

Relationship between Consumer Confidence Index and Leading Sectors in Turkey

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Abstract

As a leading indicator, the ability to measure the predictive power of consumer surveys are very important for economic policy makers, especially to capture a forward-looking perspective on consumer trends. Trends in leading sectors such as real estate, automobile and consumer electronics are expected to signal direction of consumption demand in an economy. Within this framework, whether the consumer confidence signals the trends in leading sectors or the trend in leading sectors effect the consumer sentiment are vital questions to detect the dynamics of domestic demand. Macroeconomic cycles like high and volatile inflationary environments might create counter effect to determine the direction of causality between those factors. In Turkey, there are two consumer confidence indexes, Bloomberg HT Consumer Confidence Index and TURKSTAT Consumer Confidence Index which are regularly released by early 2000. This study aims to explain simultaneous relationships between consumer confidence and leading sectors with ARDL methodology using two consumer confidence indexes. Preliminary findings state that causality mostly runs from consumer confidence to demand for the products of leading sectors.

Keywords: *Consumer Confidence, Leading Sectors, Domestic Demand.*

JEL Classifications: *D12, D84, E21*

1. Introduction

Consumption theory seeks to understand how people choose which goods and services to consume, how much they consume, and how these choices are affected by various factors such as income, prices, and preferences. There are several different approaches to consumption theory, including neoclassical economics, behavioral economics, and sociological perspectives. Neoclassical economics assumes that individuals make rational

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decisions about consumption based on their preferences and the constraints they face, such as their income and the prices of goods and services. Behavioral economics, on the other hand, recognizes that people may not always act rationally and may be influenced by factors such as emotions, social norms, and cognitive biases. Sociological perspectives on consumption theory consider how cultural and social factors, such as consumerism and consumer culture, influence consumption patterns.

The relationship between confidence and economic decision-making focuses on two main aspects. First, from a theoretical perspective, the literature has examined the concept of confidence and its role in traditional theories of consumption. The traditional consumption behavior such as life cycle, or permanent income hypothesis focuses on the relationship between consumption and income in the long run. The life cycle hypothesis and Friedman's theory of consumption help to explain how individuals make decisions about their consumption and saving patterns. These theories recognize that individuals do not simply base their consumption decisions on their current income, but also consider their expected income over the long term. The life cycle hypothesis suggests that individuals tend to save more during their working years and reduce their saving as they approach retirement, while Friedman's theory of consumption suggests that individuals make their consumption plans based on their long-term expected income, or permanent income. For example, if consumers were to behave according to the Permanent Income Hypothesis, no information known to the consumer at the time of the consumption decision would have any predictive power for how consumption will change in future periods (Hall, 1978).

Other approach to consumption relates to explaining the concept of the animal spirit. The literature of behavioral economics discusses the term to mean a range of behavior that falls outside what is normally understood as rational. The concept of animal spirits has come from the urge to action which explained decisions being taken in spite of uncertainty, animal spirits were neither rational nor irrational (Dow & Dow, 2011). Consumer spending is affected by non-economic conditions such as wars or political tensions. These issues affect the willingness of households to consume under uncertainty (Acemoglu & Scott, 1994).

Another viewpoint is the empirical analysis of the link between confidence and economic decisions. The literature of empirical studies has examined whether confidence indicators

contain any information beyond economic principles. The aim of these studies is to understand whether confidence measures have statistical significance as indicators for economic variables. The results show that the consumer confidence index can be a good indicator to explain consumption expenditure in particular cases. Especially, out-of-sample evidence presents that the contribution of confidence in explaining consumption rises when household survey indicators feature large changes. Thus, the confidence indicators can have some increasing predictive power during such incidents (Dées & Brinca, 2011).

Consumer confidence can be a useful indicator of consumption, particularly during times of economic or political uncertainty (Throop, 1992). When consumers are feeling confident about their financial prospects and the overall state of the economy, they may be more likely to make purchases and engage in consumption. On the other hand, when consumer confidence is low, consumers may be more hesitant to spend money and may instead choose to save or invest their money. There is evidence to suggest that consumer confidence can have a significant impact on real consumption expenditure, particularly in the United States (Carroll, Fuhrer, & Wilcox, 1994). Some research has demonstrated the explanatory power of consumer confidence in predicting changes in consumption levels, especially during times of high volatility, such as recessions or political shocks (Howrey, 2001). Consumer confidence can be an important factor to consider when analyzing and forecasting trends in consumption and the overall economy.

The relationship between consumer confidence and consumption can be affected by consumer investment decisions, as well. When consumers are experiencing financial distress, they may be more likely to demand assets that are more liquid, such as cash or short-term investments. This can lead to a decrease in spending on durable goods, which are typically less liquid, and an increase in spending on liquid financial assets. There is evidence to suggest that there is a link between consumer sentiment and spending on durable goods. If consumer sentiment is an indicator of financial perceptions, then changes in consumer sentiment may be correlated with changes in spending on durable goods. This relationship has been observed in empirical research, which has found that changes in consumer sentiment are often accompanied by corresponding changes in spending on durable goods (Mishkin, Hall, Shoven, Juster, & Lovell, 1978).

Consumer confidence is considered as an important indicator of economic activity, as it can influence consumer spending and other economic decisions. For example, consumers who feel more confident about their financial situation and the future of the economy may be more likely to make purchases and contribute to economic activity. On the other hand, consumers who are less confident about their financial situation and the future of the economy may be less likely to spend, which can lead to a slowdown in economic activity. The aim of our study is to examine whether consumer confidence has an effect on Turkey's leading sectors such as retail, housing, and automobiles. Hence, we use the Autoregressive Distributed Lags (ARDL) methodology to analyze the short run and long run effects of consumer confidence on the indicators of these sectors. The rest of the paper is organized as follows, section 2 explains the data and methodology used in this paper. Section 3 provides empirical results and section 4 contains concluding remarks.

2. Data and Methodology

The Consumer Confidence Index is a survey that measures how optimistic or pessimistic consumers are regarding their expected financial situation. The first surveys of consumers were conducted at the University of Michigan. The University of Michigan's Consumer Sentiment Index and the Conference Board's Consumer Confidence Index are the most well-known indicators of consumer confidence in the United States. The Michigan index started out as an annual survey in the late 1940s and eventually became a quarterly survey in 1952 and a monthly survey in 1978. The Conference Board's index was first published on a bimonthly basis in 1967 and was later released on a monthly basis in 1977 (Curtin, 1982). The two indexes are both designed to measure consumer confidence in the economy, but they do so in slightly different ways. The specific questions that are asked, as well as the sample size, survey methodology, and index formulation, can vary between the two indexes. As a result, the two indexes may sometimes produce slightly different results and can be useful for comparing and analyzing consumer sentiment over time (Ludvigson, 2004).

In Turkey, there are two consumer confidence indexes (CCI), one of them conducted by Turkish Statistical Institute, and the other is produced by BloombergHT. Both indexes are calculated monthly based on responses to the survey. The Turkish Statistical Institute uses the Consumer Tendency Survey to measure consumers' current perceptions and future

expectations regarding their personal finances and the economy. The BloombergHT survey has five questions, the first two focus on consumers' personal condition and expectations, the next two focus on consumers' expectations for the general Turkish economy, and the last question is used to calculate consumers' expenditure propensity. For TURKSTAT CCI Turkish Statistical Institute using survey results from a sample of households. The survey covers individuals aged 16 and above who are considered to be representative of their household. The sample size for the survey is 4884 households. On the other hand, BloombergHT uses 720 individual observations to calculate their confidence index. The sample is generated to reflect the general population of Turkey in terms of age, sex, and settlement. Of the participants, 288 are aged between 18 and 35, while the rest are aged between 36 and 65. More than a third of the participants live in the three largest cities: Istanbul, Ankara, and Izmir.

The index presented by the Turkish Statistical Institute uses the balance method of the European Union. The balance value is calculated by taking the difference between the proportions of positive and negative responses for each tendency question and adding 100 to this balance value. This produces diffusion indexes for each question, and the general index is obtained by taking the arithmetic mean of these diffusion indexes for the Consumer Confidence Index. The Consumer Confidence Index can have a value from 0 to 200. A value higher than 100 indicates that consumer confidence is optimistic, while a value below 100 indicates that consumer confidence is pessimistic.

The BloombergHT Consumer Confidence Index is based on a well-known index developed by Michigan University. However, the team at BloombergHT has adapted the methodology to better suit the needs of Turkish households. The survey is conducted via phone calls using a software program that includes technology and safety. The base period for the index is 2013, and the mean value for that year is 100. The index can range from 0 to 200.

In order to represent the consumption, we have used the retail sales volume index (RSVI) of TURKSTAT and the total automobile and house sales. TURKSTAT releases RSVI since the beginning of 2010 on a monthly basis with calendar and seasonal adjusted version. The total automobile and house sales variables obtained from the CBRT database and seasonally adjusted by moving average method. As a last step, we have employed industrial production

index, interest rate⁴ and unemployment rate variables to capture macroeconomic fundamentals which may influence the consumption. Table 1 describes the source and span of the variables which were employed in this study.

Table 1. Dataset Description

Variables	Source	Span
Retail Sales Vol. Ind.	TURKSTAT, 2015=100, Calendar and Seasonal Adjusted	01:2010 - 10:2022
Automobile Sales	CBRT EVDS, Seasonal Adjusted with moving average manually	01:2002 - 10:2022
Total House Sales	CBRT EVDS, Seasonal Adjusted with moving average manually	01:2013 - 10:2022
BloombergHT CCI	BloombergHT	01:2002 - 10:2022
TURKSTAT CCI	TURKSTAT, 2004-2011 and post-2012 releases merged, seasonal adjusted	01:2004 - 10:2022
Industrial Prod. Ind.	TURKSTAT, Calendar and Seasonal Adjusted	01:2002 - 10:2022
Interest Rate	CBRT EVDS, Total TRY Deposit Rate	01:2002 - 10:2022
Unemployment Rate	TURKSTAT, Seasonal Adjusted	01:2005 - 10:2022

One of the important points of time series analysis is the stationary nature of the variable. A stationary time series does not depend on the time at which it is observed, which means that its mean and variance do not vary over time. Time series that have trend, cyclical, or seasonal components are not stationary.

Many economic variables have trend, cyclical, or seasonality components, so it is important to check whether economic variables used in research are stationary or not. Table 2., presents both ADF and Phillips-Perron (1988) unit root test results. Accordingly, the retail sales volume index, TURKSTAT consumer confidence index and unemployment rate variables are first difference stationary, while automobile sales, total house sales and interest rate variables are stationary at level. Moreover, BloombergHT consumer confidence index and industrial production index variables are trend stationary. Since some of the variables are I(0) and some are I(1) processes, in our analysis we employed the ARDL model to explore the long-run relationship between consumer confidence and leading sectors in Turkey.

⁴ Total TRY Deposit Interest Rate

Table 2. Unit Root Test Results

Level	Augmented Dickey-Fuller Test				Phillips-Perron Test			
	constant		constant + trend		constant		constant + trend	
	Prob.	Lag	Prob.	Lag	Prob.	Bandwidth h	Prob.	Bandwidth h
ln (Retail Sales Vol. Ind.)	0.850	2	0.135	2	0.852	29	0.037	7
ln (Automobile Sales)	0.000	2	0.000	2	0.000	7	0.000	7
ln (Total House Sales)	0.000	0	0.000	0	0.000	8	0.000	13
ln (BloombergHT CCI)	0.138	2	0.004	2	0.049	19	0.000	11
ln (TURKSTAT CCI)	0.132	0	0.112	0	0.154	6	0.118	5
ln (Industrial Prod. Ind.)	0.617	0	0.003	0	0.642	22	0.006	6
Interest Rate	0.000	1	0.011	1	0.000	7	0.006	6
Unemployment Rate	0.498	0	0.829	0	0.277	8	0.518	8
First Difference	constant		constant + trend		constant		constant + trend	
	Prob.	Lag	Prob.	Lag	Prob.	Bandwidth h	Prob.	Bandwidth h
Δ ln (Retail Sales Vol. Ind.)	0.000	1	0.000	1	0.000	42	0.000	42
Δ ln (Automobile Sales)	0.000	1	0.000	1	0.000	2	0.000	1
Δ ln (Total House Sales)	0.000	2	0.000	2	0.000	52	0.000	52
Δ ln (BloombergHT CCI)	0.000	1	0.000	1	0.000	82	0.000	82
Δ ln (TURKSTAT CCI)	0.000	0	0.000	0	0.000	12	0.000	12
Δ ln (Industrial Prod. Ind.)	0.000	0	0.000	0	0.000	22	0.000	22
Δ Interest Rate	0.000	0	0.000	0	0.000	6	0.000	7
Δ Unemployment Rate	0.000	2	0.000	2	0.000	7	0.000	7

Optimal lag length for ADF unit root test has chosen according to Schwarz information criterion

Additionally, we estimate short-run VAR⁵ model and conduct Granger causality test at first difference of variables. Our dependent variables are retail sales volume index, automobile sales, and total house sales. Our explanatory variable is the consumer confidence index, and we will be comparing the effects of two different confidence indices: the BloombergHT Consumer Confidence Index and the TURKSTAT Consumer Confidence Index. We have estimated two models for each dependent variable and those models include macroeconomic fundamental variables interest rate, unemployment, and industrial production index in each model. Thus, the estimated ARDL model can be written in the following form:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^m \alpha_{1i} \Delta y_{t-i} + \sum_{i=0}^m \alpha_{2i} \Delta CCI_{t-i} + \sum_{i=0}^m \alpha_{3i} \Delta ip_{t-i} + \sum_{i=0}^m \alpha_{4i} \Delta i_{t-i} + \sum_{i=0}^m \alpha_{5i} \Delta u_{t-i} + \alpha_5 CCI_{t-1} + \alpha_6 ip_{t-1} + \alpha_7 i_{t-1} + \alpha_8 u_{t-1} + \varepsilon_t$$

where y_t is the retail sales volume index, automobile sales and total house sales. CCI represents consumer confidence indices. Industrial production index, interest rate and unemployment rate are expressed with ip , i and u respectively. Investigation of the presence of a long-run relationship amongst the variables of the equation presented above is tested by means of bounds testing procedure of Pesaran et al. The bounds testing procedure is based on

⁵ In this study, for both ARDL and VAR models, Schwarz info. criterion utilized for optimal lag length selection.

the F or Wald-statistics and is the first stage of the ARDL cointegration method. Accordingly, a joint significance test that implies no cointegration, ($H_0: \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8$), should be performed. The F test used for this procedure has a non-standard distribution. Thus, two sets of critical values are computed by Pesaran et al. for a given significance level. One set assumes that all variables are I(0) and the other set assumes they are all I(1). If the computed F-statistic exceeds the upper critical bounds value, then the H_0 is rejected. If the F-statistic falls into the bounds, then the test becomes inconclusive. Lastly, if the F-statistic is below the lower critical bounds value, it implies no cointegration. Once a long-run relationship is established, then the long-run and error correction estimates of the ARDL model can be obtained from the equation above. At the second stage of the ARDL cointegration method, it is also possible to perform a parameter stability test for the appropriately selected ARDL representation of the error correction model. A general error correction representation of the equation above is formulated as follows:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^m \alpha_{1i} \Delta y_{t-i} + \sum_{i=0}^m \alpha_{2i} \Delta CCI_{t-i} + \sum_{i=0}^m \alpha_{3i} \Delta ip_{t-i} + \sum_{i=0}^m \alpha_{4i} \Delta i_{t-i} + \sum_{i=0}^m \alpha_{5i} \Delta u_{t-i} + \lambda EC_{t-1} + \varepsilon_t$$

where λ is the speed of adjustment parameter and EC is the residuals that are obtained from the cointegration model represented above.

Additionally, to examine the short-run dynamics of the variables estimated VAR model represented as below,

$$\Delta x_t = \sum_{i=1}^q A_i \Delta x_{t-i} + \mu_i$$

where x represents the vector of variables including retail sales volume index, automobile sales, total house sales, consumer confidence indices and the macroeconomic fundamental set of variables, μ_i is a vector of orthogonalized shocks.

3. Results

Our ARDL estimates consist of two parts, on the left side of the tables (part 1) shows the estimation results of BloombergHT Consumer Confidence Index (BloombergHT CCI) as a measure of confidence, on the right side (part 2) presents the results of TURKSTAT

Consumer Confidence Index (TURKSTAT CCI). We use a HAC (Newey-West) covariance matrix adjustment, which will correct the value of any test statistics that are computed in estimation.

Table 3 shows the estimates of long run and short run coefficients on the retail sales volume index. According to the results, the coefficient of the error correction term is significant and negative (part 1: -0.373; part 2: -0.382), which implies that about 38% any movements into disequilibrium are corrected for within one month.

In the short run, the coefficient of the TURKSTAT CCI shows that there is contemporaneous effect on the retail sales volume index. Moreover, the TURKSTAT CCI effects on retail sales volume index after one period. An increase of 1% in the TURKSTAT CCI increases the retail sales volume index of the following month by 0.219%, and simultaneously by 0.123%. The coefficients of control variables (industrial production index and unemployment rate) are statistically significant and have the expected sign. For example, the unemployment rate is a negative sign means that retail sales fall when the unemployment rate rises. The coefficient of the industrial production index shows that there is the contemporaneous effect of the industrial production on retail sales. However, the industrial production index positively affects the retail sales volume index after one month.

In the long run, the result shows that an increase of 1% in BloombergHT CCI raises the retail sales volume index by 0.078%. On the other side, an increase of 1% in TURKSTAT CCI reduces the retail sales volume index by 0.183%. The coefficients of control variables (industrial production index, interest rate and unemployment rate) have expected sign. The industrial production index and unemployment rate are statistically significant, but the interest rate is nonsignificant.

Table 3. ARDL Results for Retail Sales Volume Index

Long Run Coefficients				Long Run Coefficients			
Variable	Coef.	t-Statistic		Variable	Coef.	t-Statistic	
ln (BloombergHT CCI)	0.078*	1.775		ln (TURKSTAT CCI)	-0.183**	-2.597	
ln (Industrial Prod. Ind.)	0.522***	3.627		ln (Industrial Prod. Ind.)	0.937***	37.564	
Interest Rate	-0.105	-0.528		Interest Rate	-0.214	-1.363	
Unemployment Rate	-2.243***	-3.122		Unemployment Rate	-0.672**	-1.971	
Short Run Coefficients				Short Run Coefficients			
Variable	Coef.	t-Statistic		Variable	Coef.	t-Statistic	
Δ ln (Retail Sales Vol. Ind.) (-1)	0.068	0.933		Δ ln (TURKSTAT CCI)	0.123**	2.482	
Δ ln (Retail Sales Vol. Ind.) (-2)	-0.198***	-3.887		Δ ln (TURKSTAT CCI) (-1)	0.219***	4.459	
Δ ln (Industrial Prod. Ind.)	0.545***	14.040		Δ ln (Industrial Prod. Ind.)	0.591***	14.670	
Δ ln (Industrial Prod. Ind.) (-1)	0.152***	2.707		Δ ln (Industrial Prod. Ind.) (-1)	0.064*	1.709	
Δ Unemployment Rate	-2.235***	-4.647		Δ ln (Industrial Prod. Ind.) (-2)	-0.169***	-4.542	
dum20	-0.009*	-1.921		Δ ln (Industrial Prod. Ind.) (-3)	-0.129***	-3.368	
Constant	0.607***	5.497		Δ Unemployment Rate	-1.737***	-3.594	
Trend	0.001***	5.795		dum20	-0.001	-0.356	
ec (-1) *	-0.373***	-5.577		Constant	0.459***	5.766	
				ec (-1) *	-0.382***	-5.728	
Adjusted R-squared	0.744			Adjusted R-squared	0.731		
Log likelihood	399.325			Log likelihood	405.435		
ARDL (3,0,2,0,1) – Case 5		I(0)	I(1)	ARDL (1,2,4,0,1) – Case 3		I(0)	I(1)
Bounds Test F-statistic: 6.045	10%	3.0	4.1	Bounds Test F-statistic: 6.378	10%	2.5	3.5
	5%	3.5	4.6		5%	2.9	4.0
	1%	4.4	5.7		1%	3.7	5.1
Serial Correlation LM Test:	Prob F(2,136) = 0.085			Serial Correlation LM Test:	Prob F(2,136) = 0.186		
Heteroskedasticity Test:	Prob F(12, 138) = 0.004			Heteroskedasticity Test:	Prob F(12, 138) = 0.001		

Table 4 shows the estimates of the long-run and short-run coefficients on automobile sales. The results show that the coefficient of the error correction term is significant and negative (part 1: -0.389; part 2: -0.424), implying that about 39% of any movements into disequilibrium are corrected within one month in part 1, and about 42% in part 2.

In the short run, the coefficient of the TURKSTAT CCI is statistically significant and positive and shows that there is a contemporaneous effect on automobile sales. An increase of 1% in TURKSTAT CCI raises automobile sales by 1.85%. The coefficients of automobile sales

indicate that there is an effect on current automobile sales. These coefficients are statistically significant and have negative signs, which is consistent with expectations. The coefficients of the control variables (industrial production index and interest rate) are statistically significant and have the expected signs. For instance, we expect that automobile sales will fall as interest rates rise. The results show that interest rate has a strong effect on automobile sales; an increase of 1% in the interest rate reduces automobile sales by about 6%. In the long run, the results show that an increase of 1% in the TURKSTAT CCI leads to a 1.05% increase in automobile sales. Interest rate is an important determinant of automobile sales in the long run. The coefficients of the interest rate are statistically significant and have a negative sign, indicating that a 1% increase in interest rates leads to a 4-4.5% reduction in automobile sales.

Table 4. ARDL Results for Automobile Sales

Long Run Coefficients			Long Run Coefficients				
Variable	Coef.	t-Statistic	Variable	Coef.	t-Statistic		
ln (BloombergHT CCI)	0.410	1.403	ln (TURKSTAT CCI)	1.042**	1.980		
ln (Industrial Prod. Ind.)	1.015***	3.781	ln (Industrial Prod. Ind.)	0.884***	4.941		
Interest Rate	-4.435***	-4.650	Interest Rate	-4.039***	-4.882		
Unemployment Rate	-3.849	-1.419	Unemployment Rate	-3.041	-1.369		
Short Run Coefficients			Short Run Coefficients				
Variable	Coef.	t-Statistic	Variable	Coef.	t-Statistic		
Δ ln (Automobile Sales) (-1)	-0.206***	-3.045	Δ ln (Automobile Sales) (-1)	-0.169***	-2.413		
Δ ln (Automobile Sales) (-2)	-0.294***	-4.999	Δ ln (Automobile Sales) (-2)	-0.268***	-4.584		
Δ ln (Industrial Prod. Ind.)	1.053***	3.049	Δ ln (TURKSTAT CCI)	1.851***	4.119		
Δ ln (Industrial Prod. Ind.) (-1)	1.377***	3.864	Δ ln (Industrial Prod. Ind.)	0.976***	2.877		
Δ Interest Rate	-6.126***	-3.795	Δ ln (Industrial Prod. Ind.) (-1)	1.444***	4.125		
Constant	2.006***	5.522	Δ Interest Rate	-5.786***	-3.664		
dum20	0.020	0.525	Constant	1.173***	5.409		
ec (-1) *	-0.389***	-5.636	dum20	0.039	0.990		
			ec (-1) *	-0.424***	-5.467		
Adjusted R-squared	0.416		Adjusted R-squared	0.450			
Log likelihood	54.106		Log likelihood	61.013			
ARDL (3,0,2,1,0) – Case 3	I(0)	I(1)	ARDL (3,1,2,1,0) – Case 3	I(0)	I(1)		
Bounds Test F-statistic: 6.061	10%	2.4	3.5	Bounds Test F-statistic: 5.861	10%	2.4	3.5
	5%	2.9	4.0		5%	2.9	4.0
	1%	3.7	5.1		1%	3.7	5.1
Serial Correlation LM Test:	Prob F (2, 200) = 0.828		Serial Correlation LM Test:	Prob F (2,199) = 0.443			
Heteroskedasticity Test:	Prob F (11, 202) = 0.006		Heteroskedasticity Test:	Prob F (12, 201) = 0.006			

Table 5 shows the estimates of the long-run and short-run coefficients on house sales. The results show that the coefficient of the error correction term is statistically significant and negative (part 1: -0.740; part 2: -0.707), implying that about 70-75% of any movements into disequilibrium are corrected within one month. In the short run, the coefficients of the industrial production index are significant and have positive signs. There is a contemporaneous effect of industrial production on house sales. However, the industrial production index positively affects house sales after one month. In the long run, the coefficients of BloombergHT CCI and TURKSTAT CCI are nonsignificant. The coefficients of the industrial production index are statistically significant and positive. An increase in the industrial production index of 1% raises house sales by 0.6% on the left side; by 0.82% on the right side. The interest rate has a negative sign, as expected, but it is not statistically significant.

Table 5. ARDL Results for Total House Sales

Long Run Coefficients			Long Run Coefficients		
Variable	Coef.	t-Statistic	Variable	Coef.	t-Statistic
ln (BloombergHT CCI)	-0.092	-0.567	ln (TURKSTAT CCI)	0.285	0.703
ln (Industrial Prod. Ind.)	0.605**	2.280	ln (Industrial Prod. Ind.)	0.823***	2.966
Interest Rate	-0.595	-0.745	Interest Rate	-0.917	-1.105
Unemployment Rate	-0.573	-0.330	Unemployment Rate	0.242	0.147
Short Run Coefficients			Short Run Coefficients		
Variable	Coef.	t-Statistic	Variable	Coef.	t-Statistic
Δ ln (Industrial Prod. Ind.)	2.305***	7.617	Δ ln (TURKSTAT CCI)	-0.704	-1.593
Δ ln (Industrial Prod. Ind.) (-1)	1.386***	4.267	Δ ln (TURKSTAT CCI) (-1)	0.334	0.750
Δ Interest Rate	0.509	0.295	Δ ln (TURKSTAT CCI) (-2)	-1.061**	-2.445
Δ Interest Rate (-1)	-2.870	-1.403	Δ ln (Industrial Prod. Ind.)	2.350***	7.862
Δ Interest Rate (-2)	-2.891	-1.608	Δ ln (Industrial Prod. Ind.) (-1)	1.158***	3.653
Constant	6.867***	8.938	Δ Interest Rate	-0.852	-0.486
dum20	-0.032	-0.975	Δ Interest Rate (-1)	-1.636	-0.782
ec (-1) *	-0.740***	-8.957	Δ Interest Rate (-2)	-5.212**	-2.505
			Δ Interest Rate (-3)	3.232*	1.796
			Δ Unemployment Rate	-5.437	-1.369
			Constant	4.626***	8.225
			dum20	-0.037	-1.143
			ec (-1) *	-0.707***	-8.248
Adjusted R-squared	0.598		Adjusted R-squared	0.622	

Log likelihood	62.538			Log likelihood	68.759		
ARDL (1,0,2,3,0) – Case 3		I(0)	I(1)	ARDL (1,3,2,4,1) – Case 3		I(0)	I(1)
Bounds Test F-statistic: 15.455	10	2.5	3.5	Bounds Test F-statistic: 13.083	10	2.5	3.5
	%				%		
	5%	2.9	4.0		5%	2.9	4.0
	1%	3.7	5.1		1%	3.7	5.1
Serial Correlation LM Test:	Prob F (2, 103) = 0.531			Serial Correlation LM Test:	Prob F (2, 98) = 0.534		
Heteroskedasticity Test:	Prob F (11, 105) = 0.000			Heteroskedasticity Test:	Prob F (12, 201) = 0.000		

As a last step, Table 6 shows the Granger causality test p-values of the VAR model estimation from the columns. both consumption variables, retail sales volume index, automobile sales and total house sales. According to the short run estimation results, we can observe the bidirectional link between the lags of BloombergHT CCI and the retail sales volume index. This is also the case for the TURKSTAT CCI. Nevertheless, we cannot observe any directional relationship between total house sales and both consumer confidence indices.

Table 6. Granger Causality Test

<i>Independent Variables</i>	<i>Dependent Variables</i>	
	$\Delta \ln$ (Retail Sales Vol. Ind.)	$\Delta \ln$ (BloombergHT CCI)
$\Delta \ln$ (Retail Sales Vol. Ind.)	-	0.065
$\Delta \ln$ (BloombergHT CCI)	0.001	-
$\Delta \ln$ (Industrial Prod. Ind.)	0.145	0.454
Δ Interest Rates	0.098	0.922
Δ Unemployment Rate	0.150	0.391

<i>Independent Variables</i>	<i>Dependent Variables</i>	
	$\Delta \ln$ (Automobile Sales)	$\Delta \ln$ (BloombergHT CCI)
$\Delta \ln$ (Automobile Sales)	-	0.525
$\Delta \ln$ (BloombergHT CCI)	0.010	-
$\Delta \ln$ (Industrial Prod. Ind.)	0.042	0.298
Δ Interest Rates	0.121	0.750
Δ Unemployment Rate	0.594	0.929

<i>Independent Variables</i>	<i>Dependent Variables</i>	
	$\Delta \ln$ (Total House Sales)	$\Delta \ln$ (BloombergHT CCI)
$\Delta \ln$ (Total House Sales)	-	0.568
$\Delta \ln$ (BloombergHT CCI)	0.393	-
$\Delta \ln$ (Industrial Prod. Ind.)	0.003	0.540
Δ Interest Rates	0.043	0.941
Δ Unemployment Rate	0.501	0.955

<i>Independent Variables</i>	<i>Dep. Variables</i>	
	$\Delta \ln$ (Retail Sales Vol. Ind.)	$\Delta \ln$ (TURKSTAT CCI)
$\Delta \ln$ (Automobile Sales)	-	0.063
$\Delta \ln$ (BloombergHT CCI)	0.089	-
$\Delta \ln$ (Industrial Prod. Ind.)	0.291	0.613
Δ Interest Rates	0.108	0.983
Δ Unemployment Rate	0.202	0.174

<i>Independent Variables</i>	<i>Dep. Variables</i>	
	$\Delta \ln$ (Automobile Sales)	$\Delta \ln$ (TURKSTAT CCI)
$\Delta \ln$ (Automobile Sales)	-	0.840
$\Delta \ln$ (BloombergHT CCI)	0.196	-

$\Delta \ln$ (Industrial Prod. Ind.)	0.048	0.352
Δ Interest Rates	0.121	0.637
Δ Unemployment Rate	0.462	0.910
<i>Dep. Variables</i>		
<i>Independent Variables</i>	$\Delta \ln$ (Total House Sales)	$\Delta \ln$ (TURKSTAT CCI)
$\Delta \ln$ (Automobile Sales)	-	0.206
$\Delta \ln$ (BloombergHT CCI)	0.556	-
$\Delta \ln$ (Industrial Prod. Ind.)	0.003	0.781
Δ Interest Rates	0.044	0.356
Δ Unemployment Rate	0.599	0.228

On the other hand, there is a link from the lag of BloombergHT CCI to automobile sales but not the other way round. Yet the lags of TURKSTAT CCI is not successful to explain automobile sales and also we cannot find a similar link from automobile sales to TURSTAT CCI.

4. Conclusion

As a leading indicator, the ability to measure the predictive power of consumer surveys is very important for economic policy makers, especially to capture forward-looking perspective on consumer trends. Trends in leading sectors such as real estate, automobile and retail sales are expected to signal the direction of consumption demand in an economy. Within this framework, whether the consumer confidence signals the trends in leading sectors or the trend in leading sectors affect the consumer sentiment are vital questions to detect the dynamics of domestic demand. Macroeconomic cycles like high and volatile inflationary environment might create counter effect to determine the direction of causality between those factors. In Turkey, there are two consumer confidence indexes, Bloomberg HT Consumer Confidence Index and TURKSTAT Consumer Confidence Index which are regularly released by early 2000. This study aims to explain both long-run and short-run simultaneous relationships between consumer confidence and leading sectors with ARDL and VAR methodology using two consumer confidence indices. Our findings state that overall, there is a link between consumer confidence and the total sales of leading sectors. According to the ARDL long-run error correction model, the change in TURKSTAT CCI is more effective to explain the change in retail sales volume index and automobile sales with respect to BloombergHT CCI. However, short-run estimates state the opposite. According to the results of the VAR model, change in BloombergHT index is more successful than change in TURKSTAT CCI to predict the change in retail sales and automobile sales. Nevertheless, both confidence indices are not efficient to predict total house sales both in the long and short run.

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