TÜRKİYE CUMHURİYET MERKEZ BANKASI

RESEARCH NOTES IN ECONOMICS

What Drives the Consumer Confidence in Turkey?

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Abstract: The literature provides strong evidence that the consumer confidence can play an important role in predicting future consumption; therefore, examining the drivers of the consumer confidence is crucial to the policymakers. This study investigates the long-run (cointegrating) and short-run relationship between the consumer confidence and main financial and macroeconomic variables. We find that exchange rate, interest rates, unemployment rate and consumer prices do affect consumer confidence both in the long-run and the short-run, though the short-run impacts of exchange rate and consumer prices are more pronounced.

Özet: İktisat yazını, tüketici güven endeksinin tüketim harcamalarını tahmin edebildiğine ilişkin güçlü kanıtlar sunmaktadır. Dolayısıyla güven endeksini açıklayan unsurların ve bu unsurların nispi etkilerinin bilinmesi politika yapıcıları için önem arz etmektedir. Bu çalışmada Türkiye'deki tüketici güven endeksi ile başlıca finansal ve makroekonomik değişkenler arasındaki kısa ve uzun vadeli ilişki araştırılmıştır. Analiz sonucunda tüketici güveninin gerek kısa vadede gerekse uzun vadede döviz kuru, tüketici kredileri faizi, işsizlik oranı ve tüketici fiyatlarından etkilendiği ve kısa vadede özellikle döviz kuru ve tüketici fiyatlarının etkisinin daha kuvvetli olduğu bulunmuştur.

1. Introduction

The literature provides strong evidence that the consumer confidence influences the real economy, in particular, consumption. The efforts to understand the impact of the confidence on consumption have especially intensified after the insight of Katona (1968), which states that willingness to buy is no less important than the ability to buy for households' consumption decisions. Carroll et al. (1994) and Bram and Ludvigson (1998) empirically test the forecasting power of the consumer confidence on consumption for the US economy and report a significant and positive relationship between the confidence and consumption growth. Nahuis and Jansen (2004) repeat the analysis for the European economies and their results indicate a similar relationship between the two. Out of sample evidence provided by Dees and Brinca (2013) shows that the consumer confidence might have an increasing predictive power during the times of large swings in the confidence for both the US and the Euro Area. Acemoglu and Scott (1994) and Delorme et al. (2001) for the United Kingdom, Belessiotis (1996) for France and Kwan and Cotsomitis (2006) for Canada provide empirical evidence showing that consumer sentiment is a leading indicator for future consumption growth.

Roos (2008) takes the discussion to the theoretical level and incorporates a "willingness to buy" channel to the standard intertemporal utility maximization model. The study finds that not only the consumers' expectations about their financial positions but also the information extracted from consumer surveys contain some predictive power on a change in aggregate consumption. Given these empirical and theoretical findings, it is safe to say that examining the drivers of the consumer confidence is directly relevant for both policymakers and academicians.

In the literature, there are only a few studies that focus on the consumer confidence in Turkey. Arisoy (2012) reports that the consumer confidence has a significant impact on consumption growth. A more recent study, Karasoy and Yunculer (2015), also find that the consumer confidence has some explanatory power on consumption, although this relationship weakens when all other relevant macroeconomic and specifically financial variables are considered. Regarding the drivers of the consumer confidence, Celik (2010) finds that industrial production and its sub-indices, stock exchange, exchange rate, oil price and business tendency surveys explain a significant portion of the variations in the consumer confidence index. Finally, Karasoy (2015) shows that the consumer confidence in Turkey is deteriorated in case of an increase in financial volatility.

In this study, we investigate the determinants of the consumer confidence in Turkey using Pesaran's bounds testing approach. In terms of the determinants, we consider both financial variables (exchange rate and interest rate) and macroeconomic variables (industrial production, inflation and unemployment rate). Having found a long-run relationship between confidence index and these variables, we use an autoregressive distributed lag (ARDL) model in levels to estimate long-run coefficients and the associated ARDL model in first differences to estimate short run coefficients.

2. Data

For the measure of Turkish consumer confidence, we employ the overall index of the Turkish Statistical Institute (TURKSTAT) and the Central Bank of the Republic of Turkey (CBRT) survey, which is collaboratively conducted by these two institutions. The survey that dates back to January 2004, is conducted monthly via a computer-based, face-to-face method within the first two weeks of each month. It is published on the last week of the respective month. The results are weighted by age and gender categories. Basically, the survey measures the assessments, tendencies and expectations of consumers on their personal finance standing, general economic situation, expenditures and savings.[1]

Table 1. Data Description

Variable	Abbreviation	Source	Period	Note
Consumer confidence index	CCI	TURKSTAT	2004:01-2015-04	
Turkish lira US dollar exchange rate	EX	CBRT	2004:01-2015-04	Average of the first two weeks of the month, log
Interest rate on consumer loans	ICONS	CBRT	2004:01-2015-04	
Unemployment rate	U	TURKSTAT	2005:01-2015:03	Seasonally adjusted
Industrial production index	IP	TURKSTAT	2005:01-2015:03	Seasonally adjusted, log
Consumer price index	CPI	TURKSTAT	2004:01-2015-04	Seasonally adjusted, log

Our monthly data set starts from January, 2004 and ends at April, 2015. In terms of explanatory variables, we consider industrial production, unemployment, inflation, exchange rate between Turkish lira and US dollar and interest rates on consumer loans.[2] In Table 1, we present the variables used in the study with their sources and time periods. We take the logarithm of exchange rate, industrial production index and consumer price index to convert

[1] The confidence index has gone through a major revision in 2012 in order to make the index compatible with the Joint Harmonized European Union Programme of Business and Consumer Surveys. The series have been expanded back to 2004 via a Reg-ARIMA model. Further information on the analytical framework, concepts, definitions and the details of the revision of the index can be found at www.turkstat.gov.tr.

[2] Following Celik (2010) we also tried Istanbul Stock Exchange 100 as a regressor, but the coefficient was insignificant both in the long-run model and error correction model. It is likely that current level of financial deepening in Turkey is not enough to make consumer be sensitive to developments in the stock market. Significant coefficients in previous studies are likely derived from common factors that move conceptually more relevant variables, such as exchange rate and interest rates.

potential exponential growth in these variables into linear growth so that their variance is stabilized.

Before setting up the empirical model, we test whether the series have unit roots by using Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test. We also augment these tests with Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, which assumes the stationarity of the series under the null hypothesis and provides a nice complement to the other two tests with null assuming that there is unit root.[3] According to the result reported in Table A1 provided in the appendix, we fail to reject unit root in most of the series. However, for interest rates, ADF and PP; for unemployment rate and industrial production, KPSS points to stationarity in levels. All in all, we cannot reach a definitive conclusion regarding the order of integration for these two variables.[4]

3. Choosing the Empirical Model

We investigate two (possible) relationships between the consumer confidence and the explanatory variables: a long-run relationship between the levels of the variables and a short-run relationship between their first-differenced terms.

Existence of a long-run relationship can be tested through either residual based single-equation methods (such as Engle and Granger, 1987; Phillips and Ouliaris, 1990; Pesaran et al., 2001) or reduced-rank multiple equation methods (Johansen, 1991). We choose Pesaran et al. (2001) bounds testing approach for two reasons. First, unit root tests discussed above suggest that our model is not balanced, i.e. some variables may be $I(0)$, while some are $I(1)$. Second, the sample size (time span) is not enough to consider a system-based approach that has superior statistical qualities asymptotically.

Following the three steps of Pesaran's approach, we first build an unrestricted error correction model (UECM) to test for the presence of cointegration. Then, provided that bounds testing points to cointegration, we estimate the long-run coefficients using an Autoregressive Distributed Lag (ARDL) framework in levels. In the third step, we employ a restricted error correction model (ECM) to estimate the short run relationship, where the ECM corresponds to the associated ARDL model in first differences. The use of Pesaran's test requires the absence of serial correlation of residuals and weak exogeneity of the

[3] Lag selection is based on the modified Akaike information criterion (AIC), which is shown to have a better size as compared to the other information criteria (Ng and Perron, 2001). Following Elder and Kennedy (2001), for variables that exhibit a natural pattern of growth (such as industrial production, exchange rates, and consumer price index), we test the presence of unit root with drift versus trend stationarity. For variables that exhibit no growth in the long run (such as consumer confidence index, unemployment rate and interest rates), we test the presence of unit root with no drift versus mean stationarity.

[4] We also conduct unit root tests with structural breaks proposed by Zivot and Andrews (1992) and Perron (1997), but do not find any evidence that structural breaks play any role in the data generating processes.

regressors. We pay attention to the first requirement during the model selection process. The second requirement is tested as explained below.

The UECM used for bounds testing takes the following form:

$$\Delta CCI_t = \alpha_0 + (\beta CCI_{t-1} + \theta' X_{t-1}) + \sum_{i=1}^{p-1} \beta_{1i} \Delta CCI_{t-i} + \sum_{i=0}^{p-1} \gamma' \Delta X_{t-i} + \varepsilon_t \quad (1)$$

where $X_t = (EX_t, ICONS_t, U_t, IP_t, CPI_t)$ is the vector of regressors, Δ is the first difference operator, and p is the lag length. The regression results and the associated statistics for different information criteria are reported in Table A2 for alternative values of lag length p.[5]

Once the test model is constructed via equation 1, we test the cointegration through an ordinary least squares (OLS) estimation of the model.[6] Table A3 presents the statistics to test the existence of cointegration and associated critical bounds for alternative cases. For completeness, we also consider the existence of deterministic trend in bounds testing, although confidence index is bounded by construction. Since the critical values tabulated in Pesaran et al. (2001) are derived for large samples, we also report critical values in Narayan (2005) that are designed for small samples. F-test rejects the null hypothesis of no cointegration at 1% and 5% significance levels in both test models. t-test, on the other hand, is inconclusive when $p = 7$, where it is in line with F-test when the parsimonious test model is used. Overall, we conclude that Pesaran's bounds testing points to cointegration among variables.[7]

As mentioned above, the regressors are assumed to be weakly exogenous within the Pesaran's bounds testing and given this assumption the cointegrating rank is restricted to unity. To test for the absence of feedback from the level of consumer confidence to the regressors, we use a variant of the bounds test suggested by Banerjee et al. (1998) which is based on the t-test for the coefficient of the consumer confidence index from OLS estimation

[5] Schwarz information criterion (SIC) points to a simple lag structure of $p = 1$ as compared to $p = 7$ pointed by AIC. SIC provides consistent and more parsimonious models than AIC, whereas AIC provides a better fit at the expense of lower degrees of freedom. However, when $p = 1$ there exists a serious serial correlation in the model. In view of the importance of the assumption that serially uncorrelated errors are required for the bounds tests, we select $p = 7$. An alternative test model that is more in line with SIC is also constructed via Hendry's general to specific approach, where insignificant lags are eliminated sequentially from ARDL(7), which results in a more parsimonious specification in the form of ARDL (7,7,1,2,1,1).

[6] We calculate an F-statistic for the joint significance of coefficients of all regressors and the dependent variable: $H_0: \beta = 0 \cap \theta = 0$. Under the null hypothesis, the asymptotic distribution of the F-statistic is non-standard regardless of whether the regressors are $I(0)$ or $I(1)$, and provide two critical values. If the F-statistic exceeds the upper bound, we can conclude that a long-run relationship exists. If the F-statistic falls below the lower bound, we cannot reject the null hypothesis of no cointegration. A value of the F-statistic that lies within the bounds makes the test inconclusive.

[7] We also check the test results with two alternative cointegration tests: Engle-Granger and Phillips-Ouliaris. The results reported in Table A4 show that a cointegration is more likely to exist when consumer confidence index is the dependent variable and the remaining variables are its long run forcing.

of the ARDL model, where each regressor is used as a dependent variable. If the null hypothesis cannot be rejected, then the regressors are confirmed to be long-run forcing for the consumer confidence index. We find that the t-statistic falls below the lower critical value in all of the cases considered; therefore, the assumption of a unique cointegrating vector among variables cannot be rejected. These results are also consistent with alternative cointegration tests (Engle-Granger test and Phillips-Ouliaris test) reported in Table A4.

4. Estimation Results

Having established the existence of cointegrating relationship, the next step is estimating the long-run coefficients via an ARDL model defined in levels. The model is augmented with auxiliary variables (first differences of the regressors and lags of the dependent variable) to control for serial correlation and simultaneity between regressors and the error term (Pesaran and Shin, 1999):

$$CCI_t = \alpha_0 + \theta' \mathrm{X}_t + \sum_{i=1}^{p} \beta_{1i} CCI_{t-i} + \sum_{i=0}^{q} \gamma' \Delta \mathrm{X}_{t-i} + \varepsilon_t \qquad (2)$$

An appropriate choice of the order of the ARDL model is crucial for valid inference on level relations. In particular, adequate number of lags is required to overcome the autocorrelation of residuals and the potential of endogeneity of regressors before estimations and inferences are carried out. Following Pesaran et al. (2001), we estimate equation 2 in the orders of an ARDL(p, q_1, q_2, q_3, q_4, q_5) model for six variables (CCI, EX, ICONS, U, IP, CPI) by searching across 8^6 models (lags from 0 to 7 for each of the six variables). We also perform an LM serial correlation test for each model to ensure that there is no serial correlation in the residuals. If the model chosen fails to pass serial correlation test, we move to the next best model. This has resulted in the choice of an ARDL(7,7,1,2,1,1) with the estimates of the levels relationship given in Table 2. All level-estimates, except for industrial production are highly significant and have the expected signs. A 1% increase in the exchange rate and consumer price is associated with 0.28 and 0.61 points decline in consumer confidence, respectively. On the other hand, a one percentage point increase in interest rate and unemployment rate is associated with a respective 1.74 and 3.51 points decline in consumer confidence.

Finally, we estimate the short-run effects of variables employing a restricted ECM associated with the level relationship above. The results are reported in Table 3. The regression fits quite well and passes the diagnostic tests against non-normal errors, serial correlation, heteroscedasticity, and autoregressive conditional heteroscedasticity (ARCH).

Functional form misspecification test, however, is failed at 10% suggesting the presence of some non-linear and/or asymmetric effects of the regressors. Recursive estimation of the residuals also crosses the bounds occasionally, which may be due to time varying nature of coefficients or exogenous shocks that are not captured by the economic variables. The associated cumulative sum and cumulative sum of squares plots, on the other hand, show that the regression coefficients are generally stable.

Table 2. ARDL (7,7,1,2,1,1) and Long-run Coefficients

Variable	Coefficient	Standard Error	t-statistic
EX	-0.28	0.06	-4.69***
ICONS	-1.74	0.31	-5.56***
U	-3.51	0.75	-4.70***
IP	0.09	0.19	0.47
CPI	-0.61	0.12	-5.20***

Note 1. Variances of the OLS estimators of the long-run coefficients are estimated using Pesaran and Shin (1999).
Note 2: *, **, and *** denote significance at 10%, 5% and 1%, respectively.
Note 3: $\chi^2_{SC}(1)$ = 0.00 [0.97], $\chi^2_{SC}(3)$ = 1.70 [0.63], $\chi^2_{SC}(12)$ = 3.31 [0.99], $\chi^2_{FF}(1)$ = 0.17 [0.67]. $\chi^2_{N}(2)$ = 0.34 [0.84], $\chi^2_{H}(1)$ = 24.74 [0.59], $\chi^2_{ARCH}(1)$ = 1.33 [0.24] denote chi-squared statistics to test for no residual serial correlation (at lads 1, 3 and 12), no functional form misspecification, normal errors, homoscedasticity, no ARCH, respectively with p-values given in bracket parentheses.

The coefficient of the error correction term (ECT) indicates a rapid self-correction, where the half-life is about 2 months. Shocks from exchange rate, interest rate, unemployment rate and consumer prices have immediate significant and negative effects over consumer confidence. In fact, the immediate effects of these variables (except for interest rates) are large in magnitude relative to their long-run effects. In particular, the consumer confidence declines by 0.42 points in response to a 1% increase in exchange rates and 0.87 points in response to a similar increase in consumer prices. A one percentage point increase in interest rates and unemployment rate leads to an immediate 0.83 and 1.55 points decline, respectively. Positive coefficients of the exchange rate in subsequent periods are noteworthy, suggesting that exchange rate plays a quite complex role in consumers' attitudes. On the one hand depreciation of local currency reduces the purchasing power of consumers, thereby undermining the confidence. On the other hand, it may boost the confidence through wealth effect (since consumers have sizable foreign currency deposits in Turkey) and income effect (through foreign currency activities such as tourism, shuttle exports, etc.). Change in the sign of the coefficients of unemployment rate in further periods is more puzzling. This may be due to the method that this variable is measured by the TURKSTAT. Since unemployment data in Turkey is calculated on 3-month moving average basis, its short run dynamics may be distorted. Industrial production, in the meantime, turns out to be insignificant, as it is the case in the cointegration regression.

Table 3. Short-run Coefficients			
Variable	**Coefficient**	**Standardized coefficients**	**t-statistic**
ΔECT	-0.35	-0.67	-7.56***
ΔCCI(-1)	0.09	0.09	1.29
ΔCCI(-2)	0.04	0.04	0.50
ΔCCI(-3)	0.27	0.27	3.61***
ΔCCI(-4)	0.15	0.15	1.61
ΔCCI(-5)	0.27	0.27	2.92***
ΔCCI(-6)	0.31	0.31	3.35***
ΔEX	-0.42	-0.54	-7.40***
ΔEX(-1)	-0.08	-0.10	-1.81*
ΔEX(-2)	-0.06	-0.07	-0.90
ΔEX(-3)	0.14	0.18	2.30**
ΔEX(-4)	0.11	0.15	1.82*
ΔEX(-5)	0.21	0.28	4.08***
ΔEX(-6)	0.15	0.19	2.93***
ΔICONS	-0.83	-0.34	-5.14***
ΔU	-1.55	-0.15	-2.71***
ΔU(-1)	2.16	0.22	3.78***
ΔU(-2)	2.85	0.29	3.49***
ΔIP	0.01	0.00	0.04
ΔCPI	-0.87	-0.18	-3.82***

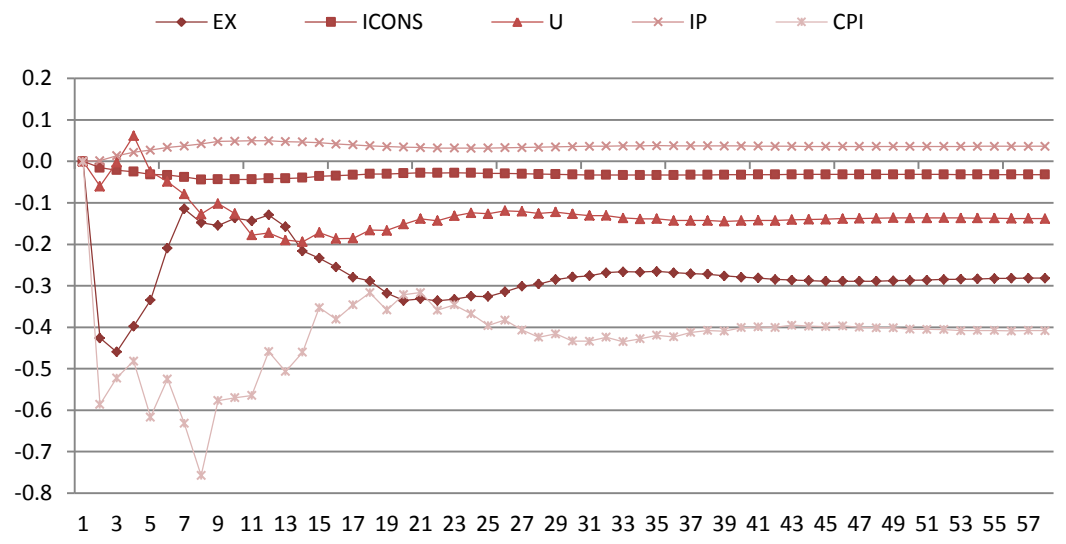
Note 1: The standardized coefficients correspond to the point estimates of the coefficients multiplied by the standard deviation of the regressor and divided by the standard deviation of the dependent variable.
Note 2: *, **, and *** denote significance at 10%, 5% and 1%, respectively.
Note 3: Adj. R^2 = 0.58, $\chi^2_{SC}(1)$ = 0.32 [0.56], $\chi^2_{SC}(3)$ = 2.11 [0.54], $\chi^2_{SC}(12)$ = 3.62 [0.98], $\chi^2_{FF}(1)$ = 4.73 [0.02]. $\chi^2_{N}(2)$ = 0.18 [0.91], $\chi^2_{H}(1)$ = 13.59 [0.85], $\chi^2_{ARCH}(1)$ = 1.24 [0.26] denote chi-squared statistics to test for no residual serial correlation (at lads 1, 3 and 12), no functional form misspecification, normal errors, homoscedasticity, no ARCH, respectively with p-values given in bracket parentheses.

To enable a comparison among the impact of the regressors, we calculate average monthly change in the regressors between 2013 and 2015 and use these values as one time shocks to the model.[8] Using the coefficients in Table 2 and Table 3, we simulate the cumulative change in the confidence index in response to a one-time shock to each regressor one at a time. According to Figure 1, the immediate response of the confidence is the highest when we apply an average shock to the consumer prices and exchange rate. Although, the effect of exchange rate dies down rapidly, the effect of consumer prices is more pronounced and become even more so in subsequent periods. The graph demonstrates the multifaceted nature of relationship between the confidence and exchange rate. Initially the confidence index shows a rapid and negative reaction to a currency shock due to higher value of short term coefficient compared to the long term one. Afterwards, a correction is observed in the index when the “positive” side effect of currency depreciation

[8] Average monthly change for (CCI, EX, ICONS, U, IP, CPI) between 2013 and 2015 is (0.010, 0.018, 0.039, 0.004, 0.007).

kicks in. Note that eventually, the cumulative change in the confidence converges to long-run impact due to the existence of a cointegrating relationship.

Figure 1. Cumulative Change in the Consumer Confidence Index in Response to a One-time Shock to the Explanatory Variables.



5. Conclusion

The literature points to a robust link between the consumer confidence and consumption; therefore, identifying the driving forces of the consumer confidence is crucial for both policymakers and academicians. In this study, we explore the determinants of the consumer confidence in Turkey, which includes both macroeconomic variables (industrial production, inflation and unemployment rate) and financial variables (exchange rate and interest rate). We employ Pesaran's bounds testing approach to test the existence of cointegration. Having established a long-run relationship, we estimate the long-run coefficients via an autoregressive distributed lag framework in levels and the short-run coefficients via an error correction model in first differences. Our results demonstrate that these variables, except industrial production, are long-run forcing of the consumer confidence. The same variables also play an important role in the short-run, where their immediate effect is even more pronounced, especially in the case of exchange rate and consumer prices. Therefore, our results suggest that monetary policy may have a direct impact on consumer confidence by achieving price stability.

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Appendix

Table A1. Unit Root Tests									
		ADF				PP		KPSS	
	Model	Level	Lag	First Difference	Lag	Level	First Difference	Level	First Difference
CCI	C	-2.42	2	-9.21***	0	-2.23	-9.04***	0.36*	0.10
EX	C+T	-1.97	0	-9.70***	0	-2.15	-9.62***	0.22***	0.03
ICONS	C	-2.90**	1	-3.72***	6	-2.77*	-7.57***	0.96***	0.13
U	C	-1.95	6	-2.73*	4	-1.79	-7.59***	0.16	0.09
IP	C+T	-2.31	2	-3.87**	4	-2.27	-12.00***	0.11	0.05
CPI	C+T	-2.44	0	-10.00***	0	-2.67	-9.96***	0.19**	0.04

Note 1: H_0 – Unit root for ADF and PP, stationary for KPSS.
Note 2: Modified AIC is used for lag selection.
Note 3: C – The test includes an intercept only, C+T – The test includes an intercept and trend.
Note 4: *, **, and *** denote significance at 10%, 5% and 1%, respectively.

Table A2. Statistics for Selecting the Lag order of the ARDL Test Equation						
p	AIC	SIC	LM (1)	LM (3)	LM (6)	LM (12)
1	4.21	4.49	4.05**	9.54**	13.58**	23.40**
2	4.21	4.62	1.90	8.48**	24.02***	28.28***
3	4.23	4.79	0.01	4.18	15.53**	19.92*
4	4.27	4.96	1.06	7.38*	27.67***	30.79***
5	4.31	5.15	1.05	15.59***	24.05***	27.33***
6	4.28	5.27	12.62***	13.11***	13.51**	16.40
7	4.16	5.29	2.04	2.83	5.56	12.88
8	4.18	5.46	5.99**	8.30**	13.48**	27.69***

Note 1: *p* is the lag order of the underlying UECM.
Note 2: LM (1), LM (3), LM (6) and LM (12) are the Lagrange Multiplier statistics for testing no residual serial correlation against orders 1, 3, 6 and 12, respectively.
Note 3: *, **, and *** denote significance at 10%, 5% and 1%, respectively.

Table A3. Bounds Testing				
	With deterministic trend		Without deterministic trend	
Model	F-statistics	t-statistics	F-statistics	t-statistics
Test model: ARDL (7)	4.65***	-3.15	5.50***	-3.87**
Parsimonious test model: ARDL (7,7,1,2,1,1)	6.46***	-4.97***	7.61***	-5.34***
Critical Values at 95%				
Pesaran et al. (2001)	(2.81, 3.76)	(-2.41, -4.19)	(2.62, 3.79)	(-1.95, -3.83)
Narayan et al. (2005)	(2.55, 3.61)		(2.79, 4.02)	
Critical Values at 99%				
Pesaran et al. (2001)	(3.50, 4.63)	(-3.43, -4.79)	(3.41, 4.68)	(-2.58, -4.44)
Narayan et al. (2005)	(3.35, 4.59)		(3.73, 5.16)	

Note 1: Critical values correspond to Case IV (unrestricted intercept, restricted trend) when the test model includes a deterministic trend, Case III (unrestricted intercept, no trend) when the test model does not include a deterministic trend. N=80, k=5.
Note 2: **, and *** denote significance at 5% and 1%, respectively.

Table A4. Alternative Cointegration Tests				
Dependent Variable	**Engle-Granger test statistic**	**p**	**Phillips-Ouliaris test statistic**	**p**
CCI	-5.09	0.03	-4.57	0.09
EX	-2.97	0.75	-2.85	0.81
ICONS	-4.13	0.21	-4.09	0.23
U	-2.78	0.83	-3.34	0.58
IP	-2.54	0.90	-4.53	0.10
CPI	-4.06	0.24	-3.90	0.30

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