# So how much *do* you pay for ethical consumption? Estimating the hedonic price for Fair Trade coffee in Sweden*

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**Abstract:** This study applies the method of hedonic pricing to estimate the impact of the Fair Trade-label on the market for coffee in Sweden. Over the past decades, the general public interest in products bearing some environmental or social responsibility label has grown considerably in the EU, and Sweden is one of the countries where public awareness of labelling issues is particularly high. The sale of labelled products in regular supermarkets has increased significantly in Sweden but despite growing supply and acceptance, a lot remains to be understood about the market. This study takes a revealed preference approach using weekly scanner sales panel data recently made available by Nielsen and the Swedish Retail Institute (HUI). A representative sample of grocery stores all over Sweden is covered, as well as all major brands supplying roasted coffee. Hedonic estimates are obtained for what consumers pay for different characteristics as accessible from the package. Results point to a considerable premium of 38% paid for Fair Trade coffee, underlining high public awareness reflected in the retailers' pricing policy**.**

**Keywords:** Fair Trade, coffee, eco-labels, hedonic pricing, ethical consumption

**JEL-codes:** J80; L11; Q56

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## 1. Introduction

Over the past decades, general public interest in products bearing some environmental or social responsibility label has grown considerably in the EU. In recent years, the sale of labelled products in regular supermarkets has increased significantly. This is interesting given that the original idea behind the Fair Trade movement emerging in the 1950s was to try to counteract structural disproportions in trade between developed and developing nations by means of creating alternative distribution channels. Given that products with a Fair Trade certificate were traditionally sold nearly exclusively in specialized retail outlets promoting the Fair Trade idea (so-called World Shops), the increasing usage of conventional marketing and retailing structures for marketing these products is noteworthy. This presumably allows producers in developing countries to gain better access to markets in developed countries (Steinrücken and Jaenichen 2007)[†].

However, despite growing acceptance and interest in labelled products, a lot remains to be understood about the functioning of the market and what guides consumers in their decisions of whether to buy a labelled product or not. As such the purpose of this paper is to study the pricing of labelled coffee in Sweden using the method of hedonic pricing. Focusing on Sweden in this context is particularly interesting for several reasons. To start with, per capita consumption of coffee has been among the world's top five for several decades in Sweden (Durevall 2007). Moreover, there has been growing awareness concerning development/poverty and climate issues in the Swedish society in recent years (Broberg

[†] For a short historical overview, note that it was only in the second half of the 1980s that the movement experienced some stronger degree of institutionalization with the creation of the European Fair Trade Association (EFTA) in 1987 and the International Fair Trade Association (IFAT) in 1989. In the 1990s, the Network of European World Shops (NEWS) was established, followed by the creation of the Fair Trade Labelling Organization International (FLO) (Wilkinson 2007).

2007), so that the usage and importance of labels in purchasing behaviour can be expected to impact to an increasing degree, which may not be as much the case in many other European countries.

Coffee as such has traditionally been the product leader of the Fair Trade movement, and, as Wilkinson (2007) points out, there is a number of studies on the issue of labelled coffee (Loureiro and Lotade 2005; De Pelsmaker et al. 2005; Lyon 2007). When it comes to Fair Trade in a Swedish perspective, the major share of this market is made up of products sold under the Rättvisemärkt label. However, despite considerable growth in recent years (between 2003 and 2004, net retail value of all products bearing a Rättvisemärkt-label grew by 40%), the market share for all products is still lower than 1%. Awareness of the Rättvisemärkt label on the other hand is high, with 47% of Swedish consumers knowing the label in 2004 (FTIE 2005).

With regard to the existing body of literature, numerous studies in the field of consumer preferences for labelled products with an environmental or Fair Trade background have addressed questions related to the issues of credibility of labelling and the potential impact of labels on consumers' perceptions of certain goods and their buying behaviour. From a Nordic point of view, Leire and Thidell (2005) point out that consumers in the Nordic countries generally hold a positive attitude towards green products and eco-labels, and that there is a high degree of trust concerning the main eco-labels. A number of studies found 20-50% of the consumers claiming to give priority to environmentally related properties of products. Still, there appears to be a discrepancy between intentions and buying behaviour. Consumers overestimate their use of product-related environmental information and instead prioritize other aspects, such as price and quality. Additionally, purchases can be guided by habits.

Price-sensivity and income-dependence of purchasing decisions have been another research focus (Arnot et al. 2006; Bunte et al. 2007).

This paper contributes to the existing literature in several ways. First, its empirical approach is the method of hedonic pricing analysis. This technique has been applied to demand for various product categories, such as wine, beef, and cars (Andersson 2005; Hahn and Mathews 2007; Schamel and Anderson 2003), but only to a limited extent in the area of eco-labelled products (Galarraga Gallastegui 2001; Galarraga and Markandya 2004; Maietta 2003). A second major contribution of this paper is its reliance on previously unavailable data material. The vast majority of studies in the area of demand analysis for labelled products and consumers' willingness to pay (WTP) so far has focused on the usage of stated preference methods and their hypothetical survey techniques to reveal consumers' valuation for certain product features (Arnot et al. 2006). In many instances, data limitations in terms of availability and detailedness have prevented the usage of revealed preference methods. Based on detailed scanner panel data now made available by Nielsen and the Swedish Retail Institute (HUI) covering grocery shops larger than $100m^2$ all around the country, it is possible to identify several relevant attributes and to elicit the premium consumers are actually paying for the Fair Trade label and other coffee attributes. Obtaining this estimate is interesting with regard to how clearly the market for labelled goods was growing in recent years. It will allow for an illustration of what ethical consumerism is worth to Swedish consumers, i.e. the premium paid for the presence of the label on the coffee package. Third, to my best knowledge, there is to date no study that has explicitly analyzed demand for labelled coffee in Sweden using a hedonic pricing approach on such an extended data set. For reasons listed above, this country is a particularly interesting case in this is context. The approach taken here is in line with works on the hedonic price of Fair Trade and eco-labelled coffee in Italy and

the UK (Galarraga Gallastegui 2001; Galarraga and Markandya 2004; Maietta 2003). In the current situation with considerable lack of comparable data-based results, this study thus adds to enriching the ongoing analysis and debate, especially in an EU-wide focus.

The rest of this paper is organized as follows. In Section 2, the employed model is presented, before data matters are discussed in Section 3. Empirical results from the estimations are presented and discussed in Section 4, while Section 5 concludes the paper.

## 2. Model and Methodology

As mentioned above, the major body of existing literature on what is referred to as socially or environmentally responsible purchasing behaviour relies on stated preference methods, with few exceptions making use of revealed consumer behaviour (Arnot et al. 2006). In the field of revealed approaches, there is a certain tendency towards employing experiments to elicit consumers' responsiveness to certain product characteristics and relative price changes (Arnot et al. 2006; Basu and Hicks 2008; Bunte et al. 2007). However, the detailedness of the data available in our case allows for employing hedonic pricing. This method is, despite its rare usage for the study of labelled products, popular in applications to demand for various other product categories, such as wine, beef, and cars (Andersson 2005; Hahn and Mathews 2007; Schamel and Anderson 2003).

The approach taken in the analysis for this paper is similar to the one adopted by Galarraga Gallastegui (2001) and Galarraga and Markandya (2004) in their case study on willingness to pay for Fair Trade and organic coffee in the UK. In addition to this case study, hedonic pricing has been employed in the analysis of the ethical content in coffee consumption in the Italian market (Maietta 2003). To my best knowledge, these are the only studies making use

of this method in the field of Fair Trade and eco-labelling. This study concerned with the Swedish market is insofar different from previous works as it covers a longer time period than the UK case and comprises considerably more detailed information than the Italian study.

Hedonic pricing analysis is based on the hypothesis that any product's quality to the individual consumer is defined by a bundle of characteristics, where goods are valued for their utility-generating attributes (Schamel and Anderson 2003). Consumers assess these attributes in case of a purchasing decision and it is assumed that there are competitive implicit markets that define implicit prices for embodied product attributes. The observed market price is the sum of implicit prices paid for each quality attribute (Rosen 1974). This is hence a way to address quality issues in a seemingly homogenous product by examining the value of the characteristics it embodies (Hahn and Mathews 2007). Each consumer chooses a bundle of product characteristics to maximize utility subject to a budget constraint. The implicit price in essence indicates the marginal willingness to pay to for a change in a certain attribute (Lutzeyer 2008). In other words, hedonic pricing analyses prices that result from the demand side and supply side equilibria while adjusting for variations in quality and allows for estimating, *ceteris paribus,* a proxy of what consumers actually pay for a certain characteristic of a good (Galarraga and Markandya 2004).

In the case of coffee, consumers' WTP arguably depends on several determinants. Crucial aspects considered in this paper follow the availability of data (as will be further discussed below) and the structure of the coffee market in Sweden. In this respect, we assume that consumers with some sense of responsible or sustainable purchasing base their valuation on the presence of the Fair Trade and/or organic label on the packaging in the first place. Further

aspects to be included in the analysis are brands, origin-marking, degree of roasting[‡], brew vs. cook[§], decaffeinated coffee[**], and special flavouring. The market for roasted and ground coffee in Sweden in general is characterized by a market structure common in most European countries with accentuated concentration of market power to a small number of large companies. In 2002, the four largest companies had a market share of 87% (Durevall 2007).

*Model specification*

From the above it follows that consumer WTP for (Fair Trade) labelled coffee is a function of a bundle of quality attributes or services, since utility depends on these rather than the quantity consumed (Thunström 2007). The good or commodity consists of a set of K characteristics, $\mathbf{z}=\{z_1,z_2, \ldots, z_K\}$ that are not directly priced but contribute to the total value of the good (Hahn and Mathews 2007). The market price of the good in question, P, is described by the hedonic price function:

$$P = P(\mathbf{z}) \qquad (1)$$

The hedonic price of an additional unit of any attribute is given by the partial derivative of P(**z**) with respect to that particular attribute. Every consumer chooses an optimal bundle of attributes (and all other available goods) so as to maximize utility subject to a budget constraint (Costanigro et al. 2007).

[‡] In Sweden coffee is commonly either mellan, mörk, or extra mörk where the first category is standard (medium) roast and the latter ones refer to darker degrees. Mild coffee is not very popular in Sweden and is not widely available.

[§] Brygg, or here referred to as "brew" coffee is coffee that is ground finely for filter coffee and regular coffee brewers. The second type, kok, is coarsely ground coffee that would be cooked in a coffeepot on the stove – the traditional way of making coffee at home in Sweden but hardly common anymore.

[**] Decaffeinated coffee only has a minor market share in Sweden since people have a general preference for comparatively strong coffee. Decaffeinated coffee is mostly exported after some processing (ECF 2008).

The utility function of a representative consumer thus depends on $z$ and a composite good $X$ (comprising all other goods) with price $w$ that has been normalized to one:

$$U = U(z, X) \quad (2)$$

s.t. $y = P(z) + X$ (3)

Utility maximization yields the following condition, with the representative consumer choosing the level of characteristic $k$ such that

$$p_k = {U_{zk}}/{U_X} \; p_k = U_{zk}/U_X \quad (4)$$

where $p_k = \partial P(z)/\partial z_k$ $p_k = {\partial P(z)}/{\partial z_k}$, $U_{zk} = \partial U/\partial z_k$, and $U_X = \partial U/\partial X$.

In general, the empirical specification to be chosen in hedonic pricing is subject to constant debate since no specification is prescribed by theory to start with (Haab and McConnell 2002; Thunström 2007). Schamel and Anderson (2003) point out that a variety of different functional forms has been employed in the literature, including log-linear, log-log, and Box-Cox transformation.

The general empirical specification reads as follows:

$$P_k = \beta_0 + \sum_{j=1}^{m} \beta_j z_{kj} + \varepsilon \; P_k = \beta_0 + \sum_{j=1}^{m} \beta_j z_{kj} + \varepsilon_k$$

(5)

where the $\beta_j$ are estimates of the marginal value of the characteristics.

## 3. Data

The data used in this analysis are weekly scanner panel data collected and provided by Nielsen. The data cover a period of three years from March 2005 - March 2008 and comprise observed sales in a representative sample of supermarkets larger than 100m$^2$ all over Sweden[††]. The data contain information on all brands supplying roasted coffee to the supermarkets included in the sample. Information is available on brands, sales volumes, prices per kg, and package sizes[‡‡]. The individual brands usually comprise more than just one variety, with each variety, here referred to as reference, possessing different characteristics that can generally be found on the packaging. 214 different references are included in the original dataset used for analysis[§§]. Numerous coffee attributes, such as organic, Fair Trade, roast, decaffeinated, and flavoured are accessible from the data and guide the analysis.

[††] The exact number of shops in the sample is not general knowledge and handled confidentially by AC Nielsen. Based on personal communication with Nielsen, it can be confirmed that sample size is around 3000. Shops are not included randomly but chosen as to secure that a representative picture in terms of area, retail chain, demographics and turnover is achieved. Additional attention is given to high scanning standards to ensure correct codification.

[‡‡] In case a certain reference was not bought in a given week, the observation for average price is zero, so that unfortunately these observations had to be treated as missing if no transaction was registered in any of the regions. Unfortunately, this missing data could not be recovered from Nielsen.

[§§] In the initially provided data, 239 references were present out of which some had to be deleted due to duplication. Moreover, extra-large packages were removed from the dataset because of their irregular occurrence and limited number of total observations. Hence, the only included package sizes were 200, 250, and 500 gr. Another 3 references were taken out of the dataset because of suspected measurement error. The observed price per kg was more than ten times the average which constituted estimation problems in terms of outlying observations.

As discussed above, the coffee market in Sweden is to a considerable extent characterized by the presence of few market leaders with high market share (Durevall 2007). Additionally, there are quite some private labels[***] introduced by leading retail chains promising particularly good value-for-money. This trend has accelerated in recent years but is not taken into account in this analysis to focus on Fair Trade and organic labelling[†††]. According to Rättvisemärkt/Fair Trade Sweden, roughly 3% of the coffee in Sweden is Fair Trade-labelled. The European Coffee Federation in its 2007 report on the European Coffee market (ECF 2008) even estimates a market share of roughly 9% for coffee bearing a responsibility or sustainability label (Fair Trade, Utz certified, Rainforest Alliance), and a market share of 7% for ecological coffee. The report constitutes considerable growth of this segment with an increase of 44% from 2006-07. Double certification is common in the Swedish market, in 2007 about half of the coffee varieties bearing a responsibility or sustainability label also had an eco-label. Table 1 presents more detailed data on the market for roasted coffee in Sweden in 2007. Market shares are given in terms of volume by supplying brand, roasting/importing company and for KRAV-labelled[‡‡‡] coffee.

**Table 1 about here.**

*Variables*

From the scanner data at hand, relevant information was processed for each reference and the following list of variables derived for empirical analysis, see Table 2 below.

[***] In Sweden referred to as EMV.
[†††] This would, however, be easily accessible from the data.
[‡‡‡] KRAV is a key player in the organic market in Sweden developing organic standards and responsible for the KRAV label. It is an incorporated association with currently 28 members representing farmers, processors, trade

**Table 2 about here.**

The variables presented in Table 2 can be further grouped as follows:

a) *Fair Trade Characteristics:* 2 dummies (Normal, and Fair Trade label).

b) *KRAV Characteristics:* 2 dummies (Normal, and KRAV label).

c) *Organic Characteristics:* 2 dummies (Normal, and Organic label).

d) *Intrinsic Characteristics – Roast Quality/Degree:* 3 dummies (mellan (medium), mörk (dark), and extra-mörk (extra dark).

e) *Coffee characteristics:* 2 dummies (brygg, and kok).

f) *Production Region label:* 2 dummies (Normal, and Origin-marked).

g) *Decaffeinated:* 2 dummies (caffeinated, and decaffeinated coffees).

h) *Flavouring:* 2 dummies (Normal, and flavoured coffee).

i) *Brands:* 41 dummies (Gevalia, Blå Mocca, Maxwell, Zoégas, Löfbergs Lila, Classic Coffee, ICA, Euroshopper, Signum, X-tra, Coop, Änglamark, Blå Vit, ODEF, Eldorado, Willy's, Hemköp, Godegården, Spar, Lindvalls, Bosnia Malt, Maraba Burbun Roasters, Svenskt Kyrkkaffe, Kettler, Corsini, Oxfam, Fair Trade, BKI, Café Organico, Drie Mollen, Folke Bergman, Najjar, Lyxkaffe, Kaffebönans, Minas, Colcafe, Servtrade, Idee, Urtekram, Kung Markatta, and other brands).

j) *Week:* 157 dummies (w1-w157).

The dummy variables underlined in the above listing represent the excluded base case that is standard for the estimation of regressions with dummy variables.

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and also consumer, environmental and animal welfare interests (see www.krav.se).

## 4. Results and discussion

Following the stepwise procedure suggested in the relevant literature on hedonic analysis for pooled cross-section data (particularly the works by Carew (2000), Galarraga Gallastegui (2001), Galarraga and Markandya (2004), and Lutzeyer (2008)), the preferred model specification on the basis of diagnostic tests, goodness of fit, and the ease of interpretation of coefficients is of semi-log form and can be written as follows since it also comprises a panel aspect:

$$LP_t = \alpha + \sum \beta_t X_t + u \qquad (6)$$

where $LP_t = \log(P_t)$ and $u$ is the random error term. The dependent variable, *P*, in all sets of regressions is price per kilo. The vector of the *j* explanatory variables, *X*, comprises the dummy variables presented in Table 2 and discussed above, for each of the *t* time periods.

The analysis was however started with applying the linear Ordinary Least Squares (OLS) estimation method. Thus, the following model was estimated[§§§]:

$$P_l = \alpha + \sum_{j=1}^{m}\sum_{i=1}^{t} \beta_j^i X_j^i + u \; P_t = \alpha + \sum \beta_t X_t + u \qquad (7)$$

where $u$ is again the random error term.

[§§§] The software used for all estimations was Stata 10.

Further comparisons were made concerning alternative transformations of the price data (the only non-binary variable included in the analysis). As argued by Costanigro et al. (2007), given the uncertainty concerning the correct specification, a flexible approach and considering various possible transformations of the dependent variable appear to be a prudent strategy in hedonic pricing analysis. Consequently, both a model with the ¼ power of the price, as well as the inverse square root of the price were estimated. $R^2$ in the case of the linear model as well as for the ¼ power transformation of the price model amounted to 0.59, while it was somewhat lower (0.53) for the model with the inverse square root transformation. Table 3 below illustrates the test diagnostics for the different specifications. It shows that we have a problem of functional form and heteroscedasticity. The same holds true with regard to serial correlation, as obtained by applying the Wooldridge test.

**Table 3 about here**

In attempting to further improve model fit and to address the problems pointed our above, a model using the natural logarithm of the dependent variable (average price per kg) was employed and eventually selected to be the preferred specification as expressed in (6). Given that the Breusch-Pagan/Cook-Weisberg procedure pointed to problems with heteroscedasticity also in this specification (Chi2(1) = 16.71 [0.000]), robust standard errors were estimated in all following estimations. The model fit in the semi-log case with robust standard errors was improved markedly compared to the previous estimations, indicated by a higher $R^2$ of 0.64. Applying Ramsey's RESET test to the semi-log model shows a statistically significant *F*-value of F(3, 21550) = 20.86 [0.000]. Hence, none of the estimated models is perfectly specified but the semi-log model performs relatively satisfyingly in this respect, showing the second-lowest magnitude *F*-value. As mentioned above, ease of interpretation of coefficients and summary statistics, as well as the fact the natural logarithmic transformation of the dependent variable is very prevalent in hedonic pricing studies and thus allows for relatively direct comparisons were among the main reasons for opting for the semi-log model in the end.

However, applying the Wooldridge xtserial test still pointed to problems with autocorrelation in the data (F(1, 192) = 12.120 [0.0006]), so that in order to address these issues a regression with Newey-West standard errors corrected for both heteroscedasticity and autocorrelation was estimated.

Estimated coefficients of the semi-log model with Newey-West standard errors are reported below in Table 4. With the modified standard errors, three coefficients ceased being statistically significant and were hence removed from the estimation[****].
Given that multicollinearity is a data pathology that often constitutes a problem in the hedonic pricing literature (Galarraga Gallastegui 2001; Lutzeyer 2008), the mean variance inflation factor (VIF) was calculated. Mean VIF for the specification illustrated in Table 4 amounted to 2.13, with all individual VIFs clearly below 10 so that it was concluded that multicollinearity is not a serious problem in this case.

Despite the large sample size, both the Shapiro-Francia and the Shapiro-Wilk test were conducted to inspect for a potential lack of normality in the distribution of residuals. The latter test rejected the assumption of normality[††††], whereas the former could not reject the assumption of normality. As lined out by Galarraga Gallastegui (2001), numerical tests for residual normality are quite weak, which is why the histogram of residuals and the normal density graphic were analysed and led to the conclusion that residuals under this specification are roughly normally distributed.

**Table 4 about here.**

Turning to the interpretation of the results shown in Table 4, a first thing to note is that we are dealing with a model where the regressors are dummy variables. This has the implication that the intercept (constant) here represents the mean log coffee price (per kg), while the slope coefficients of the regressors give the difference in the mean log coffee price of the respective dummy categories (Lutzeyer 2008).

[****] This concerned the brand dummies for Coop and Cafe Organico that were merged with the group of ”other brands”, as well as the dummy for flavoured coffee. The dummy for extra dark coffee was insignificant under all specifications and was generally not included in the estimations.
[††††] Shapiro-Francia *W‘* test for normal data: $P = 0.423$; Shapiro-Wilk *W* test for normal data: $P = 0.000$.

As far as our main variable of interest, Fair Trade labelling, is concerned, the estimated coefficient (0.323) is highly statistically significant and of the expected sign. As Galarraga Gallastegui (2001) explains, the fact that the Fair Trade label guarantees a good minimum price to the producers disregarding world market price development, the effect of this variable in the estimation was expected, and turned out, to be positive. At the market equilibrium price, the presence of the Fair Trade label will increase the log of the coffee price by 0.324, or the coffee price per kg by exp(0.323)=1.381.

As far as the other labels included are concerned, the counteracting signs of the KRAV and the general eco-/organic label are somewhat surprising, since an argumentation similar to that in the Fair Trade case would lead one to expect the presence of both labels to increase the price. As will be discussed below, statistical significance of the general eco-label coefficient was only given under one specification, so that any interpretation of this coefficient should be handled with caution and we might well face problems with multicollinearity here. Else it can only be speculated about price-setting policy for the KRAV-segment in the frame of this paper, but since KRAV is a merely Swedish label comprising only the main brands, it might be the case that these variables are at least sometimes covered by special offer campaigns in the different supermarket chains, something that is never the case for Fair Trade varieties. Maybe brand promotion constitutes a motive for a lower price to push market entry for KRAV and general consumer acceptance. In this respect, it is further worthwhile noting the main actors on the coffee market have introduced a number of new, labelled varieties over the period under investigation here. It could hence also be the case that improved market presence and larger demand are leading to lower prices due to more competition in the segment. These are interesting aspects and there certainly is room for fruitful future research here.

As can be seen from Table 4, all finally included variables are highly statistically significant. The signs of most coefficients are in accordance with expectations held previous to the actual estimation. Coffee varieties supplied by "regular" brands, such as the market leaders, have a price below the average, *ceteris paribus*, whereas "special" brands[‡‡‡‡] increase the price the consumer has to pay. Origin-marked coffee, decaffeinated coffee, and darker roast coffee are all priced above the average, which is in line with the additional effort required for production and the smaller market share or even niche-existence. However, since the year dummies remain highly significant, closer attention should be paid to year-based developments within the coffee sector.

In an attempt to capture the impact of double-labelling, i.e. the presence of both the Fair Trade and either the KRAV- or some other organic label, an additional specification comprising interaction terms (Fair*Krav, Fair*Eco, respectively) was estimated. However, including these interaction terms caused serious problems with multicollinearity. Neither interaction term was statistically significant when included individually but both turned highly significant once the other was added. Further inspection revealed that both interaction variables had individual VIFs clearly above 6, so that it was decided to leave this aspect out of the analysis. The presence of relatively few varieties with both a Fair Trade- and eco-label might further justify this decision.

For further comparison, Table 5 below presents the results for the variables of main interest for three of the estimated models discussed above. Model 1 is the final specification with the

[‡‡‡‡] Given the fact that the four largest brands in the market have a combined market share of close to 90% as lined out above, the majority of brands can be classified as small or "special" in the sense of supplying small quantities or often specialty coffees to segments not usually covered by the market leaders (one example is the case of coffee with special flavouring such as vanilla or Irish cream).

semi-log case, model 2 the linear model with untransformed price, while model 3 refers to the power transformation of the price.

**Table 5 about here.**

As can be seen from Table 5, the Fair Trade variable is highly statistically significant in all models, which is also true for the KRAV variable. In the first model, we have the discussed high price premium for Fair Trade coffee and the negative sign for KRAV-labelled coffee. The linear model confirms both these aspects, even though the Fair Trade price premium is smaller in this model with roughly 22%. Still all models confirm the counteracting signs of the premia for Fair Trade and KRAV and the fact that a considerable premium exists for Fair Trade labelled varieties. However, we find that the variable capturing general/other eco-labels is only significant in model 1 (the final specification chosen). These difficulties could be due to multicollinearity, or related to identification or measurement problems, all of which cannot be solved the frame of this paper.

As far as the remaining variables are concerned, most of them maintain the same level of statistical significance under all three estimated models. This finding concerns brands, as well as variables in other classifications. Additionally, estimated coefficients consistently are of the same sign under all models, a point that further strengthens the results obtained by the main specification.

## 5. Conclusion

The results of the empirical investigation undertaken in the frame of this study yield interesting revealed preference evidence concerning the functioning of the market for

responsibility and sustainability labelled products in a country where awareness of these issues is high. Based on the estimations, it is possible to identify the relative impact on the market price of the different coffee attributes. The calculations provide a very useful tool for further policy-relevant analysis of the market in a Swedish, but also EU-wide perspective.

As far as the use of the Fair Trade label as main variable of interest here is concerned, the estimated coefficient is strongly significant and positive, showing that consumers in Sweden pay a considerable premium for this label. *Ceteris paribus*, the presence of the Fair Trade label on the package increases the price of an "average grade" of coffee by 38%. This is an estimate much higher than those resulting from the case studies in Italy and the UK (Galarraga Gallastegui 2001; Maietta 2003), potentially pointing to higher awareness of the general public that reflects itself in the retailers' pricing policy. The impacts of organic/KRAV-labelling and general eco-labelling were not as clear-cut and would merit further inspection that is beyond the scope of the analysis for this paper.

An interesting additional aspect to note in this respect concerns the time period covered by the data used for the above analysis. The number of labelled coffee varieties has been increased notably in Sweden over the 2005-2008 period and there has been extensive coverage of related issues in the media which could lead one to expect this development to be reflected in the premium paid in different years. This further points to the question of market creation and development in the field of labelled products where Sweden could be a representative case study.

The study at hand has attempted to make a first step towards closing the existing knowledge gap as far as the market for ethical products is concerned. Of course, light has only been shed

on the consumers' side here, while it is of undeniable importance to also investigate the producing countries' perspective and to try to answer the implicit question of whether the labelling schemes concerned here are able to produce the benefits they promise. All these are promising areas for future research where problems will have to be addressed in a multidisciplinary approach so as to achieve meaningful and comprehensive results.

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Table 1: The market for coffee in Sweden (2007).

| **Volume by brand** | **Market share (%)** | | **Volume by roaster/importer** | **Market share (%)** | | **KRAV-labelled (volume/brand)** | **Market share (%)** |
|---|---|---|---|---|---|---|---|
| Gevalia | 42% | | Kraft Foods | 45% | | Gevalia | 49% |
| Zoégas | 19% | | Zoégas | 19% | | Löfbergs Lila | 19% |
| Löfbergs Lila | 16% | | Löfbergs Lila | 16% | | Zoégas | 13% |
| Classic | 9% | | Arvid Nordquist | 9% | | Coop | 7% |
| ICA | 4% | | ICA | 5% | | ICA | 7% |
| Signum | 2% | | Coop | 5% | | Classic | 5% |
| Blå Mocca | 2% | | Others | 2% | | Other brands | 1% |
| Other brands | 6% | | | | | | |

Source: The Swedish National Coffee Association.

Table 2: List of variables.

| Variables | Description | |
|---|---|---|
| **Price** | Price per kg (SEK) | Mean=55.58 SEK/kg |
| **Fair** | Fair Trade dummy | If Fair Trade-label=1, otherwise=0 |
| **Krav** | Krav dummy | If Krav-label=1, otherwise=0 |
| **Eco** | (other) eco dummy | If eco-label=1, otherwise=0 |
| **Cook** | Cook dummy | If cook coffee=1, otherwise=0 |
| **Brew** | Brew dummy | If brew coffee=1, otherwise=0 |
| **Various brand dummies:** | | If brand=1, otherwise=0 |
| Gevalia; Blå Mocca; Maxwell; Zoégas; Löfbergs Lila; Classic Coffee; ICA; Euroshopper; Signum; X-tra; Coop; Anglamark; Blå Vit; Odef; Eldorado; Willy's; Hemköp; Godegården; Spar; Lindvalls; Bosnia Malt Kaffe; Maraba Burbun Roasters; Svenskt Kyrkkaffe; Kettler; Corsini; Oxfam; Fair Trade; BKI; Café Organico; Drie Mollen; Folke Bergman; Najjar; Lyxkaffe; Kaffebönans; Minas Kaffe; Colcafe; Servtrade; Idee Kaffe; Urtekram; Kung Markatta | | |
| **Other** | Other brands dummy | If other brand=1, otherwise=0 |
| **Orig** | Origin dummy | If origin marked=1, otherwise=0 |
| **Flav** | Flavouring dummy | If flavoured=1, otherwise=0 |
| **Decaf** | Decaffeinated dummy | If decaffeinated=1, otherwise=0 |
| **w1-w157** | week dummies for weeks covered by dataset | If respective week=1, otherwise=0 |
| **Mell** | Mellan-roast label dummy | If mellan label=1, otherwise=0 |
| **Mork** | Mörk-roast label dummy | If mörk label=1, otherwise=0 |
| **Emork** | Extra-mörk-roast label | If extra-mörk label=1, otherwise=0 |

Table 3: Diagnostic test for the linear OLS and inverse square root of price model.

| Test statistics | Test procedure | Linear model | Quarter power of price | Inverse square root of price |
|---|---|---|---|---|
| **Serial correlation** | Wooldridge test for autocorrelation in panel data | F(1, 192) = 20.498 [0.000] | F( 1, 192) = 20.498 [0.000] | F( 1, 192) = 6.806 [0.0098] |
| **Functional form** | Ramsey's RESET test | F(3, 21398) = 79.20 [0.000] | F(3, 21398) = 79.20 [0.000] | F(3, 21398) = 16.95 [0.000] |
| **Heteroscedasticity** | Breusch-Pagan/Cook-Weisberg | Chi2(1) = 2895.46 [0.000] | Chi2(1) = 2895.46 [0.000] | Chi2(1) = 740.67 [0.000] |

Table 4: Parameter estimates for the log-linear model (dependent variable log(price)).

| Variable | Est. | Newey-West SE | |
|---|---|---|---|
| Const. | 4,157 | 0,06 | ** |
| Fair | 0,323 | 3,40E-02 | ** |
| Krav | -0,151 | 2,90E-02 | ** |
| Eco | 0,090 | 2,40E-02 | ** |
| Cook | -0,050 | 0,02 | * |
| d_geva | -0,215 | 0,06 | ** |
| d_blaa | -0,131 | 0,06 | * |
| d_max | -0,213 | 0,08 | ** |
| d_zoe | -0,206 | 0,06 | ** |
| d_loef | -0,162 | 0,06 | ** |
| d_class | -0,269 | 0,06 | ** |
| d_ica | -0,385 | 0,054 | ** |
| d_euro | -0,985 | 0,063 | ** |
| d_signum | -0,44 | 0,054 | ** |
| d_xtra | -0,651 | 0,054 | ** |
| d_aengl | -0,173 | 0,059 | ** |
| d_blvi | -0,713 | 0,059 | ** |
| d_odef | -0,45 | 0,058 | ** |
| d_eldo | -0,565 | 0,059 | ** |
| d_will | -0,29 | 0,061 | ** |
| d_hem | -0,162 | 0,064 | * |
| d_gode | -0,904 | 0,060 | ** |
| d_spar | -0,608 | 0,095 | ** |
| d_lind | -0,337 | 0,066 | ** |
| d_bos | 0,37 | 0,057 | ** |
| d_mara | 0,943 | 0,074 | ** |
| d_kyrk | 0,338 | 0,057 | ** |
| d_kett | 0,334 | 0,079 | ** |
| d_cors | 0,84 | 0,12 | ** |
| d_oxf | 0,529 | 0,064 | ** |
| d_ft | 0,429 | 0,074 | ** |
| d_bki | -0,631 | 0,083 | ** |
| d_drie | -0,922 | 0,061 | ** |
| d_folk | -0,441 | 0,068 | ** |
| d_najj | 0,348 | 0,059 | ** |
| d_lyx | -0,493 | 0,055 | ** |
| d_kabo | -0,238 | 0,054 | ** |
| d_mina | 0,359 | 0,065 | ** |
| d_colc | 0,721 | 0,078 | ** |
| d_serv | -0,985 | 0,06 | ** |
| d_idee | 0,21 | 0,105 | ** |
| d_urte | 0,135 | 0,07 | ** |
| d_kung | 0,218 | 0,06 | ** |
| Orig | 0,088 | 0,019 | ** |
| Decaf | 0,336 | 0,051 | ** |
| Mork | 0,101 | 0,018 | ** |
| w1-w157 | most week dummies insignificant | | |
| Obs. | 21 606 | | |

* statistically significant at the 5% level.

** statistically significant at the 1% level.

Table 5: Comparison of parameter estimates for main variables under three models.

| Variable | Model 1 (log(pr)) | | | Model 2 (linear) | | | Model 3 (power transf.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Est. | St.err. | | Est. | St.err. | | Est. | St.err. | |
| Const. | 4,157 | 0,060 | ** | 67,992 | 4,187 | ** | 16,998 | 1,047 | ** |
| Fair | 0,323 | 0,040 | ** | 21,712 | 4,292 | ** | 5,428 | 1,073 | ** |
| Krav | -0,151 | 0,030 | ** | -7,675 | 2,422 | ** | -1,919 | 0,61 | ** |
| Eco | 0,09 | 0,024 | ** | 1,961 | 1,850 | | 0,49 | 0,46 | |
| Cook | -0,05 | 0,020 | * | -4,054 | 1,188 | ** | -1,014 | 0,30 | ** |
| d_geva | -0,215 | 0,057 | ** | -13,342 | 3,718 | ** | -3,335 | 0,93 | ** |
| d_blaa | -0,131 | 0,055 | * | -10,629 | 3,640 | ** | -2,657 | 0,91 | ** |
| d_max | -0,213 | 0,076 | ** | -13,932 | 4,130 | ** | -3,483 | 1,03 | ** |
| d_zoe | -0,206 | 0,055 | ** | -14,28 | 3,534 | ** | -3,57 | 0,88 | ** |
| d_loef | -162 | 0,057 | ** | -5,957 | 4,092 | | -1,489 | 1,02 | |
| d_class | -0,269 | 0,057 | ** | -17,199 | 3,610 | ** | -4,3 | 0,90 | ** |
| d_ica | -0,385 | 0,054 | ** | -22,043 | 3,536 | ** | -5,511 | 0,88 | ** |
| Orig | 0,088 | 0,019 | ** | 3,548 | 1,212 | ** | 0,887 | 0,30 | ** |
| Decaf | 0,336 | 0,051 | ** | 19,64 | 2,810 | ** | 4,91 | 0,70 | ** |
| Mork | 0,101 | 0,018 | ** | 5,004 | 1,177 | ** | 1,251 | 0,29 | ** |

* statistically significant at the 5 percent significance level.

** statistically significant at the 1 percent significance level.

Standard errors are Newey-West standard errors