Raw producers' milk sale influence on milk consumption in Croatia

Damir Kovačić and Miroslav Božić

Abstract

Influence of raw producers milk sale on consumption in Croatia was studied. The study was organized as a marketing test. Since the testers of the experimental group (raw milk consumers) and the control group (raw milk non-consumers (were chosen to sample after the activity of independent factor (raw milk supply), the form of experiment EX - post factum was used with subsequent equalizing of groups in relation to significant characteristics for studied phenomenon. On the basis of survey results the authors concluded that raw milk supply will not affect milk consumption increase, but it would increase consumer's segment fulfilment prefering raw non packed to packed milk.

Key words: sale, raw producers' milk, consumption, experiment, Croatia

1. Introduction

In 1964 milk sale producer's raw, was legally forbidden in Croatia. This inhibition had some good as well as some bad influence on milk consumption. There was the risk of endangering milk consumers' health, as raw milk, sold through direct channels, was of bad chemical and microbiological quality. Also, this inhibition improverished milk supply od Croatian market.

In most of the Western developed countries sale of raw agricultural products, including milk, has not been inhibited, but permitted under strictly determined conditions, and it has become even more important lately.

New incentive to sale of raw producers' milk was given by liberalization of agricultural products trade, i. e. overall drop of agricultural products' prices. Producers are interested in salling of their products on their own mostly because it enables them to get higher prices and make more profit. Cosumers demand for producers agricultural products is increasing, for instance foolowing consumers segments: "peasant children in cities", "eco-consumers", "picnickers", "adventurers" etc. (Kovačić 1994, p. 28). They are interested in "those" products because buying them directly from peasants give them: really fresh products, products produced in a traditional way, and as a rule cheaper products. Direct sale is also encouraged by public administration because government wants to stop deterioration of farmers' living standards, and to enable food consumption of better quality.

Increased interest in agricultural products direct sale has obviously given strong encouragement to scientific research in this field. First papers attempted to determine importance of direct sale for both producers and consumers, and studies were based upon surveys.

The studies that appeared are conventional marketing researches, according to their theme and methodology. P o t t e b a u m (1988) studied direct sale ways of agricultural products in Germany, conditions under which direct sale is allowed, and possibilities of implementing marketing for producers selling directly. W e i n d l m a i e r and C z e m p i e l (1989) studied possibilities of selling alternatively produced milk, i. e. effectiveness of certain distribution channels. One of the best solutions is direct sale. M a h l e r (1991) studied direct sale of agricultural products in Bavaria, especially ways of direct sale in producers backyard. He determines influence of sociodemographic and psychological characteristics of "backyard" buyers and sellers, influence of buyers' and sellers' behavior, i. e. supply and demand of agricultural products on sale. He also pleads for additional government support for producers selling their products directly concluding that certain farmers benefit from direct marketing as well as whole agriculture in Bavaria. First papers in this field appeared in Croatia in early nineties (T o m a š e v i ć, 1993., K o v a č i ć, 1994., L u k a č - H a v r a n e k, K o v a č i ć, 1994.).

This research tried to find out what benefits would milk consumers have if direct sale became legal again in Croatia. The purpose of the research was to investigate the influence of raw milk sale on consumption in Croatia.

2. Methodology and data origins

The study was organized as a marketing test with two groups of testers-experimental one and control one (H a n i ć 1980, p. 20; K o t l e r 1988, p. 346; M a r u š i ć 1992, p. 133). Raw producers' milk consumers were chosen for experimental group[1]. The data of consumers behavior and attitudes were collected by questionnaires in period November - December 1993. Survey unit was a household, and collocutor was a person who took care of food supply in household. Almost always, that person was a cook or an employed woman who also cooks in the household. (Exceptions were made in singles' households). The choice of testers in the sample was intentional. Survey was made in 166 households.

Control group was a sample of "packed" milk consumers, who have mostly been unable to buy raw milk. Questioning of this consumers' group was carried out in period September - October 1993. Survey unit, choice of collocutor and a measure instrument were the same as whit raw milk consumers. Survey was made in 261 households.

Classical experiment was carried out on the assumptions that: the experimental units and the control group were chosen, experimental and control group before the operation of the independent factor were equal, independent

factor before and after the operation was measured as wel as the results of experimental and control group (M a r u š i ć 1978, p. 5). Equality of experimental and control group was achieved by random choice of units the sample. Differences in results of the first and the second measuring in the control group, which was not affected by the independent factor, were explained by general development of the phenomenon. Differences in results of experimental and control group were explained as activity of independent factor.

However, it was not possible to organize classical experiment (due to lack of funds) and EX post factor experiment was chosen. Experimental and control group were chosen after the activity of an independent factor, and the sampling was intentional. Organizing the experiment that way made it possible to achieve equality of the experimental and the control group by subsequent equalization of groups according to important characteristics of researched phenomenon. (Z i k m u n d, 1989, p. 289; M a r u š i ć, 1992, p. 124).

Equalization of groups is a way of control. The reason for this control is to disable the influence of external factors on independent variable. If that succeeds, only the independent factor will affect, and the changes that occur will be exclusively the results of the impact of independent factor. On the other hand, differences between experimental and control group may include system error, i. e. experiment would not be valid in that case.

Therefore, before testing the hypotheses, it was necessary to equalize experimental and control group concerning the important characteristics in milk consumption. According to the results of previous surveys of milk consumption in Croatia (B o ž i ć and K o v a č i ć, 1994, p. 269) those characteristics are geographic factors (food consumption habits), the level of consumer's budgets, age and qualification.

The experimental group was from Čakovec, that is, urban area in continental part of Croatia. Concerning habits in milk consumption this consumers group was relatively homogeneous. The testers in control goup were chose from the parts of entire Croatia. Concerning habits in food consumption that group of consumers is relatively different, that is, milk consumers in continetal and Mediterranean part of Croatia are substantially different in milk consumption. That is the reason why the households from Mediterranean part of Croatia were excluded from experimental group.

Equality of experimental and control group in relation to consumer's budget and the age of household members was checked by testing the hypothesis of the difference between arithmetic means of two populations (Š o š i ć 1992, p. 306). Since groups were not equal in relation to consumer's budget characteristic, the number of units in experimental sample and control group was reduced and the equality of groups reached in relation to this characteristic.

In relation to age of household members' characteristic the difference between groups was not statistically significant. Equality of experimental and control group

in relation to qualification of a housewife characteristic was checked testing the hypothesis that two characteristics of population elements are mutually impartial (Š o š i ć 1992, p. 327). The difference between groups was not statistically significant in relation to this characteristic.

After equalizing the experimental and control group, in relation to significant characteristics in milk consumption, the average milk consumption per household member, in both experimental and control group, was measured, as well as the number of households that buy milk in shops, i. e. its proportion. Equality of experimental and control group in relation to amount of consumed packed milk was checked by testing the hypothesis of the difference between arithmetic means of two populations. Equality of experimental and control group in relation to proportion of households which buy milk in shops was checked testing the hypothesis of proportions equality of two basic sets.

3. Results and discussion

Milk in cartons and raw producers milk are substitutes in consumption. These two products can satisfy the same need. It was assumed that among all milk consumers in Croatia exists a segment of urban consumers prefering raw producers' milk to milk in cartons, and until now they were not able to buy such product. The question is how would consumers of this segment react if they got supplied with demanded product not previously available.

According to theoretic statements, supply of raw producers milk would not affect quantitative increase in raw milk consumption, but the consumer segment, which demands raw producers milk, is supposed to substitute raw producers milk for milk in carton. Namely, at the low level of consumer's budget, and at the same level of prices of milk in carton and raw producers milk, quantitative increase in consumption of later milk is the function of proportional increase in consumer's budget, and possible unexpected events[2] (B o ž i ć, K o v a č i ć, p. 727).

We assume following hypotheses:

1. Supply of raw producers' milk does not affect increase in milk consumption,

2. Supply of raw producers milk does not affect substitution of raw producers' milk for milk in cartons consumption.

Experimental and the control group had to be equalized in relation to significant demographic, geographical and sociological factors before testing the hypotheses.

The level of consumer's budget significantly influences milk consumption in Croatia (B o ž i ć and K o v a č i ć 1994, p. 270). That is why experimental and control group need to be as similar as possible in relation to this characteristic.

Total family budget of a household in the experimental and the control group were converted into budget per one household member and these two distributions were compared.

In about 90% of all questioned households, family budget per one household member is less than 201 DEM per month. That level of consumer's budget was taken as the lowest level of the biggest budget cathegory. Each next category, from the biggest to the smallest figure, includes households with a budget decreased by 50 DEM.

Table 1. Consumer's budget er one household member
Tablica 1 Potrošački proračun po jednom članu kućanstva

Income	Number of households experimental group	Number of households control group
up to 50 DEM	33	26
51 to 100 DEM	46	97
101 to 150 DEM	32	49
151 to 200 DEM	27	20
201 DEM and more	21	15
TOTAL	159	207

Source: Authors' survey

Equality of the experimental and the control group in relation to consumer's budget was checked testing the hypothesis of difference between arithmetic means of two populations. Testing was at the level of 5% of significance. The interval of null-hypothesis acceptance was from -32.55 to 32.55. The difference between means of eperimental and control group was 32.75. It was obvious that it exceeded critical values of interval of null-hypothesis acceptance. Null-hypothesis was rejected and the alternative wad accepted. Alternative hypothesis stated, at the level of significance of 5%, that there was statistically significant difference between average consumer's income using raw producers milk and milk in cartons.

Therefore, it was necessary to equalize experimental and control group in relation to level of consumer's budget characteristic. Basic criterion in the procedure of equalization was to get the groups of equal frequencies in each budget category. Besides that, efforts were made to equalize the groups in relation to other characteristics - age and qualification, as much as it was possible. Two groups were formed in relation in relation to income characteristic, each included 139 households. Class "up to 50 DEM" included 26 households "up to 100 DEM" included 46 households, "up to 150 DEM" 32, "up to 200 DEM" 20 households and "over 200 DEM" included 15 households.

Equalization of groups concerning consumer's budget level resulted in new structure of experimental and control group according to age of household members.

Table 2 New age structure of experimental and control group
Tablica 2. Nova starosna struktura eksperimentalne i kontrolne skupine

Age groups	Number of households experimental group	Nuber of households control group
up to 5 years	42	36
from 5 to10 years	42	36
from 10 to 15 years	49	38
from 15 to 56 years	130	135
more than 65 years	32	30

Source: Authors' survey

There was a certain difference between experimental and control group in relation to age of household members characteristic. Hypothesis testing procedure relative to difference between means of two basic sets was repeated. The null-hypothesis that raw prodeucers'milk consumers and non-consumers did not differ in relation to average age of household members and the alternative hypothesis that there are statistically significant differences. The testing was at the level of significance of 5%. The average age in the experimental group was of 28.12 years, and in the control of 29.58 years. The difference between these two means was - 1,46. Interval of null-hypothesis acceptance is from -3.36 to + 3.36 and owing to it there was no significant difference between average age of raw producers' milk in consumer and the average age of milk in cartons consumer, i. e. that difference was not statistically significant at the level of 5%.

Equalization of groups relative to consumer's budget resulted in new structure of groups in relation to occupation of housewife characteristic.

Table 3 New structure of experimental and control group in relation to characteristics housewife's occupation
Tablica 3. Nova struktura pokusne i kontrolne skupine u odnosu na zanimanje kućanice

Qualification	Number of housewives experimental group	Number of housewives control group
Primary school	44	37
Secondary or high school	49	30
Coledge	18	22
University	28	40

Source: Authors' survey

There were certain differences between experimental and control group relative to this characteristic, so the testing was carried out to show if those differences were statistically significant. Since there were two nominal

characteristics, hypothesis that two characteristics of population elements are mutually impartial was tested. In our case the population being all milk consumers, and characteristics are housewife's occupation and milk in carton consumption. The testing was at the level of 5% significance. For the level of 5% significance and three degrees of freedom table value χ^2 is 7.82. Since the empirical value χ^2 (4.03) is less than the table value, null-hypothesis was accepted concluding that there are no statistically significant differences between experimental and control group concerning occupation of housewives.

Influence of different number of household members in experimental and conrol group, significantly affects quantity of consumed milk per household, was annulled reducing the milk consumption to one person.

Psychological factors, as well as single differences between consumers according to food consumption habits, i. e. milk consumption, were not separately researched. There has been claimed that at the low level of consumer's budget psychological factors have no significant influence on consumer's behavior. At the higher level of consumer's budget, psychological factors in food choice of a single consumer, become more significant.

It is also probable that at the low level of consumer's budget, there are some minor variations in consumer's behavior caused by psychological factors. We believe that those variations operate in opposite directions, i. e. they annual each other.

After equalizing experimental and control group in relation to significant characteristics in milk consumption the hypotheses about infuence of raw producers' milk supply on consumption were tested.

It was assumed that raw producers' milk supply will not affect quantitative increase in milk consumption in experimental group, i. e. raw producers milk consumers and non-consumers consume the same amount of milk. The testing was at the level of 5% significance. Interval of null-hypothesis acceptance is from -0.036 to 0.036. The difference between average milk consumption of experimental group and control group was -0.0036 liters daily. Therefore, there were no arguments for rejection of null-hypothesis. That was accepted as possible and the conclusion was that raw producers milk supply did not affect quantitative increase in milk consumption.

Second assumption is that raw producers milk supply causes that consumer segment, demanding raw milk, substitutes raw for milk in carton in consumption. It was tested at the level of 5% significance. Interval of nullhypothesis acceptance is between -0.1047 and 0.1047. Registered difference between proportions was -0.4723, so, number of experimental group households buying milk in shops was significantly smaller than number of households in control group. That is raw producers' milk supply affected substitution in consumption of raw producers for milk in carton.

In this study a form of EX after experiment was used. Classical experiment might be organized in the following way: two milk consumers groups would be

chosen at random in one representative city in Croatia. One would be offered raw producers' milk, and the other would not. Measuring at the experimental and the control group would be done before the beginning of the experiment and six month later. If such study would be carried out, differences between the results of experimental and control group might certainly be explained by function of impartial factor, i. e. raw producers milk supply. However, since it was impossible to organize a classic experiment due to lack of funds, and a form of EX after experiment was used, it is a question whether the experimental and the control group were equal in relation to dependent variable before the experimental group was influenced by independent variable. In the use of a classical experiment, this equality is achieved by random choice. In this study, equality was tried to be achieved by subsequent equalization of the experimental and the control group in relation to significant characteristics of milk in carton consumption. Since milk consumption in Croatia at the time of experiment realization was below the level of needs, we believe thet experiment results could be valid. Namely, when the food consumption is below the level of needs, consumption is mostly affected by age of consumers and food consumption habits. Implementation of this form of experiment in the countries with a high level of consumer's budget, where psychological factors have strong influence on food consumption, would probably give less accurate results.

The results of study have confirmed initial statement that inhibition of raw producers' milk sale, which is still sound, makes milk consumers in Croatia, i. e. consumer segment which prefers raw producer to milk in carton, stinted, that consumer segment would not increase milk consumption, but it would be able to purchase the preferred product on the market. Of course, what should be cautious and allow raw producers milk sale under strictly determined conditions, to prevent endangering milk consumers' health.

4. Conclusions

1) Supply of raw producers' milk, would not affect the increase of milk consumption in Croatia. Average milk consumption per member of household in the experimental group (raw producers milk consumers) was 0.37187 l/daily, and average milk consumption per member of household in control group (raw producers' milk non-consumers) was 0.3223 l/daily. Statistically, after the activity of the independent factor (raw consumers milk supply), these two consumer groups, were not significantly different in relation to milk consumption.

2) Raw producers' milk supply would affect the increase in fulfillment of the milk in carton consumers segment which prefers raw producers to milk in carton and is not able to buy it (measured by substitution of raw producers milk in carton). The share of households buying milk in shops in the experimental group was 23%, and of households in control group 71%. At the tested level (5%), these two sets of consumers were different after the fashion of purchasing milk in carton.

3) Raw producers milk sale should be allowed under strictly determined conditions.

UTJECAJ PRODAJE SIROVOG MLIJEKA PROIZVOĐAČA NA POTROŠNJU MLIJEKA U HRVATSKOJ

Sažetak

Proučavan je utjecaj prodaje sirovog mlijeka proizvođača u Hrvatskoj na potrošnju. Istraživanje je organizirano kao marketinški test. Budući da su ispitanici pokusne (potrošači sirovog mlijeka) i kontrolne skupine (nepotrošači sirovog mlijeka) birani u uzorke nakon djelovanja nezavisnog činitelja (ponude sirovog mlijeka) korišten je oblik pokusa EX-post factum s naknadnim izjednačavanjem skupina prema važnim obilježjima za istraživanu pojavu. Autori su na temelju rezultata istraživanja zaključili da ponuda sirovog mlijeka neće utjecati na povećanje potrošnje mlijeka, ali će povećati zadovoljstvo one potrošačke skupine koja preferira sirovo mlijeko proizvođača u odnosu na "konzumno".

Riječi natuknice: prodaja, sirovo mlijeko proizvođača, potrošnja, pokus, Hrvatska.

Notes

1 a group of people daily supplied with "raw producers'" milk by one producer who sells directly
2 health, new use, fashion, etc.

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Author's addresses - Adrese autora
Dr. Damir Kovačić
Institute of Agricultural
Economics, Zagreb
Mr. Sc. Miroslav Božić
Ministry of Agriculture and
Forestry, Croatia