FACTORS AFFECTING CONSUMPTION BEHAVIORS OF CONSUMERS IN TURKEY

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ABSTRACT: When households make decisions regarding the distribution of their income between consumption and savings, they typically consider the return rate of savings as well as other constraints. However, when firms face similar decisions, investment demand in given interest rates and other constraints become more influential. Many factors, such as financial ability, expectations in future-oriented market conditions, or borrowing probability in the process of acquiring securities and other real assets, affect consumers' decisions. Consumption habits undergo changes with respect to economic, cultural, level of globalization, and political dynamics of the country in which a consumer lives. In this paper, the variables that affect changes in consumption behavior in Turkey, a european country with middle east culture, are researched using factor analysis, which is one of several multi-variable statistical analysis methods.

Keywords: Consumption, developing economies, factor analysis, Varimax

TÜRK TÜKETİCİLERİNİN TÜKETİM DAVRANIŞLARINI ETKİLEYEN FAKTÖRLER

ÖZET: Hane halkları gelirlerini tüketim ve tasarruf arasında dağıtma kararını verirlerken karşı karşıya oldukları tasarrufların geri dönüş oranı ve diğer kısıtları göz önünde bulundurmaktadır. Firmalar için ise bu kararda veri faiz oranlarındaki yatırım talebi ve diğer kısıtlar etkili olmaktadır. Tüketicilerin maddi imkanları, ileri yönelik piyasa koşullarındaki beklentileri, satın almak istedikleri menkul ve gayrimenkulleri edinme süresinde borçlanma ihtimalleri gibi pek çok etken etkilemektedir. İnsanların tüketim alışkanlıkları içinde yaşadıkları ülkenin ekonomik, kültürel ve siyasi dinamiklerine bağlı olarak değişme göstermektedir. Bu makalede, Türkiye'de tüketim davranışlarının hangi değişkenlere bağlı olarak değiştiği çok değişkenli istatistiksel analiz yöntemlerinden faktör analizi ile araştırılmaktadır.

Anahtar Kelimeler: Tüketim, Gelişen ekonomiler, Faktör analizi, Varimax

INTRODUCTION

Consumption is defined as commodity and service usage to directly meet human needs. Households divide their income between their consumption and savings which in turn affects a household's economic welfare. Households want to get the maximum benefit from not only the goods they consume today but also the goods they will consume in the future. Environmental and internal factors are what mobilize individuals' decisions as consumers. Any changes to these factors could change their purchasing behaviors. Consumption spending is the difference between total sales made in a certain period and total sales entrepreneurs make to each other (Keynes 1936), and is considered an important factor of total demand. When viewed from the perspective of growth, the fact that this spending divides a society's resources between various investment fields is quite important when considering the standards of living in the long run.

Distribution of income refers to the sharing of generated income within an economy, between people, social groups, and production factors, during a certain period, which also explains income differences. However, knowing the percentiles of income distribution within a country allows decision-making units to make assessments regarding consumption decisions. Consumers' income percentiles have an effect on their consumption amounts as well as its

composition. Therefore, from the point of envisioning how applying a potential macroeconomic policy could affect consumption spending, it is important to know the income distribution within a country (Işığıçok 1999). In Turkey, the problem of unfair distribution of income can be seen more explicitly when the consumption structure of households is analyzed with respect to income percentiles. While consumers in low income percentiles shift their consumption spending to essential goods during times of increased in price levels, consumers in high income percentiles do not change their consumption habits when faced with price increases. Interest rates are another factor that can have an effect on consumption levels. Changes in interest rates affect the allocation of total disposable income between consumption and savings (Yumuşak and Bilen 2006). From a consumer's perspective, the importance of liberalization in Turkey's financial markets is the decrease in borrowing constraints. This change has given a higher percentage of the population the opportunity to smooth their consumptions and substitution habits during times of price increases.

The primary demographic factors affecting consumers' consumption behaviors are age, marital status, village or city residency, education level and profession, family size, and the population growth rate in their home country. Turkey is a country with a high working population rate. Because the working population rate reflects the purchasing potential of the country, it has an effect on consumption. In the case of high dependency, the rate of total savings decreases. In calculating the rate of dependency, when the non-working population who are of age to work are not taken into account the rate of dependency is not a very accurate indicator. Therefore, using the labor force participation rate is more explanatory for Turkey.

The behavioral factors affecting consumption decisions can generally be classified as expectations of consumers, including their plans and whether they are optimistic or pessimistic. Macroeconomic stability and consumer expectations regarding the future have an effect on consumption. In Turkey, it is observed that consumers who are not members of a certain social security institution must rely on generating additional savings to fund their consumption spending as they get older. Improvements in consumer expectations increase the large spending and borrowing trends. While this improves consumers' assessments of their current purchasing power, concern over future employment possibilities and pessimism regarding the appropriateness of buying durable consumer goods during the current term can cause consumers to cut their spending (Pehlivan 2006).

In this paper, Section 1 elaborates on the factors that determine consumption behaviors. Section 2 explains the econometric methodology used in this paper. Section 3 covers the factors having an effect on consumers' consumption behaviors in Turkey, and the final section contains the conclusion and additional comments.

ECONOMETRIC METHODOLOGY

The theory of factor analysis and principal component analysis as an extraction method is explained in this section of the paper. Factor analysis is a widely used methodology adopted in fields such as psychology, social sciences, education sciences, political science and international relations, economy, economic development and city planning, sociology, biology, medicine, and business (e.g., market research, particularly consumer and advertising research).This method can be used to facilitate defining a factor and providing it with a new name based on the many interrelated characteristics of units by gathering together the ones that, although unrelated to each other, when combined can assist in explaining a phenomenon (Kline 1993). It is a method used to convert interrelated data structures into unrelated and fewer new data structures, which brings forward the common factors by grouping the variables that are assumed to explain a phenomenon or event. In other words, based on relations between many variables, it is a multivariable analysis type, which facilitates the presentation of data in a more meaningful and summarized way.

Factor analysis aims to find the random factors that are unobservable but emerge after gathering variables from x data matrix having p variables, which are observed and have correlation between them, and that reflects the classification. These derived variables are called factors. This method benefits from finding the hidden dimensions that are known to exist, but cannot be determined by direct observation. The objective of using factor analysis is to decrease the large number of data sets by combining them. In other words, because it is expressed with fewer factors, mathematically derived from many variables with minimum probability of information loss, on a large scale, the operation is simplified. By using this method, a large number of data set dependencies and important points between variables are made evident, and groupings between some variables can be performed. Factor analysis ensures that variables with less importance and variables with more importance take part in the analysis with respect to their weights. Eliminating the variable with less weight is out of question. .This analysis tries to reduce the dimension and eliminate

the dependency structure (Tatlıdil 2002). By standardizing the X_{p*n} raw data matrix, the Z_{p*n} standardized data matrix is used. The linear model showing the relation between Z_j variables and common factors is expressed as follows:

$$z_i = a_{i1}f_1 + a_{i2}f_2 + \ldots + a_{im}f_m + b_iu_i \qquad i = 1, 2, 3, \ldots, p \qquad (2.1)$$

Here, a_{im} is the ith variable's load or weight over the mth factor; f_m is the mth factor; u_i is the residual factor; and b_i is the coefficient of the residual factor. The number of obtained factors as a result of the analysis shows the number of equations. The first factor has the biggest share in the total variance. Equation 2.1 is written in the matrix form as follows:

$$Z = AF + BU \qquad (2.2)$$

Here, F is the factor matrix with mxn dimension; B is the diagonal coefficients matrix with pxp dimension; U is the special factor matrix with pxn dimension; Z is the pxn standardized data matrix; and A is the weights matrix with pxm dimension. As a result of a good factor rotation dimension should be reduced, orthagonality or independency should be attained, and should be conceptually meaningful.

Contrary to regression analysis, in factor analysis, a high correlation between variables is sought. As the correlation between variables decreases, the reliability of the factor analysis results decreases. Variables with a very strong correlation relation between them generally take part in the same factor. As a result, the relations of these variables to the factor they are in are strong. In order to test whether the correlation matrix is a unit matrix, where all diagonal terms are one and all other terms are zero, the Barlett test is used. This test requires that data comes from multi-normal distribution. If the coefficient turns out to be low, the null hypothesis is accepted, if it turns out to be high, the alternative hypothesis is accepted. If the null hypothesis is not rejected then use of a factor model should be reviewed (Hair et al.,1998).

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The Kaiser–Meyer–Olkin (KMO) test measures sample adequacy and is interested in sample size. For this test, the magnitude of the observed correlation coefficients is compared to the magnitude of the partial correlation coefficients. The low value of this test shows that the correlation between variables as a pair cannot be explained by other variables.

Factor analysis is a model based analysis. It reveals the significative dimensions in data and therefore relates to the common variance. Principal component analysis accepts original data as a linear variable series and seeks to elucidate the contribution of each variable to the principal component. While the main purpose of principal component is to reduce the dimension, factor analysis tries to specify the factors that have common effect on interested variables. While there are many solution methods to determine factors in factor analysis, the most practical one is the principle components approach.

This approach calculates the factor that will explain the maximum variance in all variables. To explain the remaining amount of maximum variance, the second factor is calculated. This situation is repeated until it explains the total variance in all variables. However, in using this method one should be careful that there is no correlation between obtained factors. In other words, obtained factors should be orthogonal. Here, the objective is to obtain fewer factors, which represent the relations between variables in the highest degree. Including the factors whose eigenvalue is one or greater than one ($\lambda \geq 1$) is a widely used criterion for this method.

Eigenvalue shows the total variance explained by one factor. In the scree test method, graphics of eigenvalues are analyzed and factors are added to the solution until the vertical line becomes horizontal. In other words, by

determining the rapid decline in variance explanation rates, the number of factors is decided (Lewis–Beck 1994). Another method is to determine the factors with respect to rate of variance. Here, the larger the obtained variance rates as a result of analysis are, the stronger the factor structure is.

The objective of factor rotation is to obtain factors that can be titled and interpreted (Kalaycı et. al 2009). After determining the number of factors in the model, the number of variables that will take part in each model and the distribution of these variables to the factors are determined. In the factor pattern matrix, the coefficients, which are defined as factor loads, express a standardized variable related to the factor. Factor loads show the weight of variables at each factor. These variables, which are correlation coefficients, show the degree of relation between variables and the selected factor (Nakip 2003). Two methods are used in rotation operations. The first is orthogonal rotation, and it facilitates that obtained factors are not correlated with each other. Among the orthogonal rotation methods, varimax, quartimax, and equamax are the ones most often used. The second method is oblique rotation operation. In this case, factors are not completely independent from each other. In this paper, the varimax method has been used. In varimax method, a rotation to facilitate maximization of variances with fewer variables is performed (Kline 1994).

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Turkey is becoming a focus of interest for financial markets due to its increasing population, developing economy and market potential, and rising workforce factors. Although these elements are attractive for financial markets, changes in income levels, price levels, consumer preferences, and consumer expectations, all have an effect on consumption.

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Variable	Variable Explanation
A1	Purchasing power (current period)
A2	Purchasing power (future period)
A3	General economic situation (current period)
A4	General economic situation (future period)
A5	Employment possibilities (future period)
A6	Thought about making spending for semi-durable consumption goods (future period)
A7	Appropriateness of current period for purchasing durable consumption good
A8	Probability of purchasing durable consumption good (future period)
A9	Probability of purchasing automobile (future period)
A10	Probability of purchasing or building a house (future period)
A11	Probability of spending money for home repairs (future period)
A12	Probability of borrowing to finance consumption (future period)
A13	Appropriateness of current period for saving
A14	Probability of saving (future period)
A15	Expectation regarding change direction of prices in the future period

Table 3.1: Factor assignments for variables used

Since consumers make a decision between consumption vehicles in accordance with the status of the economic and political conjuncture of the country, present and future values of the variables are given in this paper. Economic data about future period, especially countries like Turkey, indirectly contain political and cultural dynamics. It can be said that all the data for the future period effectively dealt with these dynamics. Furthermore, items and directions of consumption varies according to the expectations about future. Within the scope of the paper, consumer tendency index, created by TSI, is used to determine factors determine household consumption in Turkey. Monthly data from between 01/2004 and 06/2012 was used to determine which variables are much more important to Turkish consumers' consumption behaviors. After determining the number of variables that will take part in the factor as well as the distribution of these variables to each factor, the factors were given names as shown in Table 3.1.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy.		0,841
Bartlett's Test of Sphericity	Approx. Chi-Square	2118,400
	Df	105
	Significant	0,000

Table 3.2: KMO and Bartlett Tests

In factor analysis, a high correlation is sought between variables. As the correlation between variables decreases, the reliability of the factor analysis results decreases. When Table 3.2 was analyzed, the result of the Barlett test was found to be significant. There is high correlation between the variables and data coming from multiple normal distributions. When the KMO coefficient was analyzed, the sample size used in the research was found to be adequate.

Variable	A1	A2	A3	A4	A5
Factor Load	0,951	0,987	0,979	0,982	0,862
Variable	A6	A7	A8	A9	A10
Factor Load	0,903	0,887	0,886	0,663	0,686
Variable	A11	A12	A13	A14	A15
Factor Load	0,657	0,859	0,846	0,873	0,683

Table 3.3: Common Variance (Communality)

Common variance is the amount of variance one variance shares with other variables in the analysis. During the analysis, variables with a factor load of 0.45 or higher were taken into consideration. As shown in Table 3.3., because the values of the factor loads of all variables in this paper were over 0.45, all were included in the analysis.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	%of Variance	Cumulative %	Total	% of Variance	Cumulative %
A1	8,98	59,88	59,88	8,98	59,88	59,88	8,21	54,78	54,78
A2	2,21	14,72	74,60	2,20	14,71	74,60	2,69	17,98	72,76
A3	1,51	10,09	84,69	1,51	10,09	84,69	1,78	11,92	84,69

Table 3.4: Total Variance Explained (Extraction Method: Principal Component Analysis)

Explained total variance gives the values before and after the rotation. When Table 3.4 is analyzed, three factors emerge. The first factor explains 59.88% of the total variance, the second factor explains 14.71%, and the third factor explains 10.09%. The amount of cumulative variance explained by the eigenvalues is 84.69% of the total variance.

Variables	Factor Loads		
	1	2	3
A1	*0.967*	0.012	0.062
A2	*0.981*	0.151	0.030
A3	*0.985*	0.085	0.039
A4	*0.985*	0.109	0.022
A5	*0.928*	0.039	−0.010
A7	*0.910*	0.149	0.190
A8	*0.758*	0.558	0.011
A13	*0.838*	0.374	−0.070
A14	*0.784*	0.470	−0.190
A15	*0.813*	0.145	0.029
A9	0.114	*0.787*	−0.180
A10	0.029	*0.828*	0.011
A11	0.345	*0.731*	0.061
A12	0.014	0.119	*0.919*
A6	0.073	−0.271	*0.908*

Table 3.5: Rotated Component Matrix

In this paper, due to its interpretation ease and use frequency, the varimax method has been chosen. In reaching a simple structure and the significant factors in the varimax method, the columns of the factor loads matrix are given priority. Notwithstanding, without varimax it is not possible to reach factor score coefficients. In Table 5, as a result of the analysis of elements whose rotated factor loads, formed by using the varimax rotation technique, have been calculated, it can be seen that the scale consists of 15 elements and three dimensions. The first factor involves consumer's purchasing power, and variables that determine the economic situation in the market majority of the variables have been collected within the first factor. This factor contains present and future expectation of earning money to do consumption and to meet basic needs of consumers such as durable consumption goods. Therefore, this factor has been called *economic situation*. The second factor has been called *security/real estate acquisition thought*, because it involves variables related to securities/real estate. This factor can be stated that more expensive consumer variables when compare with first factor variables. The third and final factor has been called borrowing probability due to taking a loan in contemplation of consumption in the future.

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CONCLUSION AND SUGGESTIONS

By using consumer trend indexes, this paper has attempted to answer the questions of what factors determine household consumption, which conditions they are in, and the effects of expectations they have on consumers. In conclusion, the existence of three factors has been determined. It is clear that within the *economic situation*, which is the first factor, household purchasing power and expectations about a country's economy (e.g., employment and progress of prices levels) comes forward to explain 54.7% of variance. *Security/real estate acquisition thought*, which explains 17.9% of variance, comes up as the second factor households consider when they prepared for spending. Finally, the fact that *borrowing probability,* with its 11.9% explanatory power, comes after the first two, shows that households think about the probability of borrowing last when making consumption spending decisions. While borrowing can be in the form of cash it could also be in the form of bank loans, etc. It could also be facilitated by credit card installments (for semi-durable consumer goods) transactions.

After three factors explaining consumers' consumption behaviors in an economic situation have been determined in this paper, factor scores and general factor score were obtained for each analyzed month by using raw data, factor loadings and explained total variance. When factor scores are examined, the first factor appears to be a decrease in consumer consumption, particularly in summer months in each year, although security/real estate acquisition, which is the second factor, shows a decrease at year ends. However, borrowing probability, which is the third and final factor, is distributed around the mean, in other words, factor scores remains almost the same in all periods in a year. The reason for this situation is the consumers continuous use of bank loans and credit cards.

A score is created on a yearly basis to interpret on an annual basis of the studied period, which is monthly basis, by adding general factor scores for each period within a year and after taking average of them. While there is a general decrease in factor scores during monthly periods we also get decreased factor scores for averages constructed during

annual periods. As a conclusion, it can be seen that depending on these three general factor scores, consumers' consumption trends are in decline. In future studies, the index used in this paper could be reconstructed to analyze regional data and information about regional welfare levels of the country can be obtained, and it can also be separated between rural and urban regions.

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