



THE RELATIONSHIP BETWEEN CREDIT CARD EXPENDITURES, CONSUMER CONFIDENCE AND CONSUMERS' SAVING TENDENCIES*

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ABSTRACT

The decisions of consumers in the economy have a decisive role in the understanding of economic indicators and planning the future. Consumer decisions are affected by many different elements. Foremost among them among are the consumer confidence index, which measures the tendency of consumers to spend or save, and credit card expenditures, which have a significant share in the consumption structure. Although the decisions taken by the households vary from time to time, it is thought that the spending of consumers with credit cards has increased especially during the COVID 19 period, but some consumers have a precautionary behavior and tend to save. Therefore, behavior of the households can be forecasted if the relationship between the expectations of consumers, saving trends and expenditure trends is determined.

For this purpose, the relationship between credit card expenditures, consumer confidence and consumers' saving tendencies are investigated for the period 2014: 03-2021: 12. The relationship between the variables for this period is analyzed with ARDL model. As a result of the applied analyzes, it has been found that there is a statistically significant cointegration relationship between variables. In the long term, credit card expenditures have a negative and significant effect on the consumer confidence index and the tendency of the savings is has no significant effect.

The short-term relationship between variables is analyzed with the error correction model (ECM). As a result of the analyzes, it was found that the savings tendency has a significant impact on the consumer confidence index, and credit card expenditures have positive but low-effect on the consumer confidence index for its lagged values.

Keywords: Consumer confidence index, saving, expenditure, ARDL Model Application.

JEL Codes: D12, D90, C22.

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1. INTRODUCTION

Consumption, investment, and savings decision of the individuals has emerged as an important issue for understanding all of the economic activities since the traditional school. According to the traditional theory, the determinant of consumption and income is the general level of prices. According to the absolute income hypothesis of Keynes, real consumption and thus saving is a function of current real income.

The lifecycle theory of consumption developed by F. Modigliani, A. Ando, and R. Brumberg, tries to examine the consumption and saving habits of households by dividing their lives into various phases. According to this hypothesis, consumption depends on lifetime income. Savings, on the other hand, are taken as a tool used to finance retirement period expenditures. Saving behavior emerges differently depending on the period of the individual's life (youth, middle age or retirement age) (Altınöz, 2014: 3). Individuals' youth income is low, but their consumption is high. In order to finance this consumption, individuals either use their savings or borrow. The amount of savings is negative. The rate of savings increases during the middle age period. The individuals increase savings to pay the borrowing of the past periods and also for the retirement periods. In the period of retirement, individuals use the savings they have already done.

According to Friedman's permanent income hypothesis, income and consumption is examined in two parts as continuous income and temporary income. permanent income is the average of all the income gained by the household now and in the future (human capital, property, assets). Temporary income is defined as the deviations that occurred in this calculated average. According to permanent income hypothesis, rational individuals increase their present savings in the expectation that it will fall in the future. If they think their income will increase in the future, they reduce their savings. In the case of growth, the rate of savings is expected to fall. According to this hypothesis, under the assumption that the current growth rate increases the future growth rate, individuals assume that there will be an increase in their income and will reduce their savings.

Standard models fail to satisfy explaining individual's savings and consumption decisions, this have resulted in the need for different descriptions. According to the behavioral life cycle hypothesis (Hersh M. Shefrin and Richard H. Thaler, 1988) the bounded rationality of consumers and a number of behavioral biases must be addressed in order to include psychological elements in the analysis of the consumption and savings decision of individuals.

In the hypothesis of behavioral life cycle, saving behaviors can be considered in more detail by evaluating the behavior of mental accounting, self-control and framing individuals. Mental accounting is a set of cognitive transactions used to organize, evaluate and follow financial activities by individuals and households. Three components of the mental accounting are most distinguishing. The first one points out how the results are detected and experienced and how decisions are taken and then evaluated.

The accounting system ensures cost-benefit analyzes performed both in advance and later. Second component of mental accounting involves determining certain accounts for activities. Both the resources and their use of the funds are labeled as in mental accounting systems. Expenditures are divided into categories (housing, food, etc.) and expenditures are sometimes limited by implicit or explicit budgets. The third component of the mental accounting is related to the frequency of evaluating accounts and choice bracketing. Accounts can be balanced daily, weekly, annual etc. and be defined narrowly or broadly. Each of the component of the mental accounting violate the principle of economic fungibility. According to mental accounting, individuals can avoid substituting spending and saving by dividing the different accounts (Thaler, 1999: 184).

Self-control explains the effect of psychological state of the individual on the choices. The self-control behavior expressing will power is effective in decision making in case of time preference and uncertainty. Choosing saving by giving up consumption requires self-control. The term self-control shows that the tradeoffs between instant benefits and long-term benefits have brought a conflict in a choice unlike in a choice between a white shirt and a blue shirt. According to the behavioral life cycle hypothesis model, self-control behavior comprises three elements. These are internal conflict, temptation, and willpower. The individual falling in the internal conflict remains among the desire to prefer consumption in the present instead of saving in the future. an expenditure to be made today is more attractive than saving is clearly understood when the psychological properties of individuals are discussed If saving is preferred in the conflict of these elements, the individual's self-control behavior is provided (Shefrin and Thaler, 1988: 611).

Framing refers to the differentiation of the individual's preferences according to the form of solutions to solve a problem. In the phase of the individual's consumption or savings decision, decisions can be affected by the way in which increments to wealth are framed or described. In the consumption behavior, the temptation of this decision may avoid saving (Tversky and Kahneman, 1986: 251).

Consumer confidence index is an indicator which is helpful in the understanding of consumer and savings trends in the economy. The consumer confidence index demonstrates the behavior of consumers and can be taken as a criterion in determining the trends of psychological elements in decision making. A consumer tendency questionnaire about their own financial condition and general economic developments on the past 12-month period and the next 12 months period. The index is scaled from 0 to 100 points. If the index value is greater than 100, consumers are optimistic if is smaller, it means pessimistic situation (<http://www.tuik.gov.tr>).

When consumers are more optimistic about the economic conditions and the future of the economy, they are expected to be willing to consume more and fund it by credit in increasing amounts. On the other hand, it can be considered that credit cards will be canalized to excessive and unnecessary consumption, will reduce savings, and other savings areas will be reduced. In this context, understanding

the interaction between credit card expenditures, savings and confidence index will be determinant in estimating the behavior of the economic factors.

2. RELATED LITERATURE

When we look at the studies concerning consumer confidence index, savings and credit card expenditures, mostly the relationship between confidence index and various macroeconomic variables such as exchange rate, interest rate, unemployment or the relationship between consumer confidence and credit card.

Ewing and Payne (1998) analyzed the long-term relationship between the personal savings rate and consumer sentiment in the United States using cointegration analysis during the period of 1959-1997. In the analysis, the consumer sentiment and personal savings rate shared a long-term balance and reducing the savings rates of households when consumer sensitivity is high.

In this context, Loria and Brito (2004) investigated the relationship between consumer confidence index, private investments and consumption, and they could not identify a cointegration relationship between these variables in the US economy between 1978- 2003. In addition, the results showed that consumer confidence cannot be expressed as the determinant of consumption and investments.

The effect of consumer expectation on the consumption is examined by Oduh, Oduh and Ekeocha (2012) for Nigerian economy between 2009-2011 and it was found that the variables having the greatest effect on consumption are the exchange rate and consumer confidence index. Similarly, Ngobo and Ingarao (2017) analyzed the impact of the consumer confidence index for France which is in the developed country category, and they stated that the increase or decreases in the consumer confidence index has asymmetric and nonlinear effect on expenses.

Klopocka (2016) investigated the effects of consumer confidence on household savings and borrowing behaviors using multiple linear regression and time series analysis using the data of Polish economy. When the changes in savings and borrowing rates are regressed against the lagged values of the consumer confidence index, it was found that this index is the best estimator of the changes in household savings and borrowing rates.

Vanlaer et.al (2019) has examined whether the decline in the consumer confidence affects household savings behaviors and if so which sub-indicators of consumer confidence play the most important role using a panel data set consisting of 18 EU countries in the 2001-2014. The research results show that the confidence in the fiscal state of the household has significantly greater impact on the household savings according to the confidence of the general economic situation. In addition, the impact of consumer confidence on household savings has been found to be increased after the crisis, due to a potentially threshold effect before and after the global crisis of 2008.

Klopocka and Gorska (2021) examined the saving behavior based on the consumer confidence index and the components of the index of 4 European countries. In the study, it is tested whether the consumer confidence index provides an estimation of the savings tendency, and if so whether this estimation power is stronger than other economic factors. The results revealed that the consumer confidence index and its components have prediction power for the estimates of the household saving rate.

Arisoy and Aydın (2014) analyzed the relationship between consumer confidence index, interest rates, consumer loans using the data of Turkish economy between 2005 to 2012 using Granger Causality and regression analysis methods. results revealed that consumer confidence index, consumer loans and interest rate variables play a role for explaining the consumer behaviors and that the positive relationship between the variables is statistically significant.

Sönmezler, Gündüz and Torun (2019) tested the interaction between credit card expenditures, consumer confidence index, inflation and cost of living index created by Istanbul Chamber of Commerce using Bound Testing in the 2012-2018 period in Turkish Economy.

Başarır, Bicil and Yılmaz (2019) analyzed the relationship between consumer confidence index and some macroeconomic variables for the period 2012-2018. They found a causality relationship from consumer confidence index to industrial production index and from BIST100 index, Exchange rate and consumer confidence index to consumer confidence index.

Yamak et.al (2019) examined the variables affecting consumption expenditure between 2004-2018 and stated that the most significant variable explaining the consumption expenditure is income and the second is consumer confidence index. Two models were build using the ARDL bound test and conclude that the consumer confidence has a positive effect on consumption expenditures in both short and long term.

Eryuzlu (2020) examined the relationship between consumer confidence index and consumer loans using causality analysis and asymmetric causality analysis between 2007-2009. Asymmetric causality analysis showed that positive shocks in the confidence index caused positive shocks in consumer loans, and negative shocks in the consumer confidence index caused negative shocks in consumer loans.

Zambak et.al. (2022) tested the relationship between consumer confidence index and some selected macroeconomic variables using Johansen cointegration test and detected a cointegration relationship between consumer confidence index and inflation, unemployment rate, young unemployment rate, consumer loan interest rate. Secondly in the study, it was concluded that the consumer confidence index was not the cause of foreign exchange rate, unemployment rate, young unemployment rate, the unemployment rate, young unemployment rate, inflation rate and consumer loan interest in the short run but move together in the long run according to the Granger Causality Tests.

3. DATA SET and METHODOLOGY

In this section of the study, information on the variables used in the study and the econometric method used are provided.

3.1 Data Set

The short and long-term relationship between credit card expenditures, consumer confidence index and saving behavior of the consumers in Turkey were investigated. In the equation, the consumer confidence index is used as a dependent variable and other variables are used as independent variables. The variables used in the study, abbreviations, forms and sources are shown in Table 1.

Table 1. Data Set

Variable	Abbreviation	Data Period	Data Source
Consumer Confidence Index	CCI	2014: 3-2021: 12	TCMB (EVDS)
Credit Card Expenditure (Sum, thousand ₺)	CCE	2014: 3-2021: 12	TCMB (EVDS)
Saving Tendency	ST	2014: 3-2021: 12	TCMB (EVDS)

According to Table 1, consumer confidence index and consumers savings tendency data are taken from the survey assessments of Central Bank (TCMB) of Turkey and credit card expenditures are used as thousands of ₺. Data includes the monthly TCMB EVDS statistics between 2014: 3 - 2021: 12. The logarithmic transformation of the data were used in the study.

The functional equation of the variables used in the study is shown in equation 1.

$$CCI_t = \beta_0 + \beta_1 CCE_t + \beta_2 ST_t + \varepsilon_t \quad (1)$$

t subscript in the equation refers to time, β terms refers to coefficients and ε_t refers to error terms.

3.2. Methodology

In the study, relationship between credit card expenditures, consumer confidence index and saving behavior are examined by the cointegration method based on the ARDL (Autoregressive Distributed Lag) approach. There are many different time series analyzes approaches used to investigate the cointegration relationship between variables. But the ARDL model has three important advantages according to other techniques (Çilyavuz, 2015: 417);

- ARDL model does not consider the stationarity of variables.
- For small samples, it gives better results than the cointegration tests developed by Engle-Granger (1987) and Johansen (1989).
- Both the short- and long-term parameters in the model can be estimated.

- The exogeneity problem of variables is considered.

The variables in the ARDL model do not need to be stationary at the same level, but the most important disadvantage of the model is that it cannot be used if one of the variables is stationary at level 2 (Çağlayan, 2006: 427). Therefore, the unit root levels of the series must be determined. If none of the series is I (2) then the cointegration relationship can be tested with the ARDL model.

In the time series that follows a random process, it is very important whether the series is stationary. If the mean, variance and covariance of a stochastic variable is constant in time, variance and covariance in time, we can say that the series is stationary.

Stationarity shows that the values of the series are approaching a certain value or the fluctuates around its expected value. If a stochastic process is not stationary, the behavior of the series will only be valid for the forecast period. But a generalization cannot be made for other periods about the series. However, in a time series, it is important that the effect of shocks is temporary and disappear after a while. The purpose in the time series is to try to determine the overall attitude or tendency of the variables outside the estimation period of the future. Before the ARDL model is estimated, the degree of stationarity of the variables are required to be tested. The unit root test has been applied to variables for this purpose. Results of unit root tests are seen in Table 2.

Table 2. Results of Unit Root Tests

Variable	ADF		PP		Degree of integration
	Constant term without trend	With Constant & Trend	Constant term without trend	With Constant & Trend	
lnCCI	-1.0714 (0.7243)	-2.8270 (0.1916)	-0.6411 (0.8552)	-2.8037 (0.1998)	I(1)
lnCCE	0.8272 (0.9940)	-1.4355 (0.8439)	-1.5062 (0.5262)	-8.1771 (0.0000)	I (1)
lnST	-2.7250 (0.0737)	-4.1735 (0.0071)	-3.7075 (0.0054)	-4.1569 (0.0075)	I (0)
First Difference					
d(lnCCI)	-9.6994 (0.0000)	-9.6817 (0.0000)	-10.1686 (0.0000)	-10.1888 (0.0000)	
d(LNCCE)	-15.8869 (0.0001)	-15.9985 (0.0000)	-26.3896 (0.0001)	-26.9953 (0.0001)	
d(lnST)	-13.4170 (0.0001)	-13.3586 (0.0000)	-13.5490 (0.0001)	-13.7986 (0.0000)	

When Table 2 which shows the results of the unit root test results are examined, it is observed that the saving series is stationary at the level, credit card expenditures and the consumer confidence index series are stationary at first order, so that none of the series are integrated from the 2nd level. Therefore, there is no objection for the implementation of the ARDL model.

The ARDL model will be estimated in the next part of the study. The estimated ARDL model in the study will be as in Equation 2.

$$\Delta CCI_t = \delta_0 + \sum_{i=1}^l \zeta_i \cdot \Delta CCI_{t-i} + \sum_{i=0}^m \theta_i \Delta CCE_{t-i} + \sum_{i=0}^n \omega_i \Delta ST_{t-i} + \varphi_1 \cdot CCI_{t-1} + \varphi_2 \cdot CCE_{t-1} + \varphi_3 \cdot ST_{t-1} + \eta_t \quad (2)$$

H₀ hypothesis and alternative hypothesis are developed as follows for the long-term results obtained from Equation 2.

$$H_0: \varphi_1 = \varphi_2 = \varphi_3 = 0$$

$$H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq 0$$

If F value obtained from the estimated model is greater than the critical value developed by Peseran et al. (2001), we can state that there is a long-term relationship among variables. If it is smaller, H₀ hypothesis will not be rejected, therefore no long-term relationship will be concluded.

The estimated equation for the long term relationship is below.

$$CCI_t = \gamma_0 + \sum_{i=1}^k \partial_{1i} CCI_{t-i} + \sum_{i=0}^p \mu_{1i} CCE_{t-i} + \sum_{i=0}^q \theta_{1i} ST_{t-i} + \varepsilon_{1t} \quad (3)$$

The short-term relationship between variables is based on the error correction model derived from ARDL model. Equation 4 shows short-term relationship.

$$\Delta CCI_t = \alpha_0 + \sum_{i=1}^g \partial_{2i} \Delta CCI_{t-i} + \sum_{i=0}^h \mu_{2i} \Delta CCE_{t-i} + \sum_{i=0}^u \theta_{2i} \Delta ST_{t-i} + \theta ect_{t-1} + \varepsilon_{2t} \quad (4)$$

The difference between the equation number 3 testing the long-term relationship and equation number testing the short-term relationship is the error correction term ect_{t-1} in equation. The error correction term coefficient is one period lagged value of the residuals from the equation number 3 and the coefficient shows that how much portion of an imbalance occurs in the short term will disappear in the long term. The sign of the coefficient of this variable is expected to be negative and significant. Also the higher the value of the coefficient means the better the imbalance will disappear (Esen et.al., 2012: 258).

4. EMPIRICAL RESULTS

In the study, the ARDL model is predicted by the package program. Peseran and Shin (1999) recommended to use lagged length if the data is annual. For longer terms, it is stated that lag length can be 3 or 4. In the study, ARDL (1, 1, 4) model was decided to the most appropriate with the lag length 4 and Model 3 among 100 possible models according to Akaike information criteria (AIC).

Table 3. ARDL (1, 1, 4) Model Estimation Results

Dependent Variable: CCI	Coefficient	St. Error	t value	P value
LNCCI(-1)	0.794792	0.066483	11.95472	0.0000
LNST	0.154485	0.023237	6.648271	0.0000
LNST(-1)	-0.129831	0.025864	-5.01982	0.0000
LNCCE	0.032659	0.019337	1.688927	0.0951
LNCCE(-1)	-0.053862	0.019665	-2.73903	0.0076
LNCCE(-2)	-0.022594	0.017070	-1.32362	0.1894
LNCCE(-3)	-0.036370	0.019916	-1.82615	0.0715
LNCCE(-4)	0.033125	0.020092	1.648626	0.1031
Constant Term	1.679695	0.512496	3.277481	0.0015

$\bar{R}^2 = 0.89, F=93,32(0.000)$

When the ARDL model results in Table 3 are examined, one lagged value of consumer confidence index coefficient, saving coefficient, one lagged value of credit card expenditure coefficient and the constant term are statistically significant at 1% significance. Credit card expenditures data and three lagged values of it are statistically significant at 10% significance level. However, two and four lagged values of credit card expenditures are found not to be statistically significant.

Table 4. ARDL Bound Test

H ₀ : There is no cointegration.		
Test Statistic	Value	k
F-statistic	6.804022	2
Critical values for bounds		
Critical value	I0 Bound	I1 Bound
10%	4.19	5.06
5%	4.87	5.85
2.5%	5.79	6.59
1%	6.34	7.52
Test statistic	t= -3.64	
Critical value	I0 Bound	I1 Bound
10%	-3.13	-3.63
5%	-3.41	-3.95
2.5%	-3.65	-4.2
1%	-3.96	-4.53

In order to investigate the cointegration relationship between the variables used in the model, the bound test was performed. The bound test results in Table 4 shows that calculated F = 6.80. This calculated value is bigger than the critical values at 5 %, 10 % and 2.5% critical levels. Null hypothesis of «there is no cointegration» is rejected. Therefore, the existence of the cointegration relationship between variables may be mentioned. In the next part of the study, long-term coefficients will be determined.

Table 5. Long Term Coefficients Estimation Results

Long term coefficients			
Variable	Coefficient	t-value	Probability
LNCCE	-0.22924	-5.25823	0.000
LNST	0.12014	1.22287	0.224

When Table 5 is examined, a negative long-term relationship between credit card expenditures and consumer confidence index was found, however no statistically significant long-term relationship between the consumer confidence index and savings were determined. Despite the detection of long-term relationship, small values of coefficients shows that the effect is at low level. In other words, a 1% decrease in credit card expenditures will reduce the consumer confidence index approximately 0.23%.

The short-term cointegration relationship based on the error correction model is located in Table 6.

Table 6. ARDL Error Correction Model Results

Variable	Coefficient	Standard Error	t-value	Probability
C	1.679695	0.499008	3.366069	0.0012
D(LNCCE)	0.032659	0.018584	1.757374	0.0826
D(LNCCE(-1))	0.025840	0.029585	0.873394	0.3850
D(LNCCE(-2))	0.003245	0.027429	0.118309	0.9061
D(LNCCE(-3))	-0.033125	0.019615	-1.688713	0.0951
D(LNST)	0.154485	0.021087	7.326192	0.0000
CointEq(-1)*	-0.205208	0.060900	-3.369616	0.0012

When the table 6 is examined, the one period lagged value of savings at 1% significance, level and three period lagged value of credit card expenditures at 10 % significance level have statistically significant effect on savings. The sign of the error correction term is negative and significant as expected. According to this conclusion, it can be said that the deviations from the balance to occur in the short term reaches to long-term balance in $1 / 0.20 = 5$ years.

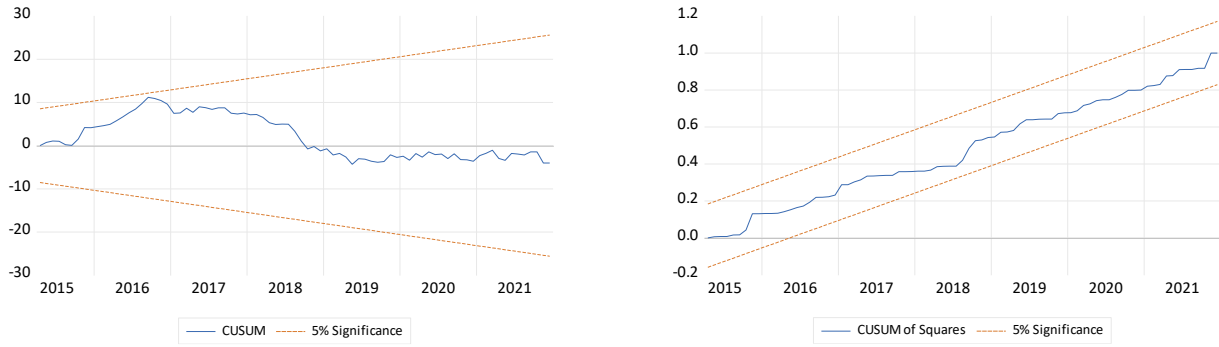
Diagnostic tests of the model were made in the study. The results of these tests are also located in Table 6. According to the results of the table, any colinearity, changing variance, heteroscedasticity or autocorrelation problem is not found, the functional form of the model is correctly determined, and the residues obtained from the error terms exhibited normal distribution.

Table 7. Diagnostic tests results

Test	Test statistic	P-value
Autocorrelation	F_statistic = 0,4256	0.5160
Functional Form	F_statistic= 0.3704	0.5445
Normality	$X^2_{(2)} = 0,45$	0.7969
Heteroscedasticity	Obs*R-kare= 3.4451	0.9034

When figure 1 is examined, it is seen that the model is a stable, residuals of the model is within the bounds, the model's parameters are significant, and there is no structural change.

Figure 1. CUSUM and CUSUM square tests



5. RESULTS

In the study, short and long-term relationship between credit card expenditures, consumer confidence index and saving behavior of the consumers in Turkey were tested using the ARDL model for the period 2014-2021. Diagnostic tests of the estimated model are made, and it is concluded that the model has no heteroscedasticity, autocorrelation, normality, functional form problems. Result of the tests about the residuals obtained from the model shows that the determined model is stable. Therefore, any structural change is not found.

According to the results of empirical findings, credit card expenditures and consumers of consumers are affected by the consumer confidence index. When the long-term coefficients are examined, it can be said that consumer confidence index negatively and significantly affected by credit card expenditures and savings have no statistically significant affect. Although there is no effect on short-term coefficients, it has been found that the tendency to save the consumer confidence index, although there is no effect of credit card expenditures. In terms of the short-term coefficients, although credit card expenditures have no effect on consumer confidence index but saving has effects of consumer confidence index.

If the confidence of consumers is reduced in the economy, the uncertainty will be involved in the future and tendency to save will increase to protect themselves. The same situation is reflected in credit card expenditures with delay. Because individuals need a certain time to rearrange their saving and consumption behavior and to decrease the consumption.

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