when unlabelled price is at the pre-label price level:

$$\underline{p}^l(p^*) = \frac{(1 - \mu^*)p^* + \sigma_c - \beta^*}{1 - \sigma_l}$$

Moreover, we define the function  $\phi = \phi(p^l) \leq 0$  (depending on the price of labelled food) as the change in clothes consumption in the North when price of labelled food changes from  $p^*$  to  $p^l$ , divided by a positive term equal to the number of Southern households in the labelled sector when labelled price is  $p^l$  (i.e.  $\phi$  is the change in clothes consumption in the North per Southern household in the labelled sector):

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<sup>10</sup>More precisely, for a unique and stable equilibrium in the post-label situation, we need that  $\frac{dc_N(\underline{p}^l(p), \gamma, 1)}{dp} + \lambda \frac{dc_S(p, p, 0)}{dp} + (1 - \lambda) \frac{dc_S(p, (1-\sigma_l)\underline{p}^l(p) - \sigma_c, 1)}{dp} > 0$  for any  $\lambda \in (0, 1)$ , which is less demanding. On the food market, we require  $\frac{df_N(\underline{p}^l(p), \gamma, 1)}{dp} + \lambda \frac{df_S(p, p, 0)}{dp} + (1 - \lambda) \frac{df_S(p, (1-\sigma_l)\underline{p}^l(p) - \sigma_c, 1)}{dp} < 0$  for any  $\lambda \in (0, 1)$ .

$$\phi(p^l) = \frac{(1 - \sigma_l)}{f_N(p^l, \gamma, 1)} (c_N(p^l, \gamma, 1) - c_N(p^*, \gamma, 0)) \quad (9)$$

We now have Proposition 1:

**Proposition 1** *Under assumptions 1 and 2, the label in free access increases the welfare in the South iff  $\sigma_c - \beta^* + \phi(\underline{p}^l(p^*)) < 0$ .*

**Proof.** Letting  $L_S^l$  and  $L_S^u$  stand for the number of workers in the labelled and the unlabelled sector respectively, with  $L_S^l + L_S^u = L$ , the equilibrium condition on the labelled food market is:

$$L f_N^l(p^l, \gamma, 1) = (1 - \sigma_l) L_S^l$$

The aggregate demand for clothes is:

$$L c_N(p^l, \gamma, 1) + L_S^l c_S(p^u, (1 - \sigma_l)p^l - \sigma_c, 1) + L_S^l \sigma_c + L_S^u c_S(p^u, p^u, 0)$$

Consider now this aggregate demand at  $p^u = p^*$  and  $p^l = \underline{p}^l(p^*)$  which guarantees that welfare in the unlabelled sector (and in the labelled sector, from free entry) remains unaffected compared to the pre-label situation. Subtracting the pre-label demand for food defined in the left-hand side of Equation (5) from the post-label aggregate demand for clothes at  $p^u = p^*$ , and  $p^l = \underline{p}^l(p^*)$ , we obtain a fall in demand for clothes iff:

$$L c_N(\underline{p}^l(p^*), \gamma, 1) - L c_N^* + L_S^l \sigma_c - L_S^l \beta^* < 0$$

since  $c_S(p^*, (1 - \sigma_l)\underline{p}^l(p^*) - \sigma_c, 1) - c_S^* = -\beta^*$ . Using the equilibrium on the labelled food market, and the post-label budget constraint in the North, the inequality becomes:

$$L c_N(\underline{p}^l(p^*), \gamma, 1) - L c_N^* + \frac{L f_N^l(\underline{p}^l(p^*), \gamma, 1)}{(1 - \sigma_l)} (\sigma_c - \beta^*) < 0$$

Rearranging, we get the inequality of Proposition 1.

Given our stability conditions, a fall (rise) in food prices is required in case of excess demand (supply) of clothes to restore markets to an equilibrium.

By the envelope theorem, it is easy to show that the utility of a Southern household increases if food prices (and income) increase. ■

With the introduction of a label, several changes occur on the clothes market. At the pre-label equilibrium level for unlabelled food,  $p^u = p^*$ , and  $p^l$  set at a level which leaves Southern workers indifferent between either sector, we have: workers in the labelled sector pay the cost in terms of clothes, they demand less clothes since their net wages are lower than in the unlabelled sector, and the Northern demand for clothes (in physical units) may increase or decrease depending on the pure label effect (the change in demand for clothes induced by an increase in improved labour standards in the South) and on the cross-price effect (the change in demand for clothes induced by the increase in labelled price).

These changes may lead to either an excess demand or an excess supply of clothes. In the case of an excess supply of clothes, the food prices must rise. This leads to an unambiguous increase in the utility of all workers in the South, since the utility of workers in the unlabelled food sector is strictly increasing in  $p^u$  and is equal to the utility of those working in the labelled sector because of free entry. The converse is true in the case of an excess demand for clothes. As a result, the welfare impact in the South is directly determined by whether the introduction of a label creates an excess supply or an excess demand for clothes, at the pre-label price for unlabelled food.

To illustrate this result, consider Cobb-Douglas utility functions both in the North and in the South with three goods: food, clothes and labour standards. Let's investigate what happens on the clothes market. First, note that the Northern demand for clothes remains unaffected no matter how are food prices and utility of improved labour standards. At  $p^u = p^*$ , there is no change in Southern demand for clothes from workers in the unlabelled sector since food price and income remain constant. The only change is from Southern households working in the labelled sector. They have to pay  $\sigma_c$ , the cost of improved labour standards in terms of clothes, but their demand decreases by  $\beta^*$  as a result of the fall in their net income they agree in order to obtain improved labour standards. The sign of  $\sigma_c - \beta^*$  thus determines whether an excess supply (demand) arise on the clothing market requiring a rise (fall) in food prices to restore markets to equilibrium. As a result, the label makes the South worse off if the improved labour standards present a net cost in terms of clothes (the net cost being the difference between the actual cost minus the amount the South agrees to give up); while the label has no impact on the welfare in the South if the net cost is only in terms of food. With more general utility functions, the result is more in favour of a positive impact of the label when the elasticity of the Northern demand for clothes in food price is less than 0 (or equivalently, when the Northern elasticity of demand for food in food price is lower in absolute value than 1) and when the label creates a pure label effect in the North (i.e. when the

label increases the demand for food at the expense of clothes).

Consider the Cobb-Douglas example again. In the case of  $p^{u^*}$  larger than the pre-label price (that is, when the inequality of Proposition 1 holds), it is easy to show that the size of the price differential  $p^{u^*} - p^*$  is larger (i) the lower  $\sigma_c$  and the larger the utility in the South of improved labour standards. With more general utility functions, four more effects play a role with the price differential being larger (ii) the more the label increases the marginal utility of food at the expense of clothes in the North and in the South, (iii) the lower the elasticity of the demand for clothes in food price in the North (or equivalently the lower in absolute value the Northern elasticity of demand for food in food price), (iv) the lower the elasticity of Southern demand for clothes in food price (or equivalently the lower in absolute value the elasticity of Southern demand for food in food price), and (v) the lower the income elasticity of Southern demand for clothes (or the higher the income elasticity of Southern demand for food), with (iii), (iv) and (v) requiring a large rise in food price to restore market to equilibrium.

We have assumed so far that  $\pi$  is perfectly determined in the pre-label situation: it is equal to 0 since labour standards in the South are low. An alternative could be to consider  $\pi$  as the subjective beliefs in the North about high labour standards in the South. This makes sense if we consider that the North might be erroneously convinced that labour standards in the South were high in the pre-label situation, so that the label in fact informs Northern consumers about low labour standards in the South. The pure label effect in this case is nil, and this although  $\pi$  could have an impact on the demands. The scandals which developed around the coffee industry or the textile industry in the recent years support the idea that consumers are not aware of extremely low labour standards in those sectors. The current campaigns led the ILO and many NGOs also attest the lack of awareness of consumers in the North.

## 4 The impact of restricted social labelling

In the previous section, we have assumed perfect mobility of workers across sectors, and argued that the possibility for workers to reallocate themselves freely towards the most beneficial sector does not allow the emergence of a welfare differential between the labelled and the unlabelled sectors.

We here explore the impact of social labelling when entry into the labelled sector is restricted, so that only a number  $\bar{L}$  of workers in the South may enter the labelled sector ( $0 < \bar{L} < L$ ). With a restricted access to the label, three kinds of equilibrium can emerge:

Case 1 (access restriction is not binding) one equilibrium with the North consuming labelled food exclusively and with workers in the South indifferent between sectors,

Case 2 (access restriction is not fully binding) one equilibrium with the North consuming labelled food exclusively and with workers in the South preferring labelled sector,

Case 3 (access restriction is fully binding) one equilibrium with the North being indifferent between the two types of food and with workers in the South preferring labelled sector,

Case 1 has already been discussed as it corresponds to the post-label equilibrium in free access. In Case 2, the access to the label is not as restricted as to obtain the highest possible price differential between the two types of food, while this is true in Case 3. For a given unlabelled price, the more binding the access restriction to the label, the higher the labelled price:  $p^l = \underline{p}^l(p^u)$  in Case 1,  $\bar{p}^l(p^u) > p^l > \underline{p}^l(p^u)$  in Case 2 and  $p^l = \bar{p}^l(p^u)$  in Case 3, with  $p^l = \bar{p}^l(p^u)$  defined as the labelled price leaving Northern consumers indifferent between purchasing labelled or unlabelled food:

$$v_N(\bar{p}^l(p^u), \gamma, 1) = v_N(p^u, \gamma, 0) \quad (10)$$

In this section, we focus on Case 3 (fully-binding restricted access), although conditions for this case to occur can only be provided ex-post.<sup>11</sup> Case 2 will also be analyzed.

The price differential between  $\bar{p}^l(p^u)$  and  $p^u$  leaves Northern consumers indifferent between the two types of food. Following Assumption 2, it creates in the South a welfare differential in favour of workers in the labelled sector:

$$v_S(p^u, (1 - \sigma_l)\bar{p}^l(p^u) - \sigma_c, 1) > v_S(p^u, p^u, 0)$$

Before turning to the impact of a restricted label, we assume a stable and unique post-label equilibrium by requiring that  $\frac{dc_S(p, (1 - \sigma_l)\bar{p}^l(p) - \sigma_c, 1)}{dp} \geq \frac{dc_S(p, p, 0)}{dp}$  in addition to the stability assumptions made in Section 2.<sup>12</sup>

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<sup>11</sup>This condition can be formally written as:  $Lf_N(p^{l*}, \gamma, 1) \geq (1 - \sigma_l)\bar{L}$  with  $p^{l*} = \bar{p}^l(p^{u*})$ .

<sup>12</sup>More precisely, for a unique and stable equilibrium in the post-label situation, we need that  $\frac{dc_N(\bar{p}^l(p), \gamma, 1)}{dp} + \lambda \frac{dc_S(p, p, 0)}{dp} + (1 - \lambda) \frac{dc_S(p, (1 - \sigma_l)\bar{p}^l(p) - \sigma_c, 1)}{dp} > 0$  for any  $\lambda \in (0, 1)$ , which is less demanding. On the food market, we require  $\frac{df_N(\bar{p}^l(p), \gamma, 1)}{dp} + \lambda \frac{df_S(p, p, 0)}{dp} +$

We first investigate the impact of a restricted label on the welfare of the Southern workers in the labelled sector. In general a restricted label makes the workers in the labelled sector better off. Interestingly, this impact may however be detrimental. At this level of generality, we are not able to derive straightforward conditions ensuring this result. This is unfortunately the case because we cannot easily construct food prices  $p^u$  and  $p^l$  leaving the welfare in labelled sector unchanged compared to the pre-label situation. However, we can give an intuitive situation in which the impact is detrimental. Consider the case of a label in free entry making households in the South worse off, that is, the case in which inequality of Proposition 1 does not hold. Suppose now that the maximum price differential the North is willing to pay is only slightly higher than the price differential leaving Southern workers indifferent between either sector. Compared to free entry, labelled price will be slightly higher and unlabelled price slightly lower, leaving the welfare of labelled workers almost unaffected.

We now turn to the impact on the workers in the unlabelled sector. Letting  $\psi = c_S(p^*, (1 - \sigma_l)\bar{p}^l(p^*) - \sigma_c, 1) - c_S(p^*, (1 - \sigma_l)\underline{p}^l(p^*) - \sigma_c, 1) > 0$  stand for the increase in demand for clothes from workers in the labelled sector due to an increase in gross income from  $\underline{p}^l(p^*)$  to  $\bar{p}^l(p^*)$ , we have Proposition 2:

**Proposition 2** *Under Assumptions 1 and 2, a fully-binding restricted access label increases the welfare of workers in the unlabelled sector iff  $\sigma_c - \beta^* + \phi(\bar{p}^l(p^*)) + \psi < 0$ .*

**Proof.** Letting  $L_N^l$  and  $L_N^u$  stand for the number of Northern consumers purchasing labelled and unlabelled units of food, respectively, with  $L_N^l + L_N^u = L$ , the equilibrium condition on the labelled food market is:

$$L_N^l f_N(p^l, \gamma, 1) = (1 - \sigma_l)\bar{L}$$

At  $p^u = p^*$  and  $p^l = \bar{p}^l(p^*)$ , the change in demand for clothes compared to the pre-label demand is:

$$L_N^l c_N(\bar{p}^l(p^*), \gamma, 1) - L_N^l c_N^* + \bar{L} c_S(p^*, (1 - \sigma_l)\bar{p}^l(p^*) - \sigma_c, 1) + \bar{L}\sigma_c - \bar{L}c_S^*$$

Dividing the whole expression by  $\bar{L}$ , and using the function  $\phi$  defined at equation (9), there is a fall in aggregate demand for clothes iff:

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$$(1 - \lambda) \frac{df_S(p, (1 - \sigma_l)\bar{p}^l(p) - \sigma_c, 1)}{dp} < 0 \text{ for any } \lambda \in (0, 1).$$

$$\phi\left(\bar{p}^l(p^*)\right) + c_S\left(p^*, (1 - \sigma_l)\bar{p}^l(p^*) - \sigma_c, 1\right) + \sigma_c - c_S^* < 0$$

Using  $c_S(p^*, (1 - \sigma_l)\underline{p}^l(p^*) - \sigma_c, 1) - c_S^* = -\beta^*$ , and  $\psi = c_S(p^*, (1 - \sigma_l)\bar{p}^l(p^*) - \sigma_c, 1) - c_S(p^*, (1 - \sigma_l)\underline{p}^l(p^*) - \sigma_c, 1)$ , we get the inequality of Proposition 2.

The result follows from our stability conditions and from the envelope theorem. ■

Compared to the condition of Proposition 1 (dealing with the change in Southern welfare induced by a label under free entry), the condition of Proposition 2 (ensuring that a restricted label makes households in the unlabelled sector better off) varies in two respects. First, the restriction on the supply of labelled food leads to a different change in clothes consumption in the North as the labelled price is higher than under free entry. The sign of this change depends on the sign of the elasticity of the Northern demand for clothes in food price above  $p^l = \underline{p}^l(p^*)$ , with a negative elasticity being beneficial for households in the unlabelled sector. Second, this increase in labelled price creates an income effect for workers in the labelled sector. This effect is detrimental for households in the unlabelled sector as it increases the demand for clothes. Adding up these two effects, we obtain that a label under fully-restricted may be better or worse than a label in free entry for workers in the unlabelled sector.<sup>13</sup> In the Cobb-Douglas example, however, the change in Northern consumption of clothes to a change in food price is nil, so that households in the unlabelled sector are worse off with a label under restricted access than under free entry.

In general, the label makes the workers in the labelled sector better off while its impact on the workers in the unlabelled sector is ambiguous. Let's now consider that, ex-ante, any household in the South has the same probability  $\frac{\bar{L}}{L}$  to be hired in the labelled sector. The following corollary gives us the impact of a label on the Southern expected utility, referred to as  $E(v_S)$ , when access to the labelled sector is restricted to a very small number of households:

**Corollary 1** *If  $\bar{L} \rightarrow 0$ , then  $E(v_S) > v_S^*$  iff  $\sigma_c - \beta^* + \phi\left(\bar{p}^l(p^*)\right) + \psi < 0$ ,*

<sup>13</sup>As discussed previously, the access to the label could not be as restricted as to obtain the highest possible price differential between the two types of food. Formally, Case 2 occurs if and only if  $f_N(p^{l*}, \gamma, 1) = (1 - \sigma_l)\bar{L}$ , with  $\bar{p}^l(p^{u*}) > p^{l*} > \underline{p}^l(p^{u*})$ . In this situation, the condition of Proposition 2 has to be rewritten as  $\sigma_c - \beta^* + \phi(p^{l*}) + \psi' < 0$ , where  $\psi' = c_S(p^*, (1 - \sigma_l)p^{l*} - \sigma_c, 1) - c_S(p^*, (1 - \sigma_l)\underline{p}^l(p^*) - \sigma_c, 1)$ . The only change is that the labelled price is here somewhere between  $\underline{p}^l(p^{u*})$  and  $\bar{p}^l(p^{u*})$ . This modifies the size of both the price effect  $\phi$  and the income effect  $\psi$ .

where  $v_S^*$  represents the Southern indirect utility function in the pre-label situation.

**Proof.**  $E(v_S) = \frac{\bar{L}}{L} v_S(p^u, (1 - \sigma_l) \bar{p}^l(p^u) - \sigma_c, 1) + \frac{L - \bar{L}}{L} v_S(p^u, p^u, 0)$ . If  $\bar{L} \rightarrow 0$ , then  $E(v_S) \rightarrow v_S(p^u, p^u, 0)$ . The result follows from Proposition 2. ■

## 5 Fair wages

To illustrate the two previous sections, we now consider that the labelled variety ensures that a 'fair wages' requirement is satisfied, instead of guaranteeing improved labour standards.

In the pre-label situation, The utility function of Northern households is defined at (1). The third argument,  $\pi$ , is now a dummy variable which takes a value 1 if the minimum wage requirement in the South is satisfied, and a value 0 otherwise. We assume that before labels are implemented, wages are low so that  $\pi = 0$ . In the South, the utility function can be written as:

$$U_S = U_S(c_S, f_S) \tag{11}$$

Under stability conditions similar to those stated in Section 2, a unique and stable equilibrium food price  $p^*$  exists and is well-defined, with an equilibrium wage in the South  $w_S^* = p^*$ .

We now investigate the impact of a label guaranteeing fair wages. We assume that access to the label is free and costless, and that wages in the labelled sector are required to be higher than some threshold  $\tilde{w}$ . To keep the discussion simple, we assume here that this threshold is slightly higher than the pre-label wage equilibrium in the South:  $\tilde{w} = w_S^* + \varepsilon$ , with  $\varepsilon$  very small. The unlabelled variety does not give any information about the wage level. Once again, we assume that Southern households, as consumers, are indifferent towards wage conditions applying in the production of the goods they consume.

Under the free access assumption, the labelled and unlabelled prices must be identical when both markets open. Indeed, as long as labour is perfectly mobile across the two sectors, a difference in prices between the labelled and the unlabelled varieties of food in the South attracts all workers in the sector with the highest price. This necessarily leads to a zero supply of the least costly variety. The label is therefore unable to create a price differential between the two modes of production.

With the introduction of a label, the Northern demand for food may increase or decrease with respect to its pre-label level. As we shall now argue, the commitment about 'fair' wage in the labelled sector will be honoured if and only if the Northern demand for labelled food increases:

**Proposition 3** *The minimum wage requirement in the labelled sector  $w_S^{l*} \geq \tilde{w}$  is met if and only if  $V_{N,13} < V_{N,23}$ , where  $V_{N,13}$  ( $V_{N,23}$ ) is the change in marginal utility of clothes (food) as  $\pi$  increases.*

**Proof.** (1) Suppose that  $V_{N,13} \geq V_{N,23}$ . We then have  $f_N(p^l, \gamma, 1) \leq f_N(p^l, \gamma, 0)$ . Given our stability Assumption,  $Lf_N(p^l, \gamma, 0) + Lf_S^0(p^l, w_S^l) < L$  at  $p^l > p^*$ . Combining these two inequalities yields an excess supply on the food market at  $p^l \geq p^* + \varepsilon$ . The equilibrium prices and wage have then to be such that:  $p^{l*} < p^* + \varepsilon$ , and hence  $w_S^{l*} < \tilde{w}$ .

(2) If  $V_{N,13} < V_{N,23}$ , then  $f_N(p^*, \gamma, 1) > f_N(p^*, \gamma, 0)$  and, accordingly,  $Lf_N(p^*, \gamma, 1) + Lf_S(p^*, w_S^*) > L$ . Given our stability Assumption,  $Lf_N(p^l, \gamma, 1) + Lf_S(p^l, w_S^{l*}) = L$  only if  $p^l > p^{0*}$ . This gives  $w_S^{l*} \geq \tilde{w}$ . ■

Southern workers are paid a 'fair' wage when the label increases the Northern demand for labelled food so that, at a 'fair' price, the world demand for food exhausts total production. This increase in Northern demand is indeed necessary to keep an equilibrium on the food market at a higher price. In this case, every household in the South benefits from the rise in wage, irrespective of whether it is selling labelled food to the North or any type of food to the South. This arises if and only if  $V_{N,13} < V_{N,23}$  so that the label increases the marginal utility of food with respect to clothing in the North.<sup>14</sup>

We now explore the impact of social labelling when entry into the labelled sector is restricted. First, note that the labelled price is higher than the equilibrium price in free access, and the unlabelled price lower. We assume, for simplicity, that  $V_{N,13} \leq V_{N,23}$  so that the label does not increase the demand for clothes in the North. This ensures that  $p^{l*} > p^*$  under a restricted label.

Condition 1 below requires that access to the label is restricted so that Northern demand for labelled food at the pre-label equilibrium price exceeds labelled production:

**Condition 1** *At  $p^l = p^*$ ,  $L \cdot f_N(p^*, \gamma, 1) > \bar{L}$ .*

<sup>14</sup>In the absence of improved labour standards,  $\sigma_c = 0$ ,  $\beta^* = 0$ , and  $p^l(p^*) = p^*$ . The condition of Proposition 1 simplifies and only depends on the change in Northern consumption as  $\pi$  increases:  $c_N(p^*, \gamma, 1) - c_N(p^*, \gamma, 0)$ .

Under Condition 1, the price of labelled units of food is larger than the pre-label equilibrium price, therefore leading to a rise in the welfare of households working in this sector. The unlabelled price may rise depending on whether the fall in Northern demand for clothes as labelled price rises dominates the increase in Southern demand for clothes as labelled income rises. Proposition 4 summarizes our discussion:

**Proposition 4** *Under Condition 1, a label unambiguously increases the welfare of workers in the labelled sector, while it increases the welfare of workers in the unlabelled sector iff  $\phi(\bar{p}^l(p^*)) + \psi < 0$ .*

In the Cobb-Douglas case, the demands are not affected by the label. At the free entry equilibrium, the minimum wage requirement in the labelled sector cannot be satisfied since the equilibrium food prices are equal to the pre-label equilibrium price, leaving the income in the South unaffected. As a result, only unlabelled units of food are produced and sold. In the restricted case, the welfare of workers in the labelled sector unambiguously rises, while it unambiguously falls for workers in the unlabelled sector. This is necessarily the case since the equilibrium food price in free entry is somewhere in between the labelled and the unlabelled price in restricted access. In Proposition 4, it can be seen that the condition cannot hold since both the price effect  $\phi$  is nil as food prices do not affect the demands for clothes and the income effect  $\psi$  is positive.

## 6 Child labor-free labels

The model developed in Sections 3 and 4 allows us to analyze the impact of a label certifying the absence of child labour in the production process. Over the last decade, several labelling programs have been launched in order to struggle child labour. They are mostly active in the hand-knotted carpet industry, the leather footwear industry, and the hand-stitched soccer ball industry.

Our basic model is slightly modified. In both countries, North and South, there are  $L$  identical households made up of one parent and one child. Parents have one unit of time, that they supply inelastically on the labour market. Children also have one unit of time. In the North, children do not work, and spend all their time on leisure, while in the South households have to choose how much time a child works and how much time he spends on leisure. We let  $l_S$ , with  $l_S \in [0, 1]$ , represents the amount of time a child allocates to work in the South, so that  $(1 - l_S)$  represents the amount of time he allocates to leisure.

The utility function of a Northern household is defined at equation (1) where the third argument  $\pi$  indicates the probability that the units of food consumed are produced exclusively with adult labour. The budget constraint is given by Equation (3). In the South, the utility function is given by:

$$U_S = U_S(c_S, f_S, 1 - l_S)$$

In the South, adult labour and child labour are perfect substitutes in production, with one unit of adult labour producing  $\gamma_S$  unit of food while one unit of child labour produces 1 unit of food. Full income in the South is represented by  $w_S$ , with  $w_S = p(\gamma_S + 1)$ . The budget constraint of a Southern household is given by:

$$p(\gamma_S + 1) = c_S + pf_S + p(1 - l_S)$$

In the South, the impact of a rise in the price of food on the supply of child labour is ambiguous, as it depends on the relative strength of the income effect and the substitution effect:  $\frac{dl_S}{dp} \geq 0$ .<sup>15</sup> As a result, the supply of food may be increasing or decreasing in its own price. In order to guarantee a unique and stable equilibrium, we need to make some assumptions similar to those stated in Section 2. In particular, we require that, at all price levels, an increase in the price of food leads to a higher total net supply of food from the South. This assumption implies that the slope of the Southern demand for food is smaller than the slope of the supply of food.

We now consider the impact of the introduction of a social label. The social label can be given to all units of food that are produced without child labour. The label is free, costless and perfect in the sense that a necessary condition to obtain the label is the absence of child labour. We assume that adult labour is perfectly mobile, and can costlessly reallocate itself between the labelled and the unlabelled sector.

In this section, we require the Northern demand for food not to be too large so that, at the initial prices, it does not exceed the production capacities of all adult workers in the South. Since the demand for labelled food may differ from the pre-label demand for food, our next assumption applies to the largest of both demands. We therefore require:

**Assumption 3** *At  $p^l = p^*$ ,  $L \cdot \max(f_N(p^*, \gamma, \pi), f_N(p^*, \gamma, 1)) \leq L \cdot \gamma_S$ , where  $p^*$  represents the pre-label equilibrium price.*

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<sup>15</sup>We let  $\frac{dl_S}{dp}$  represent the (total) derivative of the supply of child labour to the price of food:  $\frac{dl_S}{dp} = \frac{\partial l_S}{\partial p} dp + \frac{\partial l_S}{\partial w_S} \frac{\partial w_S}{\partial p} dp$ .  $\frac{dl_S}{dp}$  therefore represents the change in child labour when food prices, adult wages and child wages all change in the same proportions.

When the Northern demand for food is not very large, the labelled and unlabelled prices must be identical. Indeed, as long as adult labour is perfectly mobile across the two sectors, a difference in prices between the labelled and the unlabelled varieties of food in the South attracts all adult workers in the sector with the highest price. This leads to either an excess supply of the variety with the highest price, or an excess supply of clothing. As a result, the only possible equilibrium is such that the labelled and the unlabelled variety sell at the same price. Under a social label, the equilibrium is such that all units of food sold to the Northern consumers are produced by adult workers only, while the children previously producing units of food consumed in the North now produce exclusively for Southern consumers. We are now in a position to state our next proposition:

**Proposition 5** *Under Assumption 3, food prices increase if and only if  $V_{N,13} < V_{N,23}$ . When food prices increase (fall), welfare in the South increases (falls). Child labour increases (falls) with food prices if  $\frac{dl_s}{dp} > 0$  ( $< 0$ ).*

**Proof.** The arguments closely follows those stated in Proposition 1. ■

At constant price and income, a label can modify the Northern demand for food through the pure label effect. As a result, food prices (labelled and unlabelled) can change. In the South, the rise (fall) in food prices necessarily increases (decreases) the utility of all households, as they are net suppliers of food. (The relative price of clothing falls, and they are net demanders of clothing).

Even if food prices rise, the level of child labour may rise or fall depending on the elasticity of the demand for child leisure to food prices. There is a large body of empirical studies investigating the link between household income and child labour, but with no consensus.<sup>16</sup> Negative income effects, whereby a low family income leads to more child labour, were thus found in Patrinos and Psacharopoulos (1995), Cartwright (1999), Grootaert (1999), and Edmonds (2005). This supports Basu and Van's 'luxury axiom' according to which children are sent to work when family income falls below a given subsistence target. Other studies tend to show that rises in parental income may have no effect on child labour, possibly because child labour is not a bad in parental preferences (see e.g. Bhatta (1998), Canagarajah and Nielsen (1999), Ray (2000), and Deb and Rosati (2002)). Lastly, some studies have stressed the fact that rises in household income may also imply better earnings opportunities for children (in the model, this corresponds to a simultaneous increase of both  $p^l$  and  $p^u$ ). In this case, child labour may increase

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<sup>16</sup>Surveys of this literature include Dar et al. (2002), Brown et al (2003), Basu and Tzannatos (2003), Bhalotra and Tzannatos (2003), and Edmonds (2005).

with a rise in household income, over some income range (see Psacharopoulos (1997), Canagarajah and Coulombe (1997) and Bhalotra and Heady (2003)).

If only a fraction of adults may enter the labelled sector, or if the Northern demand exceeds the adult production capacities in the South, the discussion is very similar to the restricted social labelling in section 5. Under the assumption that  $V_{N,13} \leq V_{N,23}$ , the label increases the price of the labelled units of food, while the price of unlabelled units may rise or fall. Compared to the pre-label situation, child labour may increase or decrease depending on the income effect for adult workers, and the price effect versus the income effect for children.

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