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The mutual relations between food product prices and consumer behavior of population in Azerbaijan domestic agricultural market

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Abstract

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The purpose of the research is to invistigate the influance of relative changes of food prices to the consumer behavior of population, to study the peculiarities of the socio-economic aspects of food demand and their formation, assessment and prediction of the mutual relations between the capability of payment demand of population and consumer prices index (CPI). Research methodologies are: generalization, grouping, systems approach, statistical and econometric analysis. The results of the research are influence and its assessment of the relative changes of food prices to consumer behavior and food demand of population. Some research limitations appeared in shortage of information in deep and complete researching of consumption in catering and import of food product. Research originality and scientific novelty is: influence of the relative changes of food prices to consumer behavior and food demand of population was analyzed as a complex statistic and econometric. The salary of the state and income policy, social protection events were determined in regulation of their mutual relations. The significance of practice research is influence of producers of the relative changes of food prices to consumer behavior and food demand of population in stimulation domestic food producers and import replacing events, increase of social welfares of population.

Key words: relative change; food prices; payment demand; population; consumer behavior; ekonometric reviews; prediction

Introduction

Agricultural activity plays an important role in providing the population with foodstuff, as well as maintaining environmental and ecological advantages, protection and rational use of land and including ensuring socio-economic development in both the country and economical regions, rural areas (Pazek et al., 2014).Markets including agrarian markets are being studied by economists as a place of intensive interaction among citizens belonging to different social-economic group, and in other words between purchasers and sellers (Vlkova et al., 2015).

Quantity, structure and volume of product output in market economy depend on demand and consumption behaviour of population as well. Demand specifies not only volume-quantity index of activity of market subjects, but also main parameters of development strategy. Consequently, elements defined demand and consumption behaviour of population are one of the essential tools focused on dynamic increase of production of product. Change of demand and consumption

behaviour of population in this and other direction causes positive and negative reaction of product either in industry or agricultural enterprises. Consumption behaviour accompanied by decrease of demand of population causes to stagnation, crisis, and increase leads to progress and prosperity.

Theoretical principles of consumer behavior

Food is an integral part of life and is a factor in the survival of life (Rai, 2007). The need for food and provisions is very clear and simple purposeful ground, as well as is physiological demand. Life depends directly on how this need is met (Mela, 1999).

From the starting 1950s, consumer behavior has turned into an object of research, not only with the economy, but also with other sciences such as sociology, anthropology, and clinical psychology. Today consumer behavior is studied as a major and important part in the economic science (Tadajewski, 2009). Thus, the purchaser participates in a number of mental, intellectual assessments of alternatives by seeking better pricing in the product obtaining process (Khosla, 2010).

Consumer evaluations may take place continuously throughout the consumer's decision-making process about consumers' food products purchase. Consumers evaluate alternatives of intended utility from the point of view of functional (pragmatic) and psychological (symbolic) context (Belch et. al., 2009). Hawkins and Gilson (1999) presented the food consumer as a person collecting and processing information consciously or unconsciously, working on meeting and improving the demands in accordance with his/her lifestyle at present. Berkman and Gilson (1981) understood consumer behavior as actions of individuals involved in the actual or potential use of different foods in the markets. Solomon (1999) understood consumer behavior as physical, emotional, and mental acts for choosing, purchasing, using and disposing of commodities and services to meet people's needs and demands. Blackwell et al., (2006) noted that consumer behavior is an action that individuals could take to benefit from products and services to meet their own personal needs. The British economics helped increasing of attitude to the consumer behavior and its more significance with toughening of competition in retail industry in the world (Lancaster et al., 2002).

Researching the factors affecting consumer behavior

It should be noted that, the Nielsen International study found that although stimulating effect of the price on consumer behavior was greater than half of North Americans (61%), slightly over half of Europeans (54%), The Asia-Pacific region and the Middle East and Africa had an equal role of both quality and price in the consumer behavior.

Mohd et.al., (2010), Mallinckrodt and Mizerski (2007) came such a conclusion that received pricing or price had a significant impact on purchasing intent of foodstuffs and consumer behavior was based on it. Also, Holmes and Paswan (2012) believed that quality of product effected on consumer behavior of the purchaser only together with price. Golob and Podnar (2007) noted that received pricing or price provided the consumer with additional value, pricing.

Some authors have also studied the issues of formulating consumer behavior related to food products in the close environment or family. Hendrarini et al., (2018) studied mutual relations between food safety and consumer behavior and each potential consumer has demonstrated that consumer behavior can be closely related to the environment, including relatives, friends and family members.

Grunert, (2002) who researched consume of foodstuffs noted that physical features of goods as its internal feature, and other aspects as external features, for example price and income effected. Wądołowska et al., (2008) came such a conclusion that choice, priority in foodstuffs and generally consumer behavior was in relation with different factors of choosing foodstuffs (for example avertising, healthy, sensitivity, functionality, social-culture) and social-demographic features of consumer (for example age, economic status - incomes, education, gender, residential area and are of living apartment).

Kotler and Keller (2005) recommended to be more focused on price-related factors in the consumer behaviors along with their product quality, Meldrum and McDonald, (2007) said that information about price of product had a great importance in the consumer behaviors, Gökirmaklı et al., (2017) stated that the provision of consumers with the right information about goods could affect consumer behavior. Hristov and Kuhar, (2014) studied most of market research that rating scales are used to understand consumer behavior, Quester and Smart, (1998) studied effect of many features of goods to the consumer behavior.

Gökirmaklı et al., (2017) researched idea of citizens and consumer behaviors in relation with ecological products. Lanfranchı et al., (2016) studied structure of demand for foodstuff (coffee) and consumer behaivior, said that quality was one of the main factors in consumer choosing, Ellickson, (2016), Richards and Hamilton, (2010), Hausmann and Leibtag, (2007) studied retail trade of foodstuffs in USA empirically. Kahlon and George (1995) concluded in their researches that agrarian products market and its regulation had a great role in distribution of food, meet farmers' proposals, traders, consumers, and the government's demand for products of this industry.

Thus, it can be said that main factors of the consumer price index, the income of the population as well as the average monthly wage in the economy can be noted in terms of consumer behavior and in particular the agrarian market products, in other words, food products and their economic factors.

Method and Methodology

The purpose of each research is to examine the theoretical provisions in real-time and within problems, to improve or upgrade products or processes. Calculating of evidences and turning of them into results are called methodology. Methodology-one of the factors affecting research and its results and often depends on the purpose of the research, the nature of dependent and administrative instruments and the hypothesis of the research.

When conducting analysis in the article it was used correlation-regression method. So, with the help of PASW Statistics_18, Gretl and EViews_9 econometric programs equations have been set and graphs have been drawn. It is known from history that the first form of regression is the least squares method. This method was published by Legendre in 1805 and by Gauss in 1809. Gauss discovered further development of the least squares theory in 1821.

Analysis factors influenced on consumption behaviour and price

Population income is included in main factors influenced on consumption behavoiur and price. In general, total population income in Azerbaijan compared to 2003 increased by 7.91 times in 2016 and reached to 45395.1 million manat[1]. Trade turnover or commodity and demand to products and suggestion, as a rule, interact with prices and act as the result of consumer behaviour. Retail trade turnover in Azerbaijan in 2015 increased compared to 1991 and became 25721082.6 manat (Table 1, 2, 3, 4, 5, 6)(Figure 1).

Increase trends of retail trade turnover per capita of the population are regarded as the biggest R^2 and significant p, t-statistics accordance.

As for population income, which is one of the factors significantly influence, however, it appears some incomprehensibility when show population income in dollars. Indicating population income in dollars it increased from 3101.9 million dollars in 1997 to 50321.5 million dollars in 2014[2].

In 2014 population income in dollars increased by 16.22 times compared to 1997, 5.90 times compared to 2005, 1.57 times compared to 2010. This income index compared to 2014 decreased by 19.26% in 2015 when the rate of exchange was 1.0261 and compared to 2014 decreased by 43.48%, compared to 2015 decreased by 30.09% in 2016

Table. 1. Increase trends of retail trade turnover

1995−2015 (1995 = 100)	2000−2015 (2000 = 100)	2005−2015 (2005 = 100)	2010−2015 (2010 = 100)
$Y = 7.96t^2 - 64.19t + 247.36$	$y = e^{(4.367+0.180t)}$	$y = 1.15t^2 + 31.38\,t + 66.02$	$y = e^{(4.502+0.126t)}$

Table. 2. Increase trend of retail trade turnover for per capita of the population

1995−2015 (1995 = 100)	2000−2015 (2000 = 100)	2005−2015 (2005 = 100)	2010−2015 (2010 = 100)
$y = 5.95t^2 - 41.88t + 196.76$	$y = e^{(4.385+0.168t)}$	$y = 38.66t + 51.05$	$y = e^{(4.51+0.11t)}$

Table. 3. Increase trends of population income

2003−2016 (2003 = 100)	2005−2016 (2005 = 100)	2010−2016 (2010 = 100)
$y = 67.91t^{0.91}$	$y = -0.41t^2 + 51.63t + 38.87$	$y = 0.42t^3 - 5.87t^2 + 35.93t + 68.92$

Table. 4. Increase trends of food storage of retail trade enterprises (by the end of the year)

2005−2015 (2005 = 100)	2010−2015 (2010 = 100)
$y = e^{(4.419+0.133t)}$	$y = e^{(4,411+0,151t)}$

Table. 5. Increase trends of non-food storage in retail trade enterprises (by the end of the year)

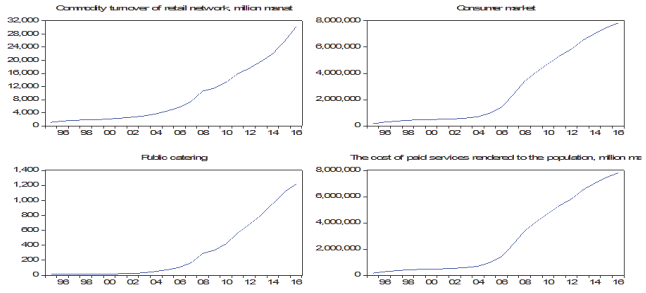
2005−2015 (2005 = 100)	2010−2015 (2010 = 100)
$y = e^{(4.417+0.136t)}$	$y = e^{(4.396+0.154t)}$

Table. 6. Increase trend of food storage in retail trade enterprises (by the end of the year)

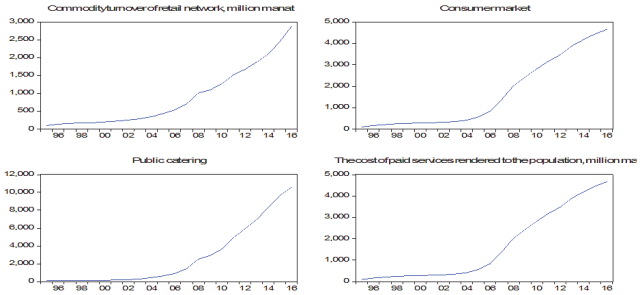
2005−2015 (2005 = 100)	2010−2015 (2010 = 100)
$y = e^{(4.429+0.121t)}$	$y = e^{(4.463+0.139t)}$

[1] 1$ = 1.65 manats (AZN) for 2016 year

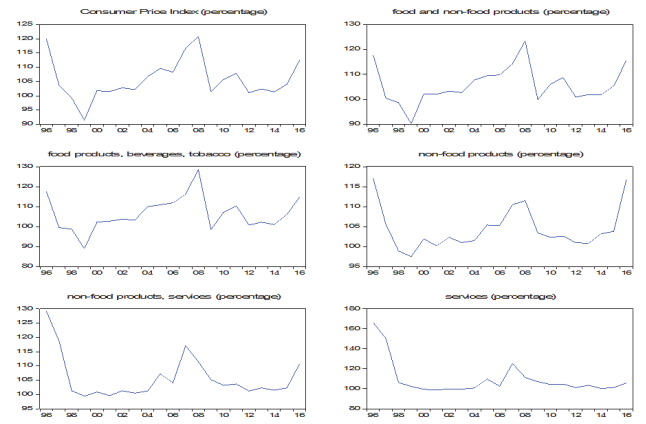
[2] 1$ = 0.80 manats (AZN) for 1997 year, 0.98 manats for 2004 year, 0.79 manats for 2014 year



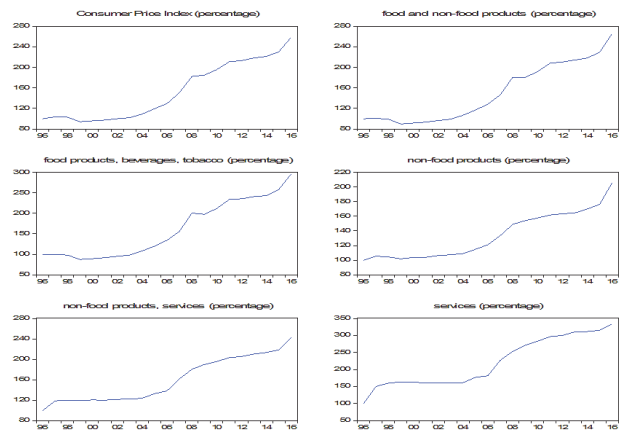
Dynamics of internal trade



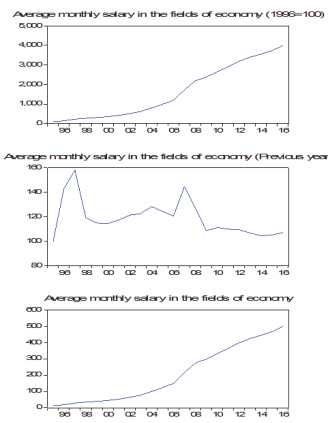
Dynamics of internal trade (1996 = 100)



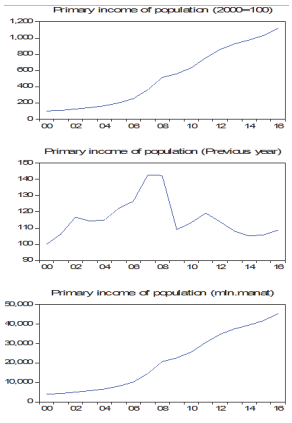
Price index



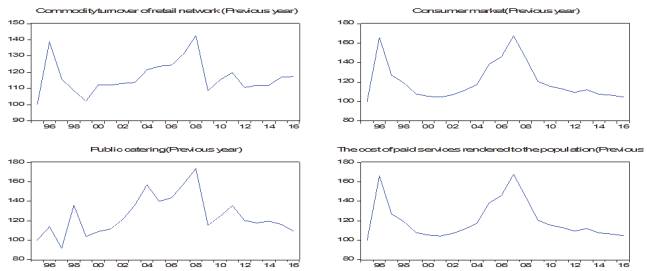
Price index (1996 = 100)



Dynamics of average wage in the economy



Dynamics of incomes of the population



Dynamics of internal trade (compared to the previous)

Fig. 1. Dynamics of the incomes, trade and wage in the economy

when the rate of exchange was 1.5959. This, certainly, can be concerned to the per capita income of population in dollars.

One of the essential factors that significantly influence on CPI and also price of food product, consumption behaviour of population is nominal salary of population. It reached to 466.9 manat in 2015, increasing by 37.3 times compared to 1995, 10.5 times compared to 2000, 3.8 times compared to 2005, 1.4 times compared to 2010 (Table 7).

Trend equation of either population cost or population income relative to time is based on their absolute index.

Table.7. Trend equation of consumption costs of population.

	2001-2015 years	2005-2015 years	2010-2015 years
Consumption costs, total	$y = -0.093t^3+2.836t^2-0.612t+39.687$	$y = 19,372\ t+38,736$	$y = -2.437t^2+36.95+111.69$
Food products	$y = -0.059t^3+1.443t^2-3.106\ t+21.509$	$y = -0.321t^2+10.418\ t+23.875$	$y = 71.592\ (t^{0.182})$
Alcohol	$y = -0.001t^3+0.035\ t^2-0.226\ t+0.771$	$y = 0.087\ t+0.312$	$y = 0.738\ (1.102^t)$
Tobacco products	$y = 0.003\ t^2+0.083\ t+0.627$	$y = 1.109\ (1.082^t)$	$y = 0.174t+1.573$
Clothes and shoes	$y = e^{(0.418+0.179t)}$	$y = -0.025t^3+0.476t^2-1.203t+5.583$	$y = 9.981\ (t^{0.299})$
Water, electricity, gas and other types fuel	$y = e^{(0.374+0.186t)}$	$y = 1.557t+1.638$	$y = -0.302t^2+3.769t+6.351$
Domestic appliances, household appliances and home daily care	$y = e^{(0.381+0.193\ t)}$	$y = 3.414(1.201^t)$	$y = 2.851t+7.321$
Health service	$y = e^{(-0.265+0.196t)}$	$y = 1.837\ (1.201^t)$	$y = 5.269\ (t^{0.472})$
Transport fare	$y = e^{(0.281+0.110t)}$	$y = 1.299t+1.578$	$y = -0.223t^2+2.896t+5.932$
Communication costs	$y = e^{(-1.039+0.230t)}$	$y = 1.198\ (1.209^t)$	$y = 3.861\ (t^{0.418})$
Relax and cultural costs	$y = 0.744(1.204^t)$	$y = 1.541\ (1.208^t)$	$y = 4.592\ (t^{0.495})$
Education costs	$y = 0.289(1.222^t)$	$y = -0.011t^3+0.211t^2-0.738t+1.536$	$y = -0.098t^2+1.199t+1.116$
Hotel, café, restaurant and canteen	$y = -1.335t^3+0.332t^2-0.011t+2.851$	$y = 3.429(1.204^t)$	$y = 1.862t+10.847$
Other goods and service	$y = 0.934(1.191^t)$	$y = 1.912\ (1.189^t)$	$y = 1.183t+4.693$

Source: Made up by the author based on information in www.stat.gov.az

While selecting equations R^2 and parameters t-statistics significance, in other words 95%, 99% and 99.9% probability is accepted (*p < 0.05, **p < 0.01 and ***p < 0.001 conditions). Therefore, equations result different. Considering trend equations, it is clear that cubes, squares and natural logarithmic (exponent e) equations cover majority in trend equations in 2001-2015. There is a complex equation. This indicates verticality of increase in geometric way in those periods. There are a lot of linear equations and upper equations in 2005-2015 trend equations. However, there is not a cubic equation in 2010-2015 trend equations and other equations are equal. The above mentioned can be concerned to population income. Although cubic equations dominate among 2001-2015 and 2005-2015 trend equations, later basic equations included linear and upper and logarithmic equations (Table 8).

Generalized shock for economic deceleration in the world and in oil exported countries is, certainly, a shock appears during fall of oil export income. Initial shock fall of oil income caused to certain deceleration in various sectors of

Table 8. Trend equation of structure of population income

Absolute figures	2001-2015 years	2005-2015 years	2010-2015 years
Income – total	$y = 0.617t^2+6.578t+15.837$	$y = 18.979t+35.862$	$y = -1.694t^2+31.785t+112.171$
Employment income	$y = -0.039t^3+1.143t^2-4.031t+14.476$	$y = 6.302t+11.181$	$y = 6.023t+43.953$
Self-employment income	$y = 4.558t-6.759$	$y = 0.142t^2+3.505t+10.481$	$y = 5.762t+31.073$
Agricultural income	$y = 5.612\ (1.133^t)$	$y = 11.016\ (e^{(0.103s)})$or $y = 11.016(1.110^t)$	$y = -0.309t^2+4.602t+15.611$
Lease income	$y = -0.001t^3+0.041t^2-0.239t+1.113$	$y = 0.092t+0.751$	$y = 1.278\ (t^{0.161})$
Property income	$y = -0.001t^3+0.035t^2-0.260t+0.727$	$y = 0.035t+0.132$	$y = 0.308\ (t^{0.296})$
Obtained current transfer	$y = -0.021t^3+0.617t^2-2.173t+5.287$	$y = 3.338t+3.335$	$y = 21.643 + (9.263\ ln(t))$
Pension	$y = -0.019t^3+0.535t^2-1.969t+4.505$	$y = 2.865t+2.343$	$y = 17.929+ (8.105\ ln(t))$
Allowance and social aid	$y = -0.003t^3+0.075t^2-0.300t+0.835$	$y = -0.011t^2+0.451t+0.295$	$y = 0.271t+2.333$
Social transfers in nature	$y = 0.091\ (t^{1.156})$	$y = 0.151x+0.422$	$y = 1.252\ (0.267^x)$
Other income	$y = 2.092\ (t^{0.888})$	$y = -0.022t^3+0.529t^2-1.688t+10.677$	$y = -0.139t^2+3.381t+10.881$
Income obtained from other families	$y = e^{(2.816 + (-3.393/t))}$	$y = -0.013t^3+0.343t^2-1.173+8.206$	$y = 1.915t+8.6$
Money transfer from abroad	$y = 0.912\ (e^{(0.139t)})$	$y = -0.009t^3+0.177t^2-0.478+2.431$	$y = -0.081t^2+1.053t+2.831$

Source: Made up by the author based on information in www.stat.gov.az

Table 9. Increase trend of indices of consumption prices

	2000−2015 (2000 = 100)	*2010−2015 (2010 = 100)*
Total products and services	$y = e^{(4.478+0.068t)}$	$y = e^{(4.411+0.151t)}$
Food products	$y = 14.99t + 63.21$	$y = e^{(4.394+0.145t)}$
Non-food products	$y = -0.052t^3+1.479t^2-6.397t + 107.2$	$y = -3.72t^3+37.77t^2-82.89t+149.12$
Paid services	$y = -17.46t^3+3.104t^2-0.108t + 120.03$	$y = 27.37t + 62.84$

Source: Made up by the author based on information in www.stat.gov.az

economy and slash of budget income influenced on governmental sector. This process was followed by devaluation of manat decreasing 2 times.

This process, certainly, influences on consumption market, consumption costs (Table 9).

Variety of increase trends of indices of consumption price is related to elasticity of products.

Econometric analysis

First of all, let's have a look at dependence of CPI, which having effect on welfare of population and is the one of the macroeconomic indices of economy in the Republic, in 3 variants: on consumption market, nominal income of population. It is clear from model (1) designed under absolute indices, this model is statistically significant (t-statistics, at least $p < 0.05$ condition is met). But as $R^2 = 0.531$ showed that the dependence is not large. 53% of variation of CPI happened due to selected change in model. The rest (47%) of it is the result of ignored index.

In addition, let's review dependence of indices of three factors on CPI accepting the year of 2000 as base year (2000 = 100) and study the model (2). This model is statistically significant (t-statistics, at least $p < 0.05$). As $R^2 = 0.987$ showed that the dependence is not large. 98% of variation of CPI happened due to selected change in model. The rest (2%) of it is the result of ignored index (Table 10).

Otherwise, our research will focus on the CPI's dependence on the factors that influence it. At that time, the statistical significance of the acquired model (3) is low (t-statistics, at least $p < 0.05$). $R^2 = 0.813$ indicates that dependence is sufficiently tight. That is, 81% of the CPI change is due to the selected variables in the model. The remainder (19%) occurred at the expense of non-existent indicators. Nevertheless, since the model's initial revenues are less statistically significant, we remove it from the model. From this model (4) it is clear that there is also a doubt about its statistical significance. Thus, the average monthly nominal salary for the economy cannot meet minimum requirements (t-statistics, $p < 0.05$). It is also removed from the research. $R^2 = 0.819$ indicates that dependence is sufficiently tight. That is, 82% of the CPI change is due to the selected variables in the model. The remainder (18%) occurred at the expense of non-existent indicators. Nevertheless, we deduce from this model that the average monthly nominal salary in the model is less statistically significant. And the next model is the model that expresses the dependence of the CPI on only the consumer market (5). At this time the model is statistically significant and even $p < 0.001$ is conditional. In this model, $R^2 = 0.793$ indicates that the dependence is sufficiently tight. That is, 79% of the CPI change is due to the selected variables in the model. The remainder (21%) occurred at the expense of non-existent indicators. However, we would like to build a model that expresses dependence on CPI's consumer market and earnings. From this model we can say that this model (6) is not statistically significant. (t-statistics, $p < 0.05$). $R^2 = 0.798$ indicates that dependence is sufficiently intense. That is, 80% of the CPI change is due to the selected variables in the model. The remainder (20%) occurred at the expense of non-existent indicators (Table 11).

We will explore the CPI's dependence on the initial earnings of the population and the volume of retail trade, excluding general economic, monthly average nominal salary and total consumer market. Here, we will conduct research in 3 variants. First of all, you need to know the dependence of the CPI on absolute figures. The model (7) obtained at this time is statistically significant (t-statistics, at least $p < 0.05$ condi-

Table 10. Dependence of indices of three factors – market wage and income

	Const	Consumer market	Average wage in the economy	Primary income	R^2	F	P−(F)	DW	
Consumer price index	100.458***	0.002**	0.173***	−0.003***	0.531	F (3,13) 4.911	0.017	2.099	(1)
	(38.12)	(2.325)	(3.501)	(−3.641)					
Consumer price index (2000 = 100)	81.453***	−0.063*	0.078**	0.123**	0.987	F (3,13) 342.427	1.29e-12	1.438	(2)
	(20.54)	(−2.064)	(2.373)	(2.633)					

Note: 1.(t-stat); 2. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 11. Dependence on CPI's consumer market and earnings

	Const	Consumer market	Average wage in the economy	Primary income	R^2	F	P- (F)	DW	
Consumer price index (compared to the previous)	52.535***	0.581***	−0.018	−0.109	0.813	F(3,13) 18.899	0.000051	1.549	(3)
	(6.644)	(3.323)	(−0.108)	(−1.05)					
Consumer price index (compared to the previous)	52.698***	0.566***	−0.113		0.813	F(2,14) 30.495	7.90e-06	1.543	(4)
	(7.043)	(5.772)	(−0.112)						
Consumer price index (compared to the previous)	50.503***	0.473***			0.793	F(1,15) 57.763	1.61e-06	1.410	(5)
	(6.854)	(7.600)							
Consumer price index compared to the previous)	50.123***	0.558***		−0.082	0.798	F(2,14) 27.612	0.00001	1.459	(6)
	(6.604)	(3.204)		(−0.520)					

Note: 1. (t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

tionally paid). However, as in the case of (1), R^2 ($R^2 = 0.571$) indicates that dependence is not sufficiently high. That is, 57% of the CPI change is due to the selected variables in the model. The remainder 43%) occurred at the expense of non-existent indicators.

In other versions of our study, let's look at the relative dynamic performance of the CPI and the factors influencing it, based on the base year (2000 = 100). At this time, the statistical significance of the acquired model (8) is high (t-statistics, at least $p < 0.05$). $R^2 = 0.988$ indicates that dependence is too tight. That is, 99% of the CPI change is due to the selected variables in the model. The rest (1%) occurred at the expense of non-existent indicators (Table 12).

Let's look now at the next version of our research that the CPI and the factors that affect it are dependent on the dynamic performance of the previous year. At this time, the statistical significance of the model (9) is low (t-statistics, at least $p < 0.05$). $R^2 = 0.827$ indicates that dependence is too tight. That is, 83% of the CPI change is due to the selected variables in the model. The remainder (17%) occurred at the expense of non-existent indicators. Since the overall average monthly nominal salary is less statistically significant, we deduce it from the model and the next model is taken from the model (10), which specifies the CPI only dependent on the volume of retail trade and the earnings of the population. At the time, the statistical significance of the model was considerably lower and the initial incomes of the population did not meet the $p < 0.05$ requirement. In this model, $R^2 = 0.820$ indicates that the dependence is sufficiently high. That is, 82% of the CPI change is due to the selected variables in the model. The remainder (18%) occurred at the expense of non-existent indicators. But we have to deduce the initial income of the population from the model. As a result, we would like to build a model that specifies the dependence of the CPI on the volume of retail trade. From this model, we can say that this model is statistically significant (t-statistics, even $p < 0.001$). $R^2 = 0.855$ indicates that the dependence is sufficiently tight. That is, 86% of the CPI change is due to the selected variables in the model. The remainder (14%) occurred at the expense of non-existent indicators (Table 13).

Table 12. Relative dynamic performance of the CPI and the factors influencing it

	Const	Retail market	Average wage in the economy	Primary income	R^2	F	P- (F)	DW	
Consumer price index	99.518***	0.002**	0.183***	−0.003**	0.571	F (3,13) 5.772	0.0098	2.149	(7)
	(39.01)	(2.668)	(3.816)	(−4.076)					
Consumer price index (2000 = 100)	82.719***	−0.058**	0.072**	0.118**	0.988	F(3,13) 369.62	7.88e-13	1.504	(8)
	(21.41)	(−2.369)	(2.237)	(2.913)					

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

Table 13. The remainder (14%) occurred at the expense of non-existent indicators

	Const	Retail market	Average wage in the economy	Primary income	R^2	F	P- (F)	DW	
Consumer price index (compared to the previous)	44.447***	0.516***	0.082	−0.077	0.827	F(3,13) 20.764	0.00003	1.642	(9)
	(5.130)	(3.601)	(0.603)	(−0.729)					
Consumer price index (compared to the previous)	42.626***	0.514***	0.028		0.820	F(2,14) 31.969	6.03e-06	1.510	(10)
	(5.230)	(3.649)	(0.253)						

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

Table 14. The remainder (61%) occurred at the expense of non-existent indicators

	Const	Public catering	Average wage in the economy	Primary income	R^2	F	P− (F)	DW	
Price index of articles of food and drinks	103.737***	0.048	0.278**	−0.005**	0.397	F (3,13) 2.781	0.0830	2.516	(11)
	(25.70)	(1.765)	(2.869)	(−2.622)					

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

The research focuses on the price index of food products and drinks in terms of the size of public catering, total economy, average monthly nominal salary, and population's initial earnings. The model (11) obtained at this time is statistically significant (t-statistics, at least p < 0.05 conditionally paid). However, R^2 = 0.397, ie very low, indicates that dependence is insufficient. That is, 39 % of the CPI change is due to the selected variables in the model. The remainder (61%) occurred at the expense of non-existent indicators (Table 14).

Considering the year 2000 as the base year, we will see the price index of food products and beverages dependent on the size of public catering, total economy, average monthly nominal salary, and population's initial earnings (2000 = 100). At this time, the statistical significance of the model (12) obtained is low (t-statistics, at least p < 0.05). However, R^2 = 0.988, ie very high, indicates that dependence is strong enough. That is, 99% of the CPI change is due to the selected variables in the model. The remainder (1%) occurred at the expense of non-existent indicators. Since the average monthly nominal salary in the economy is of little statistical significance, we deduce it from the model and the model (13) of the next model, the price index of food products and beverages, depends only on the size of public catering and the population's initial earnings. The statistical significance of this model is considerably higher. In the model, each indicator even p < 0.001 pays. In this model, R^2 = 0.989 indicates that the dependence is sufficiently high. That is, 99% of the change in price indices of food products and beverages is due to the selected variables in the model. The rest (1%) occurred at the expense of non-existent indicators (Table 15).

We will use the indicators comparable to the previous year covering the price index of food products and drinks in terms of the size of public catering, the economy's total, average monthly nominal salary, and dependency on the population's earnings. At this time, the statistical significance of the model (14) is low (t-statistics, at least p < 0.05). However, R^2 = 0.718, ie very high, indicates that dependence is strong enough. That is, 72% of the change in price indices of food products and beverages is due to the selected variables in the model. The rest (28%) occurred at the expense of non-existent indicators. Since the total monthly average nominal salary in the economy is of little statistical value, we remove it from the model and the model (15) of the next model, food products and drinks price indices, depends only on the size of public catering and the population's initial earnings. The statistical significance of this model is considerably higher. Each indicator in the model p < 0.01 pays. In this model, R^2 = 0.695 indicates that the dependence is sufficiently high. That is, 69% of the price indices of food products and drinks accounted for 31% of the selected variables in the model due to unacceptable indicators (Table 16).

Let's look at the CPI, which is one of the main macroeco-

Table 15. The rest (1%) occurred at the expense of non-existent indicators

	Const	Public catering	Average wage in the economy	Primary income	R^2	F	P- (F)	DW	
Price index of articles of food and drinks (2000 = 100)	72.159***	−0.018**	0.026	0.226***	0.988	F (3,13) 378.821	6.73e-13	2.139	(12)
	(13.96)	(−2.694)	(0.476)	(3.124)					
Price index of articles of food and drinks (2000 = 100)	72.920***	−0.019***		0.259***	0.989	(2,14) 601.309	2.67e-14	2.108	(13)
	(15.26)	(−4.274)		(10.95)					

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

Table 16. 69% of the price indices of food products and drinks accounted for 31% of the selected variables in the model due to unacceptable indicators

	Const	Public catering	Average wage in the economy	Primary income	R^2	F	P- (F)	DW	
Price index of articles of food and drinks (compared to the previous)	51.751***	−0.229**	0.507***	0.229	0.718	F (3,13) 11.046	0.0007	1.621	(14)
	(4.447)	(−2.377)	(3.244)	(1.046)					
Price index of articles of food and drinks (compared to the previous)	56.253***	−0.162**		0.621***	0.695	F(2,14) 15.917	0.0003	1.489	(15)
	(5.186)	(−2.248)		(5.510)					

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

nomic indicators of the economy, on the consumer market in the Republic, and the dependence on the nominal income of the population and the economy on the average monthly nominal salary. It is clear from the model (16) that is based on absolute figures that this model is statistically significant (t-statistics, at least $p < 0.05$ conditionally paid). Also, $R^2 = 0.990$ indicates that the dependence is too tight. That is, 99% of the change in the volume of the consumer market was due to the selected variables of the model, and 1% of the indicators, which were ignored by the model.

Additionally, let's look at the dependence of the consumer market and the three factors affecting it, by analyzing the base year 2000 (2000 = 100) and analyzing the model (17). This model has less statistical significance (t-statistics, at least $p < 0.05$ condition is not paid). $R^2 = 0.989$ indicates that the dependence is sufficiently tight. That is, 99% of the volumes of consumer market volatility are due to the selected variables in the model. The rest (1%) occurred at the expense of non-existent indicators. Nevertheless, we deduct the overall economic average for the model as the average monthly nominal salary is less statistically significant. From this model (18), it is clear that the statistical significance of this model is sufficient. Indicators of the population's income can meet the minimum requirement (t-statistics, $p < 0.05$). $R^2 = 0.989$ indicates that dependence is sufficiently tight. That is, 99% of the change in the volume of the consumer market, the selected variables in the model, 1% occurred at the expense of non-model indicators (Table 17).

Another option for our research is to focus on the dependence on the volume of the consumer market and the factors affecting it from the previous year. At that time, the statistical significance of the acquired model (19) is low (t-statistics, at least $p < 0.05$). $R^2 = 0.928$ indicates that the dependence is sufficiently tight. That is, 92% of the volumes of consumer market volatility are due to the selected variables in the model. The remainder (8%) occurred at the expense of non-existent indicators. Nevertheless, we deduce from this model that the average monthly nominal salary in the model is less statistically significant. From this model (20), it is clear that this model is no longer static. Thus, the population's initial incomes can be minimal (t-statistics, $p < 0.05$). $R^2 = 0.922$ indicates that the dependence is sufficiently tight. That is, 92% of the change in the volume of the consumer market was due to the selected variables in the model, and 8% - by the indirect figures (Table 18).

Now let's explore the dependence of retail trade on the CPI, the initial earnings of the population, and the economy's total, average monthly nominal salarys. Here are three versions of our research. In the first variant, you will see the dependence of retail trade on absolute figures. The model (21) obtained at that time is statistically significant (t-statistics, at least $p < 0.05$ conditionally paid). Here $R^2 = 0.985$ indicates that dependence is sufficiently tight. That is, 98% of the volume change in the retail trade occurred at the expense of the selected variables in the model, and 2% due to the unaccustomed indicators.

In another version of the study, let's look at the relative dynamic performance of retail trade by taking the base year

Table 17. 99% of the change in the volume of the consumer market, the selected variables in the model, 1% occurred at the expense of non-model indicators

	Const	Average wage in the economy	Primary income	Consumer price index	R^2	F	P−(F)	DW	
Consumer market	−16193.7**	−37.969**	1.324***	161.643**	0.990	F(3,13) 441.265	2.52e-13	0.977	(16)
	(−2.301)	(−2.161)	(6.363)	(2.325)					
Consumer market (2000 = 100)	320.842*	0.122	1.436***	−3.916*	0.989	F(3,13) 413.559	3.83e-13	0.807	(17)
	(2.038)	(0.395)	(6.296)	(−2.064)					
Consumer market (2000 = 100)	293.104**		1.484***	−3.485**	0.989	F(2,14) 660.051	0.7578	0.758	(18)
	(2.146)		(7.992)	(−2.315)					

Note: 1.(t-stat); 2. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 18. 92% of the change in the volume of the consumer market was due to the selected variables in the model, and 8% - by the indirect figures

	Const	Primary income	Average wage in the economy	Consumer price index	R^2	F	P−(F)	DW	
Consumer market (compared to the previous)	−31.897*	0.436**	0.127	0.789***	0.928	F(3,13) 56.189	1.06e-07	1.526	(19)
	(−1.857)	(2.838)	(1.051)	(3.323)					
Consumer market (compared to the previous)	−26.601	0.548***		0.758***	0.922	F(2,14) 83.115	1.71e-08	1.474	(20)
	(−1.614)	(0.545)		(3.204)					

Note: 1.(t-stat); 2. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 19. 98% of the volume change in the retail trade occurred at the expense of the selected variables in the model, and 2% due to the unaccustomed indicators

	Const	Average wage in the economy	Primary income	Consumer price index	R^2	F	P−(F)	DW	
Retail market	−16736.5**	−42.5866**	1.147***	171.497**	0.985	F(3,13) 281.271	4.54e-12	1.009	(21)
	(−2.572)	(−2.621)	(5.961)	(2.668)					
Retail market (2000 = 100)	444.780**	0.115	1.499***	−5.172**	0.983	F(3,13) 259.903	7.52e-12	0.854	(22)
	(2.456)	(0.323)	(5.714)	(−2.369)					
Retail market (2000 = 100)	418.693**		1.544***	−4.767**	0.983	F(2,14) 416.447	3.37e-13	0.804	(23)
	(2.670)		(7.244)	(−2.757)					

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

Table 20. 88% of retail sales volumes are due to the selected variables in the model, and 12% due to indirect figures

	Const	Average wage in the economy	Primary income	Consumer price index	R^2	F	P−(F)	DW	
Retail market (compared to the previous)	−25.144	0.263	0.077	0.967***	0.882	F(3,13) 32.579	2.58e-06	2.058	(24)
	(−1.296)	(1.518)	(0.561)	(3.601)					
Retail market (compared to the previous)	−21.949		0.329**	0.948***	0.879	F (2,14) 32.579	3.63e-07	1.951	(25)
	(−1.213)		(2.648)	(3.649)					

Note: 1.(t-stat); 2. * p < 0.05; ** p < 0.01; *** p < 0.001

(2000 = 100) and the factors affecting it. At that time, the statistical significance of the acquired model (22) is low (t-statistics, at least $p < 0.05$). $R^2 = 0.983$ indicates that dependence is too tight. That is, 98% of the volume change in the retail trade takes place at the expense of the selected variables in the model. The remainder (2%) occurred at the expense of non-existent indicators. Nevertheless, we deduce from this model that the average monthly nominal salary in the model is less statistically significant. From this model (23), it is clear that this model is no longer static. Each such indicator can meet the minimum requirement (t-statistics, even in $p < 0.001$). $R^2 = 0.983$ indicates that dependence is sufficiently tight. That is, 98% of the volume change in the retail trade occurred at the expense of the selected variables in the model, and 2% due to the unaccustomed indicators (Table 19).

Now, in the next version of the survey, let's look at the dependence of retail trade on the volume and the factors that affect it, compared to the previous dynamic indicators. At this time, the statistical significance of the acquired model (24) is low (t-statistics, at least $p < 0.05$). $R^2 = 0.882$ indicates that dependence is too tight. That is, 88% of the volume change in retail trade is due to the selected variables in the model. The remainder (12%) occurred at the expense of non-existent indicators. As the overall average monthly nominal salary is less statistically significant, we remove it from the model, and the next model is the model (25), which specifies the volume of retail trade, but only the CPI and its dependence on the initial earnings of the population. The statistical significance of this model is normally $p < 0.05$ conditionally paid. In this model, $R^2 = 0.879$ indicates that the dependence is sufficiently tight. That is, 88% of retail sales volumes are due to the selected variables in the model, and 12% due to indirect figures (Table 20).

Results and Conclusions

It can be concluded from the research that, along with all macroeconomic indicators, increase of economic growth, retail trade turnover, retail trade turnover per capita, product inventories of retail trade enterprises, non-food products in retail trade enterprises, foodstuffs was observed. The most important period of growth during these years is the year 2006 (the full implementation of the "Contract of the Century"). This has, in particular, been an increase in public catering and paid services. At the same time, there has also been a rapid increase in the incomes of the population and the average salary of the economy, which are the main factors affecting price indices and consumer behavior. At the same time, substantial changes have been made in the consumption expenditures of the population and the structure of these consumption expenditures.

CPI estimates the price and tariffs of foodstuffs and paid services, as well as the volumes of consumer market, retail trade, public catering and paid services, as well as the analysis of dependence on initial earnings and average salary's in the economy, it played the least role in dependence and had an average salary on the economy. In other words, consumption behavior and prices were affected by the initial incomes of population and the overall macroeconomic situation.

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