TÜRKİYE CUMHURİYET
MERKEZ BANKASI

RESEARCH NOTES IN ECONOMICS

Consumer Confidence Indices and Financial Volatility[1]

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Özet: Reel iktisadi faaliyete ilişkin veriler, özellikle de özel tüketim, oldukça gecikmeli olarak açıklanmaktadır. Bu yüzden daha zamanlı açıklanan göstergelere politika yapıcılar ve kamuoyu tarafından önem atfedilmektedir. Aylık olarak açıklanan tüketici güven endeksleri bu bağlamda yakından takip edilmekte, tüketime ve iktisadi faaliyete ilişkin verdikleri sinyaller dikkatle yorumlanmaktadır. Bu not güven endekslerinin hangi faktörlerden etkilendiğini sorgulamaktadır. Finansal değişkenlere hassaslığı bilinen güven endekslerinin finansal oynaklığa da duyarlı oldukları gösterilmiştir. Döviz kuru, faiz oranı, BIST endeksine ilişkin oluşturulan yurt içi finansal oynaklık göstergeleri ile yurt dışı finansal oynaklığı temsil eden VIX endeksi, güven endekslerini olumsuz yönde etkilemektedir. Bunun yanında, güven endeksleri kısa vadede ekonomik aktiviteden çok enflasyon gelişmelerinden etkilenmektedir. Güven ve oynaklık arasında bulunan güçlü ilişki finansal piyasalarda istikrarı hedef alan politikaların, tüketim eğilimi açısından da önemli olduğunu vurgulamaktadır.

Abstract: Real economic activity data, specifically private consumption, is published with a considerable time lag. This makes indicators with shorter publication lags quite popular for policy makers as well as the public. In this regard, the confidence indices which are released monthly are followed closely; and their signals on private consumption and economic activity are interpreted carefully. This note investigates the factors that affect confidence indices. It is well-established that confidence indices are sensitive to developments in financial markets. This analysis shows that they are also affected by financial volatility. The domestic volatility indicators of financial variables such as exchange rate, interest rate, and BIST (stock exchange), and VIX index which essentially represent external financial volatility deteriorate consumer sentiment. Moreover, it is found that confidence indices are affected much more from inflation dynamics compared to the economic activity in the short run. The strong relation between confidence and volatility points out that the policies aimed at stability in financial markets may also improve consumption tendency.

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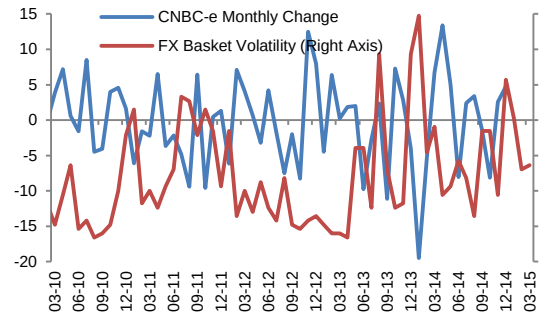
1. Introduction

Real economic activity data are published with a considerable time lag. This makes timely data at higher frequency valuable to get an insight of current economic situation. Consumer Confidence Indices (CCIs) are among such indicators and they are followed closely by analysts, policy makers, as well as the public. Analysts tend to relate the changes in consumer confidence to macroeconomic indicators such as private consumption demand, economic growth or inflation. Hence, understanding the factors affecting CCIs is important for better interpretation of confidence data releases. This note aims to document the factors that affect short term fluctuations in CCIs, with a special emphasis on financial volatility. To this end, we select four different indices as measures of consumer sentiment: Overall CCI from CNBC-e and from TURKSTAT-CBRT surveys, as well as Propensity to Consume Index (PCI) and Consumer Expectations Index (CEI) from the CNBC-e survey.

There is a vast literature on the relation between consumer confidence indices and economic activity and macroeconomic indicators. Generally, the focus is on the predictive power of CCIs for private consumption.[1] Even though measuring the forecast power is important from the viewpoint of a policy-maker, investigating the drivers of consumer confidence is also a valuable endeavor. Considering the large fluctuations in CCIs that Turkey has experienced recently, we study whether such fluctuations signal merely changes in economic activity, private consumption and whether they are also sensitive to other shocks. We conjecture that not only certain macroeconomic and financial indicators affect confidence but also perceived distress and volatility are quite significant for short term CCI fluctuations. Using foreign exchange (FX) and Borsa Istanbul (BIST) Index volatility, Figure 1 and Figure 2 present the monthly relation between changes in CNBC-e consumer confidence index and financial volatility.[2] Figures show that higher financial volatility is associated with lower consumer sentiment.

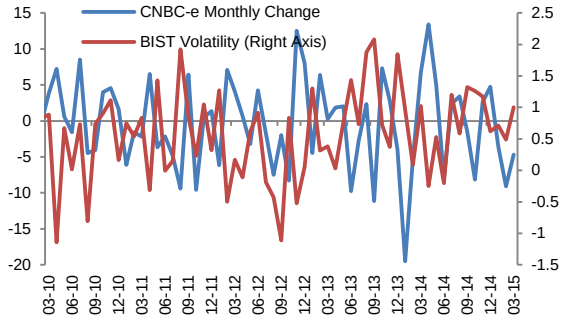
[1] There are a number of studies that investigate the forecast power of confidence indices for private consumption for different countries. See for example Bram and Ludvigson (1998) and Ludvigson (2004) for US, Dion (2006) for Euro Area, Karasoy and Yüncüler (2015) for Turkey, and Golinelli and Parigi (2004) for a cross country comparison.
[2] See Section 2 for calculation of these indicators.

Figure 1. CNBC-e Consumer Confidence Index and FX Volatility*



Source: CNBC-e, CBRT.
*Volatility measure is author's own calculation..

Figure 2. CNBC-e Consumer Confidence Index and BIST Volatility*



Source: CNBC-e, BIST.
*Volatility measure is author's own calculation.

Many studies present evidence on the co-movement of consumer confidence and financial variables. Among earlier studies, Katona (1975) states that; consumption is affected by confidence through individuals' perception about their future financial conditions. Indeed, Lemmon and Portniaguina (2006) and Otoo (1999) show that consumer sentiment is very closely related to US stock market developments. Çelik (2010) and Çelik et al. (2010) model consumption as a function of financial variables and production in a long-term setup for Turkey. Similarly, Kandır (2006) and Görmüş and Güneş (2010) also focus on the link between consumer confidence and stock market. Notably, these studies focus on the long-term relationship between confidence and financial variables for Turkey, ignoring the potential effect of financial volatility and/or financial distress on consumer confidence. With this motivation, this note aims to provide evidence with a short term perspective on how various macroeconomic and financial factors and volatility affect the consumer sentiment in Turkey. Any detrimental effect of financial volatility on confidence will provide evidence in favor of Mishkin's (1978) "liquidity hypothesis," which states that during times of financial distress, confidence worsens, as a result; agents prefer to hold liquid assets and that's why the durable good consumption declines.

There are many studies showing how uncertainty affects economic activity via households' and firms' expectations. From the households' expectations perspective, Carroll (1996) and Romer (1990) show that higher uncertainty leads agents to build up a buffer stock of savings. Benito (2004) finds that perceived uncertainty leads to delays in purchases of durable consumption goods. Bachman et al. (2013) point out the "wait and see" mechanism for firms in highly volatile times. When confidence falls, firms postpone investment plans and this eventually leads to a drop in overall economic activity. This note contributes to the literature by providing evidence of a strong relation between households' confidence and financial volatility.

2. Data

2.1 Consumer Confidence Indices in Turkey

We use monthly consumer confidence surveys of CNBC-e and Turkish Statistical Institute (TURKSTAT) conducted in collaboration with Central Bank of the Republic of Turkey (CBRT). CNBC-e survey has been conducted monthly since January 2002 and consists of 5 questions. First two questions assess the respondent's personal condition and expectations. Following two questions evaluate the expectations with regard to the current and future state of the Turkish economy. The fifth question measures current durable good consumption tendency of consumers. There are two sub-indices of CCI: Consumer's Expectations Index (CEI), calculated from question 2 and question 4, and Propensity to Consume Index (PCI), calculated using the fifth question only.

TURKSTAT-CBRT Survey aims to measure the present situation assessments and future period expectations of consumers' on personal financial standing and general economic course. CCI is calculated from four questions on financial and general expectations, expectations on unemployment and probability of saving.[3] Both CNBC-e and TURKSTAT-CBRT CCIs are evaluated between 0 and 200, where a value above 100 (below 100) refers to optimistic (pessimistic) consumer confidence.

2.2 Macroeconomic Data and Volatility Indicators

Non-farm unemployment rate and Consumer Price Index (CPI) (2003=100) are obtained from TURKSTAT. Non-farm unemployment data is available from 2005, whereas CPI is available from 2003 and monthly changes are computed with seasonally adjusted data. To proxy economic activity and aggregate demand, we generate monthly GDP figures by using Fernandez (1981) methodology. The last GDP observation is for the first quarter of 2015. For real stock price index, we deflate the nominal BIST 100 Index by CPI. Daily US Dollar/TL and Euro/TL parities and foreign exchange basket are obtained from Bloomberg. For the interest rate, we use the personal loan rate, which is announced weekly, obtained from the Banking Regulation and Supervision Agency (BRSA). The reason for using personal loan rate is that it is easily observed and followed by households. Moreover, it generally co-moves with other interest rates. Daily and weekly data are aggregated to obtain monthly figures as simple averages.

[3] The survey started to be applied in accordance with the Joint Harmonized European Union Programme of Business and Consumer Surveys in 2012. A back-casting method using Reg-ARIMA model has been applied in order to produce the historical index values of the new Consumer Confidence Index for the 2004-2011 period.

Financial volatility is calculated for the foreign exchange basket, personal loan rate, and natural logarithm of BIST Index. First, within-month standard deviations are calculated using daily or weekly data, and then the series are standardized, which makes interpretation of the regression coefficients easier. The VIX index measuring the implied volatility of S&P 500 index options is reported by the Chicago Board Options Exchange. Using this index, we will be able to capture the effect of perceived external volatility on financial markets. Moreover controlling this variable is also important for identifying the effect of domestic volatility indicators on confidence, since one would expect external volatility to affect both.

3. Regression Models

3.1 Simple Model

In this study, we focus solely on the short-term changes in confidence indices. The long-run relation of the level of indices and certain macroeconomic variables are presented in Çelik (2010) and Çelik et al. (2010). At the simplest setup, one may relate the changes in consumer sentiment to the changes in economic activity and expect some persistence. We take month-on-month changes of GDP as a proxy for economic activity.[4] Thus our simple model is given in Equation 1.[5]

$$\Delta CCI_t = \alpha_0 + \sum_{i=0}^{k} \beta_i \Delta GDP_{t-i} + \sum_{i=1}^{m} \gamma_i \Delta CCI_{t-i} + \varepsilon_t. \quad (1)$$

We see that, in this very simple model, consumer confidence is related to its own lags but does not depend on economic activity indicator (Table 1 in Appendix, columns 1-4).

3.1 Macroeconomic Indicators

Next, following the literature, we add inflation and non-agricultural unemployment rate as explanatory variables. Even though monthly GDP and some lags of CCIs are found to be insignificant above, we keep these variables in the model. In what follows, we will preserve only statistically significant variables in the regressions. It seems that among these macroeconomic indicators, only inflation matters for confidence. Inflation has a negative influence on all four types of indices. Notably, especially for PCI (which essentially measures propensity to consume for durable goods) higher inflation leads to considerable fall in the

[4] One may think that instead of using monthly GDP, other economic activity indicators can be used such as industrial production. We repeat all the regressions with industrial production index and its sub components such as consumption, investment, durable or non-durable consumption good production and conclude that our main results are robust.
[5] The lags which are significant at 10 percent level are kept in regressions. We tried 4 lags at most.

index value. After adding these macroeconomic indicators, own lags of consumer sentiment are not significant except for TURKSTAT-CBRT (Table 1 in Appendix, columns 5-8).

3.2 Financial Indicators

It is not that surprising to observe that consumer confidence is not related to economic activity or unemployment. Literature documents that the short-term movements in the confidence are closely related to financial indicators. With this concern, we add the first difference of the log real BIST 100 index, the first difference of the interest rate for personal loans, and the change in foreign exchange basket. We omit the GDP and unemployment rate and keep only variables and lags that are statistically significant following general to specific (GETS) methodology.[6]

Results show that financial variables are indeed closely related to consumer confidence.[7] The foreign exchange basket is highly significant for all four indices (Table 1 in Appendix, columns 9-12). Personal loan rate is statistically significant for PCI and for TURKSTAT-CBRT. Meanwhile, BIST is statistically significant for CNBC-e and CEI. As expected, both the rise in interest rate and a depreciation of Turkish lira deteriorate confidence. A rise in the FX basket is especially detrimental for the PCI index. Positive changes in the BIST index, on the other hand, improve CNBC-e and CEI CCIs. Note that even if the financial variables are added to the regressions, inflation stays to be important for short-term fluctuations in CCIs.

3.3 Financial Volatility

The main goal of this note is to investigate the relation between financial volatility and confidence level. To this end, we include our volatility measures into the analysis. It is possible to include the volatility indicators to the regressions one by one or all three at the same time. We report the results for both cases and continue to keep only statistically significant variables. One concern is the inclusion of both the change and the standard deviation of financial variables as explanatory variables. The reason for such a concern is that some of the volatility information is already embedded into the changes. Therefore, instead, we include volatility indicators and control for the levels of financial variables. As reported in Table 2 in Appendix, domestic volatility matters for consumer confidence. In these specifications, the changes in VIX index are statistically significant as well, suggesting

[6] One should note that even if we do not omit and run our regressions with these variables, the findings do not change.

[7] At this point, a discussion of simultaneity is necessary. This note constitutes an initial attempt to detect the relation between financial variables and confidence indices; bi-directional relations should be studied in a VAR type of model which is postponed as future work.

that external volatility is also one of the drivers of the changes in confidence indices. For CNBC-e CCI, all three domestic volatility indicators are statistically significant in addition to VIX. For CEI, FX and personal loan volatility indicators are statistically significant. Notably, for PCI and TURKSTAT-CBRT loan volatility does not affect confidence. For TURKSTAT-CBRT, only FX volatility is statistically significant. In addition, for PCI the coefficients of FX and BIST volatility are larger compared to the other CCIs which suggests that the impact of volatility is much worse for durable good consumption tendency. The observed differences in different consumer confidence indices may be emanating from sample differences between the two surveys.

Instead of running regressions with volatility indicators one by one, we may also include all at once in order to differentiate separate effects of volatility measures. Once we add these three variables to the regressions, we see that VIX is again highly statistically significant for all. Coming to domestic volatility indicators, controlling for VIX, FX volatility and personal loan rate volatility remain statistically significant for CNBC-e CCI. For CEI, personal loan rate and for PCI, BIST volatility indicators are significant (Table 3 in Appendix).

4. Discussion and Conclusion

The above analyses show that consumer confidence indices in Turkey are mainly sensitive to inflation, VIX index, and various domestic volatility indicators in the short run. The findings suggest that there is a close relationship between financial volatility and consumer sentiment. The result that confidence is affected by volatility indicators may reveal an extra transmission mechanism in distressful times suggesting that households' consumption and saving decisions are sensitive to the presence of uncertainty in the financial markets. Moreover, our results further enhance the importance of financial stability policies in the aftermath of the financial crisis. The strong relation between confidence and volatility shows that policies aiming at stability in financial markets also improve consumption tendency.

The findings on the VIX index trigger further discussions. It might be the case that the VIX index captures the "news" effects. To be explicit; even if the consumers do not follow foreign financial markets directly, the news on increased global volatility provided by media, may inform households. Alternatively, it may simply reflect some part of domestic volatility, when there is a co-movement between domestic and external volatility. The indices' different responses to volatility indicators might also be related to this issue. For example in Table 3 in Appendix, it seems that TURKSTAT-CBRT CCI does not respond to domestic volatility indicators but it responds to VIX index. Actually if we exclude VIX and consider domestic volatility measures, we see that FX volatility becomes statistically significant for this index.

Even though the long term concurrent relation is well presented with various VECM models, the simultaneity might be investigated for the short-run as well. Some researchers (see for example Otoo (1999) and Starr (2012)) point out that confidence and financial variables along with other macroeconomic indicators affect each other contemporaneously. Desroches and Gosselin (2002) conduct a threshold analysis and show that especially during highly volatile periods, consumer confidence indices' explanatory and forecast power increases. They suggest that economists and policy makers should pay attention to consumer confidence especially in times of economic or political uncertainty. This kind of VECM or VAR type analysis which includes domestic and external volatility would give an idea on causality and transmission mechanisms; therefore present a clearer picture. These are postponed as future work.

Appendix

TABLE 1: Regressions with macro-economic and financial variables

	(1) CNBC-e CCI	(2) CNBC-e CEI	(3) CNBC-e PCI	(4) TURKSTAT-CBRT CCI	(5) CNBCe CCI	(6) CNBCe CEI	(7) CNBCe PCI	(8) TURKSTAT-CBRT CCI	(9) CNBCe CCI	(10) CNBCe CEI	(11) CNBCe PCI	(12) TURKSTAT-CBRT CCI
GDP - MoM	-0.262	-0.0764	-0.0514	-0.152	-0.274	0.0226	-0.380	-0.112				
	(-0.71)	(-0.22)	(-0.10)	(-1.44)	(-0.75)	(0.07)	(-0.72)	(-0.95)				
L.GDP - MoM	-0.437	-0.527	-0.464	0.174	-0.337	-0.354	-0.0762	0.167				
	(-1.17)	(-1.45)	(-1.11)	(1.65)	(-0.93)	(-0.98)	(-0.20)	(1.52)				
Non-Agriculture Unemp. Rate-change					-1.785	-1.060	2.184	-0.384				
					(-0.83)	(-0.52)	(0.72)	(-0.52)				
CPI - MoM					-4.120***	-2.986***	-6.139***	-1.522***	-2.241**		-3.152*	-0.915**
					(-3.24)	(-2.85)	(-2.78)	(-3.66)	(-2.34)		(-1.78)	(-2.38)
D. Real BIST Index - logged									22.27*	22.01**		
									(1.96)	(2.54)		
D.Personal Loan Rate											-1.623*	-0.397***
											(-1.92)	(-4.17)
D.FX Basket									-44.81***	-31.91***	-85.54***	-17.63***
									(-3.06)	(-2.96)	(-3.72)	(-5.00)
L.CCI	0.144	0.0324	0.0488	0.264***	0.0963	0.0238	0.0164	0.234**				0.143*
	(1.46)	(0.32)	(0.62)	(2.67)	(0.93)	(0.20)	(0.21)	(2.38)				(1.74)
L2. CCI	-0.273**	-0.216*	-0.0939	-0.143	-0.149	-0.0783	-0.0564	-0.158*	-0.164*			
	(-2.59)	(-1.90)	(-1.17)	(-1.51)	(-1.50)	(-0.67)	(-0.78)	(-1.72)	(-1.94)			
Constant	0.0548	0.00678	-0.0886	-0.228	2.382**	1.659*	3.227**	0.771**	1.240	-0.156	1.737	0.521*
	(0.08)	(0.01)	(-0.09)	(-1.05)	(2.42)	(1.82)	(2.32)	(2.52)	(1.50)	(-0.31)	(1.18)	(1.88)
Observations	156	156	156	132	122	122	122	122	122	146	122	122
Adjusted R^2	0.0834	0.0551	-0.00763	0.0579	0.102	0.0390	0.0474	0.160	0.373	0.204	0.275	0.338

Estimation period: January 2002-June 2015 for (1), (2) and (3). January 2004-June 2015 for (4), March 2005-June 2015 for (5)-(8), (9), (10), (12); January 2003-June 2015 for (11)
Dependent variable is change in CCI *varies in regressions 1 to* 12.
L denotes lag of that variable.
MoM implies monthly percentage change.
t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

TABLE 2: Regressions with volatility indicators

	(FX)	(Loan Rate)	(BIST)	(FX)	(Loan Rate)	(BIST)	(FX)	(Loan Rate)	(BIST)	(FX)	(Loan Rate)	(BIST)
	CNBCe CCI - change	CNBCe CCI - change	CNBCe CCI - change	CNBCe CEI - change	CNBCe CEI - change	CNBCe CEI - change	CNBCe PCI - change	CNBCe PCI - change	CNBCe PCI - change	TURKSTAT-CBRT CCI - change	TURKSTAT-CBRT CCI - change	TURKSTAT-CBRT CCI - change
CPI - MoM	-3.613***	-4.205***	-3.898***	-2.460**	-2.926***	-2.741***	-4.724**	-5.846***	-5.549***	-1.265***	-1.476***	-1.476***
	(-3.27)	(-3.61)	(-3.33)	(-2.40)	(-2.94)	(-2.76)	(-2.53)	(-2.84)	(-2.64)	(-3.30)	(-3.75)	(-3.75)
D.VIX	-0.320**	-0.452***	-0.377***		-0.336***	-0.342***		-0.625***	-0.443***	-0.0644*	-0.138***	-0.138***
	(-2.39)	(-4.78)	(-3.87)		(-3.47)	(-3.50)		(-4.28)	(-3.00)	(-1.68)	(-4.10)	(-4.10)
Real BIST Index - logged							-7.937**					
							(-1.99)					
L. CCI - change										0.161*	0.181*	0.181*
										(1.79)	(1.82)	(1.82)
FX Basket Volatility - Standardized	-1.340*			-1.345***			-3.757**			-0.709***		
	(-1.89)			(-2.79)			(-2.50)			(-2.87)		
Personal Loan Rate Volatility - Standardized		-0.913**			-0.964***							
		(-2.33)			(-3.90)							
BIST Index Volatility - Standardized			-1.531**						-3.433***			
			(-2.01)						(-3.00)			
Constant	1.806**	2.075**	2.603***	1.160	1.339	1.390	83.77**	2.926**	4.001***	0.619**	0.785***	0.785***
	(2.04)	(2.35)	(2.76)	(1.28)	(1.59)	(1.64)	(2.05)	(2.14)	(2.64)	(2.13)	(2.70)	(2.70)
Observations	122	122	122	122	122	122	122	122	122	122	122	122
Adjusted R^2	0.205	0.192	0.201	0.0999	0.134	0.117	0.163	0.131	0.170	0.257	0.197	0.197

Estimation period: March 2005-June 2015.
The regressions are run by domestic volatility indicators one by one as shown above of each regression in parenthesis.
Controlling levels.
Dependent variable is CCI *varies in regressions 1 to* 4.
L denotes lag of that variable, D denoted first difference of that variable.
MoM implies monthly percentage change.
t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 3: Regressions with all three domestic volatilities, added at once				
	(1) CNBCe CCI	(2) CNBCe CEI	(3) CNBCe PCI	(4) TURKSTAT-CBRT CCI
CPI - MoM	-3.789***	-2.926***	-5.549***	-1.476***
	(-3.38)	(-2.94)	(-2.64)	(-3.75)
D.VIX	-0.316**	-0.336***	-0.443***	-0.138***
	(-2.34)	(-3.47)	(-3.00)	(-4.10)
FX Basket Volatility - Standardized	-1.327*			
	(-1.87)			
Personal Loan Rate Volatility - Standardized	-0.897**	-0.964***		
	(-2.58)	(-3.90)		
BIST Index Volatility - logged - Standardized			-3.433***	
			(-3.00)	
L. CCI				0.181*
				(1.82)
Constant	1.761*	1.339	4.001***	0.785***
	(1.97)	(1.59)	(2.64)	(2.70)
Observations	122	122	122	122
Adjusted R^2	0.214	0.134	0.170	0.197

Estimation period: March 2005-June 2015
Dependent variable is CCI *varies in regressions 1 to 4.*
L denotes lag of that variable, D denoted first difference of that variable.
MoM implies monthly percentage change.
t statistics in parentheses
* p<0.1, ** p<0.05, *** p<0.01

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