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## **WHAT DETERMINES PURCHASING BEHAVIOUR FOR ORGANIC AND INTEGRATED FRUITS AND VEGETABLES?**

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### **Abstract**

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Food quality and safety are among the main consumer concerns which have stimulated growth of demand for food from non-conventional production practices. Consumer behaviour in relation to quality identified food such as organic food and food from integrated production system is an evolving phenomenon, and therefore needs to be constantly studied to acquire sound foundation for business development strategies of agro-food producer. A country-wide survey related to purchasing behaviour of organic and integrated fruit and vegetables has been prepared for Slovenia. An ordered probit model of consumer choice was developed on the basis of survey results to quantify various determinants of purchase frequency for organically and integrally produced fruit and vegetables. Results show that purchase of analysed produce is most significantly influenced by their availability in retail outlets, followed by consumers' income, health and environmental considerations, and visual attractiveness of products. Demand for organically and integrally produced fruit and vegetables could be further stimulated by targeted knowledge and awareness raising actions.

*Key words:* consumer behaviour, fruit and vegetable, organic food, integrated agricultural production, ordered probit model, Slovenia

*Abbreviations:* IFOAM – International Federation of Organic Agriculture Movements; OIFV - organic and integrated fruit and vegetables

### **Introduction**

Modern food consumer is highly concerned about the safety and quality of the food products purchased. This concern goes simultaneously with their awareness of the relation between the production practice and quality of food products, as well as environmental concern in regards to food (Thøgersen and Olander, 2002). Moreover, the awareness has contributed to-

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wards growing demand for food from non-conventional production practices as well as an increasing consumer interest in having a closer relationship with the food producer (Thompson, 1998; Wier et al., 2003; Vermeir and Verbeke, 2006; Botonaki et al., 2006). This change has been especially significant in the demand for organic foods, since the global annual organic sales are estimated at around 38.6 billion US Dollars in 2006 which is double figure in comparisons

with the figure in 2000 (Willer et al., 2008). Consumption of organic food is highly concentrated in North America and Europe since these two regions comprise 97% of the global demand (Sahota, 2008). Consumption in these two markets is growing at close to 20% annually (Wier and Calverley, 2002; Halberg et al., 2006). Fruit and vegetables is the largest segment in the European organic food market with almost one fourth of total organic food sales in 2006. Moreover, organic fruit and vegetables represented about 2 percent of all fruit and vegetable sales in Western Europe (Willer et al., 2008). This pattern is related particularly with the increased awareness of the importance of a healthy diet and positive perception of fruit and vegetable in this respect (Connor, 1994; Viaene et al., 2000; William and Hammit, 2001; Lambert, 2001; Belows et al., 2008).

Response towards these trends on the supply side is also evident, since organic agriculture is one of the most rapidly developing market segments in both developed and developing countries (Halberg, 2006). Land area under organic agriculture has increased from 16.9 million hectares in 2000 to 30.4 in 2005 globally, whereas the growth in Europe was even faster (Willer et al., 2008). In 2005 the organic area made up 3.9% of the total utilised agricultural area in the European Union, and the highest proportions were recorded in Austria with 11.0%, Italy with 8.4%, and the Czech Republic and Greece both with 7.2% (Eurostat, 2007). Simultaneously the global organic food chain has been transformed from a local network of producers and consumers to a highly coordinated and formally regulated supply system (Raynolds, 2004).

Agricultural policies in many developed countries, including European Union, have responded to favourable market trends and benefits external to the markets (e.g. environmental and spatial impacts) arising from organic farming and other sustainable agricultural practices (Hamm et al., 2002). This is reflected in rising importance of measures to encourage and promote organic farming (OECD, 2003). With new EU legislation geared towards increasing the produc-

tion of organic food in Europe going to be applied since 2009, the growing awareness of organic food and its benefits should see the market continuing its high growth into the near future.

There is a rather great amount of research work attributed to the attitudes of consumers towards safe food, both in broad sense and with a particular accent towards organic fruit and vegetables<sup>1</sup>. However, a rapid growth in demand and production of these food categories necessitate continuous research in order to document and understand the evolution of the markets. Necessity to investigate consumers' attitudes towards these food categories is even more expressed in case of countries where the corresponding markets have emerged only relatively recently. In these cases the underlying knowledge regarding consumer attitudes, perception and behaviour in relation to organic food is also rather insufficient. Countries acceding to the European Union are a good example of such markets, since the accession brings inclusion into the common policy framework where organic agriculture and other quality identified food production play important role.

In this paper we are trying to contribute to a better acquaintance with consumers' attitudes and perception towards organic and integrated fruit and vegetables in the case of Slovenia. Activities related establish an integrated framework for organic farming started in late nineties, but adequate consumer studies are non-existing. A country-wide survey has been conducted in order to determine the characteristic of the consumers of organic and integrated fruit and vegetable. The paper aims to elucidate and to quantify the impact of various determinants influencing purchasing behaviour of organic and integrated fruit and vegetables consumers in Slovenia. Survey results have been used to develop a consumer behaviour model of qualitative choice (Pindyck and Rubinfeld, 1991). Results of this research are aimed at enabling more effective marketing strategies of organic and integrated fruit and vegetable producers in Slovenia, but also to support public policy initiatives to stimulate demand of these categories of food.

<sup>1</sup>for review see: Torjusen et al., 2004; Yiridoe et al., 2005.

## Materials and Methods

### *A brief overview of related research*

Determinants of food choice and radical changes of related behavioural patterns are challenging and important in many aspects. Initially, the main focus was to investigate consumer's needs and motivations in order to support agro-food industry and retailing sector in searching competitive advantage with supreme supply. Currently the questions of food choice became also an issue from the perspective of public health and motivation of the policy makers in developed economies to improve dietary patterns of the population. Contemporary research literature on food choice considers product attributes as one of the perspectives to increase understanding of consumer or buyer (Assael, 1998). A product is comprehended as an aggregation of several characteristics and components – referred as product attributes; upon which buyers makes their choices. Consumers during a complex cognitive process form beliefs and develop attitudes and intentions. A number of papers have dealt with the consumer behaviour, decision-making process and attitudes towards notion of safety related to food, both in broad sense and with a particular accent towards food produced under a specific quality assurance system like organic agriculture.

Previous studies showed that consumers perceive organic food as of higher quality, safer and fresher (e.g. Thompson and Kidwell, 1998; Schifferstein and Oude Ophuis, 1998; Loureiro et al., 2001; Botanaki et al., 2006; Kihlberg and Risvik, 2007). Another dimension of attributes related to organic food is positive environmental impact, since it is perceived as produce grown as natural and without chemicals (Grunert and Juhl, 1995). However consumers' concerns regarding the pollution tend to be less important drivers for organic food consumption than so called private benefits (Weir et al., 2003; Bellows et al., 2008). Therefore healthiness of the products in comparison to conventional food options is among the main reasons for organic food purchase (Loureiro et al., 2001; Krystallis and Chryssohoidis, 2005; Kihlberg and Risvik, 2007; de Magistris and Gracia, 2008). In this respect the concern for children healthy diet has also been identified (Latacz-Lohmann and Foster, 1997).

Yiridoe et al. (2005) exposed the importance of knowledge on organic food products as a factor that is strongly affecting buying decision, since consumers without information cannot differentiate the attributes of organic from conventional alternatives. Related factor to knowledge is trust in system of labelling and conformity to standards of production practices defined in regulation (Botonaki, 2006; Achilleas and Anastasios, 2008).

The importance of price as a barrier to purchase fruit and vegetable from non-conventional production systems is confirmed by an increasing amount of research that assess the consumers' willingness to pay a premium for organic or safe products (e.g. Weaver et al. 1992; Underhill and Figueroa, 1996; Govindasamy and Italia, 1999; Boccaletti and Nardella, 2000; Canavari et al., 2005; Batte et al., 2007).

Production yields are considerably lower for organic production and therefore achieved price premium is a key determinant for organic farming attractiveness and profitability. Consumers' willingness-to-pay a premium shows the value they place on the product attributes, whereas socio-demographic characteristics, perceived quality and risks determine the value consumers are willing to pay.

From the brief literature review it is evident, that consumer behaviour in relation to quality identified food such as organic and food from integrated production system is an evolving phenomenon, and therefore needs to be constantly studied. Only precise knowledge regarding the consumer perception in this respect will provide sound foundation for business development strategies of agro-food producer. Likewise, this information is needed also to assist rapidly emerging food and agricultural policies that prevalently place stimulation of high quality fruit and vegetables consumption as an important objective (e.g. European Commission "White Paper on Nutrition" and "School fruit and vegetable scheme" within the Common Market Organisation for fruit and vegetables).

### *Organic food and food from integrated production system in Slovenia*

Market for organic fruit and vegetables in Slovenia started to develop in the late nineties, whereas the first attempts to promote integrated production were

present a decade earlier (MAFF, 2006). Foundations for development of adequate certification system started with the establishment of Slovenian Organic Farmers' Association in 1997 by market oriented organic farmers. Standards were prepared by an NGO Institute for Sustainable Development and were published also by the Slovenian Ministry of Agriculture Forestry and Food. The standards were accordant to the IFOAM Basic Standards and some other national standards (e.g. Austrian Ernte and German Bioland). As early as in 1999, a total of 300 farms applied for certification (Slabe, 2002). Since then controlled farming systems such as integrated and organic farming are on the increase. During the period prior the Slovenian accession to the European Union national regulations have been accepted regarding to organic farming and integrated agricultural production system. After the accession Slovenia adopts entire EU system of food quality identification including organic farming (e.g. EEC. 2092/91). Today a significant part of fruit production (especially apples and pears) is produced following the integrated standards and marketed under the national label and two private collective marks, one for fruit and the other for vegetable. In 2007 around 56.9 thousand hectares of farmland was cultivated under the integrated farming system which represents more than one fourth of total arable land and permanent plantations in Slovenia (MAFF, 2008). In total 6,041 farms acquired an integrated farming certificate for the same year. More than two thirds of the area is arable land; mainly maize and feed grain and therefore the crop enter food chain as animal feed. The rest of the area is under permanent plantations and the produced fruit and vegetable is differentiated on the market. On the other hand organic production is still rather sporadic and the market presence is rather low. In 2007 the area under organic farming was about 29.3 thousand hectares, but almost ninety percent of the land is grassland and pastures. Only minor part of that area is intended for differentiated market production, since organic animal products (e.g. meat or dairy) are extremely rare. Rather, the produce is entering conventional supply chains, and the prevalent motivation of the farmers to

enter the organic control is to be eligible for additional budgetary support. Around 2,000 farms have been in the system organic control and 1.610 has acquired the organic farming certificate (MAFF, 2008). However, the range of organic products is relatively broad, but the quantities available are extremely small. The main items are seasonal farm products or simple processed foods such as dried fruits, juices, vinegar, wine, and some dairy products. Lately in 2007 one of the smallest industrial dairy enterprises has started with the production of fermented products. However, there are still rather large challenges ahead, particularly for the Slovenian organic agricultural sector to increase market presence and assure stable supply of produce.

#### *The survey objectives and methodology*

The overall objective of this research is to gain a better insight regarding consumption of organic and integrated fruit and vegetables (latter referred as OIFV) in Slovenia and associated beliefs and attitudes of consumers. The source of data was a consumer survey conducted country-wide on a representative sample of 1027 households.

Beside the socio-demographic identification of the respondents, the main part of the questionnaire can be divided into the following sections:

- general dietary patterns and lifestyle determination;
- overall fruit and vegetable purchasing behaviour;
- household's fruit and vegetable self-sufficiency level;
- acquaintance, beliefs and perception of OIFV and
- purchase frequency of OIFV.

On the basis of the acquired data a consumer choice model has been developed. Focus of the empirical scrutiny was given to identify determinants that influence purchase frequency of the OIFV. Methodology selection was directed by the ability for adequate incorporation of the ordinal nature of data describing purchasing behaviour of OIFV. The model that satisfactorily fulfils the criterion falls within the group of models of qualitative choice - more specifically the ordinal probit model (Pindyck and Rubinfeld, 1991).

Following Greene (1997), the ordered probit model can be specified, as built around a latent regression:

$$y_i^* = \beta' x_i + \varepsilon \quad (1)$$

where  $y_i^*$  is an unobserved frequency of quality fruits and vegetables purchase,  $\beta^l$  is the vector of unknown parameters and  $x_i$  is a vector of explanatory variables (which may be continuous or discrete) denoting attributes influencing purchasing behaviour of respondent and  $\varepsilon$  is the independently and identically normally distributed error term. The ordered probit model tests the null hypothesis  $H_0: \beta_k^l = 0$  for every explanatory variable denoting that the independent variable  $k$  does not have an effect in explaining changes in the probability of  $y_i$ .

Results from our survey provide information on the respondents' purchase frequency of organic and integrated fruit and vegetable which is ordinal with five categories. While  $y_i^*$  is unobserved, respondents actually report their purchase decisions by selecting one of the five categories. Values for  $y_i$  are 0 through 4, where 0 represents no purchase of organic and integrated fruit and vegetables and 4 represents 2-3 weekly purchases of such produce.

The analysis builds from the following hypotheses:

(i) consumers of OIFV in Slovenia are mostly influenced by the qualitative characteristics and not by the price premium;

(ii) barrier to purchase (demotivator) for OIFV organic are price and availability;

(iii) the main motivator to prefer integrated and organic fruit and vegetable to conventional is superior quality;

(iv) important quality characteristics to consumers are nutritive value, freshness, flavour or taste and general appearance.

The results of ordered probit models<sup>2</sup> were interpreted by using the partial change or marginal effects on the probability of ordinal outcome. In doing so, the independent variables - other than the one being examined - were held constant at their mean values. The calculation of quasi-elasticity is based on the results of marginal effects, i.e. partial derivatives of the

probability function ( $Y$ ). Like "standard" elasticity coefficients, quasi-elasticity coefficients can be interpreted as the percentage impact of a unit change of an explanatory variable on the probability of the observed outcome.

## Results and Discussion

Before turning to the results from the consumer choice model, this section starts with some general results about the perception of organic and integrated fruit and vegetables by Slovenian consumers grasped from the survey.

Despite a rather short period of organic and integrated production presence in Slovenia and no explicit marketing activities the survey results show that consumers' awareness is generally high. As expected the highest rate of recall has been achieved for the term "bio" that is an equivalent for "organic" in Slovenian language. As much as 94.4% of respondents have associated these expressions with fruit and vegetable. More than two thirds relate the phrase "ecological" with food, whereas only 38% of the respondents were acquainted with the term "integrated".

An open ended question was prepared to acquire basic associations of the respondents with the analysed categories of fruit and vegetables. Results show a rather high degree of responds homogeneity, since the three most frequent replies represent more than 80%. Associations are positive and generally indicate correct basic understanding. However, results show that the respondents do not distinguish among the organic and integrated categories and perceive them as synonyms. That's why we have treated the frequency responses as for one product category only.

In total replies were categorised into 48 standardised answers and the highest frequency (37.1%) was attributed to association related to "healthy food". With 23.4% follows the category "free from harmful substances" where replies like: chemical free, pesticide free and alike were aggregated. Direct associations regarding the production practice rank third with 21.7% of replies. Surprisingly low share of replies was associated with "envi-

<sup>2</sup>Estimation of the empirical model was conducted by using the LIMDEP software (Greene, 1999).

**Table 1**  
**Purchase frequency for organic and integrated fruit and vegetables**

Purchase frequency	Number of observations	Frequency, %	Cumulative frequency, %	Dependent variable (PURCHAS)
Never	261	27.97	27.97	0
Less than once a month	225	24.12	52.09	1
1-3 times a month	162	17.36	69.45	2
Once a week	181	19.40	88.85	3
More than once a week	104	11.15	100.00	4
Total observations	933*	100.00	/	/

\* Non-responses or 'I don't know' responses were omitted from the analysis

ronment" (1.7%) and better quality (1.5%). The highest frequency among the wrong associations went to "low calories" (0.7%).

Dependent variable in the consumer choice model was formed on the basis of the question where respondents were asked to evaluate (*self reporting*) purchase frequency of organic and integrated fruit and vegetable (OIFV). Responses were coded in an ordinal scale as presented in the Table 1 below.

As suggested from the survey results Slovenian consumers assert rather a high purchase frequency for OIFV, since almost one third of them buy this category of produce at least once a week. Roughly the same share of respondents (28%) is non-buyers of OIFV and one quarter of them are sporadic buyers with purchasing fewer than once a month. About 17% of respondents buy this product few times a month.

Table 2 aggregates variables employed in the evaluated consumer choice model, which gives us some further insights to the topic. The finding that Slovenian consumers relate attributes of health as the main association with OIFV is confirmed with the highest rank from the likert test followed by the environmental attribute. Interesting finding comes from the question regarding the price of OIFV that ranks on last position. It seems Slovenes do not consider themselves as price sensitive.

When asked to compare general appearance and taste of OIFV with the "ordinary", produce respondents evaluate the appearance to be less likely better

than taste. However, the "level of disagreement" among respondents (standard deviation) is also higher.

Perception regarding the availability of the studied categories of fruit and vegetables in the most frequently used retail shop is inclined towards the answer "insufficient"; however again high standard deviation is observed. On the other hand, dependency between the origin of food and quality has been reported as highly important.

As might be expected from the general characteristic of Slovenian rural economy the level of households' self-supply with fruit and vegetables is rather high since only 37% of respondents purchase more than half of the total consumption.

Table 3 presents the parameter estimates from the ordered probit model of consumer choice for organic and integrated fruit and vegetables in Slovenia.

Based on the results of a likelihood ratio test (Pindyck and Rubinfeld, 1991) the model is statistically significant at 99% or above. The results of the  $\chi^2$  test reveal that the differences between the model coefficients are statistically significant. However, the value of the likelihood ratio index (LRI) goodness-of-fit coefficient (Greene, 1997) is rather low (0.049), which implies that the model explains only a part of the variance within the dataset. However, the main purpose of this empirical work was not to maximise probability function but to evaluate impact of some attitudinal variables on purchase frequency. Rather low LRI values were also expected due to the fact the

**Table 2**  
**Definition of explanatory variables and descriptive statistics of data used in the model**

		Total average (st. dev.)	Y = 0 average (st. dev.)	Y = 1 average (st. dev.)	Y = 2 average (st. dev.)	Y = 3 average (st. dev.)	Y = 4 average (st. dev.)
No. of observations		933	261	225	162	181	104
Logarithmic transformation of households' annual income	<i>INC_LN</i>	12.24 (0.52)	12.09 (0.52)	12.29 (0.54)	12.30 (0.52)	12.30 (0.48)	12.30 (0.47)
Environmental attribute OIFV prod. environment friendly (likert scale, 1-7)	<i>ENVIR</i>	5.84 (1.56)	5.85 (1.66)	5.80 (1.53)	5.88 (1.68)	5.80 (1.44)	5.98 (1.48)
Health attribute: OIFV considered healthier (likert scale, 1-7)	<i>HLTH</i>	6.07 (1.35)	5.88 (1.55)	6.00 (1.30)	6.25 (1.21)	6.15 (1.25)	6.22 (1.32)
Price attribute: OIFV are too expensive (likert scale, 1-7)	<i>PRICE</i>	5.68 (1.55)	5.77 (1.59)	5.68 (1.41)	5.62 (1.61)	5.61 (1.60)	5.72 (1.56)
Visual attractiveness of OIFV (likert scale, 1-7)	<i>VISUAL</i>	4.71 (1.62)	4.40 (1.68)	4.41 (1.48)	4.78 (1.62)	4.98 (1.54)	5.38 (1.59)
Taste of OIFV deemed better (likert scale, 1-7)	<i>TASTE</i>	5.35 (1.51)	5.17 (1.56)	5.05 (1.59)	5.46 (1.46)	5.56 (1.40)	5.83 (1.31)
Availability of OIFV by frequently used retailers (likert scale, 1-7)	<i>RETAIL</i>	3.99 (1.91)	3.52 (2.01)	3.62 (1.89)	4.12 (1.82)	4.36 (1.70)	4.85 (1.77)
Perceived linkages between origin and quality (likert scale, 1-7)	<i>ORIG_Q</i>	5.92 (1.33)	5.99 (1.39)	5.74 (1.46)	5.82 (1.31)	6.04 (1.10)	6.10 (1.33)
More than 50% of F&V purchased (0=N; 1=Y)	<i>BUYER</i>	0.37 (0.48)	0.23 (0.42)	0.29 (0.45)	0.47 (0.50)	0.44 (0.50)	0.48 (0.50)
At least one meal daily cooked by themselves (0=N; 1=Y)	<i>COOK</i>	0.57 (0.50)	0.50 (0.50)	0.44 (0.50)	0.60 (0.49)	0.60 (0.49)	0.63 (0.48)
Residence in rural area (0=N; 1=Y)	<i>RURAL</i>	0.63 (0.48)	0.60 (0.49)	0.48 (0.50)	0.63 (0.48)	0.73 (0.45)	0.54 (0.50)

Source: the model

survey dataset comprised only rather general determinants influencing households' purchasing behaviour. For higher degree of explanatory capacity of the model clearer definition of determinants is needed in the future work.

Income status of consumers considerably determines purchasing frequency for organic and integrated fruit and vegetable. As has been expected, frequency significantly increases with higher household disposable incomes; however the estimated marginal effects reveal non-linear patterns for this variable. A high

quasi-elasticity coefficient for non-buyers (Y=0) ranking to 0.66 suggests that low income level is very likely determines no purchasing of organic and integrated fruit and vegetables. Also marginal effects clearly suggest that higher frequency of purchase is closely related with households' disposable incomes (and vice versa). The corresponding quasi-elasticity for a regular purchase of such produce (once a week or more) ranges to 0.39.

The model results with respect to the stated environmental concern reveal that respondents not con-

sidering production of organic or integrated fruit and vegetable as environment friendly (or they are indifferent to environmental aspects of production) are more likely to be among non-buyers. It however has to be noted that the impact of environmental concerns on purchasing behaviour is significant, but not explicit. The highest quasi elasticity coefficient is linked with decision not to purchase (0.08). Rather inconclusive

results regarding environmental concern might be further explained with low association between organic and integrated production practices and implications on environment by the Slovenian consumers.

Consumers' perception of organic and integrated fruit and vegetables being healthier than conventional products significantly increases the probability (and frequency) of actual purchase. On the contrary, per-

**Table 3**  
**Results of the consumer choice model**

Explanatory variable	Ordered probit of purchasing behaviour		Marginal effects for various outcomes			
	Coefficient	t-statistic	Prob(Y=0)	Prob(Y=1)	Prob(Y=2)	Prob(Y=3)
Constant	-4.29	-4.20	1.306	0.406	-0.181	-0.773
Households' yearly income	0.30	3.84	-0.092	-0.029	0.013	0.054
Environmental concern towards production of OIFV	-0.08	-2.40	0.025	0.008	-0.003	-0.015
Health concern: OIFV considered healthier	0.10	2.63	-0.030	-0.009	0.004	0.018
Price consciousness: OIFV are too expensive	-0.02	-0.67	0.006	0.002	-0.001	-0.003
Visual attractiveness of OIFV	0.10	3.82	-0.031	-0.010	0.004	0.018
Taste of OIFV deemed better	0.09	2.88	-0.026	-0.008	0.004	0.015
Availability of OIFV by frequently used retailers	0.13	6.00	-0.038	-0.012	0.005	0.023
Perceived linkages between origin and quality	-0.01	-0.05	0.001	0.000	-0.000	-0.000
More than 50% of F&V purchased	0.14	1.67	-0.043	-0.013	0.006	0.025
At least one meal daily cooked by themselves	-0.09	-1.08	0.028	0.008	-0.004	-0.016
Residence in rural area	-0.18	-2.11	0.056	0.017	-0.008	-0.033
Log likelihood function	-1155.27	/	/	/	/	/
Restricted log likelihood	-1215.00	/	/	/	/	/
LR test $\chi^2$ (d. freedom.)	119.49 (11)	/	/	/	/	/
LRI	0.049	/	/	/	/	/

Source: the model

sons not considering quality products as healthier are more likely to be among non-buyers (quasi elasticity 0.10).

According to the model results, price consciousness has no significant impact on purchase of quality fruits and vegetables. Interestingly, non significant coefficient suggests that price of higher quality products is not a decisive element of purchasing behaviour. Purchasers are likely to continue buying such products notwithstanding higher prices of such products. Surely, these results should not be considered a basis for an ultimate conclusion about low consumer price sensitivity for organic and integrated fruit and vegetables in Slovenia. Some additional and more sophisticated measuring approaches should be employed to confirm these indications.

It is confirmed by the model results that consumers consider the visual attractiveness (appeal) of fruits and vegetables they make purchasing decision. Consumers which believe that visual appealing of organic or integrated fruit and vegetables is not satisfying (worse than conventional), are less likely to buy these categories of produce. The highest quasi-elasticity is 0.02, which is again linked with decision not to purchase and therefore, impact of visual attractiveness on purchase frequency is rather low.

Taste appears to significantly affect the consumer preferences to purchase fruit and vegetables from organic or integrated production systems. Model results show that consumers perceiving these categories of fruits and vegetables as having superior taste comparing the conventional ones are more likely to be among buyers. Quasi elasticity for  $Y=0$  is estimated at 0.081.

It can be further examined, however that the consumers do not relate quality of fruits and vegetables with their micro-origin. The coefficient estimating this determinant is insignificant. With this question we were estimating potentials for "local supply" marketing strategy, which turned to be inappropriate.

Market for organic fruit and vegetable in Slovenia might still be considered as insufficiently developed. Situation for integrated produce is slightly better; however awareness of consumers is very low for this cat-

egory. Therefore it has been expected, that availability of such products at "my retailer" has significant role on the consumer purchasing behaviour. Model results clearly confirm these expectations and favour strong emphasis on distribution strategy.

The level of self-sufficiency showed to be rather high for Slovenian households; however, result from the model doesn't confirm the expected inverse relations. The fact that households buy more than a half of fruits and vegetables does not have a statistically significant effect on purchase of organic and integrated fruit and vegetable.

Similar holds for dietary habits of households. Consumers which prepare at least one main meal within the household a day might be named as "traditional eaters". Results from the model confirm that meal preparation is not significantly related with higher probability to purchase organic or integrated fruit and vegetables. Therefore "traditional eaters" are not necessary the main purchasers of organic and integrated fruit and vegetable. Reversely; marginal effects suggest that the probability for frequent purchase (outcome  $Y=3$ ) decrease, however with low quasi elasticity.

Results for the last variable suggest that consumers from rural areas are generally less likely to buy organic and integrated fruit and vegetables. This might be related either to the problem of availability for these produces in rural area, insufficient awareness of consumers but partially also to the household self-supply with fruit and vegetable.

## Conclusions

In this paper we evaluated some of the factors that might affect frequency of organic and integrated fruit and vegetable consumption in Slovenia. On the basis of a country-wide survey of the representative sample (1027 households) data for consumer choice model were obtained. The model estimated falls within the group of ordered probit models (Pindyck and Rubinfeld, 1991).

Some introductory information regarding the attitudes and perception of organic and integrated fruit

and vegetable among Slovenian consumers might be revealed from simple descriptive statistics. The main conclusion from this is that Slovenian consumers do not associate environmental dimension with organic fruit and vegetable production. The most frequent association in this respect is health (“organic or integrated is healthy”) and free from harmful substances, whereas less than two percent of respondents relate impacts on environment. Implication from this finding is that much wider promotional and educational activities regarding organic and integrated fruit and vegetable is needed in Slovenia. Especially awareness for integrated production is very low (only 38% of respondents relate this term with food) despite the fact that the actual production of such fruit in Slovenia is considerable high especially for staple fruit such as apples and pears.

Another result from the study is revealed rather high purchase frequency for organic and integrated produce. Almost one third of respondents reported they buy this category of produce at least once a week, however roughly the same share of respondents (28%) falls within the group of non-buyers. Surely, using the self-reporting method for purchase frequency of a subgroup of product that is not clearly defined (or homogeneously perceived) might lead to over evaluation. However, very low share of incorrect associations (e.g. low calories) and high frequency of non-specific association (healthy and free of harmful ingredients) might indicate that consumers attribute “organic or integrated” category uncritically. They “believe” they purchase this category of fruit or vegetable if the produce fulfils some general stereotypes e.g. produced within extensive orchard. This conclusion again supports already identified need for more effective promotion and consumer education.

The ordinal probit model was constructed using purchase frequency for organic and integrated fruit and vegetables as dependent variable and 11 selected qualitative determinants as independent variables. Results of the model are statistically significant whereas the goodness-of-fit indicator (LRI) is rather low. However; at this stage of the research even with low explanatory capabilities for variance, the model gives

valuable insight into the organic and integrated fruit and vegetable purchasing behaviour of Slovenian population.

The most significant impact on purchase frequency has availability of organic and integrated fruit and vegetables in the shop where respondents make majority of their shopping. Clearly, the importance of availability favours effective distribution activities, but also the emerging initiative of promoting local supply (farmers market) and short retail chain for fruit and vegetables.

Model confirms important inverse implication of disposable household income on purchase frequency, where beside the affordability effect (these category of produce is more expensive) also education and awareness might influence the result.

The two basic criteria of quality – taste and visual attractiveness have both significant effects on the frequency of purchase. If consumers perceive organic and integrated fruit and vegetables as superior in terms of taste and visual appeal, probability of a more frequent purchase is higher (it has however to be noted that quasi elasticity for both determinants is low). Nevertheless, descriptive results of the survey suggest that consumers claim they are often prepared to “sacrifice” superior visual attractiveness for the organic and integrated category, but the taste should be better. This might be a useful guideline for business development strategies.

Relation between environmental concern and organic or integrated fruit and vegetable is significant but rather inconclusive. Marginal effect are positive for non buyers, whereas for frequent buyers are negative. These results are accordant with conclusion about low association between environment and organic and integrated production.

Insignificant relation has been evaluated for meal preparation patterns, however they are rather explanatory. Probability of being frequent buyer of organic or integrated fruit and vegetable increases with the fact that a respondent is only sporadically cooks meals at home. Traditional eating patterns are not a characteristic of aware and affluent consumers. They do increase the share of food consumed away from home

and are also disposed to modern food categories where organic and integrated produce surely can be classified.

The study presented contributes towards a better understanding of demand for organic and integrated fruit and vegetable in emerging markets. Despite this, additional research would be needed to understand sufficiently such a complex processes as food choice. In this respect, it would be interesting to study in greater detail consumers' attitudes by different distribution channels and strategies for organic and integrated fruit and vegetables.

This would help to prioritise specific attributes and to evaluate price sensitivity of consumers for organic and integrated produce.

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