Research Article

THE EFFECT OF CREDIT CARD USAGE ON CONSUMER BEHAVIOR[1]

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ABSTRACT

While the credit cards, which is a modern payment instrument, is an important tool for producers and sellers in order to exist in the market and to maintain their strength in today's intense competitive environment, it is a tool for consumers to benefit from prestige, short-term cash credit, not needing to carry money, opportunity for installment shopping and late payment advantage. Widespreading of installment applications on credit cards continuously changes the consumer behaviors having a dynamic structure. Even though the purchasing decision in consumer behaviors starts with the emergence of a need, the credit cards presented by banks to their users like a gift effect consumer behaviors by expeditiously replacing cash, enabling consumers to buy any product easily, providing convenience in purchasing transactions, and making the life easier. Accordingly, consumers may move away from exhibiting rational behaviors. In this study, the relationship between credit card usage and household expenditures was researched with the co-integration bound testing approach ARDL (autoregressive distributed lag) by using quarterly data of 2002-2015 periods. According to the obtained findings, a long-term relationship with the credit card and the amount of the transaction volume per credit card was determined. In error-correction model, it was observed that the short-term deviations disappeared between the series acting together in long term.

Keywords: Credit cards; consumer behavior, autoregressive distributed lag, consumption, error correction model.

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INTRODUCTION

Credit card is the payment instrument of the modern world and called as the plastic money. Thus, it enables the cardholder to purchase the required goods and services without paying at the moment of meeting the need. The card market of our country has become the third biggest market in the Europe as the credit card count reached up to 58.79 million in 2016, while it was 15.71 million in 2002. While the UK takes place at the top of this ranking, Spain ranks number two. When the total transaction amount with credit cards is examined, Turkey ranks 10_{th} in Europe (Aysan, Duru, Kara, Muslim and Yıldıran, 2006: 34-49). According to the data announced by the Bank Card Center (BCC), the credit card payment amount in August of 2016 shows the highest credit card expenditure that has ever been made up till today, with 47.7 billion. In line with the data obtained from the Turkish Banking Association (TBA), the number of banks in our country, including the branches in the Turkish Republic of Northern Cyprus and in foreign countries, is such as to support that we take part amongst the top ten countries in terms of expenditure in Europe. Indeed, there were 60 banks in Turkey in 1988, 52 of which were deposit banks and 8 of which were public banks (https://www.tbb.org.tr). While this figure was steadily increasing until 1994, 3 banks were shut down due to the currency crisis experienced in the country in 1994. Both with the decrease in the number of banks and the effect of the crisis, there has been a compulsory decrease in the consumption amount. The devaluation made with the January 24th decisions in 1994 increased the rate of foreign exchange by 12.6% (Hatipoğlu and Aysan, 1994: 51). This increase in the rate of foreign exchange resulted in positive effects on the banking market, and caused an increase in the number of banks and in the transaction volume especially made by credit cards. While 1999 was recorded as the highest figure in the number of banks, it started to decrease with a rapid decline of 25% after 2000 (Celasun, 2002: 1-46). The reason for this decline is the crises experienced in November, 2000 and February, 2001. The high inflation and interest rates experienced in the 2001 financial crisis accelerated speculative capital movements and increased budget deficits (Göktaş, 2000). In the program put into practice after the crisis, importance was attached to the banking sector, and new decisions were taken in order to reform the banking sector and have a say in the international competition (Fırat, 2013). Despite the fact that there was no serious decrease in the numbers of banks as of 2002-2016, there was an increasing trend in the transaction volume made with credit cards (Turkish Bankers Association [TBA], 2002-2016). Although the effects of the mortgage crisis in the United States in 2008 quickly reached to a global dimension, it did not lead to a significant change in the number of banks in Turkey (TBA, 2008). Despite the fluctuation in the number of banks, the number of credit cards has continuously increased. This has also positively affected the habit of using credit cards. Credit cards, which have such a big importance in the economy, have been a subject for many studies in the national and international literature by attracting the attention. However, the impact of credit cards on household consumption could not have the due importance on the agenda of academic researches. Therefore, the effect of credit card usage on household expenditures will be examined at micro dimension in this study. In accordance with this purpose, the study is discussed under four main headings. In the first part of this study, the use of credit cards and the place of the credit cards in the economy are discussed; the studies addressing this issue in the national and international literature has been included in the second chapter, and

the data set and the results obtained with the method used in the study has been included in the third section. In the conclusion section, an evaluation has been made about the subject.

Credit Card Usage and Place of Credit Cards in the Economy

With the developing technology, the need for alternative payment tools to meet the ever-increasing needs of individuals has led to the emergence of credit card payment systems by improving payment instruments. Payment instruments are classified mainly under four main groups. These are respectively; credit cards, spending cards, bank cards, and store cards (Kaya, 2009: 1).

A credit card is a payment instrument which enables customers to buy goods and services and to use cash credits within the determined credit limits allocated to the customers. Despite it doesn't have the similar features of the modern credit card, the first credit card was introduced in the nineteenth century. In 1894, the first credit card in the history was issued by the Hotel Letter Credit Company based in US and in course of time it has been used to control various oil companies and stores to check customer accounts. In 1968, the first credit card was released to the market in Turkey which was called as the "Dinners Clubs". However, the use of credit cards remained limited due to the high inflation and the crisis resulting from interest rates at that time. But; payment instruments have become widespread in Turkey as well as all around the world in the 1990s as a result of the positive developments in the global financial markets. (Aysan and Müslim, 2006).

There is no doubt that using credit cards has many advantages. First of all, risks arising as a result of carrying cash are eliminated. Secondly, it provides facility of payment in purchasing goods and services. As well as these, with the recent developments in technology the competition among credit card issuers escalates. This competition encourages financial institutions issuing credit cards to offer a wide range of products which enables individuals to acquire a credit card easier. Therefore, credit card usage increases and its usage area broaden day by day (Çeker, 1997: 1). As a result of the developments experienced, the number of credit cards increased from 671 thousand in 1991 to 58.8 million in 2016; while the expenditure amount reached to 2 trillion 718 billion 234 million TL from 537 billion TL. The economic crisis in 2001 has been influential on the strengthening of the Turkish banking sector and, accordingly on the development of the banking and credit card markets. Thus, the number of credit cards increased by 137% between 2002 and 2007, and reached to 37.3 million, and the credit card expenditures reached to 141.5 billion TL as of 2007. There was also an increase in the rate of credit card usage between 2008 and 2016, but this increase was not as large as in previous periods. While this figure reached 58,8 million in 2016, the transaction volume of the credit cards reached to 602,5 billion TL (Table 1).

Table 1. Credit Card Numbers And Expenditure Amounts

Years	Number of Credit Cards	Total Transaction Amount	Number of POS
2002	15,71	24,51	0,50
2003	19,86	39,42	0,66
2004	26,68	64,63	0,91
2005	29,98	85,28	1,14
2006	32,43	108,40	1,28
2007	37,34	141,47	1,45
2008	43,39	184,99	1,63
2009	44,39	202,84	1,74
2010	46,96	234,26	1,82
2011	51,36	290,62	1,98
2012	54,29	361,07	2,13
2013	56,83	427,69	2,29
2014	57,00	480,32	2,19
2015	58,21	548,83	2,15
2016	58,79	602,40	1,74

Source: Interbank Card Center (ICC) http://bkm.com.tr/yerli-ve-yabanci-kredi-kartlarinin-yurt-ici-kullanimi/, . (Date of Access: 12.04.2017)

The widespreading of credit card usage affects the consumption patterns of consumers and accordingly their demands. The fact that the opportunity that credit cards offer for installment shopping, making purchases without paying cash and paying a certain amount of total credit card debt at the last payment date gives a chance to the consumers to make an unplanned consumption that is beyond their necessary needs (Baydemir, 2004: 86). In addition, the presence of consumption-triggering factors such as consideration of consumption as an instrument for status, constant change of fashion, special occasions, and advertisements are dragging the consumers into more consumption trends. As a matter of fact, it is known that approximately 602,40 billion TL of final consumption expenditures are made by credit card by 2016. When the distribution of the consumption expenditures made with credit cards in Turkey are analyzed according to the expenditure groups (Table 2); market and shopping centers are in the first place while gasoline and fuel stations are in the second place. In 2016, it is observed that gasoline and fuel stations are followed by clothing and accessories, various foods and electronic products respectively. In addition to this, it seemed in the table that credit cards have now begun to be used for public / tax payments and private pension expenditures, areas where credit cards have never been used until 2014. On the one hand, the sellers seem to be eager to make sales with credit cards as it provides regular cash flow. On the other hand, consumers are happy to use credit cards which enable them to have the opportunity to benefit revolving credit offered by banks. Besides, it is possible to use credit cards in purchasing and leasing all goods and services available in the economy. As a result, credit card usage becomes widespread depending on all these factors.

Table 2. Private Consumption Expenditures (%) Made with Credit Cards According to Expenditure Groups in Turkey

Expenditure Group	2014	2015	2016
Market and Shopping Centers	18,83	19,52	19,63
Gasoline and Fuel Stations	10,77	9,36	8,92
Clothing & Accessories	7,96	7,90	7,83
Various Food	6,74	6,65	6,86
Electrical-Electronic Goods, Computer	7,70	7,01	6,37
Service Sectors	6,46	5,40	5,11
Building Materials, Hardware, Hardwood	4,82	4,71	4,35
Furniture and Decoration	4,47	4,15	4,07
Car Rental-Sales / Service / Spare Parts	3,46	3,69	3,83
Health / Health Products / Cosmetics	3,30	3,45	3,59
Public / Tax Payments	-	2,05	3,25
Eat	2,89	3,10	3,25
Telecommunication	3,64	3,03	3,05
Travel Agencies / Transportation	2,72	2,96	2,76
Insurance	2,72	2,96	2,76
Education / Stationery / Office Materials	2,46	2,60	2,67
Other	2,58	2,16	2,25
Accommodation	1,97	2,06	1,88
Airlines	1,84	1,89	1,81
Jewelers	2,31	2,07	1,76
Individual Pension	-	0,77	1,31
Building Contractor Works	0,78	0,82	0,96
Casinos / Drinking Places	0,56	0,57	0,59
Club / Association / Social Services	0,56	0,57	0,59
Rent A Car	0,22	0,26	0,28
Direct Marketing	0,25	0,27	0,26
Total	100	100	100

Source: Interbank Card Center (ICC) http://bkm.com.tr/secilen-sektore-gore-aylik-gelisim/?filter_group=0&List=Listele, (Date of Access: 14.04.2017).

LITERATURE REVIEW

There are many national and international studies focusing on non-cash payment instruments in today's world where non-cash payment instruments are becoming widespread. Non-cash payment instruments, especially credit cards that have a significant market and market share among these instruments, have been of interest both in the academic environment and the business world. When national and international literatures are examined, it is seen that these studies are clustered in three main themes. In the first heading, it is seen that those studies, which examine banking sector's competitiveness specific to the credit card market, take place (Ausubel, 1991; Aysan and Müslim, 2007; Bresnahan, 1982; Iwata, 1974; Kurul, 2011; Panzar and Rosse, 1987); in the second heading of the scientific studies, it was seen that the subject of non-price competition was discussed and the effect of non-price competition on expenditures and consumer decisions was examined in the

credit card market (Agarwal, Chomsisengephet and Liu, 2010a; Agarwal and Mazumder, 2010b; Akın, Aygan and Yıldıran, 2010; Chakravorti and Emmons, 2003; Kızgın, 2009) and finally the other study subject resist us examining the credit card market in terms of demand by summarizing the studies made on decision making behaviors of credit card customers, choice of card, card changing behaviors, reactions to interest rates, financial education levels, satisfaction ratings, rationality and irrationality levels, and learning processes (Aşan, 2007; Ayden and Demir, 2011; Çavuş, 2006; Gökçen and Kaya, 2009; Hayhoe, Leach and Turner, 1999; Jones, 2005; Norvilitis et al., 2006; Oktay, Özer and Alkan, 2009; Ucal, Lou O'Neil and Çankaya, 2011; Tunalı and Taloğlu, 2010; Yılmaz and Çatalbaş, 2007; Wang, 2011; Warwick and Mansfield, 2000).

And the studies evaluating the credit card market in terms of demand also take part under different main headings in itself. Credit card preferences at the consumer level and the factors affecting their preferences were tried to be determined by using data at the bank level or the questionnaire data in the demand dimension. The impact of credit card usage on consumers' spending habits has been a subject for a limited number of studies. (Durukan, Elibol and Özhavzalı, 2005; Uzgören and Ceylan, 2007; Altan and Göktürk, 2007).

Durukan et al. (2005) searched the effect of installment practice in Turkey on consumers' spending habits and found that consumers were not sufficiently conscious about the credit card usage and they had credit card debts as much as their monthly spending amounts on average.

In their studies Altan and Göktürk (2007) examined the private consumption expenditures made with credit cards with multiple regression analysis by using the variables of disposable income, interest rate, inflation and consumption expenditures made with credit cards at the scale of Turkey. According to the analysis results, it was determined that total private final consumption expenditures are mostly affected by credit cards, and credit cards are followed by disposable income, inflation and interest rates respectively.

Uzgören et al. (2007) examined how the number of POSs, number of credit cards, GNP per capita, inflation rate and the 2000-2001 crisis affected the total amount of credit card usage, and he reached to a conclusion that 99.9% of the changes in the total transaction amount made with credit cards in the country could be explained by these 5 variables. While an inflationary environment, which causes an increase in the number of POS, credit cards, GDP per capita and a decrease in the purchasing power of individuals, causes people to increase their credit card expenditures, financial crises have a negative effect on credit card usage.

METHODOLOGY

Data and Method

In this study, where consumer-spending patterns of credit card usage were examined, quarterly time series for the period of 2002-2015 were used. The amount of transaction per credit card, the numbers of pos and credit/debit cards used in the study were obtained from the web page of the BCC, and the data of household wage (salary) was obtained from the web page of the Turkish Statistical Institute (TSI). The variables were

included in the model after being deflated by the gross domestic product deflator (2010=100). A double logarithmic model was used in the study, and the Eviews 9.0 econometric package program was used in the analyzes. The explanations of the variables were presented in Table 3.

Table 3. Variables Used in Model

Dependent Variable	
TC	Card Transaction Volume (TL, value, per credit card)
Independent variable	
KS	Number of Cards (Quantity, number)
PS	Number of POS (Quantity, million pieces)
HC	Household Real Wage (TL, 2010 fixed prices)
DMY	Credit Card Installment Limit (0 before 2013, 1 after.)

The limit on the number of installments, which was put into practice in 2013 on the installment shopping applications, was included in the study as a dummy variable, because of the consideration that the limit might have a declining effect on the credit card usage.

Time series of the analyzed variables must be integrated at the same level in the co-integration tests of Engle-Granger (1987), Phillips and Quliaris (1990) and Johansen (1988), which are used to test the existence of long-termed relationships between variables. In cases where time series are not integrated at the same level, the use of the ARDL Bound Testing Approach proposed by Pesaran and Shin (1995, 1999) and later developed by Pesaran, Shin and Smith (2001) is recommended to be used. When this approach is compared to the other co-integration methods, it can be applied regardless of whether the series are I(0), I(1) or mutually co-integrated. Moreover, this approach is also appropriate for small and limited sample size (Pesaran et al., 2001: 299).

The bound testing to be applied to those variables, which are not stationary at the same level after the unit root analysis, gives the opportunity to examine short and long term dynamics regardless of whether the time series of the variables are I(0) or I(1). The bound testing model defined for applying the bound testing and including the short-term error correction model:

$$\Delta Y_t = a_0 + \sum_{l=1}^{p} a_{1l}\,\Delta Y_{t-l} + \sum_{l=0}^{p} a_{2l}\,\Delta X_{t-l} + a_3 Y_{t-1} + a_4 X_{t-1} + \acute{u}_t\, dir. \qquad (1)$$

In the equation (1); α_0 refers to the constant term; α_3 and α_4 coefficients refer to the long-term relationships; α_{1l} and α_{2l} coefficients refer to the short-term relationships; Δ refers to the difference operator, $\acute{u}_t$ refers to the error term carrying the white noise process and p refers to the optimum lag length. Optimum lag length can be obtained by using one of the information criteria of Akaike (AIC), Schwarz (SC) and Hannan-Quinn (HQ). The presence of co-integration in the bound testing approach that will be applied after the optimal lag length is found by testing the significances of long-term (and) coefficients.$\alpha_3\alpha_4$ After determining that there is no auto-

correlation issue in the boundary test model established with optimal lag, which is pointed out by the information criterion with the least critical value, the bound testing is applied to determine the existence of a long-term relationship between the relevant variables (Karagöl, Erbaykal and Ertuğrul, 2007: 76).($H_0: a_3 = a_4 = 0$)[2]

The calculated F-statistical values are compared to the relevant critical values tabulated by Pesaran et al., 2001: 300-301) and Narayan (2005, pp. 1987-1990). These critical values include two asymptotic critical values representing the upper and lower bounds, which are generated by the assumption that all variables are I(1) or all variables are I(0). The F-statistical value below the lower limit of I(0) means that there is no co-integration, the F- statistical value above the upper limit I(1) indicates that there is a co-integration relation and that long-term dynamics can be examined, and the statistical value between the upper and lower limits refers to the state of instability. In this case, it is suggested to look at the integration levels again (Peseran et al., 2001: 290).

The long-term relationship between variables can be obtained by applying the conditional ARDL (p, q) model partaking in the equation (2) to those parameters where the existence of a long-term relationship was determined as a result of the bound testing:

$$Y_t = b_0 + \sum_{l=1}^{p} b_1 Y_{t-l} + \sum_{l=0}^{q} b_2 X_{t-l} + e_t \qquad (2)$$

In the equation (2); p represents the most appropriate lag length for the dependent variable; and q represents the most appropriate lag length value for the independent variable in the ARDL (p, q) model. After estimating the relevant model, the long-term coefficients are calculated by means of the formula given below:

$$c_L = \frac{\sum_{j=0}^{q} b_{2,j}}{1-\sum_{j=0}^{p} b_{1,j}} \qquad (3)$$

In the relevant equation; b_1 represent the dependent variable, and b_2 represents the independent variable. After examining the appropriateness of the ARDL model with the diagnostic and stability tests, the Error Correction Model (ECM) based on the ARDL approach is estimated with the Classical Least Squares (CLS) method in the model, in which the long-term relationship between the variables is examined. The conditional error correction model, which was established to examine the short-term dynamics and find the short-term error correction parameter, is given below:

$$\Delta Y_t = b_0 + b_1 e_{t-1} + \sum_{i=1}^{p} b_2 \Delta Y_{t-i} + \sum_{i=0}^{q} b_3 X_{t-1} + u_t \qquad (4)$$

In the equation (4), p and q express the optimum lag lengths of the dependent and independent variables, respectively, b_2 ve b_3 coeficients refer to the coefficients of short-term dynamic coefficients where the model

[2] In the presence of the auto-correlation problem, the lag length corresponding to the second least critical value is taken as optimum, and then the presence of auto-correlation is examined in the model.

converges to the equilibrium, e_{t-1} refers to the error correction term and b_1 refers to the adaptation rate (Fosu and Joseph, 2006). Finally, the stability of the ARDL parameters of the ARDL (p, q) model, in which short and long-term dynamics are analyzed, is examined with the CUSUM or Chow (1960) tests CUSUM-Square.

Econometric Estimation

The stationary levels of those variables that are included in the function were analyzed with the ADF and PP unit root tests before analyzing the effect of credit card usage on consumption patterns of consumers (Table 4).

Table 4. Unit Root Test Results

Variables		ADF Test				PP Test			
		Constant		Constant and Trend		Constant		Constant and Trend	
		t-statistic	p-value	t-statistic	p-value	t-statistic	p-value	t-statistic	p-value
TC	Level	-2,892 (4)	0,053	-2,425 (4)	0,362	-2,889	0,053	-1,096	0,920
KS		0,676 (0)	0,991	-2,405 (0)	0,372	2,775	1,000	-2,163	0,499
PS		-3,965 (1)	0,003	0,743 (1)	0,998	-3,623	0,008	0,124	0,996
HC		-0,062 (4)	0,839	-3,442 (8)	0,058	-1,215	0,661	-4,064	0,012
TC	First dif.	-1,555 (3)	0,498	-2,079 (3)	0,545	-6,788	0,000	-7,945	0,000
KS		-9,006 (0)	0,000	-9,351 (0)	0,000	-9,226	0,000	-15,785	0,000
PS		-3,230 (1)	0,024	-10,092 (0)	0,000	-7,991	0,000	-10,061	0,000
HC		-5,643 (5)	0,000	-5,547 (5)	0,000	-11,343	0,000	-11,542	0,000
TC	Second dif.	-14,543 (2)	0,000	-14,433 (2)	0,000	-19,752	0,000	-19,326	0,000

Note: Optimum lag length is determined by using Schwarz Information Criteria. Critical values for 1%, 5% and 10% are (-3.562), (-2.918) and (-2.638) for the constant model and (-4.144), (-3.468) and (-3.178) for the constant and trend model, respectively. Lag numbers are given in brackets.

When Table 4 is examined, the HC variable (in the fixed and trend models) is stable at the significance levels of 1%, 5%, and 10%, and the other variables except TC are first rank difference stable, and the TC variable is second rank difference stable according to the ADF unit root test. According to the results of the PP unit root test, the HC variable (in the fixed and trend models) is stable at the level, and the other variables are first rank difference stable. As the stationary levels of the variables used in the study are different, the ARDL Bound Testing was used to examine the relationship of co-integration in the study. While applying the ARDL approach, before making any prediction theoretically, optimal lag length of unrestricted error correction model (UECM) belonging to the relationship between credit cards and consumption expenditure was specified by making use of the Information Criterion of Akaike (AIC), Schwarz (SC) and Hannan-Quinn (HQ), which is widely used in the literature, in the first stage (Table 5).

Table-5. Information Criteria Values of Lag Level

Lag	Constant			Constant and Trend		
	AIC	SC	HQ	AIC	SC	HQ
1	-3,809	-3,477	-3,681	-3,988	-3,619	-3,846
2	-4,411	-3,927	-4,225	-4,598	-4,078	-4,398
3	-4,562	-3,924	-4,318	-4,675	-4,000	-4,416

The optimal lag length was determined according to the Schwarz Information Criterion in the study, in which quarterly data set was used, and three was found for the TC function. After it was determined that the error correction model, which was established as a result of LM test (0,1023) made for the fixed and trend models, held no auto-correlation at the significance level of 10%, it was examined whether there was a co-integration relationship between the applied bound testing and the series, and the bound testing results obtained are given in Table 6.

Table 6. Bound Test Results

F Statistic (k=3)	Significance Level	Critical Values *		Critical Values **	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound
5,46366	10%	2,37	3,2	3,64	4,67
	5%	2,79	3,67	4,31	5,42
	1%	3,65	4,66	5,95	7,23

** Lower and upper limits are Pesaran et.al. (2001) Table CI (V).*
***Lower and upper limits are Narayan (2005) Status V for 55 observation levels*
k is the number of independent variables.

When Table 6 is examined, while F-statistical value is above the critical upper limit of Pesaran et al.'s (2005) significance levels of 1%, 5%, and 10%, Narayan's (2005) significance levels of 5% and 10% was seen to be above the critical upper limit. Therefore, it is possible to talk about a long-run relationship for the components of the function, in which the effect of the credit card usage on consumption is examined, by rejecting the absence hypothesis, which claims that there is no co-integration relationship, at the significance levels of 1%, 5% and 10 % according to Peseran et al. (2001).

The ARDL model reflecting the long-run dynamics of the credit card consumption function and the error correction model reflecting the short-term dynamics were established after determining that there was a long-term co-integration relationship between the variables according to the bound testing result, and SC was used in determining the number of lags. The results of twenty models showing the smallest SC values as a result of fifty four different models are given (in Figure 1). According to the SC results, it was decided that the most appropriate lag lengths for the ARDL model are (1,2,0,1). These lag values represent the values (p, q, r, s) required

to construct the ARDL bound testing. The estimation results of ARDL (1,2,0,1) model estimated in respect to this lag length are given in Appendix -1.

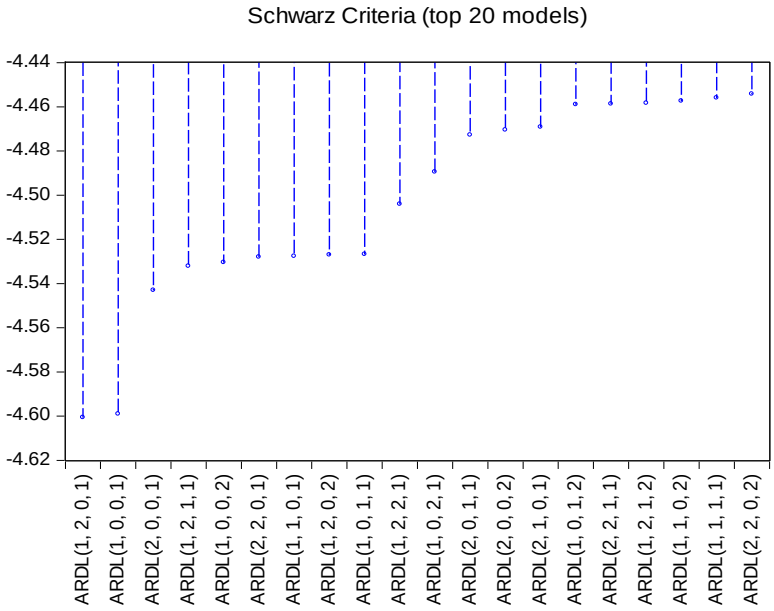

Figure 1. The Most Suitable Lag Results According to Schwarz Information Criteria

Since predicted ARDL (1,2,0,1) model meet all descriptive test requirements, long-term parameter results of cigarette demand function is given in Table 7.

Table 7. ARDL (1,2,0,1) Long Term Coefficients

Variables	Coefficient	Std. Dev.	t-stat	Possibility
LKS	0,549	0,249	2,206	0,033**
LPS	0,620	0,115	5,390	0,000*
LHC	0,971	0,268	3,623	0,001*
DMY	0,020	0,041	0,487	0,629
@TREND	-0,010	0,008	-2,334	0,018**

* statistically significant at 1%, ** statistically significant at 5%

When Table 7 is examined, it was seen that the long-term coefficients of the other independent variables except the puppet variable (DMY) were statistically significant; the sign of the parameter of the trend variable (TREND) was negative, and the signs of the parameters of credit card number (LKS), pos number (LPS) and household wage value (LHC) were positive. These results are compatible with the economic expectation. According to Table 7, household income (0.971) is the variable with the greatest effect on the volume of credit card usage in the long term, and it is seen that this value is followed by pos number (0.620) and credit card number (0.549).

After determining the long-term relationship of household consumption function, the short-term relationship of the consumption function was analyzed by using the difference values of the error terms and the variables obtained from this relationship, and the obtained estimation results of the short-term error correction model were presented in Table 8.

Table 8. ARDL (1,2,0,1) Short Term Error Correction Model for Credit Card Transaction Function

Variables	Coefficient	Std. Dev.	t-stat	Possibility
D(LKS)	0,025	0,041	0,617	0,541
D(LKS(-1))	-0,148	0,045	-3,258	0,002*
D(LPS)	0,133	0,075	1,766	0,084***
D(LHC)	0,574	0,045	12,862	0,000*
D(DMY)	-0,011	0,019	-0,556	0,581
C	-4,881	1,014	-4,814	0,000*
e_{t-1}	-1,292	0,061	-21,333	0,000*

* statistically significant at 1%; ** statistically significant at 5%; *** statistically significant at 10%.

According to the estimation results of the error correction model, the coefficient of the error correction term is statistically significant and negative at the significance level of 1%. The fact that the error correction coefficient is negative and statistically significant confirms that there is a long-term relationship between consumption made with credit card and credit card usage and widespreading of pos devices and household's wage. The error correction variable coefficient was determined as greater than one (-1.292) and negative. The fact that the coefficient is more than one and negative means that the system stabilizes by fluctuation, in other words, the fluctuation decreases at each time and carries the system to stability in the long term (Narayan and Smyth, 2006: 339). In addition, the current and delayed period parameter values are statistically significant and have a negative effect on the consumption made with credit cards in the short term.

The stability tests of the long and short-term coefficients were examined with CUSUM (cumulative sum of recursive residuals) and CUSUM-Square (cumulative sum of squares of recursive residuals) tests, and the results obtained were given in Figure 2. According to the results of CUSUM and CUSUM-Square tests in Figure 2, the error terms are within the limits showing the critical values, thus it points out that the long and short-term coefficients are stable.

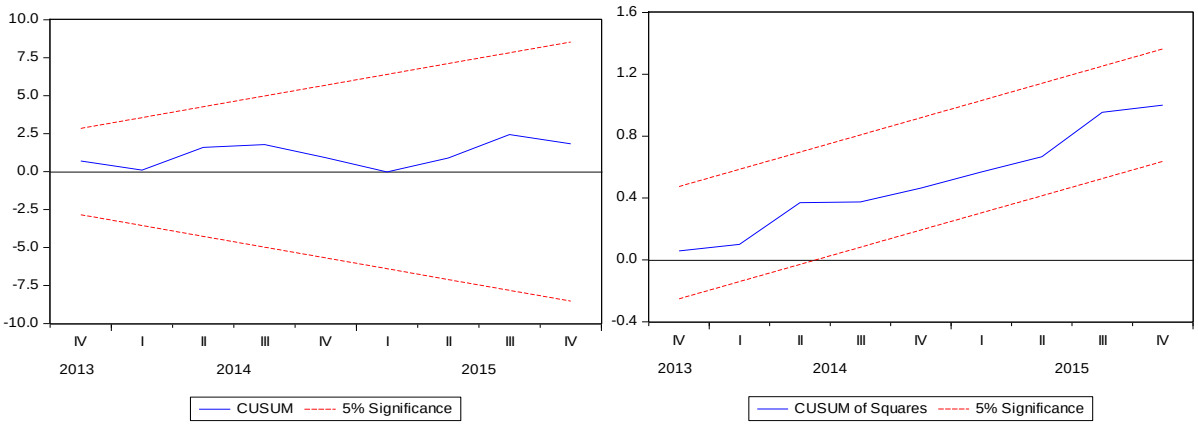

Figure 2. CUSUM and CUSUM-Square Graphics for Long Term Relationship Model

DISCUSSION AND CONCLUSION

The effect of credit card usage on consumer behavior by using quarterly data for 2002-2015 period was analyzed with the ARDL model. As a result of the analysis, while the parameters of number of active cards, pos number, household wage level and trend were found statistically significant, dummy variable was found insignificant. An increase of 1% in card and pos numbers and household wage results in an increase of 54%, 62% and 97% respectively, in the transaction volume made with credit cards. A positive relationship was determined between household income level and credit card expenditures. This situation can be a sign that consumers spend more than their incomes, and consume out of their basic needs with showing off effect. Moreover, it was seen that the limitation on the number of installments in installment shopping that was put into practice in 2013 didn't affect the transaction volume made with credit cards. It is considered that the obtained estimation result can be stemmed from individual loans applications of banks that have long repayment schedule against the relevant legislation amendment. According to the estimation results of the short-term error correction model, the fact that the coefficient of error correction term is statistically significant and negative at the significant level of 1% confirms that there is a long-term relationship between consumption made with credit card and credit card usage and widespreading of pos devices and household's wage.

5 billion transactions are annually made in Turkey, which is amongst the first 3 countries in the European countries with 59 million credit cards in 2016, and the transaction volume reaches 375 billion dollars. The card payment system with such a large transaction volume is under the control of Mastercard and Visa. Turkey, which has achieved world standards with its accumulation of knowledge, technology and experience, both can contribute to the development of the country's economy by bringing this large market in the country's economy, can prevent the underground economy, and can decrease the inflation and increase the employment. As a matter of fact, although the Turkish Payment System (TROY), which is Turkey's first national payment system and was developed by BKM on April 1st, 2016, was started to be used, the number of people using the system is very low. Therefore, it is necessary to promote TROY through public spots or strong advertising campaigns, so that the

necessary consciousness can be created. Different and attractive campaigns should be conducted by the 25 member banks for TROY users in order to extend its usage in national shopping. As a result of these studies, it is considered that MasterCard and Visa, which are widely used in Turkey, are expected to leave their places to TROY over time.

KREDİ KARTI KULLANIMININ TÜKETİCİ DAVRANIŞLARINA ETKİSİ

TÜRKÇE GENİŞ ÖZET

GİRİŞ

Modern bir ödeme aracı olan kredi kartları, günümüzün yoğun rekabet ortamında üreticiler ve satıcılar açısından pazarda var olmanın ve güçlü kalmanın önemli bir unsuruyken tüketiciler açısından ise prestij, kısa vadeli nakit kredi, para taşıma gereksizliği, taksitli alışveriş imkanı ve geç ödeme avantajından yararlanma unsurudur. Kredi kartlarına uygulanan taksit uygulamasının giderek yaygınlaşması dinamik bir yapıya sahip olan tüketici davranışlarını sürekli değiştirmektedir. Tüketici davranışlarında satın alma kararı, bir ihtiyacın ortaya çıkması ile başlamasına rağmen bankalar tarafından kullanıcılarına bir ödül gibi sunulan kredi kartlarının nakitin yerini hızla alması, tüketicilerin her ürünü kolayca satın almasına imkan tanıması, satın alma eylemlerinde ödeme kolaylığı sağlayarak hayatı kolaylaştırarak tüketicinin satın alma davranışlarını etkilemektedir. Dolayısıyla tüketiciler rasyonel davranış göstermekten uzaklaşabilmektedirler.

YÖNTEM

Kredi kartı kullanımındaki tüketici harcama kalıplarının incelendiği bu çalışmada, 2002-2015 dönemine ait üçer aylık zaman serileri kullanılmıştır. Çalışmada kullanılan kredi kartı başına işlem tutarı, pos ve kredi/banka kartı sayısı, BKM'nin web sayfasından ve hanehalkı ücret (maaş) verisi ise Türkiye İstatistik Kurumu (TÜİK)'nun web sayfasından elde edilmiştir. Değişkenler gayri safi yurtiçi hasıla deflatörü (2010=100) ile deflate edildikten sonra modele dahil edilmiştir. Ayrıca çalışmada, kredi kartları kullanılarak yapılan taksitli alışveriş uygulamaları üzerine 2013 yılında uygulamaya geçirilen taksit sayısı sınırı, kredi kartı kullanımı üzerinde azaltıcı bir etkiye sahip olabileceği düşüncesinden yola çıkarak bu düzenleme çalışmaya kukla değişken olarak dahil edilmiştir. Çalışmada çift logaritmik model kullanılmış olup, analizlerde, Eviews 9.0 ekonometrik paket programı kullanılmıştır.

Değişkenler arasındaki uzun dönemli ilişkilerin varlığını test etmek için çalışmada hangi modelin kullanılacağına karar verilmesi gerekmektedir. Bunun için ilk olarak zaman serilerinin aynı düzeyde bütünleşik olup olmadıkları analiz edilmiştir. Aynı düzeyde bütünleşik olmadığı durumda, Pesaran ve Shin (1995, 1999) tarafından ortaya konulan ve daha sonra Pesaran, Shin ve Smith (2001) tarafından geliştirilen ARDL Sınır Testi Yaklaşımının kullanılması önerilmektedir. Bu yaklaşım diğer eşbütünleşme metotları ile karşılaştırıldığında; serilerin I(0), I(1) veya karşılıklı eşbütünleşik olma durumundan bağımsız olarak uygulanabilmektedir. Ayrıca, bu yaklaşım küçük ve sınırlı örneklem büyüklüğü için de uygun bir özellik taşımaktadır (Pesaran vd., 2001, s.299).

Optimum gecikme uzunluğu; Akaike (AIC), Schwarz (SC) ve Hannan-Quinn (HQ) bilgi kriterlerinden biri kullanılarak elde edilebilmektedir. Optimum gecikme uzunluğu belirlendikten sonra uygulanacak sınır testi yaklaşımındaki eşbütünleşmenin varlığı, uzun dönem (α_3 ve α_4) katsayıların anlamlılıkları test edilerek

bulunmaktadır. En küçük kritik değere sahip olan bilgi kriterinin işaret ettiği optimum gecikme ile kurulan sınır testi modelinde, otokorelasyon probleminin olmadığı tespit edildikten sonra ilgili değişkenler arasında bir uzun dönem ilişkinin varlığını belirlemek ($H_0: a_3 = a_4 = 0$) için sınır testi uygulanmaktadır (Karagöl, Erbaykal ve Ertuğrul, 2007, s. 76).

Hesaplanan F-istatistik değerleri, Pesaran vd. (2001, s. 300-301) ve Narayan (2005, s. 1987-1990) tarafından tablolaştırılan ilgili kritik değerler ile karşılaştırılır. Bu kritik değerler, tüm değişkenlerin I(1) ya da tüm değişkenlerin I(0) olduğu varsayımı ile oluşturulan üst ve alt sınırı temsilen iki asimptotik kritik değer bulunmaktadır. I(0) alt sınırının altında kalan F istatistik değeri, hiç eşbütünleşme olmadığını; I(1) üst sınırının üzerinde yer alan F istatistik değeri ise eşbütünleşme ilişkisinin var olduğunu ve uzun dönem dinamiklerin incelenebileceğini, istatistik değerinin alt ve üst sınırlar arasında kalması ise kararsızlık durumunu ifade etmektedir. Bu durumda bütünleşme derecelerine yeniden bakılması önerilmektedir (Peseran vd., 2001, s. 290). Sınır testi sonucu uzun dönemli bir ilişkinin varlığı tespit edilen parametrelere, eşitlik (1)'de yer alan koşullu ARDL (p,q) modeli uygulanarak değişkenler arasındaki uzun dönem ilişkisi elde edilebilir:

$$Y_t = b_0 + \sum_{l=1}^{p} b_1 Y_{t-l} + \sum_{l=0}^{q} b_2 X_{t-l} + e_t \qquad (1)$$

Eşitlik (1)'de; ARDL (p,q) modelinde, p bağımlı değişken; q ise bağımsız değişken için en uygun gecikme uzunluğu değerini ifade etmektedir. İlgili modelin tahmininden sonra uzun dönem katsayılar aşağıda verilen formül yardımı ile hesaplanmaktadır:

$$c_L = \frac{\sum_{j=0}^{q} b_{2,j}}{1-\sum_{j=0}^{p} b_{1,j}} \qquad (2)$$

İlgili eşitlikte; b_1, bağımlı değişkeni, b_2, ise bağımsız değişkenleri ifade etmektedir. Değişkenler arası uzun dönem ilişkisinin incelendiği modelde, ARDL modelinin uygunluğu diognostik ve istikrarlılık testleri ile incelendikten sonra ARDL yaklaşımına dayalı Hata Düzeltme Modeli (ECM), Klasik En Küçük Kareler (KEKK) yöntemi ile tahmin edilmektedir. Kısa dönem dinamiklerin araştırılması ve kısa dönem hata düzeltme parametresinin bulunması için kurulan koşullu hata düzeltme modeli aşağıda verilmektedir:

$$\Delta Y_t = b_0 + b_1 e_{t-1} + \sum_{i=1}^{p} b_2 \Delta Y_{t-i} + \sum_{i=0}^{q} b_3 X_{t-1} + u_t \qquad (3)$$

Eşitlik (3)'te yer alan p ve q sırasıyla bağımlı ve bağımsız değişkenlerin optimum gecikme uzunluğunu, b_2 ve b_3 katsayıları modelin dengeye yakınsadığı kısa dönem dinamik katsayılarını, e_{t-1} hata düzeltme terimini ve b_1 uyarlanma hızını ifade etmektedir (Fosu ve Joseph, 2006). Son olarak, kısa ve uzun dönem dinamiklerinin incelendiği ARDL (p,q) modelinin ARDL parametrelerinin istikrarlılığı ise CUSUM, $CUSUMQ^2$ veya Chow (1960) testleri ile incelenmektedir.

BULGULAR

Çalışmada yer alan değişkenlerin durağanlık dereceleri ADF ve PP birim kök testi ile analiz edilmiştir. Değişkenlerin durağanlık derecesinin farklı olmasından dolayı çalışmada eş bütünleşme ilişkisinin araştırılmasında ARDL Sınır Testi kullanılmıştır. ARDL yaklaşımı uygulanırken; teorik olarak herhangi bir öngörüde bulunmadan önce ilk aşamada, kredi kartları tüketim harcama ilişkisine ait kısıtlanmamış hata düzeltme modeli (unrestricted error correction model, UECM) için optimal gecikme uzunluğu, literatürde yaygın olarak kullanılan Akaike (AIC), Schwarz (SC) ve Hannan-Quinn (HQ) Bilgi Kriterinden yararlanılarak belirlenmiştir. Üçer aylık veri setinin kullanıldığı çalışmada, optimal gecikme uzunluğu Schwarz Bilgi Kriterine göre tespit edilmiş olup, üç bulunmuştur. ARDL tahminine geçmeden önce modelin gerekli varsayımları sağlayıp sağlamadığı kontrol edilmiştir. Dolayısıyla sabit ve trendli model için yapılan LM testi sonucunda (0,1023) kurulan hata düzeltme modelinin %10 anlamlılık düzeyinde otokorelasyon barındırmadığı saptandıktan sonra uygulanan sınır testi ile seriler arasında eş bütünleşme ilişkisinin olup olmadığı incelenmiştir. F istatistik değerinin Pesaran vd. (2001) %1, %5, %10 anlamlılık değerlerinin kritik üst sınırının üzerinde yer alırken, Narayan (2005)'ın %5 ve %10 anlamlılık değerlerinin kritik üst sınır değerinin üzerinde olduğu görülmektedir. Dolayısıyla eş bütünleşme ilişkisinin olmadığını iddia eden yokluk hipotezi Peseran vd. (2001)'e göre %1, %5 ve %10 anlamlılık düzeylerinde reddedilerek, kredi kartının kullanımının tüketim üzerindeki etkisinin incelendiği fonksiyona ait bileşenler için uzun dönemli ilişkiden söz edilebilmektedir.

Sınır Testi sonucuna göre değişkenler arasında uzun dönem eş bütünleşme ilişkisinin olduğuna karar verildikten sonra, kredi kartı tüketim fonksiyonunun uzun dönem dinamiklerini yansıtan ARDL modeli ve kısa dönem dinamikleri yansıtan hata düzeltme modeli oluşturulmuş ve gecikme sayılarının belirlenmesinde SC kullanılmıştır. Elli dört farklı model sonucunda en küçük SC değerlerini gösteren yirmi modele ait değer sonuçları bulunmuştur. SC sonuçlarına göre, ARDL modeli için en uygun gecikme uzunluklarının (1,2,0,1) olduğuna karar verilmiştir. Tahmin edilen ARDL (1,2,0,1) modelinin tüm tanımlayıcı testleri sağladığı kontrol edildikten sonra kredi kartı tüketim fonksiyonunun uzun dönem parametre tahmin edilmiştir. Tahmin sonuçlarına göre, kukla (DMY) değişkeni hariç diğer bağısız değişkenlerin uzun dönem katsayılarının istatistiksel olarak anlamlı olduğu; trend (TREND) değişkenine ait parametre işaretinin negatif, kredi kartı sayısının (LKS), pos sayısının (LPS) ve hanehalkı ücret değerine (LHC) ait parametrelerin işaretlerinin ise pozitif olduğu görülmektedir. Bu sonuçlar iktisadi beklenti ile uyumluluk göstermektedir. Ayrıca analizde, uzun dönemde kredi kartı kullanım hacmi üzerinde en büyük etkiye sahip olan değişkenin hanehalkı geliri olduğu (0,971) ve bu değeri sırası ile post sayısı (0,620) ve kredi kartı sayısı (0,549) takip ettiği görülmektedir.

Hanehalkı tüketim fonksiyonuna ait uzun dönem ilişkisi tespit edildikten sonra bu ilişkiden elde edilen hata terimleri ile değişkenlerin fark değerleri kullanılarak tüketim fonksiyonunun kısa dönem ilişki durumu analiz edilmiştir ve elde edilen kısa dönem hata düzeltme modeli tahmin edilmiştir. Hata düzeltme modeli tahmin sonuçlarına göre, hata düzeltme terimi katsayısı %1 anlamlılık düzeyinde istatistiksel olarak anlamlı ve negatif değerlidir. Hata düzeltme katsayısının negatif ve istatiksel olarak anlamlı olması, Kredi kartı ile yapılan tüketimin kredi kartı kullanım ve pos cihazı yaygınlığı ve hanehalkının elde ettiği ücret arasında uzun dönemli ilişkinin

olduğunu doğrulamaktadır. Hata düzeltme değişkeni katsayısı birden büyük (-1.292) ve negatif olarak belirlenmiştir. Katsayının birden büyük ve negatif olması; sistemin dalgalanarak dengeye geldiğini diğer bir ifade ile dalgalanmanın her seferinde azalarak uzun dönemde sistemi dengeye taşıdığını ifade etmektedir (Narayan ve Smyth, 2006: 339). Ayrıca kısa dönemde; cari ve gecikmeli dönem parametre değerleri istatiksel olarak anlamlı ve kredi kartı ile yapılan tüketim üzerinde negatif etkiye sahiptir. Uzun ve kısa dönem katsayılarının kararlılık sınaması ise CUSUM (cumulative sum of recursive residuals) ve CUSUMSQ2 (cumulative sum of squares of recursive residuals) testleri ile incelenmiş ve elde edilen CUSUM ve CUSUMSQ2 testi sonuçlarına göre, hata terimlerinin kritik değerleri gösteren sınırlar içerisinde kaldığı dolayısıyla uzun ve kısa dönem katsayılarının istikrarlı olduğunu ifade etmektedir.

TARTIŞMA VE SONUÇ

2002-2015 dönemine ait üçer aylık veriler kullanılarak kredi kartı kullanımının tüketici davranışlarına etkisi, ARDL modeli ile analiz edilmiştir. Yapılan analiz sonucunda, aktif kart sayısı, pos sayısı, hanehalkı ücret düzeyi ve trend parametreleri istatistiki olarak anlamlı bulunurken kukla değişkeni ise anlamsız bulunmuştur. Kart ve post sayısı ile hanehalkı ücretindeki %1'lik bir artış kredi kartı ile yapılan işlem hacmini sırası ile %54, %62 ve %97 oranlarında bir artışa neden olmaktadır. Hanehalkı gelir düzeyi ile kredi kartı harcamaları arasında pozitif ilişti tespit edilmiştir. Bu durum tüketicilerin gelirinin üzerinde tüketim harcamasında bulunduğunun ve temel ihtiyaçlarının dışında gösteriş etkisi ile tüketim yaptığının bir göstergesi olabilmektedir. Ayrıca 2013 yılı itibariyle uygulamaya geçirilen kredi kartı ile yapılan taksitli alışverişte taksit sayısı sınırlaması, kredi kartı ile yapılan işlem hacmini etkilemediği görülmektedir. Elde edilen tahmin sonucunun, ilgili mevzuat değişikliğine karşı bankaların sergilediği uzun geri ödeme vadesine sahip bireysel kredi uygulamalarından kaynaklanabileceği değerlendirilmektedir. Kısa dönem hata düzeltme modeli tahmin sonuçlarına göre ise hata düzeltme terimi katsayısı %1 anlamlılık düzeyinde istatistiksel olarak anlamlı ve negatif değerli olması, kredi kartı ile yapılan tüketimin kredi kartı kullanım ve pos cihazı yaygınlığı ve hane halkının elde ettiği ücret arasında uzun dönemli ilişkinin olduğunu doğrulamaktadır.

2016 yılında yaklaşık 59 milyon kredi kartı sayısı ile Avrupa ülkeleri içerisinde ilk 3 ülke arasında bulunan Türkiye'de yılda 5 milyar adet işlem yapılmakta ve işlem hacmi 375 milyar dolara ulaşmaktadır. Bu kadar büyük bir işlem cirosuna sahip kartlı ödeme sistemi Mastercard ve Visa'nın kontrolü altındadır. Bilgi birikimi, teknolojisi ve deneyimi ile dünya standartlarını yakalayan Türkiye, bu büyük pazarı ülke ekonomisine kazandırarak gerek ülke ekonomisinin gelişimine katkı sağlayabilir, kayıt dışı ekonomiyi önleyebilir gerek ise enflasyonu düşürebilir ve istihdamı artırabilir. Nitekim 1 Nisan 2016 tarihinde BKM'nin geliştirdiği Türkiye'nin ilk milli ödeme sistemi olan Türkiye Ödeme Sistemi (TROY) kullanılmaya başlanmış olmasına rağmen kullanan kişi sayısı çok düşük düzeydedir. Dolayısıyla gerekli bilincin oluşabilmesi için TROY'un kamu spotları veya güçlü reklam kampanyaları ile tanıtılması gerekmektedir. Ulusal alışverişlerde kullanımının yaygınlaştırılması için TROY kullanıcılarına yönelik 25 üye banka tarafından farklı ve cazip kampanyalar yürütülmelidir. Bu çalışmaların bir sonucu olarak zaman içerisinde Türkiye'de sık kullanılan Mastercard ve Visa'nın yerini TROY'a bırakacağı düşünülmektedir.

Anahtar Kelimeler: Kredi kartlari, tüketici davranişlari, sinir testi, tüketim, hata düzeltme modeli.

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APPENDIX

Appendix 1. Long Term ARDL (1,2,0,1) Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTC	0,725398*	0,084145	8,620806	0,0000
LKS	0,023689	0,054282	0,436408	0,6647
LKS(-1)	-0,012237	0,054986	-0,222555	0,8249
LPS	0,170348*	0,060123	2,833342	0,0069
LHC	0,565933*	0,052942	10,68971	0,0000
LHC(-1)	-0,299184*	0,072828	-4,108091	0,0002
DMY	0,005486	0,011185	0,490456	0,6262
C	-4,587749*	1,548825	-2,962084	0,0049
@TREND	-0,002839	0,002407	-1,179407	0,2446
R-squared	0,971194	Mean dependent var		-4,256617
Adjusted R-squared	0,965301	S.D. dependent var		0,099691
S.E. of regression	0,018570	Akaike info criterion		-4,968952
Sum squared resid	0,015173	Schwarz criterion		-4,600622
Log likelihood	144,1617	Hannan-Quinn criter,		-4,826902
F-statistic	164,8263	Durbin-Watson stat		2,048479
Prob(F-statistic)	0,000000			

* statistically significant at 1%; ** statistically significant at 5%; *** statistically significant at 10%.