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Impact of organic certification on the price of ready-to-drink fruit nectars and juices

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Abstract

Several studies indicate that the consumer market considers the price of organic foods to be significantly high and attribute this fact as one of the main restrictive aspects for starting the consumption of organic foods or even increasing their frequency. Given this scenario, the present study is proposed as a way to confirm such a perception. Therefore, the purpose of the study is to evaluate if the price of organic is higher than conventional in the market of ready-for-consumption juices and nectars, using samples collected in Brazil and France. For this, the hedonic price methodology was applied, using as variables the information described on ready-to-drink processed juices/nectars marketed in Brazil and France. The results of the study confirm that organic version is more expensive, with the price being approximately 50% higher in the Brazilian market, and 10% higher in France. Additional attributes, such as type of packaging, pulp content, and flavor, are also relevant for the price. This is believed to be the first study to evaluate the impact on price of the organic certification of ready-for-consumption juices and nectars in different consumer markets.

Keywords: hedonic price; organic food; attributes; Brazil; France.

Practical Application: The increase in price due to organic certification is different in the two countries analyzed, possibly because of differences in production scale, the supply of products, and the variety of manufacturers. So, depending on the market, organic certification has different impacts on the product price.

1 Introduction

Purchasing is the result of making a decision. Hence, understanding the way consumers make their purchasing decisions becomes increasingly important for business success and for the creation of public policies (Antonialli, 2015; Demirtas, 2019). Additionally, it is believed that, contrary to the traditional Marxist theory that people find meaning through production capacity, people find their identity through consumption, including the consumption of food (Dixon, 1999). Thus, in this context, one could note the growth in the market for organic products because of the increased demand for products and services that possibly promote health and well-being (Dias et al., 2015).

Evidence of this market growth is noted in the study by the Research Institute of Organic Agriculture (FiBL) and the International Federation of Organic Agriculture Movements (IFOAM), where it was found that the area of cultivable land devoted to organic production and the organic market increased from 11 to 69.8 million hectares and from $15 to $97 billion, respectively, from 1999 to 2017 in the worldwide (Willer & Lernoud, 2019).

The development of the organic food market is only one element of a more complex phenomenon of ecological consumption, and the reinforcement of a new paradigm called green marketing (Bryla, 2016). Thus, to sustain and strengthen the growth of this phenomenon, an increase in studies related to organic foods can be noted, because understanding the motivations and, especially, the difficulties in the consumption of such products is vital to achieving success (Demirtas, 2019).

Consumer opinion studies indicate a perception that organic products are expensive and that this limits their consumption (Aguiar et al., 2016; Bryla, 2016; Diaz et al., 2011; Kesse-Guyot et al., 2013; Lea & Worsley, 2005; Martins et al., 2019; Organis & Market Analysis, 2017). Such opinion emphasizes the need to discuss the price of organic food in more detail and reinforces the importance of carrying out studies like this.

The current study was based on data obtained in the Brazilian and French markets, where there are different levels of consolidation of the organic food market: Brazil has 1,136,857 hectares of agricultural land under organic cultivation, which is only 0.4% of the total arable land, and a volume of retail sales of only 4 euros per person per year. France has 1,744,420 hectares of agricultural land under organic cultivation, corresponding to 6.3% of the total arable land, and an annual sales volume of 118 euros per person (Willer & Lernoud, 2019). Another interesting aspect is the difference in financial turnover: in 2015 the turnover in the organic food market was 530 million euros in Brazil (Liu, 2016); while in France the figure was around 5.5 billion euros (Agence BIO, 2016).

Ready-for-consumption juices and nectars are in high demand among consumers. In 2017, for example, global consumption was 36.2 billion liters, with around 25% of this consumption in the European Union and 9.4% in Latin America (AIJN, 2018). In the

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same period in Brazil, consumption exceeded 1.1 billion liters, with the annual consumption per capita amounting to 5.3 liters; this indicates a growth of consumption per capita of 36% from 2010 to 2017, making these products the fourth most consumed non-alcoholic beverage in each location (Associação Brasileira das Indústrias de Refrigerantes e de Bebidas não Alcoólicas, 2017; Instituto Brasileiro de Geografia e Estatística, 2017a). In France, total consumption in 2017 exceeded 1.4 billion liters, and the annual consumption per capita amounted to about 21 liters (AIJN, 2018). In addition, the great growth of organic versions of these products stands out in France, when one considers that from 2013 to 2017 expenses increased 77% from 138 to 244 million euros (Agence BIO, 2019).

Thus, the current study was conducted to verify whether the organic certification of ready-for-consumption juices and nectars influences their price in samples collected in different markets: Brazil and France. Finally, it is worth mentioning that these products were chosen for their great representativeness and diversity, and because of the absence of similar studies.

1.1 Hedonic price analysis on foods and drinks

Considering that a customer places a value on a good that depends on its individual attributes, such as organic certification, the hedonic price methodology is a relevant technique for examining such relationships. This analysis consists of equating the price of the products with their attributes, and in this way estimating the marginal price of each one, as well as the contribution of each attribute to the final price (Donnet et al., 2008). The implicit marginal price of each attribute is obtained from the partial derivative of the price function in relation to the attributes. A positive result indicates that the specific attribute is positively valued by consumers, a negative one indicates that it is negatively valued, and a nil value is insignificant (Donnet et al., 2008). The method consists, therefore, in a regression of the sale prices of the products in relation to their main attributes (Naslavsky, 2010).

When using this methodology, it is important to pay attention to the choice of attributes (independent variables), since these should cover the key factors that compose and explain the dependent variable (price), and there should be no correlation among them (Santi, 2009).

This approach has been widely applied to the wine market, with a consensus that the price of wine is essentially determined by explicit labeling characteristics (region of origin, grape variety, and harvest year), rather than characteristics describing sensory aspects (aromas and harmony of the components, for example). The reason for this conclusion is that the attributes listed on the product packaging are easily identifiable by nonspecialists, while the sensory attributes are appreciated only by experts in the field (Luppe & Angelo, 2005).

The method used in the present work was based on the analysis of hedonic prices, because this has been used to measure the marginal value of attributes in the price of various food products, such as olive oil (Cavallo et al., 2018; Romo Muñoz et al., 2015), vegetables (Ghazaryan et al., 2018), wine (Hu & Baldin, 2018; Luppe & Angelo, 2005; Naslavsky, 2010), yoghurt (Ballco & De-Magistris, 2018), milk (Bimbo et al., 2016), cheese (Valente, 2016), and coffee (Donnet et al., 2008; Schollenberg, 2012). It is believed that processed juices and nectars can also be analyzed using the same technique, because of the variations in the forms in which they are presented and mainly because of the difficulty of objectively evaluating their attributes, such as the organic/conventional typology, the type of packaging, and the pulp/juice content.

Although this methodology is constantly being applied in the food segment, there is a lack of studies for ready-to-drink organic juices and nectars. Thus, one of the objectives of this work is to fill this gap.

2 Materials and methods

2.1 Data and variables

The data were obtained by verifying the prices and the objective information on the packaging labels of the respective products, which are available on the supermarkets' websites, specifically the type of packaging (glass, plastic, or carton); the flavor, according to the classes that are detailed below; the organic or conventional production method; the pulp content, as detailed below; and, in the specific case of the French market, the absence or presence of concentrated pulp/juice in the respective formulation. These data are objectively available on the product label, except for the price, which is reported by the supermarket; they are therefore suitable for the proposed analysis, as suggested by Luppe & Angelo (2005).

The data used in this study were collected in online stores of large supermarket chains because this made collecting information faster and cheaper, and also reflects the development of this new way of buying food and drinks (i.e., online shopping) which is expected to grow intensely in the coming years, with predicted increases of around 130% in sales from 2017 to 2022 (Tetra Pak Index, 2018).

In the Brazilian market, the sample collection took place on the websites of Grupo Pão de Açúcar (2017) and Sonda Delivery (2017), which are giants of the national food and beverage supermarket sector; together, they represent 16% of the sector's total revenue in 2018, with Grupo Pão de Açúcar in second place and Sonda in ninth place in billings (Associação Brasileira de Supermercados, 2019). The city of São Paulo was chosen as the reference location for the sites because it is a city of great national relevance and has, for example, a great impact on the generation of wealth (11% of the national gross domestic product in 2017) and a large share of the national population (about 6% in 2017) (Instituto Brasileiro de Geografia e Estatística, 2017a, b).

In the French market, data collection was carried out on the Carrefour website (cursos.carrefour.fr, accessed on June 18, 2017) because it has great relevance in the food and beverage sales segment; its share of the local market in 2018 reached about 21%, which is equivalent to second place in the segment (Statista, 2020). The city of Paris was chosen as the reference location because it is the capital and largest city in the country, and because of its great relevance in one of the main regions,

Île-de-France, which in 2017 generated about one-third of all French wealth (Eurostat, 2019).

Based on the data shown above, it is evident that the companies consulted in Brazil and France are among the leaders in the supermarket segment in their respective countries. In addition, these companies had data on several products on their websites at the time of study, with illustrations of their respective packaging; these were all collected as necessary information for this study. Considering the relevance of these companies in the supermarket segments, as well as their respective geographic locations, we consider that the products offered by them and used as samples in this study fairly well represent the sample universe of ready-for-consumption juices and nectars. It is worth mentioning that promotional prices were not considered in this study.

The dependent variable in the current study is the price. The products analyzed had volumes of approximately 1 liter; the volumes ranged from 900 to 1000 mL. A correction was made in the situations that deviated from the reference value so that the price was given in R$/l (Brazil) and €/l (France).

For Brazil, the following variables were chosen:

a) *Type of packaging*: the containers generally used in the national market for the chosen volume are glass, plastic, or cartons (also called aseptic packaging, composed of interlayers of polyethylene, paper, polyethylene, aluminum, and two other layers of polyethylene);

b) *Flavor class*: the flavors were grouped into three distinct classes considering the local population's consumption habits, according to the authors' view: traditional, which refers to common tastes regularly consumed in Brazil, such as grape, apple, passion fruit, orange, lemon, peach, tangerine, cashew nut, mango, strawberry, pineapple, and guava; exotic, which refers to differentiated products with flavors that are not common in the country, such as blueberry, cranberry, white grape, and Valencia orange; and mixed, which refers to beverages with mixed flavors;

c) *Method of production:* organic or conventional. In this case, the identification of the product as organic was based on the presence, on the main panel of the packaging, of a seal of identification provided by a certifying company authorized for this purpose;

d) *Pulp content*: two groups were chosen, the first including integral juices (or with a pulp content of 100%), and the second including beverages with a reduced pulp content, such as tropical juices and nectars.

For France, the type of packaging, method of production, and pulp content variables were essentially the same as those measured for the samples from Brazil.

The flavor class was divided into three groups (traditional, mixed, and exotic), as in the Brazilian market. However, aspects related to the specificity of each country were taken into account. Hence, in the mixed group for France, a mixture of different fruits was considered. The traditional group contained orange (orange and grapefruit), pineapple, lemon, tangerine, apple, apricot, banana, pear, strawberry, guava, mango, and grape. The exotic group was represented by cranberry and pomegranate.

The variable *ingredient* was also added in the analysis of data from the French market because claims related to the absence or presence of concentrated pulps/juices were observed in the ingredient lists. Therefore, it was assumed that this was an important variable in this market.

After data collection and tabulation, the Pearson chi-square test was applied to verify the existence of an association between the categorical variables, and thus to corroborate the differences between the markets.

Table 1 shows the variables used in the analysis of the Brazilian and French markets, their descriptions, and modalities.

Subsequently the observations in relation to the previously defined variables were classified and the hedonic price methodology was conducted using IBM SPSS 21 Statistics.

2.2 Hedonic price analysis

Initially one should consider that a product is defined by its characteristics (Rosen, 1974). It is considered that its set of characteristics is composed of X = (X1, . . ., Xk), and it is also assumed that the preferences of economic agents in relation to any good are determined only by the vector of characteristics of the product (Rosen, 1974; Santi, 2009). In addition, it is assumed that there is a functional relation f between the price p of a good and its characteristic vector X, as shown by Equation 1 (Luppe & Angelo, 2005; Santi, 2009).

$$p=f(X) \tag{1}$$

Assuming that hedonic prices are defined by the partial derivative of the hedonic function, we obtain the relationship shown by Equation 2.

$$\frac{\partial p}{\partial x_k}(x)=\frac{\partial f}{\partial x_k}(x), \qquad (k=1,\ldots,K) \tag{2}$$

The hedonic price $\frac{\partial f}{\partial x_k}(x)$ indicates how much the price p of a good changes if it undergoes a marginal change in its characteristic X_k (Santi, 2009).

There are different choices for the hedonic function: linear, quadratic, logarithmic, and semi-logarithmic (Luppe & Angelo, 2005). However, if there are independent database variables that will be used in binary form, the choice for the functional form of the model is limited to level–level or log–level (Naslavsky, 2010).

According to Halvorsen & Palmquist (1980), in cases where the dependent variable appears in logarithmic form and the independent variables in binary form, the percentage effect of the presence of each attribute must be calculated using Equation 3.

$$\text{Percentage of value-added} = 100.\{\exp(\beta) - 1\} \tag{3}$$

where β is the coefficient obtained in the hedonic price analysis in relation to a given attribute.

Table 1. Dependent and explanatory variables used in hedonic analysis in the Brazilian and French markets.

Brazilian Market		French Market		Typology
Variables	Description	Variables	Description	
Dependent Variable	Retail Price	Dependent Variable	Retail Price	Continuous variable
Price	(R$/l)	Price	(€/l)	
Explanatory variables		Explanatory variables		
Type of container	Glass	Type of container	Glass	Dummy variable
	Plastic		Plastic	Dummy variable
	Carton*		Carton*	Dummy variable
Flavor	Traditional*	Flavor	Traditional*	Dummy variable
	Mixed		Mixed	Dummy variable
	Exotic		Exotic	Dummy variable
Method of production	Organic	Method of production	Organic	Dummy variable
	Conventional*		Conventional*	Dummy variable
Pulp content	100% or integral	Pulp content	100% or integral	Dummy variable
	Lower than 100% or not integral*		Lower than 100% or not integral*	Dummy variable
Ingredient	-	Ingredient	Absence of concentrate juice*	Dummy variable
	-		Presence of concentrate juice	Dummy variable

*Reference categories: These categories are considered to be zero in all dichotomous variables, which implies that the coefficients of the other categories represent deviations from the reference group. This is used to avoid perfect multicollinearity. Thus, for each qualitative regressor, the number of binary variables introduced must be one less than the number of categories of that variable (Gujarati & Porter, 2011).

The hedonic price functions for juices/nectars in the different markets are shown by Equations 4 and 5.

$$Log\ (Price_{Brazil}) = \beta_0 + \beta_1.Glass + \beta_2.Plastic + \beta_3.Mixed + \beta_4.Exotic + \beta_5.Organic + \beta_6.100\%\_Integral + e_i \quad (4)$$

$$Log\ (Price_{France}) = \beta_0 + \beta_1.Glass + \beta_2.Plastic + \beta_3.Mixed + \beta_4.Exotic + \beta_5.Organic + \beta_6.100\%\_Integral + \beta_7.Presence\_of\_concentrate\_juice + e_i \quad (5)$$

The quality of the adjustment of the regression equation was measured by R^2, which provides the percentage of variation in the dependent variable by the referred model (Gujarati & Porter, 2011). According to the same authors, R^2 ranges from 0 to 100%, assuming higher values as the independent variables better explain the dependent's behavior.

Adjusted R^2 has an interpretation and meanings similar to R^2; the difference consists of the fact that the first is adjusted by the number of variables used in the model, making it less sensitive in contrast with traditional R^2, which almost invariably increases and never decreases with the entry of explanatory variables. Adjusted R^2 may increase or decrease, and an increase will only occur if the variable is important for the model (Gujarati & Porter, 2011). Therefore, for these reasons it was decided to use adjusted R^2.

3 Results and discussion

Table 2 shows the descriptive statistical analysis of the prices evaluated in Brazil and in France. Differences can be seen between the two markets and, in particular, a greater dispersion in the Brazilian market, as indicated by a higher coefficient of variation and standard deviation.

The sample observations obtained reflect what was available at the time of data collection. Due to the method used to obtain data, one of the limitations of the study is related to the generalization of the results, which applies to other works that have used the hedonic price methodology for foods (e.g., Romo Muñoz et al., 2015; Hu & Baldin, 2018). However, it should be noted that, despite this caveat, this is an important pilot study in the segment of ready-to-drink juices and nectars, as shown by the results and discussion.

For the Brazilian market, Table 3 shows a predominance of cartons, with 72% of the observations. Glass and plastic showed modest market proportions: 16% and 12%, respectively. Regarding the flavor, the traditional predominates (71%), followed by mixed (23%) and exotic (6%). For the type of production, it is evident that there is still a predominance of conventional (93%). The analysis of the pulp/juice content indicates that in Brazil there is a predominance of reduced content juice (69%) over integrals or 100% juice (31%).

Table 3 also shows that, in the French market, plastic bottles and cartons had similar results: 45% and 41%, respectively. Glass bottles represented only 14%. Comparing the two countries, distinct behaviors are evident, since in Brazil the market is, basically, covered by cartons, whereas in France, the percentages for cartons and plastic bottles are similar. The result of the chi-square test corroborates this conclusion at the 5% level; that is, there is an association between the type of packaging adopted and the country in which it is marketed.

In relation to flavor, similarities are observed between the two countries, which is confirmed by the chi-square test, showing no significance between them at the 5% level.

In France, a predominance of the traditional flavors can be noted. It is worth mentioning that the proportion of organic products observed in the French market is more than twice that in the Brazilian market, which indicates a greater supply; this confirms what has previously been mentioned. The chi-square test reinforces this observation at the 5% level; that is, there is an association between the method of production and the country where the product is sold.

Table 2. Summary of variable price of juices and nectars marketed in Brazil and France.

Variable	Number of Observations	Average	Standard Deviation	Variation Coefficient	Minimum Price	Maximum Price
Brazilian Price	100	R$ 9.25 (€ 2.18)	R$ 5.09 (€ 1.20)	55.03%	R$ 4.45 (€ 1.05)	R$ 23.90 (€ 5.63)
French Price	93	€ 2.19	€ 0.86	39.27%	€ 0.90	€ 7.10

Euro-to-Brazilian Real Exchange Rate on May 2, 2017: € 1 = R$ 4.246 (pt.exchange-rates.org/history/BRL/EUR/T).

Table 3. Number of observations for each attribute of the variables in the Brazilian and French markets and results of the chi-square test.

Variables	Brazilian Market		French Market			
	Number of observations	%	Number of observations	%	chi-square	*p-value
Type of Container						
Glass	16	16	13	14		
Plastic	12	12	42	45	27.268	0.000
Carton	72	72	38	41		
Flavor						
Traditional	71	71	60	65		
Mixed	23	23	30	32	2.598	0.273
Exotic	6	6	3	3		
Method of Production						
Organic	7	7	17	18	5.63	0.018
Conventional	93	93	76	82		
Pulp Content						
100% or integral	31	31	77	83	52.455	0.000
Lower than 100% or not integral	69	69	16	17		
Ingredient						
Absence of concentrate juice	-	-	77	83	-	-
Presence of concentrate juice	-	-	16	17		

*p-value: significance by applying the chi-square test for categorical variables in the analyzed markets.

For the variable content of pulp/juice in the French products, it can be noted that the beverages classified as integrals or 100% pulp content represent 83% of the observations, which indicates that this class dominates in this country. This situation is the opposite of what is seen in Brazil, indicating that consumption habits are quite different between the two countries. Again, the chi-square test is consistent with these observations, showing significance at the 5% level; the test denotes the existence of an association between the pulp content and the country where the beverage is marketed.

Regarding the variable *ingredient* in France, most observations indicated products without concentrated juice.

After the data collection, the assumptions considered in the model were checked, as proposed by Vasconcellos & Alves (2000) and Mankiw (1990).

By presenting the variables and their market share, one can verify the impact of these variables on the hedonic price model for the Brazilian market. Table 4 shows that the selected variables explain a great proportion of the price variation, since the adjusted R^2 is 77%; i.e., the referred model can explain 77% of the price variation. Furthermore, the null hypothesis can be rejected by using the F-test, because the model found significance at 5% probability. It is also noteworthy that all the explanatory variables of this model are statistically significant at the same level of probability.

Some studies which have used the hedonic pricing method for food and beverages, and which show their respective R^2 and/or adjusted R^2 coefficients, are shown in Table 5.

There seems to be no definition in the literature of an acceptable limit for these coefficients. In addition, it is worth mentioning that the adjusted R^2 values found (Brazil, 0.770, and France, 0.495) are higher than those in some previously published studies as shown by Table 5.

In the Brazilian market, organic certification increases the price by approximately 50% over the price for the conventional version, which indicates, at least in the segment under investigation, that organic food is more expensive. This confirms the observations of local consumers as reported by Aguiar et al. (2016) and Organis and Market Analysis (2017). In a study performed in a Brazilian city, it was found that most of the interviewed consumers were willing to pay up to 25% more for an organic version of a particular food (Aguiar et al., 2016). Even though the current study was not executed in the same locality, it strongly implies the origin of consumers' idea that the price of organic food is high, since the price premium for these products is double what was considered in the 2016 survey to be fair, thus making it evident that the products are perceived as expensive.

For the type of container, it can be noted that glass and plastic bottles have a positive impact on product prices, with

Table 4. Coefficients for the characteristics of juices and nectars in Brazil and French, obtained from the log-linear model of hedonic prices and the estimation of value-added.

Variable	Brazilian Market			French Market		
	Coefficient	p-value	Value-added	Coefficient	*p-value	Value-added
Constant	0.713	0		0.135	0	
Type of container						
Glass	0.244	0	27.60%	0.094	0.007	9.90%
Plastic	0.169	0	18.40%	0.033	0.222	Not significant
Flavor						
Mixed	0.099	0.001	10.40%	0.093	0	9.70%
Exotic	0.297	0	34.60%	0.298	0	34.70%
Method of production						
Organic	0.405	0	49.90%	0.092	0.003	9.60%
Pulp content						
100% or Integral	0.209	0	23.20%	-0.023	0.474	Not significant
Ingredient						
Presence of Concentrate juice	-	-	-	-0.141	0	-13.20%
Adjusted R^2		0.77			0.495	
F value		56.344			13.876	
**p-value		0.000			0.000	

*p-value: significance by applying the t-test for each explanatory variable of the model; **p-value: significance by applying the F-test for the model.

the prices being 28% and 18% greater, respectively, than the price of juice in cartons.

In regard to the impact of flavors, mixed and exotic add value in relation to traditional. The increases in price are, respectively, 10% and 35%.

Regarding the pulp content, integral juices (100% content) are priced approximately 23% higher than juices with reduced content.

The analysis of the French model shows that the selected variables explain less of the price variation, because the adjusted R^2 is approximately 50%; i.e., the referred model can explain 50% of the price variation. Nevertheless, the null hypothesis can be rejected by applying the F-test at 5% probability. In contrast to the Brazilian model, in the French market some explanatory variables are not significant at the same level of probability. Products in plastic containers, for example, did not show significant price differences compared to those in cartons; in addition, there is no significant price discrepancy between 100% juice or integral juices and those that do not have such attributes.

Regarding the type of container, when the product is in a glass bottle it is more expensive than when it is in a carton, with an increase of 10% in the price. This is in agreement with what was found by Szathvary & Trestini (2014), who attribute this to the high costs of glass production. Other favorable aspects, according to the Glass Packaging Institute (2013), are that consumers generally consider glass to be a responsible choice, both to protect their health (because there is no risk of bisphenol-A leaching into the beverage, which can happen with some plastic packaging) and also to protect the environment, and also because of sensory issues.

Table 5. Values of R^2 and/or adjusted R^2 in different studies which used the hedonic price methodology for food and beverages.

Product	Values of R^2 and/or adjusted R^2	Reference
Olive oil	Model 1: $R^2 = 0.75$ Model 2: $R^2 = 0.77$	Cavallo et al. (2018)
	$R^2 = 0.853$ and adjusted $R^2 = 0.850$	Romo Muñoz et al. (2015)
Vegetable	Model 1: $R^2 = 0.43$ Model 2: $R^2 = 0.34$ Model 3: $R^2 = 0.40$ Model 4: $R^2 = 0.31$ Model 5: $R^2 = 0.38$ Model 6: $R^2 = 0.52$ Model 7: $R^2 = 0.44$	Ghazaryan et al. (2018)
Wine	Model 1: adjusted $R^2 = 0.6917$ Model 2: adjusted $R^2 = 0.7352$ Model 3: adjusted $R^2 = 0.5751$	Hu & Baldin (2018)
	$R^2 = 0.202$ and adjusted $R^2 = 0.184$	Luppe & Angelo (2005)
Yoghurt	$R^2 = 0.6565$ and adjusted $R^2 = 0.6424$	Ballco & De-Magistris (2018)
Milk	Model 1: adjusted $R^2 = 0.8862$ Model 2: adjusted $R^2 = 0.9188$ Model 3: adjusted $R^2 = 0.9349$ Model 4: adjusted $R^2 = 0.9215$	Bimbo et al. (2016)
Cheese	Model 1: $R^2 = 0.538$ Model 2: $R^2 = 0.620$	Valente (2016)
Coffee	Model 1: $R^2 = 0.59$ Model 2: $R^2 = 0.53$ Model 3: $R^2 = 0.64$	Schollenberg (2012)

The organic certification had a positive significance in the French market, thus confirming the tendency observed by Kesse-Guyot et al. (2013); an increase of 10% in the price compared to the price of conventional products was found. One of the factors that causes the increased price in both markets is the cost of organic certification, because to keep the identification stamp on the packaging of the processed products it is necessary to hire a certifier and conduct specific analyses on the product to validate the process.

Food and Agriculture Organization of the United Nations (2017) describes other possible explanations for the high prices of organic food: low supply, higher production costs (due to the difficulty of economies of scale), post-harvest cost increases (due to the difficulty in separating organic products from conventional ones, especially in transportation and in processing), and insufficient marketing. In addition, Food and Agriculture Organization of the United Nations (2017) emphasizes that factors with little or no impact on the production processes of conventional food contribute to the increased prices for organic: higher standards of animal welfare; greater rigor in aspects of environmental protection; adoption of alternative practices that are generally more laborious and therefore more expensive than the application of agrochemicals for agricultural management; and rural development, which results in new jobs in agriculture and ensures a higher income for producers.

Moreover, it is important to emphasize the difference between the price increases in the two markets: in Brazil the premium is 50%—five times greater than that observed in France. A reasonable explanation for this observation is the economies of scale resulting from the greater circulation of organic food, including juices and nectars, in France. This discrepancy is easily checked by analyzing the financial turnover resulting from the marketing of organic products in the European country (5.5 billion euros) and in the South American country (530 million euros), as shown by, respectively, Agence BIO (2016) and Liu (2016). Macena et al. (2011) also point to the small supply of organic products, mainly due to the shortage of raw materials, as one of the aspects contributing to the higher prices in Brazil.

Another reason for the difference in the price premium is the difference in the number of organic products and brands found in samples from the countries—seven in Brazil and 17 in France. This indicates a difference in the supply, thus corroborating the argument that the greater the supply, the lower the product price. In relation to the number of organic brands, three organic food companies were found in Brazil, while France had seven, indicating a greater competitiveness in the European country, which contributes to a reduction in prices.

The analysis of the coefficients for the flavors reveals that mixed and exotic flavors in France were more expensive than traditional ones, with coefficients of, respectively, 10% and 35%, which indicates values for the premiums like those in Brazil (10% and 30%, respectively).

Regarding the presence of concentrates in the formulation of the juices and nectars found in the French market, it was shown that the price of these was significantly negative, at the 5% level, in relation to juices and nectars that did not contain such an ingredient. The value of the discount reached 13%. One likely explanation is that consumers note a loss in quality in products that contain concentrates. In addition, it is advantageous for the industry to use concentrates, as they can minimize transport costs because a smaller volume of water needs to be transported.

4 Conclusions

This study was designed to verify whether the price of organic ready-for-consumption juices and nectars is higher than the price of conventional juices and nectars. For this, the market for ready-to-drink juices and nectars was analyzed from samples collected in Brazil, a country still at an early stage of development in relation to organic foods, and in France, where its consumption is popular among consumers.

The use of the hedonic pricing method indicates that the presence of organic certification leads to a positive additional value, which is five times greater in Brazil than in France. Thus, the results indicate that the current study can provide important substance to discussions about the marketing aspects of organic food. It was verified, at least in the segment evaluated, that the presence of organic certification implies a higher final sale price.

The limitations of this study are the absence of sufficient detail about production costs in the investigated countries and the type of sampling performed which prevents drawing more comprehensive conclusions. Therefore, we suggest that scholars carry out a similar analysis of other products in different countries, considering detailed production costs and more robust samples.

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