Market Analysis of Typical Products in Italy: Bivariate Statistical Relationships Between Qualitative Variables[*]

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The denominations of origin being perceived by the consumers in terms of both intrinsic qualities and of extrinsic qualities, have contributed in no uncertain manner to the increase of the typical products in question, positively influenced also by the noted emergencies coming from verified alimentary alarms during the beginning of the XXI century. The objective of this paper, is to determine the habits of purchase of typical and traditional products of the people of Messina (Sicily, Italy). To do this a "motivational" survey was carried out by traditional methodology of descriptive researches. The adopted methodology of research was quantitative and random. The random research strives to identify the factors that depend on the behaviour of purchase and the appraisal of the existing relationships of cause-effect in a determined population. The interviewed were given a questionnaire composed of 17 questions on their knowledge of the typical products characteristics, the frequency of consumption, the monthly amounts destined to the purchase, the motivations that push them to the purchase of typical products rather than pre-packed. Methodologically, our statistical analysis has been performed using the log-likelihood ratio test in order to investigate the existence of association between the joint distributions of qualitative measured variables.

Keywords: typical products, market analysis, statistical analysis, log-likelihood ratio test

Introduction

In Italy the consumption of DOP (Denomination of Protected Origin) and IGP (Protect Geographic Indication) typical agricultural and food-products is quite high. In particular, during the last few years, as a consequence of the changes in the preferences and in the purchase's behaviour, we have witnessed an interesting evolutionary trend in the amount of typical products purchased in regards to the realized values. The reasons for these positive trends are multiple, but the most important is the manifested necessity of the consumer to search

higher quality and alimentary safety. The denominations of origin, in fact, being perceived by the consumers in terms of both intrinsic qualities (nutritional, organoleptic and health properties) and of extrinsic qualities (availability of the products in the markets, brands and species variety), have contributed in no uncertain manner to the increase of the typical products in question, positively influenced also by the noted emergencies coming from verified alimentary alarms during the beginning of the XXI century: best remembered of all the alimentary scandals is the bovine BSE, the avian influenza and the dioxin chicken. At the same time, we can notice an increase of interest in the distribution operators, especially from the organized distribution in a large scale (GDO), to that of typical products. The considerable attention to modern distribution is due mostly to the increased demand, more and more precise and specific, that the consumers put to the market, and as said before particularly important are the aspects revolving around safe food and traceability of products. Consumers consider it easier to find these requirements in products protected by the Community norm rather than in the traditional commodity, evermore accredited and less linked to the territory of origin. Also in Italy, the European country with the most typical products, there has been the same evolutionary process in food consumption.

Adopted Methodology to Lead the Survey

The objective of this paper, is to determine the habits of purchase of typical and traditional products of the people of Messina (Sicily, Italy). To do this a "motivational" survey was carried out by traditional methodology of descriptive researches ("questionnaire" survey). The adopted methodology of research was quantitative and random. The random research strives to identify the factors that depend on the behaviour of purchase and the appraisal of the existing relationships of cause-effect in a determined population. Before starting the survey, the research group substantially developed a research hypothesis, identified the survey's objective and delimited the research areas. In respect to the questions, a series of questions were put together to be put to the consumers regarding the perceived quality, the relationship price quality and the product's general goodness. With these questions an attempt has been made to interpret the consumer's requirements and above all how much the product's brand of quality can be influential in the purchase. At this point it is important to point out: initially one of the main targets was to highlight the "difference in information" that purchases had in regards to "typical products" that is any food product that has received legal recognition with brands DOP, IGP or STG (Lanfranchi, 2008). We immediately came to the conclusion, seeing that only 2% of the interviewed answered correctly to the questions regarding "typical products" thus confirming the state of "differences in information". Therefore, the decision was made to broaden the survey on the consumption not only of typical products (Lanfranchi & Giannetto, 2009), but also to traditional products, these of course identify with a precise territory and have been on the market for a long time. The survey on the typical product's consumption was conducted, in the period between the 15/03/2010 and the 15/06/2010, with a sample of 1954 consumers of Messina (Sicily, Italy). The survey with the handing out of a questionnaire was done mostly in sales points of the large scale organized distribution (GDO), interviewing directly a sample of consumers, with the face to face method, and using an ad hoc card-questionnaire. The sample's size was fixed taking into consideration the research objectives and the available resources. The questionnaire was divided into three sections. The first regarded the acquisition of the inherent information regarding the associate-demographic and economic characteristics of the interviewed consumers (age, sex, total number of the members of their family, degree of education, total familiar income).

The second one aimed at characterizing the reasons and the specific consumption of typical products (the types of products, of frequency consumption, place of purchase). The third dealt with the finding of the information on the perception of quality, food safety and the prices of typical products as opposed to the pre-packaged conventional ones, as well as the reasons for the possible refusal of typical products consumption.

Socio-economic Characteristics of the Sample

The analysis was conducted on a large sample, made up of people with different social-economic-demographic characteristics, so as to have the most reliable survey possible. The survey, however, was conducted taking into consideration only the interviewed people that answered correctly to the question relating to the degree of knowledge of a typical or a traditional product (they had to give an example), for this consideration, of the 1,954 which received questionnaires, only 1,290 were interviewed that's to say 66% of the total. Therefore, the survey focused exclusively, as already done in other surveys on agricultural and food products consumption in Sicily, on the share of consumers that asserted to habitually consume the products object of the survey. Of the 1,290 consumers, on which the analysis has concentrated, 41.7% represented the number of males and 58.3% the females. Based on the demographic characteristics, the subjects are subdivided into four age-brackets; those between 19 and 29 years (A) constitute approximately 27%, those between 30 and 49 years (B) are 41%; of the remaining, 26% comprise ages between 50 and 69 years (C) and 5% are those that exceed 69 years of age (D). From this one finds that the subjects that best answered with accuracy to the questions proposed, manifesting special interest and attention on the discussed issue, are the subjects of medium age, that, for family reasons, are dedicated to the management of the food basket of their family. The average composition of the sample family was 3.21 units. The majority of the interviewed people belonged to a family of two to four members (65.50%), followed by those with more than four members (20.46%); only 14.04% of the interviewed declared being single. In reference to qualifications, the findings are that 79% of the interviewed sample belonged to a high-middle cultural level, in particular 59% have a high school diploma and 20% are university graduates. Other social-demographic characteristic variable of the interviewed is their income. Regarding the family income, the category of consumers represented most is that with a declared income between 10 and 25 thousand Euros per annum (A) (40%), followed by those with income between 25 and 35 thousand Euros (B) (32%), those with income between 35 and 45 thousand Euros (C) (21%); and finally only 7% declared to have an income of more than 45 thousand Euros per annum (D). To characterize the basic variables that condition the consumer in the moment of the purchase of a typical product, we have turned to the survey's main components, that has allowed us to synthesize the data collected through the questionnaire.

Data Processing

The interviewed were given a questionnaire composed of 17 questions on their knowledge of the typical products characteristics, the frequency of consumption, the monthly amounts destined to the purchase, the motivations that push them to the purchase of typical products rather than pre-packed. Respectively the third and the fourth question, in which the interviewed was asked to indicate a Sicilian typical product and a Messinese typical product, it has emerged that almost the totality of the interviewed thought to know at least one Sicilian or Messinese typical product, while in reality only a minimal part succeeded in making correct examples; almost all,

in fact, cited traditional products or local products not certified or without disciplining factors. In the following, we have considered correct the answers relating to typical, traditional or local product listings that have a link with the territory of Messina. To the question relating to the habitual consumption of typical products of Messina, from the given answers the majority of the interviewed (approximately 800) consumes typical products frequently. It can be easily understood that the "typical product" market is flourishing, and the demand is constantly on the increase even thought there is an economic crisis in the country. The data is confirmed by the answers supplied by the interviewed on the question regarding the weekly consumption of typical products; in fact, approximately 60% consumes a typical product more than two times a week. Only 9%, instead, declared that they never consume this type of product, almost 51% of the interviewed declared that their personal consumption of typical products during the last five years has remained unchanged. The data is interesting, because it evidences that the agricultural food-product is always present in the purchase basket of the Sicilian consumers. Other interesting data has been obtained from the answers supplied in relation to the amount of monthly expenditure on typical products in proportion to the income employed in the consumption of such products. Most of the interviewed declared that they spent less than 50 €a month on typical products, this data contrasts with the previous, which evidences instead a high frequency of weekly purchases of the product. Through the survey, in particular with the question in which the interviewed was asked to explain the reasons why they preferred typical products to pre-packed, and we have tried to understand which might be the strong points of the "typical" market. A concrete answer was given, in fact more than 70% of the interviewed answered that they buy "typical" products for organoleptic reasons. Precisely 33% buy it because the product has a better taste, while 39% buy it for its quality. Although, in general terms, important attention is given to hygiene and to safety, only a minimal part of the interviewed sample said that they acquire the product because it is safe. Moreover many of the interviewed consider the product not to be economical. Only 2% of the interviewed is convinced that the typical product, in terms of quality, is worse than the pre-packed. Finally, also on the safety issue, the typical product is perceived by the interviewed sample as being better than the pre-packed product. In fact, the data shows that more than half of the sample chosen, said that as far as they are concerned the pre-packed product is less safe than the typical one.

Only 34% of the consumers supported the idea, that on the quality issue the two products are equal. On the subject of the purchase's habits, it is asked if it is economically convenient to buy typical products. The more frequent answer (64%) has been negative, there is in fact a general conviction that acquiring a typical product does not lead to a saving.

Such data is confirmed by the answer given to the question in which it asked which could be the reasons that prevent the consumer from acquiring a typical product. Well, the more frequent answer is motivated by the high price (33%), followed by the difficulty of finding the product (27%) and the lack of information (24%), only 5% of the consumers do not acquire the product because they think that it is less safe than the others.

In reference to the moment in which, during the day, one prefers to consume a typical product, the most frequent answer made reference to lunch. This consideration emerges in relation to the types of food that in a greater percentage are consumed by the observed group, generally foods that for their very nature (cheeses, wines, and sweets) are not apt to satisfy nutritional requirements and morning habits (the "typical products" the percentage destined to be consumed at breakfast is equal to 7%, and it refers to the use of jams and similar products). Moreover, with the increasing social development, that pushes more and more to frenetic rhythms,

lunch with reduced hours, females often engaged in too involving jobs and thus they have little passion for the culinary art, and consequently lunch is often had away from home, resorting to pre-packed products which are of easy consumption.

The consumers were asked if they paid attention to the information contained in the label; the resulting data evidences that there is always a greater control of the nutritional and caloric content of the acquired product. Only 16% of the interviewed never look at the label before buying a typical product. Always on the purchase's habits, in the end the consumer was asked where he considers more convenient to buy a typical product. Many think that the more convenient place to purchase is the supermarket (30%) or direct selling by enterprise (29%). This is completely in line with the national trend, in fact, in the previous paragraphs we noted how Italians prefer to buy food products, with the brand of quality, mainly in supermarkets or large shopping centres.

Bivariate Statistical Analysis of Qualitative Variables

The Log-Likelihood Ratio Test: Methodological Aspects

In order to investigate the existence of association between qualitative variables measured, we realized the cross-tabulations and, with reference to the joint distributions of each couple of categorical variables, we estimated the log-likelihood ratio test and its p-value (Zelterman, 1988; Fujikoshi & von Rosen, 2000; Soliani, 2004). The significance level chosen for the statistical analysis was $\alpha = 0.05$. The log-likelihood ratio test, known in literature as G test, is used to evaluate the association between two categorical variables.

In a table with M rows and N columns, let f be the observed frequencies; splitting the operations into three steps, we have:

I = $\sum f \ln(f)$ of each cell;

II = $\sum f \ln (f)$ of each marginal total of row and of column;

III = $\sum N \ln (N)$, with N equal to the total number of observations.

The G value is given by $G = 2 \cdot (I - II + III)$. Considering, for example, three treatments and three blocks (as reported in Table 1) it's possible to identify the bivariate distribution for each couple of qualitative variables.

Table 1

Bivariate Distribution in a 3 × 3 Table

Estimate	Treat. I	Traet. II	Traet. III	Total
Block 1	a_1	a_2	a_3	n_1
Block 2	b_1	b_2	b_3	n_2
Block 3	c_1	c_2	c_3	n_3
Total	n_4	n_5	n_6	N

In order to calculate the G test you can apply the following formula:

G = [($a_1 \ln a_1 + a_2 \ln a_2 + a_3 \ln a_3 + b_1 \ln b_1 + b_2 \ln b_2 + b_3 \ln b_3 + c_1 \ln c_1 + c_2 \ln c_2 + c_3 \ln c_3$)

- ($n_1 \ln n_1 + n_2 \ln n_2 + n_3 \ln n_3 + n_4 \ln n_4 + n_5 \ln n_5 + n_6 \ln n_6$) + ($N \ln N$)]

The degrees of freedom are $(m - 1) \times (n - 1)$. In order to obtain a G correct value (G_{adj}), we have to relate it to a q quantity, known as Williams Correction ($G_{adj} = G / q$). The q Williams correction is calculated by the following formula:

$$q = 1 + \frac{(m+1) \cdot (n+1)}{6N}$$

where m and n are the rows and columns numbers, respectively, and N is the total number of observations.

The Log-Likelihood Ratio Test: Application

First, we investigated the degree of association between regular consumption of local products and the age-class of consumers (see Table 2). The likelihood ratio test was highly significant, thus denoting a significant correlation between the examined categorical variables. In particular, regular consumers mainly belong to the age-class B and C, i.e., they are aged between 30 and 49 years and between 50 and 69 years.

Table 2

Bivariate Distribution of Habitual Consumption of Typical Products and Age Classes

Age classes	Habitual consumption		
	No	Yes	Total
A	152	198	350
B	185	351	535
C	119	216	335
D	43	26	69
Total	499	791	1,290

Notes. G Test = 24.381; Degree of freedom = 3; *p*-value = 0.000.

The association between habitual consumption of local products and the income class of consumers (see Table 3) is not, however, statistically significant, as denoted by the *p*-value of the Likelihood ratio test, which is far superior to fixed α significance level.

Table 3

Bivariate Distribution of Habitual Consumption of Typical Products and Income Classes

Income classes	Habitual consumption		
	No	Yes	Total
A	198	318	516
B	158	255	413
C	107	164	271
D	36	54	90
Total	499	791	1,290

Notes. G Test = 0.191; Degree of freedom = 3; *p*-value = 0.979.

The habitual consumption of local products is strongly associated with educational level, because regular consumers seem to be mostly well-educated, with a diploma or an even greater degree (see Table 4).

Also, there seems to be a significant link between quality assessment and regular consumption of local products, because those who regularly use these products express the highest quality ratings (see Table 5).

Focusing our attention on the quality judgments, we can see that they are positively associated with educational level (see Table 6) and with age classes between 30 and 49 years and between 50 and 69 years (see Table 7).

We also note a significant association between quality assessment and income class (predominantly 1 and 2)

(see Table 8) and monthly expenditure, as the satisfied consumers appear to allocate less than €50 (see Table 9).

Table 4

Bivariate Distribution of Habitual Consumption of Typical Products and Qualification

Educational level	Habitual consumption		
	No	Yes	Total
Primary licence	22	17	39
Secondary licence	126	106	232
Diploma	267	494	761
Degree	84	174	258
Total	499	791	1,290

Notes. G Test = 36.516; Degree of freedom = 3; *p*-value = 0.000.

Table 5

Bivariate Distribution of Habitual Consumption of Typical Products and Quality Assessment

Quality assessment	Habitual consumption		
	No	Yes	Total
Worst	14	15	29
Identical	161	98	259
Better	324	678	1,002
Total	499	791	1,290

Notes. G Test = 76.648; Degree of freedom = 2; *p*-value = 0.000.

Table 6

Bivariate Distribution of Qualification and Quality Assessment

Quality assessment	Qualification				
	Primary licence	Secondary licence	Diploma	Degree	Total
Worst	0	3	22	4	29
Identical	4	69	155	31	259
Better	35	160	584	223	1,002
Total	39	232	761	258	1,290

Notes. G Test = 31.844; Degree of freedom = 6; *p*-value = 0.000.

Table 7

Bivariate Distribution of Age Classes and Quality Assessment

Quality assessment	Age classes				
	A	B	C	D	Total
Worst	6	13	9	1	29
Identical	107	98	45	9	259
Better	237	425	281	59	1,002
Total	350	536	335	69	1,290

Notes. G Test = 35.750; Degree of freedom = 6; *p*-value = 0.000.

We also studied the link between income class and monthly spending intended for the purchase of local products (see Table 10). It is possible to notice that, for the most part, consumers belonging to low income classes (1 or 2) spend less than €50 for the purchase of this type of products.

By analyzing the relationship between educational level and monthly spending, we found a significant association, since consumers of typical products, with a diploma or a degree, devote a small amount of money (less than €50) for the purchase of this kind of products (see Table 11).

Table 8

Bivariate Distribution of Income Classes and Quality Assessment

Quality assessment	Income classes				
	A	B	C	D	Total
Worst	15	4	6	4	29
Identical	119	90	38	12	259
Better	382	319	227	74	1,002
Total	516	413	271	90	1,290

Note. G Test = 19.273; Degree of freedom = 6; p-value = 0.004.

Table 9

Bivariate Distribution of Monthly Expenditure and Quality Assessment

Quality assessment	Monthly expenditure				
	Nothing	< €50	€100	>€100	Total
Worst	0	20	5	4	29
Identical	2	201	39	17	259
Better	0	562	271	169	1,002
Total	2	783	315	190	1,290

Notes. G Test = 53.536; Degree of freedom = 6; p-value = 0.000.

Table 10

Bivariate Distribution of Income Class and Monthly Expenditure for Typical Products

Income class	Monthly expenditure				
	Nothing	< €50	€100	>€100	Total
A	0	335	113	68	516
B	0	240	112	61	413
C	0	146	74	51	271
D	2	62	16	10	90
Total	2	783	315	190	1,290

Notes. G Test = 25.553; Degree of freedom = 9; p-value = 0.002.

Table 11

Bivariate Distribution of Qualification and Monthly Expenditure for Typical Products

Qualification	Monthly expenditure				
	Nothing	< €50	€100	>€100	Total
Primary licence	0	16	14	9	39
Secondary licence	0	157	50	25	232
Diploma	2	467	184	108	761
Degree	0	143	67	48	258
Total	2	783	215	190	1,290

Note. G Test = 17.766; Degree of freedom = 9; p-value = 0.038.

Then, we carefully the relationship between weekly consumption and monthly expenditure (see Table 12) and we found that the a high number of consumers weekly consume typical products between one and three times, usually spending in a month less than €50.

Table 12

Bivariate Distribution of Weekly Consumption and Monthly Expenditure for Typical Products

Weekly consumption	Monthly expenditure				
	Nothing	< €50	€100	>€100	Total
Never	2	102	9	3	116
Once	0	294	87	61	442
Two/Three times	0	319	171	62	552
> three times	0	68	48	64	180
Total	2	783	315	190	1,290

Notes. G Test = 135.764; Degree of freedom = 9; *p*-value = 0.000.

Finally, we assessed the existence of any relationship between qualification of consumer and income class, in order to evaluate if a higher qualification corresponds to a higher income class. Looking at the results reported in Table 13, we can see that this relationship is statistically significant. In particular, focusing our attention on "diploma" and "degree" educational level subjects (i.e., those who were more likely to habitually buy local products), it appears that they belong to relatively low income classes (A and B for Diploma, B and C for Degree).

Table 13

Bivariate Distribution of Qualification and Income Class

Qualification	Income class				
	A	B	C	D	Total
Primary licence	16	3	19	1	39
Secondary licence	137	48	40	7	232
Diploma	292	281	125	63	761
Degree	71	81	87	19	258
Total	516	413	271	90	1,290

Notes. G Test = 105.359; Degree of freedom = 9; *p*-value = 0.000.

Conclusions

On the basis of the results, we can safely say that the culture of community protection brand is still not well established, as in most cases the consumer has not understood the true meaning of the denomination of origin. The Italian consumer, therefore, does not have the exact knowledge of the existence of brands that guarantee the place of origin of the primary materials. A second important aspect concerns the large majority of consumers, that, on the choice criteria, deem the product origin of Italian a pre-eminent factor, but the same percentage considers a clear label, complete and detailed on the product very important. Therefore, we find in the market, on one side, a part of the market that demands guarantees on the product's quality and its origin, starting from the packaging, and on the other side the vendor segment, identified with brands that satisfy, in part, such requirements. In this framework, the consumer's perception fits to the typical agricultural food products. The concept of type

commonly refers to the product's material and immaterial characteristics that make it singular and easily recognizable by the consumer. The elements that connote the type are the territorial ties, and therefore the geographic origin, the materials employed and the production process and adopted transformation. The problems that face the typical spinneret are connected to the necessity to implement stiff strategies to expand and to consolidate the contexts in which the typical products enjoy a privileged position that legitimate the application of a higher price compared to competitive products. This represents the added value for the agricultural product and higher profit margins for the agricultural entrepreneur. Over the years, in fact, the profits of the agricultural enterprise have been progressively eroded by the globalization market phenomenon and by the reduction of the budget of expenditure destined to the community agricultural policy that, for budget necessity and for the public expense control, in the time has changed the support modalities; so the contributions have been freed from the volume of production and linked to the sustainable production processes for the environment and safe for the consumer's health. After all, we can assert that the way to follow in pursuing the objective of the enhancement of "typical" agricultural food-products is the one linked to the progressive reduction of the degree of informative asymmetry which characterizes the current market.

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