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Effects of animal welfare standards on consumers' food choices

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Abstract

Nowadays, besides the food quality characteristics – the nutritional content, hygienic standards of foods, food additives, agrochemicals – that continue to attract the interest of the consumers, additional ethical factors like animal welfare, animal rearing and origin, and environmentally friendly production are playing an important and determinant role in consumers' food choices.

Thus, the main aim of this paper is to measure consumers' awareness of animal welfare by studying their attitudes and behaviour towards three certified animal products – meat, eggs and dairy products. Moreover, the effects of personal values, attitudes and other socioeconomic factors on demand for food produced under animal welfare standards are studied and measured utilising a self-administered questionnaire.

The most important factors that affect consumers' intention to buy the three studied animal products are family size, the treatment of farm animals and the identity code of the animal (label). Results demonstrate that consumers are deeply concerned about animal welfare, and the majority of them express their intention to pay a small premium for food produced in compliance with animal welfare standards. The study also reveals that the market for products certified for complying with animal welfare standards has high potentials for further development.

Keywords: *Certified dairy products, animal welfare, consumer attitudes, intention to buy.*

1. Introduction

Consumers are becoming more and more conscious about food attributes that cannot be recognised by sight, taste and smell. Such attributes are related to nutritional ingredients, chemical additives and residues, safety, health standards, convenience, ethical issues, animal rearing and origin (Henson, 1996; Wandel & Bugge, 1997; Bernués et al., 2003; Cheftel, 2005). On top of that, attributes like environmentally friendly production methods and animal welfare standards gain the highest importance during product purchase (Bernués et al., 2003). This importance of animal welfare issues is clearly reflected in the huge amount of EU legislation designed to improve the welfare of farm animals (Bennett & Blaney, 2003; Vanhonacker et al., 2008). This growing concern of EU consumers in livestock production methods may be attributed to various

outbreaks of food scares and animal diseases. Thus, animal welfare, food safety and public health have become the primary issues in policy making and in retailers' strategy (Noordhuizen & Metz, 2005).

In 2003, McCarthy et al. suggested that the decreasing tendency in red meat consumption, noted in Europe, can be attributed to a growing concern in environmental and animal welfare issues and Blokhuis et al. (2003) concluded that animal welfare is finally an important attribute of food quality, as quality is related to the production process too. A study in four EU countries (UK, Ireland, Italy and France) revealed that consumers normally consider animal welfare as an index of more important food attributes such as food safety, quality and health, balancing good welfare patterns with good food patterns (Harper & Henson, 2001). However, though consumers are sensitive to animal

welfare issues, this is not reflected in their buying behaviour.

The study of Verbeke and Viaene (1999) revealed that food safety, welfare and environmentally friendly production methods are the most critical factors affecting poultry, beef and pork consumption. María (2006) found that animal welfare awareness level has increased over the last years in Spain, though it is still lower compared to the respective level of northern EU countries and the USA. Skoufos et al. (2004) found that consumers in Epirus (Greece) place rearing conditions as the most important factor for producing high quality meat and dairy products.

European consumers clearly care about animal welfare and want to make well-informed purchasing choices though they feel hampered by a lack of complying animal welfare standards during the production process (IP/05/698). The eurobarometer survey in 2005 revealed that EU consumers are willing to pay more for animal welfare-friendly food (Eurobarometer, 2007). Half the EU consumers believe the importance of animal welfare is undermined by EU states and demand animal welfare protection through Common Agricultural Policy (CAP) initiatives (Burgess & Hutchinson, 2005).

Generally it has been noted (Harper & Henson, 2001) that EU consumers face sobering impediments – small quantities, high prices and lack of information provided via product labels – in identifying and buying animal welfare-friendly products.

Food labelling over the past years plays an important role in consumer food choices (Cheftel, 2005), as consumers' buying behaviour can significantly alter when they read the provided labels on food package (Derby & Levy, 2001). Consumers expect food labels to be understandable, short and simple and to provide essential and useful information (Kehagia et al., 2007). However, consumers' buying decisions appear to be influenced by logos and signs even if they do not fully understand them (Schröder & McEachern, 2004).

In addition, several studies denote that socio-demographic characteristics influence substantial consumers' willingness to buy and (or) pay more for certified food products. Factors such as gender, age, level of education and income are the main characteristics affecting buying behaviour of certified food (Govindasamy & Italia, 1999; Wilcock et al., 2004). Henson (1996) found that women and young consumers are more positive in paying a price premium for certified food products, while Wandel and Bugge (1997) found that consumers with a higher level of education are more willing to pay for certified products.

In this respect sociodemographic characteristics are expected to play a significant role in buying behaviour related to animal welfare standards. The focus of this work is two-fold; first an attempt is made to measure consumers' awareness of animal welfare by studying their attitudes and behaviour towards three certified animal products, meat, eggs and dairy products. Second the paper also presents an attempt to identify the effect of personal values, attitudes and socioeconomic factors on the consumption of such foods. The study was carried out on the base of a self-administered questionnaire.

In the next section the applied methodology is described and some descriptive statistics of the surveyed consumers are given. Then the results are presented explaining the derived model estimates and the interpretation, concluding with the main inferences.

2. Methodological background

As mentioned earlier, first a questionnaire was constructed and designed, taking into account the relative literature (McCarthy et al., 2003; Wilcock et al., 2004; Napolitano et al., 2006; Vanhonacker et al., 2008) and then a factor analysis was performed in order to group the respondents' answers according to their relevance and identify the minimum number of variables that are included in the model. Finally, the Tobit model was applied to estimate the influence of the factors affecting the demand for each one of the three studied certified dairy products: meat, eggs and milk products.

Data were collected by surveying personally 400 consumers, residents of Thessaloniki city, during the period July–September 2007. All selected consumers are responsible for purchasing their households' food. The questionnaire was designed in two main sections: the questions of the first part of the questionnaire refer to consumer behaviour towards dairy products, frequency of consumption and place of purchase, while the questions of the second part attempt to measure respondents' subjective attitudes towards animal welfare, health, safety of reared livestock and level of awareness for the three studied products. Finally, the willingness to pay (WTP) a premium to buy certified products was also measured with the use of a five-point Likert scale with 5 equal to totally agree and 1 equal to totally disagree.

3. Results

3.1. Descriptive statistics

Female respondents have the higher representation within the sample (63.35% are female and 36.65%

male) and this is probably due to the fact that only consumers responsible for the food preparation and purchasing were interviewed. In addition, 57.25% of the respondents are between 21- and 40-years-old, 62.75% are married, 38.75% university graduated and 22.75% high school graduates. Regarding the occupation of the respondents, 32.25% work in the public sector (civil servants), 27.25% are white collar workers, 10.5% businessmen, 6% housewives and 5.5% retired. The average monthly household income of the sample is 1950€. Forty percent of the respondents have a net monthly income up to 1500€, 54.35% share a net monthly income between 1500 and 3000€, whereas only 5.75% have a net monthly income exceeding 3000€.

Regarding the frequency of buying certified products, surprisingly only 15.5% of the respondents do not buy such products. Among those who purchase, the average level of annual consumption is 77.66 kg meat, 104 eggs and 160.88 kg/l milk products. Generally, respondents believe (76%) that the purchase of certified dairy products may have a positive influence in animal welfare.

The majority of the respondents (55%) believe that welfare, hygiene and safety standards within the EU are higher, compared to non-European countries, but in Greece they are of less importance (54.3%).

In addition, information was extracted on the consumers' WTP for certified animal welfare products, asking them if they are willing to pay a higher price for meat and dairy products produced with animal welfare standards. Thus, according to their responses, 27.5% are willing to pay up to a 5% premium, and 25.8% up to a 10% premium for the meat products. The relative percentages for certified eggs are 30 and 16.8, while for milk products, 27.5 and 19 (Table I).

3.2. Factor analysis

Sequentially, a factor analysis was performed to identify and the most important variables to be

Table I. WTP for meat and dairy products produced with animal-friendly production methods.

		WTP				
		0%	5% more	10% more	25% more	>25%
Meat	Frequency	118	110	103	29	20
	%	29.5	27.5	25.8	7.3	5.0
Eggs	Frequency	146	120	67	26	18
	%	36.5	30.0	16.8	6.5	4.5
Milk products	Frequency	134	110	76	32	28
	%	33.5	27.5	19	8.0	7.0

used in the estimated model. As far as the safety of consumption is concerned, the factor analysis with varimax rotation revealed a three-component solution which is presented in Table Ia (Appendix). The total variance explained is 58.64% and items with loading higher than 0.400 are presented. The items that load higher in the first component are "production conditions" and "slaughter and handling conditions", hence entitling that component "handling conditions". The second component can be interpreted as "labeling", since the items included are "date of package and consumption" and "health control stamp". Finally, the third component can be named "food management" since it includes the items "careful management at home" and "preservation in selling points".

The factor analysis results on the information that should accompany slaughtered animals revealed a two-component solution (Table IIa, Appendix) with an explained total variance equal to 56.32%. The items with higher loadings in the first component are "date of animal slaughter", "country of animal rearing", "country of animal slaughter", and "country of animal birth", hence entitling this component "country of rearing-slaughter-birth". The second component can be named "identity code" and includes only one item.

The factor analysis on attitudes towards meat origin, place of purchase, information and inspection revealed a five-component solution (Table IIIa, Appendix) and an explained total variance equal to 55.75%. The first component entitled "meat origin" and includes five items; the second component is named "purchase from supermarket"; the third component is interpreted as "information necessity" including items related to what information consumers require when they are buying meat products; the fourth component is entitled "purchase from local butcher" and includes two items; and the final component is named "inspections in certified shops" and consists of three items.

Finally, regarding the perceived animal species that need to improve the welfare level, factor analysis resulted in a four-component solution with the total variance explained equal to 40.82% (Table IVa, Appendix).

3.3. Model estimates

As mentioned earlier, to estimate the exact impact of the factors affecting the demand for each one of the three studied certified dairy products – meat, eggs and milk products – a Tobit model was applied. In demand equations the reference consumer is female, a university graduate and unemployed. Dependent variables used in the analysis for every single dairy

product studied are the annual quantities of certified meat consumed by respondents' families (QUANT_MEAT), the annual quantities of certified eggs consumed by respondents' families (QUANT_EGGS) and the annual quantities of certified milk consumed by respondents' families (QUANT_MILK) (Table Va, Appendix). Independent variables included in the analysis can be divided in two main groups: demographic variables and variables related to consumers' attitudes and behaviour (Table VIa, Appendix).

Estimates from the Tobit model for certified meat are presented in Table VIIa (Appendix). Demographic characteristics do not significantly affect the demand for certified meat. The place of meat purchase has a significant effect in the consumption equation. The variable LOCAL_BUTCHERY has a positive and significant effect, meaning that consumers who prefer the local butchery consume higher quantities of certified meat. The variable OPEN_MARKET has been found to have a significant but negative effect in the consumption of certified meat. This means that consumers who prefer to buy from the open market consume less certified meat compared to those who do not prefer to buy meat from the open market.

Respondents' attitudes and beliefs about animal welfare, food safety and certification seem to have an influence in the consumption of certified meat. The variable POSITIVE_IMPACT was found to positively affect the consumption of certified meat; hence, respondents who believe that they can contribute to animal welfare by buying certified products, consume higher quantities of certified meat.

Consumers' attitude towards the role of the state in providing animal welfare has a significant and positive impact in the quantity of certified meat. Those who believe that the state should control the certification system of animal welfare standards (THE_STATE_SHOULD_CONTROL) consume larger quantities of certified meat.

The variables CHICKEN_CALVES_PIGS and HENS_DAIRYCOWS_BEEFCATTLE SHEEP are statistically significant and have a positive sign in the certified meat consumption equation. This means that consumers who stated that animal welfare standards should be important in all livestock produce consume larger quantities of certified meat.

The importance of the label and the information provided in the variable SAFE_SEAL_DATE_ON_PACKAGE appears to have a positive impact in quantity consumption of certified meat. Consumers who pay attention and believe that information about safety control and production method is necessary in certification labels consume larger quantities of certified meat.

Estimates derived from the Tobit model for certified eggs are illustrated in Table VIIIa (Appendix). The number of children in the household seems to positively affect the consumption of certified eggs (variable CHILD), meaning that the higher the number of children, the larger the quantities of certified eggs consumed. Occupation was found to have a negative effect in the consumption of certified eggs (variables BUSINESSMAN and EMPLOYEE), which means respondents who run their own enterprise or work as employees consume lower quantities of certified eggs.

Respondents' attitudes and beliefs about animal welfare, food safety and certification seem to have an influence in the consumption of certified eggs. The variable POSITIVE_IMPACT was found to positively affect the consumption of certified meat, meaning that respondents who believe that they can contribute to animal welfare by buying certified food products, consume larger quantities of certified eggs.

Consumers who prefer certified food and are interested in being aware of the animal origin (variable I_WATCH_ALWAYS_SOURCE) consume larger quantities of certified eggs. Moreover, those who consider it important that all slaughter products must be accompanied by the identity code (variable IDENTITY_CODE) seem to consume more certified eggs.

Model estimation for milk products (Table IXa, Appendix) revealed that number of children in the household as well family status have a positive effect in the consumption of certified dairy products. According to the findings, households with children (variable CHILD) consume larger quantities of certified dairy products. In addition, respondents who are not married (variable FAMILY_STATUS_NOT_MARRIED) consume more certified dairy products.

Larger quantities of certified milk products are consumed by those who believe that purchasing certified products supports animal welfare (variable POSITIVE_IMPACT).

Consumers who prefer certified food and are interested in being aware of the animal origin (variable I_WATCH_ALWAYS_SOURCE) consume larger quantities of certified dairy products. Moreover, those who consider important the existence of the identity code in slaughter products (variable IDENTITY_CODE) seem to consume more certified dairy products.

Consumers' attitudes towards the role of the state in providing animal welfare have a significant and positive impact in the quantity of certified dairy products. Those who believe that the state should control the certification system of animal welfare

standards (THE_STATE_SHOULD_CONTROL) consume larger quantities of certified dairy products.

The variable IDENTIFY_FROM_THE_LABEL describes consumers' chance to recognise from the label or the stamp the production system followed, which was found to have a positive impact on the consumption of certified dairy products. As a result respondents who are aware of and recognise the certification label, consume larger quantities of certified dairy products.

WTP a premium for milk products (variable WTP_MILK) has a positive effect on quantity consumption of certified dairy products. That means consumers who are more willing to pay a higher price for certified dairy products consume larger quantities of these products.

Comparing the results derived from model estimates for the three studied products it can be highlighted that the demand for certified food produced according to animal welfare standards can be affected by more or less the same set of factors. Thus, common factors in all the three model estimates – which have a positive effect on WTP – are the number of children in the household, the place of animal origin, the identity code in slaughter products and the role of the state in controlling the whole chain. Thus, it is clear that factors like animal origin and identity code can be influenced by the state or processing industries and they can contribute to further expansion of the consumption of certified dairy products.

4. Conclusions

Summarising the conclusions derived from this work, first descriptive elements and then interpretation of the model estimates are presented. The survey indicates that the vast majority of respondents are strongly concerned about animal welfare and support the implementation of the relative EU legislation (76% of the respondents). Moreover, respondents are willing to pay a price premium to buy certified meat and dairy products produced under welfare standards. Most of the respondents (84.5%) buy and consume certified meat and dairy products occasionally or regularly.

Though most of the respondents seek for label information on production methods, they have difficulties in identifying and understanding the label. However, they stated that purchasing certified food products can be viewed as a support on welfare, health and safety of livestock production.

Findings of model estimation for certified meat revealed that consumers' attitudes towards certification and animal welfare significantly affect consumption quantity. Respondents who check products for

Table II. Factors affecting the demand for certified meat.

Statistically significant variables	Effect
SAFE_SEAL_DATE_ON_PACKAGE	Positive
OPEN_MARKET	Negative
HENS_DAIRYCOWS_BEEFCATTLE_SHEEP	Positive
CHICKEN_CALVES_PIGS	Positive
LOCAL_BUTCHERY	Positive
THE_STATE_SHOULD_CONTROL	Positive
POSITIVE_IMPACT	Positive

inspection stamps and expire date labels consume larger quantities of certified meat. In addition, the consumption of certified meat increases when consumers believe that the inspection system should work properly and purchasing certified food could support animal welfare. Consumers who buy meat from a local butcher are also willing to consume more certified meat (Table II).

The estimation of the Tobit model for certified eggs revealed that socioeconomic factors affect the quantity of consumed certified eggs and families with children consume larger quantities of certified eggs. On the other hand, occupation is negatively related to the demand for certified eggs. Respondents who are businessmen or employees are less likely to purchase and consume certified eggs. Consumers who believe the purchase of certified products support animal welfare have a higher possibility to participate in the market of certified eggs. Respondents who prefer to buy certified food and to find label information on animal origin, identity code, production method and process have a positive effect on the quantity consumed and therefore on the demand of certified eggs (Table III).

Number of children in the household and non-married consumers has a positive impact on the demand for certified milk products. Respondents who feel buying certified food could support animal welfare and who put emphasis on labelling, such as the identity code of slaughtered animals, are more likely to consume larger quantities of certified milk products.

Consumers who are willing to pay a price premium for certified animal welfare products and who can identify livestock production conditions from the

Table III. Factors affecting the demand for certified eggs.

Statistically significant variables	Effect
CHILD	Positive
BUSINESSMAN	Negative
EMPLOYEE	Negative
IDENTITY_CODE	Positive
POSITIVE_IMPACT	Positive
I_WATCH_ALWAYS_SOURCE	Positive

Table IV. Factors affecting the demand for certified milk products.

Statistically significant variables	Effect
WTP_MILK	Positive
IDENTIFY_FROM_THE_LABEL	Positive
THE_STATE_SHOULD_CONTROL	Positive
I_WATCH_ALWAYS_SOURCE	Positive
POSITIVE_IMPACT	Positive
IDENTITY_CODE	Positive
FAMILYSTATUS-NON MARRIED	Positive
CHILD	Positive

product label are willing to purchase more certified milk products.

Finally respondents who believe that the state should inspect farmers, retailers and the whole chain, and products to be accompanied by labels on origin of the animal are willing to consume larger quantities of certified milk products (Table IV).

In the context of the current findings it can be concluded that animal welfare and health are a priority in consumer's decision making and purchase behaviour. Greek consumers are very confident of their ability to improve animal welfare by purchasing certified dairy products and appear to be willing to pay premiums to obtain these products. However, they insist on the need for state inspections and improvements in the reliability of the inspection system. Based on the results of this study, the market for certified dairy food produced according to animal welfare standards has the potential for further development, since the demand for such products seems to be increasing in the near future. Furthermore, it seems that factors like animal origin and identity code in slaughter products can significantly influence the market of the whole range of certified products, as they positively affect the demand.

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Appendix

Table Ia. Factor analysis on attitudes towards safety in food consumption.

Factor	Load	Variable description
Handling conditions	0.711	Production conditions
	0.559	Slaughter and handling conditions
Label	0.675	Date of package and consumption
	0.693	Health control stamp
Food management	0.804	Careful management at home
	0.406	Preservation at selling points

Table IIa. Factor analysis on attitudes towards information on slaughtered animals.

Factor	Load	Variable description
Country of rearing-slaughterer-birth	0.906	Date of animal slaughter
	0.659	Country of animal slaughter
	0.857	Country of animal rearing
Identity code	0.559	Country of animal birth
	0.665	Animal identity code

Table IIIa. Factor analysis on meat origin, place of purchase, information and inspection.

Factor	Load	Variable description
Meat origin	0.468	I prefer certified meat products
	0.678	Butcher should label the origin of the meat
	0.782	I always read meat product labels
	0.788	I pay attention to the origin of the meat
Purchase from supermarket	0.510	I prefer domestic meat products
	0.778	I prefer to buy meat from S/M because it is cheaper
	0.790	I prefer to buy meat from S/M for my convenience and to save time
Information necessity	0.662	I buy meat from the central meat market because the prices are lower
	0.681	I need information about certification systems of meat products
	0.828	Mass media should inform consumers about meat production systems
Purchase from local butcher	0.693	Good animal treatment is reflected in the quality of meat products
	0.802	I purchase from a local butcher because I am satisfied by the service
	0.815	I purchase from a local butcher because it has a great variety of meat products
Inspections in certified shops	0.359	I prefer to buy small meat quantities and more frequently
	0.631	I purchase from a meat producer because I trust him
	0.691	The state should make frequent inspections in the certification systems of meat products

Table IVa. Factor analysis on attitudes towards animal species that need to improve welfare level.

Factor	Load	Variable description
CHICKEN-CALVES-PIGS	0.807	Chicken
	0.552	Calves
	0.659	Pigs
HENS_DAIRYCOWS_BEEFCATTLE_SHEEP	0.518	Hens
	0.533	Beefcattle
	0.620	Dairycows
TURKEYS_DUCKS	0.371	Sheep
	0.800	Turkeys
FISH_HORSES_RABBITS	0.820	Ducks
	0.589	Fishes
	0.503	Horses
	0.652	Rabbits

Table Va. Description of dependent variables.

QUANT_MEAT	Six month consumption of certified meat (in kg)
QUANT_EGGS	Six month consumption of certified eggs (in units)
QUANT_MILK	Six month consumption of certified milk products (in kg or lt)

Table VIa. Independent variables included in the estimation model.

MALE	If male = 1, otherwise = 0
FEMALE	If female = 1, otherwise = 0
AGE	Age in years
INCOME	Monthly net income in €
BUSINESSMAN	If businessman/self-employed = 1, otherwise = 0
EMPLOYEE	If employee in public/private sector = 1, otherwise = 0
RETIRED	If retired = 1, otherwise = 0
DEPENDENT	If unemployed, housewife = 1, otherwise = 0
CHILD	Number of children in the family
FAMILY_STATUS-MARRIED	If married = 1, otherwise = 0
FAMILY_STATUS-NON MARRIED	If non married/divorced/widowed = 1, otherwise = 0
UNIVERSITY	If university graduate = 1, otherwise = 0
HIGH SCHOOL	If high school graduate = 1, otherwise = 0
PRIMARY SCHOOL	If primary school graduate = 1, otherwise = 0
IDENTIFY_FROM_THE_LABEL	If production method can be identified from the label = 1, $\alpha\lambda\lambda\iota\omega\zeta=0$
INFORMATION_FOR_FRIENDLY_PRODUCTION	If information on animal welfare high = 1, otherwise = 0
OPEN MARKET	If purchases from open market = 1, otherwise = 0
LOCAL_BUTCHERY	If purchases from butcher = 1, otherwise = 0
PRODUCER	If purchases from producer = 1, otherwise = 0
SUPER_MARKET	If purchases from super market = 1, otherwise = 0
POSITIVE_IMPACT	If believes that buying certified food supports animal welfare = 1, otherwise = 0
THINK_ABOUT_WELFARE	If interested in animal welfare = 1, otherwise = 0
WTP_MEAT;WTP_EGGS, WTP_MILK	If willing to pay more = 1, otherwise = 0
CHICKEN_CALVES_PIGS	If believes that welfare is most important to be improved for chicken, calves and pigs = 1, otherwise = 0
FISH_HORSES_RABBITS	If believes that welfare is most important to be improved for fish, horses and rabbits = 1, otherwise = 0
HENS_DAIRYCOWS_	If believes that welfare is most important to be improved for hens, dairy cows,
BEEFCATTLE_SHEEP	beefcattle and sheep = 1, otherwise = 0
TURKEYS_DUCKS	If believes that welfare is most important to be improved for turkeys and ducks = 1, otherwise = 0
I_NEED_INFORMATION	If seeks information on certification systems = 1, otherwise = 0
I_WATCH_ALWAYS_SOURCE	If interested in animal origin = 1, otherwise = 0
THE_STATE_SHOULD_CONTROL	If believes that the state should intensify the inspections = 1, otherwise = 0
PRODUCTION_COUNTRY	If interested in country of animal birth, rearing and slaughter = 1, otherwise = 0
IDENTITY_CODE	If interested in meat identity code = 1, otherwise = 0
PRODUCTION_SYSTEM	If believes in the importance of production and animal treatment conditions = 1, otherwise = 0
SAFE_KEEP_PRODUCTS	If believes in the importance of storing conditions and product management = 1, otherwise = 0
SAFE_SEAL_DATE_ON_PACKAGE	If believes in the importance of stamp and label information = 1, otherwise = 0

Table VIIa. Model estimation for the demand of certified meat.

	Coefficient	Standard error	z-Statistic	Probability
MALE	-0.765611	4.703738	-0.162766	0.8707
AGE	-0.301090	0.247193	-1.218034	0.2232
BUSINESSMAN	4.480911	8.412461	0.532652	0.5943
EMPLOYEE	1.887890	6.422123	0.293967	0.7688
RETIRED	-3.195217	13.39241	-0.238584	0.8114
TURKEYS_DUCKS	-2.232557	2.216274	-1.007347	0.3138
CHILD	-1.402637	4.770247	-0.294039	0.7687
FAMILY_STATUS	6.631946	5.586275	1.187186	0.2352
UNIVERSITY	-5.853960	7.160104	-0.817580	0.4136
PRIMARY SCHOOL	3.294507	9.171724	0.359203	0.7194
HIGH SCHOOL	-0.601998	6.394978	-0.094136	0.9250
INCOME	0.001807	0.002589	0.697961	0.4852
I_NEED_INFORMATION	-0.629224	2.205704	-0.285271	0.7754
I_WATCH_ALWAYS_SOURCE	1.716830	2.305174	0.744772	0.4564
THE STATE SHOULD CONTROL	4.671616	2.141006	2.181972	0.0291
IDENTIFY_FROM_THE_LABEL	-6.681373	4.631413	-1.442621	0.1491
INFORMATION_FOR_FRIENDLY PRODUCTION	7.629322	7.605614	1.003117	0.3158
OPEN MARKET	-26.61442	12.20732	-2.180201	0.0292
LOCAL BUTCHERY	13.38384	7.345982	1.821927	0.0685
PRODUCER	7.519824	6.581725	1.142531	0.2532
SUPER_MARKET	5.837178	5.798858	1.006608	0.3141
POSITIVE IMPACT	25.87436	9.296827	2.783139	0.0054
PRODUCTION_COUNTRY	0.900832	2.261734	0.398293	0.6904
IDENTITY_CODE	3.106670	2.058884	1.508910	0.1313
PRODUCTION_SYSTEM	-1.275956	2.171290	-0.587649	0.5568
SAFE_KEEP_PRODUCTS	-2.410252	2.171597	-1.109898	0.2670
SAFE SEAL DATE ON PACKAGE	5.469329	2.260132	2.419916	0.0155
THINK_ABOUT_WELFARE	-3.055319	10.10638	-0.302316	0.7624
WTP_MEAT	-0.402733	6.399501	-0.062932	0.9498
CHICKEN CALVES PIGS	3.919147	2.255097	1.737906	0.0822
FISH_HORSES_RABBITS	-2.120099	2.111044	-1.004289	0.3152
HENS DAIRY COWS BEEF CATTLE SHEEP	3.543508	2.108900	1.680264	0.0929
CONSTANT	38.13743	1.645671	23.17440	0.0000
Mean dependent var	33.15014	Akaike info criterion	8.794468	
Log likelihood	-1516.224	Average log likelihood	-4.295251	

Values in bold are significant at 1%, 5% and 10% level.

Table VIIIa. Model estimation for the demand of certified eggs.

	Coefficient	Standard error	z-Statistic	Probability
MALE	-2.431977	9.153710	-0.265682	0.7905
CHILD	26.16804	9.395045	2.785302	0.0053
AGE	-0.197344	0.461902	-0.427243	0.6692
FAMILY_STATUS	-0.743446	10.84725	-0.068538	0.9454
UNIVERSITY	-2.136387	13.91877	-0.153490	0.8780
PRIMARY SCHOOL	8.013456	17.17217	0.466654	0.6407
HIGH SCHOOL	1.062142	12.46328	0.085222	0.9321
BUSINESSMAN	-34.65648	16.61918	-2.085331	0.0370
EMPLOYEE	-24.98593	12.40344	-2.014435	0.0440
RETIRED	-5.427749	25.52033	-0.212683	0.8316
INCOME	0.000215	0.004647	0.046350	0.9630
CHICKEN_CALVES_PIGS	-4.328980	4.359387	-0.993025	0.3207
FISH_HORSES_RABBITS	-3.887113	4.850872	-0.801322	0.4229
HENS_DAIRYCOWS_BEEFCATTLE SHEEP	6.673294	4.138091	1.612651	0.1068
TURKEYS_DUCKS	-0.292801	4.277831	-0.068446	0.9454
I_NEED_INFORMATION	-3.051267	4.223548	-0.722442	0.4700
I_WATCH_ALWAYS_SOURCE	12.10087	4.518868	2.677853	0.0074
THE_STATE_SHOULD_CONTROL	2.235205	4.133469	0.540758	0.5887
IDENTIFY_FROM_THE_LABEL	-6.950887	8.996259	-0.772642	0.4397
INFORMATION_FOR_FRIENDLY PRODUCTION	-1.021604	15.25188	-0.066982	0.9466
OPEN MARKET	35.16970	22.31363	1.576153	0.1150
LOCAL_BUTCHERY	18.48211	13.98815	1.321269	0.1864
SUPER_MARKET	6.421880	11.29185	0.568718	0.5695
PRODUCER	12.70251	12.58961	1.008968	0.3130
POSITIVE IMPACT	33.78337	17.21943	1.961933	0.0498
PRODUCTION_COUNTRY	0.228555	4.344740	0.052605	0.9580
IDENTITY_CODE	7.232295	4.054944	1.783575	0.0745
PRODUCTION_SYSTEM	-0.287889	4.168188	-0.069068	0.9449
SAFE_KEEP_PRODUCTS	2.280273	4.194404	0.543647	0.5867
SAFE_SEAL_DATE_ON_PACKAGE	-5.582958	4.329358	-1.289558	0.1972
THINK_ABOUT_WELFARE	-12.72987	18.94555	-0.671918	0.5016
WTP_EGGS	4.652342	13.34244	0.348687	0.7273
CONSTANT	73.17075	3.569237	20.50039	0.0000
Mean dependent var	44.84367	Akaike info criterion		8.148520
Log likelihood	-1475.550	Average log likelihood		-3.977225

Values in bold are significant at 1%, 5% and 10% level.

Table IXa. Model estimation for the demand of certified milk products.

	Coefficient	Standard error	z-Statistic	Probability
MALE	-14.90826	13.34294	-1.117314	0.2639
AGE	0.294784	0.700202	0.420998	0.6738
CHILD	58.58813	13.53492	4.328665	0.0000
FAMILY_STATUS-NOT MARRIED	42.27302	16.08689	2.627792	0.0086
UNIVERSITY	-24.20262	20.16295	-1.200351	0.2300
PRIMARY SCHOOL	-33.73644	26.11773	-1.291706	0.1965
HIGH SCHOOL	-15.61348	17.99753	-0.867535	0.3856
BUSINESSMAN	-25.10753	24.06905	-1.043146	0.2969
EMPLOYEE	-4.765037	18.19567	-0.261877	0.7934
RETIRED	21.28599	37.66798	0.565095	0.5720
INCOME	0.005208	0.007281	0.715274	0.4744
CHICKEN_CALVES_PIGS	0.757413	6.382803	0.118665	0.9055
FISH_HORSES_RABBITS	-0.857801	5.914865	-0.145025	0.8847
HENS_DAIRYCOWS_BEEFCATTLE SHEEP	4.991795	5.963323	0.837083	0.4025
TURKEYS_DUCKS	-7.089817	6.698354	-1.058442	0.2899
I_NEED_INFORMATION	-5.194933	6.252841	-0.830812	0.4061
I_WATCH_ALWAYS_SOURCE	11.73836	6.677913	1.757788	0.0788
THE_STATE_SHOULD_CONTROL	10.09043	5.994513	1.757788	0.0923
IDENTIFY_FROM_THE_LABEL	28.32214	13.11825	2.158987	0.0309
INFORMATION_FOR_FRIENDLY PRODUCTION	2.275799	21.71185	0.104818	0.9165
OPEN MARKET	-10.05356	34.30364	-0.293076	0.7695
LOCAL_BUTCHERY	-1.943832	20.60169	-0.094353	0.9248
PRODUCER	3.907760	18.80733	0.207779	0.8354
SUPER_MARKET	-6.095704	16.46457	-0.370232	0.7112
POSITIVE_IMPACT	46.68264	25.74581	1.813214	0.0698
PRODUCTION_COUNTRY	-8.309577	6.401255	-1.298117	0.1942
IDENTITY_CODE	13.83152	5.789898	2.388905	0.0169
PRODUCTION_SYSTEM	7.300964	6.211119	1.175467	0.2398
SAFE_KEEP_PRODUCTS	0.807550	6.172420	0.130832	0.8959
SAFE_SEAL_DATE_ON_PACKAGE	-8.301215	6.380242	-1.301081	0.1932
THINK_ABOUT_WELFARE	-1.415793	28.60668	-0.049492	0.9605
WTP_MILK	61.53393	17.41532	3.533322	0.0004
CONSTANT	105.7494	4.866788	21.72878	0.0000
Mean dependent var	70.42210	Akaike info criterion		9.517886
Log likelihood	-1643.907	Average log likelihood		-4.656960

Values in bold are significant at 1%, 5% and 10% level.

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