Consumer sentiment and confidence indices in Nigeria: a panel data analysis

Olorunsola E. Olowofeso and Sani Doguwa[1]

1. Introduction

Consumer indicators play important role in providing decision-makers and forecasters with necessary information about current and future economic expectations. Consumer confidence measures were formulated in the late 1940s by George Katona at the University of Michigan as a way to include empirical measures of consumer expectations into models of spending and saving behavior. The approaches of the University of Michigan surveys on consumer confidence have been imitated in many countries across the globe in the last two decades.

The consumer expectations and other expectations surveys plays distinctive role in determining public policies as well as business decisions. This influence is based on the ability of the indices and other indicators to provide an accurate gauge of how consumers will react to changes in the economic environment both at short, medium and long time basis. Empirically, these surveys have shown their capability to measure the various factors that shape consumers' decisions as well as provide timely information about their future intentions. In addition, consumer surveys provide regular assessments of consumer attitudes and expectations and are used to assess economic trends and forecasting. The consumer indicators help to monitor consumers' personal, business, unemployment, government economic policy, price, exchange and interest rate expectations. The surveys are designed to explore why changes in consumer expectations occur and how these changes influence consumer spending and saving decisions.

A question of concern from a forecasting perspective point of view is whether consumer sentiment provides leading information in forecasting household consumption and, in turn, GDP. A number of international studies have provided evidence in this regard. Carroll *et al*. (1994) and Johnson *et al* (2004) shows that the Michigan Index of Consumer Sentiment assists in forecasting consumption for the United States. Acemoglu and Scott (1994) use United Kingdom consumer sentiment data to arrive at a similar conclusion for the United Kingdom. Utaka (2003) also shows a significant association between Japanese consumer sentiment and Japan's GDP.

The answers most consumers give to questions about current and future economic outlooks are generally informed by news and personal experiences over the previous months, some of which may in turn be reflected in data that were already available. This invites the question: do surveys, data analysis and survey findings tell us a great deal more than we already know? In order to address this question, this paper examines the relationship that exists between consumer confidence indicator, short-term interest rate and other selected macroeconomic variables. The paper further estimated the consumer confidence regressions in a structured time series framework by using data from the six geo-political zones of Nigeria. The gap between the observed and the perceived consumer expectations are

[1] Statistics Department, Central Bank of Nigeria, Abuja, Nigeria. (Email: oeolowofeso@cenbank.org; sidoguwa@cenbank.org). The views expressed in the paper are the opinions of the authors and not the position of Central Bank of Nigeria.

assessed. In addition, we look at whether various sentiment indicators can be explained on the basis of commonly available economic data. We find that much of the movement in sentiment indicators can be explained by variables such as GDP, interest rates, inflation rate, and some other economic variables. The rest of the paper is structured in four sections. Section 2 reviews related literature. The data and the econometric methodology are presented in section 3, while section 4 presents the empirical results of the descriptive and the econometric results. The fifth section presents the concluding remarks of the paper.

2. Literature review

In the last ten years, there has been a lot of literature on firm and households confidence indicators and their usefulness in evaluating and forecasting short and medium terms economic phenomena. The extent to which sentiment indicators can forecast economic activity and short-term economic developments has been a recurring topic in economic and applied statistics research works ever since the Index of Consumer Sentiment (ICS) was introduced in 1952 by George Katona and his colleagues at the University of Michigan. In most of the research works carried out in the last ten years, it has been proved that both confidence and survey indicators are useful in evaluating the current economic development and also used for short-term forecasting purpose. Many academics, applied statisticians and applied economists have proposed the use of linear with time-varying coefficients to evaluate the robustness and the performances of forecasting models based on confidence indicators for both in-sample and out-of-sample characteristics.

Consumer expectations surveys have generally been conducted with the objective of evaluating the relationship between consumer indicators and other macroeconomic variables of interest as well as examining economic trends and prospects. Confidence indicators derived from business and consumer survey results give crucial information on business and consumer assessments of the economic situation and their intentions and expectations for the future.

Mueller (1963) assess the forecasting performance of the Michigan consumer confidence survey and found that lagged confidence variables were significant predictors of durable and non-durable household expenditures. Furthermore, Friend and Adams (1964) found that the ICS was useful for forecasting motor vehicle expenditures; however, they also found that stock prices were a reliable substitute for the survey measure. Later research studies by (Fair 1971; Juster and Wachtel 1972a, 1972b) supported Mueller's claim that sentiment could predict other durables as well. Mishkin (1978), it was argued that the ICS could be interpreted as measuring consumers' subjective assessment of the probability of financial distress, and used a significant relationship between the ICS and household assets and liabilities to support this hypothesis. He argued that the ICS should be a significant predictor of consumer durables expenditure, since durables are illiquid and hence less likely to be purchased by consumers facing financial difficulties. This was discovered when financial variables were not taken into account, but that when they were the sentiment variable became largely redundant. Again, in some literature, a few researchers are more skeptical about the usefulness of the confidence indices in forecasting. Emerson and Hendry (1994) use a Vector Autoregressive technique to state that in general, leading indicators do not additional information in forecasting. In addition, they further strength that leading indicators are frequently revised and open to certain degree of subjectivity in the selection process of the component variables. The discovery is in line with the findings of Weale (1996), in which the initial transformation and refinement of the data is considered as additional sources of ambiguity when dealing with leading indicators. In a similar development, the paper of Stock and Watson (1993) considered the choice of indicators included in the model as the key source of uncertainty in model specification and forecasting.

In contrast, Throop (1992) estimated a five-variable vector error-correction model (VECM) with the changes in the ICS, durables spending, non-durables and services spending, permanent income, and the 6-month commercial paper rate as endogenous variables. He found that changes in sentiment caused changes in durables spending (but not in non-durables and services); in contrast, durables spending did not cause changes in sentiment. When he replaced the ICS with economic variables that he found predicted sentiment (unemployment and inflation), forecast errors were usually lower than in regressions where the ICS (or its current financial conditions component) were used.

In a similar development, Leeper (1992) used a vector autoregression (VAR) framework to assess the relationship between consumer sentiment and activity. His results echoed Mishkin's. Sentiment innovations only improved the VAR's predictions of industrial production and unemployment when financial variables (again, stock prices and T-bill rates) were excluded from the analysis. Later work by Matsusaka and Sbordone (1995) also used a VAR framework, but found that consumer sentiment explained a large proportion of the innovation variance of GNP, after controlling for the Index of Leading Indicators and a measure of default risk. Estrella and Mishkin (1978) used a simple probit analysis including financial variables to assess the usefulness of survey measures for predicting recessions. Again in the literature, there is a suggestion that sentiment variables become redundant when the researcher controls for financial variables, but this finding is by no means consistent across the board. The early work of Hymans and Mishkin tends to favour the interpretation that sentiment indicators summarize prior (or contemporaneous) economic information, a finding echoed by Throop (1992) and Lovell and Tien (2000). Desroches and Gosselin (2002) assess the usefulness of consumer confidence indices in forecasting aggregate consumer spending in the United States. They constructed a simple threshold model that takes into account the magnitude of variation of consumer confidence indexes to forecast consumption expenditures. They concluded that strong variations in confidence matter for consumption, as confidence is a significant predictor of consumption during high-volatility periods.

Cotsomitis and Kwanf (2006) attempts to examine the ability of consumer confidence to forecast household spending within a multicountry framework. They used two confidence indices, namely the Consumer Confidence Indicator and the Economic Sentiment Indicator and find that there is much variability in the in-sample incremental forecasting performance of the confidence indices for the countries canvassed. The results of their out-of-sample tests indicate that these confidence indices provide limited information about the future path of household spending. They added that European economic forecasters and government policy makers should, therefore, be careful when using the CCI and ESI to predict consumption growth in EU countries.

In the work of Gulley and Sultan (1998), they established a link between the Consumer Board Consumer Confidence on various stock prices, bond yields and some currency rates using a GARCH model. Similarly, Jansen and Nahuis (2003) study the relationship between stock market developments and consumer confidence in 11 European countries over the years 1986-2001. They argue that the relationship between stock market and consumer sentiment depends on the expectations about economy-wide conditions rather than the conventional wealth effect. In another investigation, Vuchelen (2004) analyzes whether information content of consumer sentiment can be explained by some economic and financial variables such as unemployment, growth rate, interest rates and exchange rates. He discovered that both interest rates and dollar exchange rate have significantly negative effect on consumer sentiment. Lemmon and Portniaguina (2006) explore time series relationship between investor sentiment and the small-stock premium using consumer confidence as a measure of investor optimism. They discovered that sentiment does not appear to forecast time series variation in the value and momentum premiums. Yasemin and Sadullah (2010) studied the link between Government Spending, Consumer Confidence and Consumption Expenditures in Emerging. They attempts to introduce a new variable to this well-known literature by investigating the existence of a relationship between government

expenditure, consumer spending and consumer confidence for a group of emerging market countries. They empirically demonstrated the important role of consumer confidence on government spending and private consumption expenditures. Previous studies usually focus on the relation between consumer confidence and other macroeconomic indicators for developed countries. However, there is hardly any study that models consumer confidence as a function of relative price of petrol, unemployment rate, VAT revenue and other macroeconomic indicators discussed in this work for a country like Nigeria. Empirically, the link between consumer confidence and other macroeconomic variables has not been well established in other studies on CCI in Nigeria.

3. Data and econometric methodology

3.1 Data

The data used for this study are obtained from the surveys of the Consumer Expectations Survey (CES) of Central Bank of Nigeria from Q2 2008 to Q2 2012, the Statistical Bulletin and the National Bureau of Statistics (NBS) publications of the Central Bank of Nigeria. Other data are obtained from the surveys data of the business expectations and inflation attitudes. The confidence data were taken from consolidated quarterly expectations surveys data of both households and firms in the six-geopolitical zones of Nigeria. The sectors covered for the firms include Industry, Construction, Wholesale and Retail Trade, Financial Intermediation, Hotels and Restaurants, Renting and Business Activities and Community and Social Services. In addition, some of the secondary data collected were obtained from various publications of the National Bureau of Statistics of Nigeria the consumer price index and national accounts data. The Consumer confidence index (CCI) collected reflects the short-term trend of activity and major movements in overall economic activity. Most of the data are current and expectations values for next quarter and one year ahead. The data collected were analyzed using the Statistical Packages for Social Sciences (SPSS) Version 20, Eviews and MATLAB software. The choices of the indicators are based on the relevance of the variables to this study. In this paper, the cubic spline interpolation was used to convert the quarterly indicators to monthly series given the paucity of monthly data.

3.2 Method of data analysis

The data collected were analyzed using the software Statistical Packages for Social Sciences (SPSS), Eviews and MATLAB. Given the paucity of monthly data, cubic spline interpolation was used to convert the quarterly indicators to monthly series.

3.2.1 Computation of confidence indices

The three confidence indices are computed on different scales, so the magnitudes of the point changes are not directly comparable.

ABC/Money – consumer comfort index

The Consumer Comfort Index (CCI) is computed by taking the sum of the positive percentages (“excellent” and “good”) from each question and subtracting the sum of the negative percentages (“not so good” and “poor”) and then averaging them (Langer, 2003).

For each question, Xi = (excellent % + good %) – (not so good % + poor %)

$$CCI = (X_1+X_2+X_3)/3 \quad (1)$$

Conference Board - Consumer Confidence Index

The Consumer Confidence Index (CCI) is computed by taking the positive percentage for each question divided by the sum of the positive and negative percentages. This number is then divided by the base year value. For each question, Xi = [((positive %)/(positive % + negative %))/Base Year Value]*100

CCI = ((X1+X2+X3+X4+X5)/5) (2)

Michigan - Index of Consumer Sentiment

The Reuters/University of Michigan consumer sentiment index was designed after World War II at the University of Michigan by the eminent psychologist George Katona, whose pioneering efforts focused on integrating economic psychology with macroeconomic theory, modeling, and forecasting. Katona maintained that there was a sharp difference between income (the ability to buy) and the willingness to buy (consumer psychology). His argument was that if people feel better off, they will spend more, while if they feel worse off, they will spend less.

Table 1 summarizes the Consumer Confidence Indicators and the other macroeconomic indicators, the corresponding IDs that are used in the tables of this work, and the corresponding sources from which the data are collected.

Table 1

Macroeconomic factors, respective IDs, and data sources

Economic factor	ID	Source
All Share Index	ASI	CBN, Statistical Bulletin
Buying Intension Index	BII	CBN, Statistical Bulletin
Conference Board's Consumer Confidence Index	CBM	Authors' Calculation
Consumer Confidence Index	CCI	CBN, Statistical Bulletin
Crude Export	CEX	CBN, Statistical Bulletin
Exchange Rate	EXR	CBN, Statistical Bulletin
External Reserves	XRS	CBN, Statistical Bulletin
Government Spending	GSP	Federal Ministry of Finance
Gross Domestic Product Growth Rate	GDP	National Bureau of Statistics
Inflation Rate	INR	CBN, Statistical Bulletin
Michigan's Consumer Sentiment Index	CMI	Authors' Calculation
Petrol Price (₦/Litre)	PEP	CBN, Statistical Bulletin
Previous Consumer Index	PCI	CBN, Statistical Bulletin
Private Sector Credit	PSC	CBN, Statistical Bulletin
Unemployment Rate	UER	National Bureau of Statistics
VAT Revenue	VAR	CBN, Statistical Bulletin

Pearson correlation analysis

Pearson correlation analysis is the statistical analysis tool used to study the relationship between the Consumer Confidence Indicators and the other macroeconomic indicators. The null hypothesis of the test for CCI and each macroeconomic indicator is that there is no association between CCI and other macroeconomic indicators.

3.2.2 Unit roots and cointegration

Time series tests, such as Granger causality test, are usually preceded by another test for identifying the integrated order of the variables. Augmented Dickey-Fuller (ADF) test proposed by Dickey and Fuller (1979) and extended by Said and Dickey (1984) is used for the identification of the order of integration of the macroeconomic indicators and the

Consumer confidence indicators used in this work. The null hypothesis is that the time series under study is not stationary and the alternative hypothesis is that the time series is stationary. A time series is stationary if its statistical properties do not change after being time-shifted (Brockwell and Davis, 2002). Critical values recommended by Banerjee et al. (1993) are used for the unit root test.

We employ conventional unit root tests of the Dickey-Fuller test (ADF) (Dickey and Fuller 1979 and 1981), and the Phillips–Perron (1988) test (PP). In addition, we also employ several unit root tests like Dickey-Fuller Test with GLS Detrending (DFGLS), The Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) Test, Elliot, Rothenberg, and Stock Point Optimal (ERS) Test, Ng and Perron (NP) Tests to the consumer confidence indicators and other macroeconomic variables considered (For brevity of this paper only the ADF results are presented in this paper, the other unit root test are available on request). The Johansen (1988) and Johansen and Juselius (1990) procedure was used to estimate the cointegrating relationships of the consumer confidence indicators in the long-run and short-run fluctuations.

Vector Error Correction Method (VECM)

The direction of causality among the cointegrated variables could be specified by using the vector error correction models (VECM). The VECM augments a vector autoregressive process in first differences of the variables with their cointegrating relationship. We used only the Trace test to take decision in this paper as it has more local power than other alternatives.

3.3 Econometric model of the consumer sentiment and consumer confidence

This section clearly describes the econometric models developed for the work. The quarterly consumer sentiment and consumer confidence regressions in a structured time series framework formulated are presented below. To develop a practical model of the determinants of consumer attitudes, we expand on the traditionally used explanatory variables—such as inflation, petrol price, unemployment, stock market performance (All Share Index), unemployment rate, exchange rate, inflation rate, interest rate, gross external reserve, GDP growth rate (%), and private sector credit.

The econometric representation of the consumer confidence regression equation is specified as follows:

$$CMI_t = \beta_0 + \beta_1 PCI_t + \beta_2 VAR_t + \beta_3 ASI_t + \beta_4 BII_t + \beta_5 INR_t + \beta_6 PEP_t + \beta_7 PSC_t + \beta_8 GDP_t + \beta_9 GSP_t + \beta_{10} CEX_t + \varepsilon_{1t}. \quad (4)$$

and $\varepsilon_{1t} \sim N(0, \sigma^2)$

$$CBM(t) = \alpha_0 + \alpha_1 PCI_t + \alpha_2 VAR_t + \alpha_3 ASI_t + \alpha_4 BII_t + \alpha_5 INR_t + \alpha_6 PEP_t + \alpha_7 PSC_t + \alpha_8 GDP_t + \alpha_9 GSP_t + \alpha_{10} CEX_t + \varepsilon_{2t} \quad (5)$$

Where $\varepsilon_{2t} \sim N(0, \sigma^2)$

β_j, j=0,…, 10 and α_j, j=0,…, 10 are the parameters to be estimated. The dependent variables: "CMI (t)" denotes the monthly Reuters/University of Michigan's consumer sentiment index at time period "t," and "CBM (t)" denotes the Conference Board's consumer confidence index. The explanatory variables are clearly described in Table 1. The explanatory variables are described in Table 1. For the sake of brevity, we drop the monthly time index for the remainder of this article.

4. Empirical Results

Correlation analysis

Before we report the empirical results of our two models developed couple with the other results, it would be useful to first examine the statistical relationship between consumer confidence index and some of the variables considered in the work. The first column in Table 2 reports the correlation between the percentage growth rate, the Michigan confidence sentiment and the buying intension index of the consumers. As can be seen from this Table 2, these series reveal a close association for the period under consideration.

Table 2

Correlations between CC Indicators and Key Macroeconomic Variables

CCI	GDP growth, CBM, BII	0.780, 0.922, 0.749
BII	CBM, EXR, GDP	0.724, 0.630, 0.602
GSP	CCI, EXR, INR	0.297, 0.467, 0.385
PEP	CCI, INF, GSP	0.232, 0.015, 0.303
GDP	CCI, UER, GSD	0.780, 0.389, 0.400
INR	CCI, UER, GSP	0.556, 0.183, 0.386

Source: Authors' Calculation

Table 2 shows the correlations between each overall index and the economic variables. All of the correlations are in the expected direction: except for unemployment and CPI that gave positive value of 0.1831. The confidence indices correlate well with GDP, unemployment, and inflation. In addition, there are moderate and statistically significant correlations in the expected directions between the indices and the other economic variables: the INR, petrol price and government spending.

Table 3

The Degree of relationship between the ABC/Money, Conference, Michigan approaches

	ABC/Money	*Conference*	*Michigan*
ABC/Money	1		
Conference	0.536631	1	
Michigan	0.809333	0.825638	1

Source: Authors' Calculation

Table 4

Correlation matrix of CCI, short-term interest rate and other macroeconomic variables

	ASI	BII	CBM	CCI	CEX	CMI	EXR	GDP	GSP	INR	PCI	PEP	PSC	UER	VAR	XRS
ASI	1	0.447282	0.779173	0.859499	0.432418	-0.68328	-0.05474	0.708168	0.156249	0.669915	0.859499	0.045579	0.233187	0.47514	0.511271	-0.54752
BII	0.447282	1	0.723517	0.749428	0.670502	-0.27849	0.629705	0.602293	0.390337	0.032082	0.749428	0.467766	-0.39762	0.817847	0.53739	-0.80225
CBM	0.779173	0.723517	1	0.92245	0.367539	-0.44318	0.246029	0.72254	0.261451	0.40943	0.92245	0.360392	0.089486	0.575839	0.483877	-0.61084
CCI	0.859499	0.749428	0.92245	1	0.579459	-0.58571	0.196857	0.779868	0.297279	0.55553	0.9999	0.232153	-0.08144	0.696191	0.594518	-0.78047
CEX	0.432418	0.670502	0.367539	0.579459	1	-0.22602	0.329262	0.386729	0.182357	0.116626	0.579459	0.102292	-0.50089	0.790784	0.668199	-0.82475
CMI	-0.68328	-0.27849	-0.44318	-0.58571	-0.22602	1	-0.1089	-0.62839	-0.44223	-0.83709	-0.58571	-0.18184	-0.22327	-0.25086	-0.05612	0.32864
EXR	-0.05474	0.629705	0.246029	0.196857	0.329262	-0.1089	1	0.048371	0.46755	-0.12068	0.196857	0.7052	-0.1621	0.655559	-0.08545	-0.50218
GDP	0.708168	0.602293	0.72254	0.779868	0.386729	-0.62839	0.048371	1	0.40027	0.584458	0.779868	0.17312	-0.03855	0.389035	0.358412	-0.52944
GSP	0.156249	0.390337	0.261451	0.297279	0.182357	-0.44223	0.46755	0.40027	1	0.385781	0.297279	0.303173	-0.02733	0.344805	-0.11472	-0.37429
INR	0.669915	0.032082	0.40943	0.55553	0.116626	-0.83709	-0.12068	0.584458	0.385781	1	0.55553	0.014743	0.348557	0.183142	-0.02586	-0.30371
PCI	0.859499	0.749428	0.92245	0.9999	0.579459	-0.58571	0.196857	0.779868	0.297279	0.55553	1	0.232153	-0.08144	0.696191	0.594518	-0.78047
PEP	0.045579	0.467766	0.360392	0.232153	0.102292	-0.18184	0.7052	0.17312	0.303173	0.014743	0.232153	1	-0.02422	0.368565	-0.16801	-0.27566
PSC	0.233187	-0.39762	0.089486	-0.08144	-0.50089	-0.22327	-0.1621	-0.03855	-0.02733	0.348557	-0.08144	-0.02422	1	-0.29371	-0.36794	0.378471
UER	0.47514	0.817847	0.575839	0.696191	0.790784	-0.25086	0.655559	0.389035	0.344805	0.183142	0.696191	0.368565	-0.29371	1	0.512282	-0.94921
VAR	0.511271	0.53739	0.483877	0.594518	0.668199	-0.05612	-0.08545	0.358412	-0.11472	-0.02586	0.594518	-0.16801	-0.36794	0.512282	1	-0.56052
XRS	-0.54752	-0.80225	-0.61084	-0.78047	-0.82475	0.32864	-0.50218	-0.52944	-0.37429	-0.30371	-0.78047	-0.27566	0.378471	-0.94921	-0.56052	1

Source: Authors' Calculation

This paper examined the degree of association between the three most prominent approaches. A main reason the three confidence measures correlate so strongly over time, even though they use quite different methods, is that they each use a consistent methodology which produces reliable trend measurements over time. Even though the indices are highly correlated over time, particularly between Michigan and Conference Board, and between Michigan and ABC/Money with degree of relationship 82.56 percent and 80.93 percent, respectively, the results can diverge in the short term. One reason is the different fieldwork and release schedules; releases of the different indices within the same week or even on the same day can be based on very different field periods. The relationship between the Michigan Consumer Sentiment Index and GDP growth over the next quarter is negative correlated, implying that GDP growth declines following periods of high confidence. The correlation obtained here is potentially consistent with a precautionary savings argument that is higher confidence is associated with lower uncertainty about the future and therefore a reduction in saving, then high confidence will be associated with a higher level of current consumption relative to future consumption and lower consumption growth going forward.

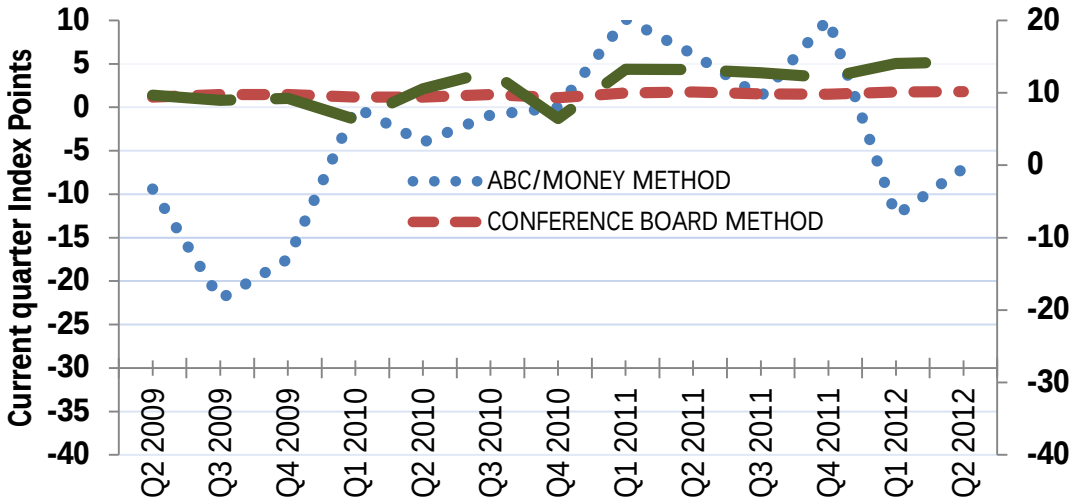


Fig 1: Consumer Outlook Index

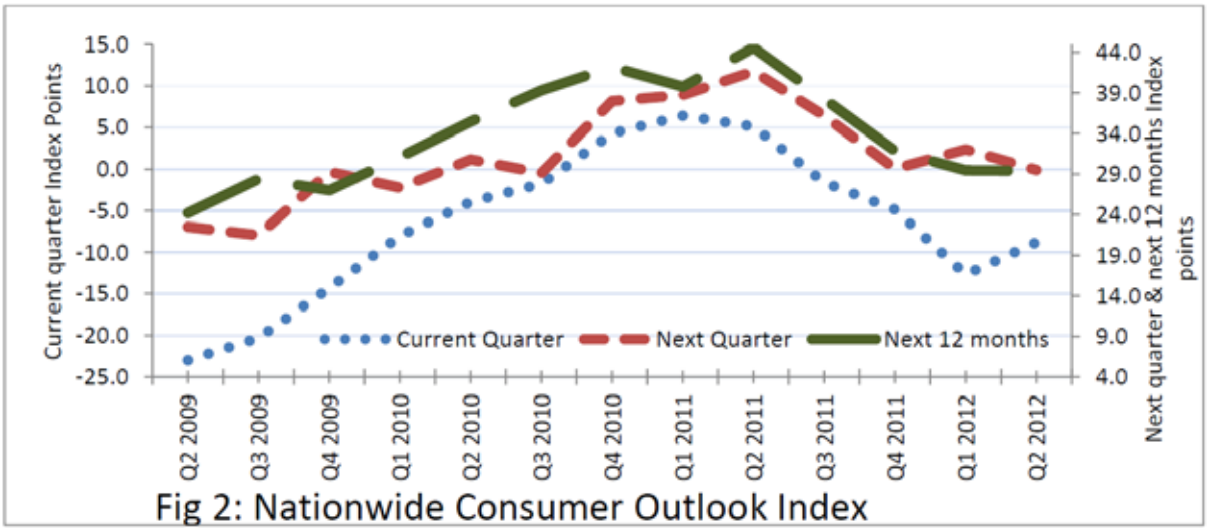


Fig 2: Nationwide Consumer Outlook Index

Fig.2 shows the trend of the national Outlook Index from Q2 2009 to Q2 2012. The next quarter and the next 12 months outlook are more optimistic than the current quarter in all the periods considered. Precisely, the Consumer's overall outlook in Q2 2012, which stood at –8.8 points rose by 3.9 points above its level in the previous quarter but fell by 13.9 points below its levels in the corresponding period of 2011. The bleak outlook of consumers in the quarter under review could be attributable to the pessimistic outlook of consumers in their family financial situation, which dropped to –16.7 from –15.9 points in the previous quarter. Consumer outlook for the next quarter was positive, at 29.5 points the index rose significantly by 38.3 points from the –8.8 points attained in the current quarter. The positive outlook of consumers in the next quarter could be attributable largely to the optimistic outlook of consumers in their family income.

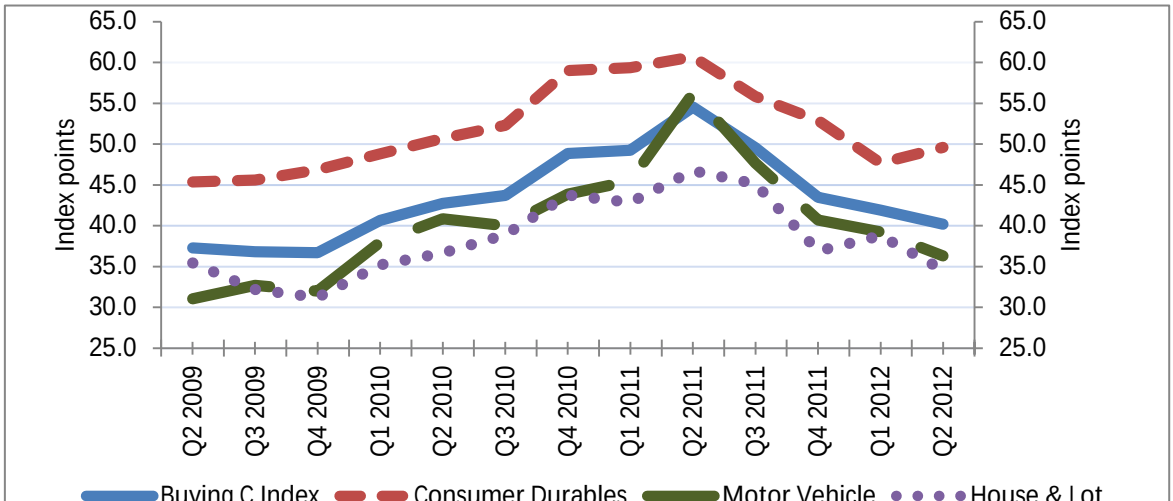


Fig. 3: Buying Conditions Index: National

Fig. 3 depicts the buying conditions index of the consumers from Q2 2009 to Q2 2012. Majority of consumers nationwide believed that the current quarter is not the ideal time to purchase big-ticket items like consumer durables, motor vehicles and house and lot. In quarter two 2012 the overall buying conditions index for consumer for big-ticket items stood at 40.2 per cent, representing a decline of 1.7 and 14.4 points when compared with the level attained in previous quarter and the corresponding period of 2011. The decline in buying conditions index in Q2 2012 was driven largely by the decline in sentiments on motor vehicle and house and lot, with the house and lot posting the lowest sentiment in the last 9 quarters.

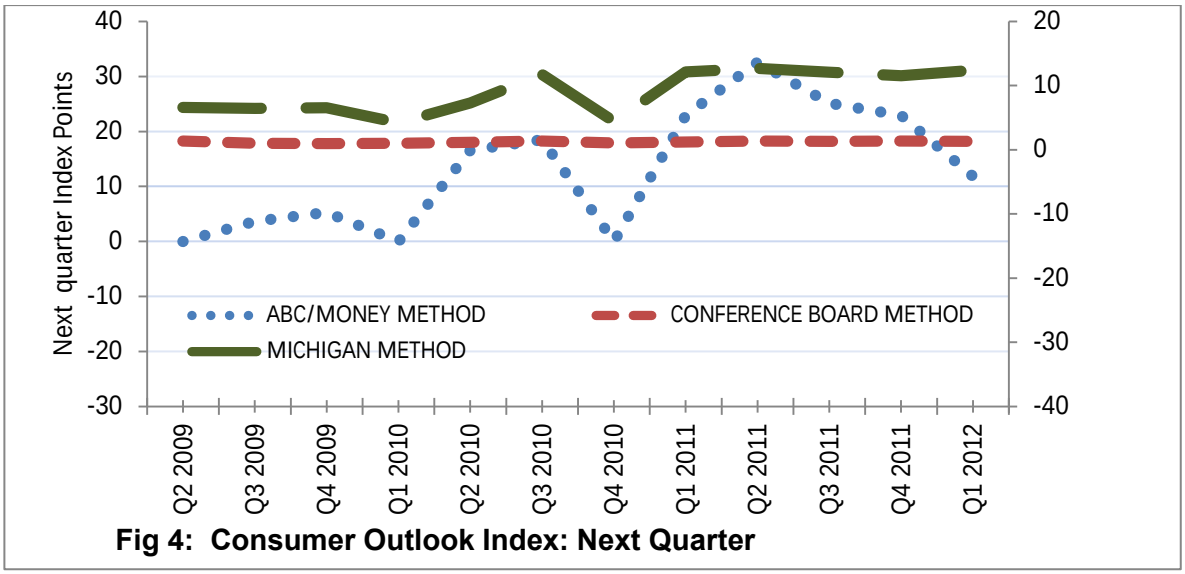


Fig 4: Consumer Outlook Index: Next Quarter

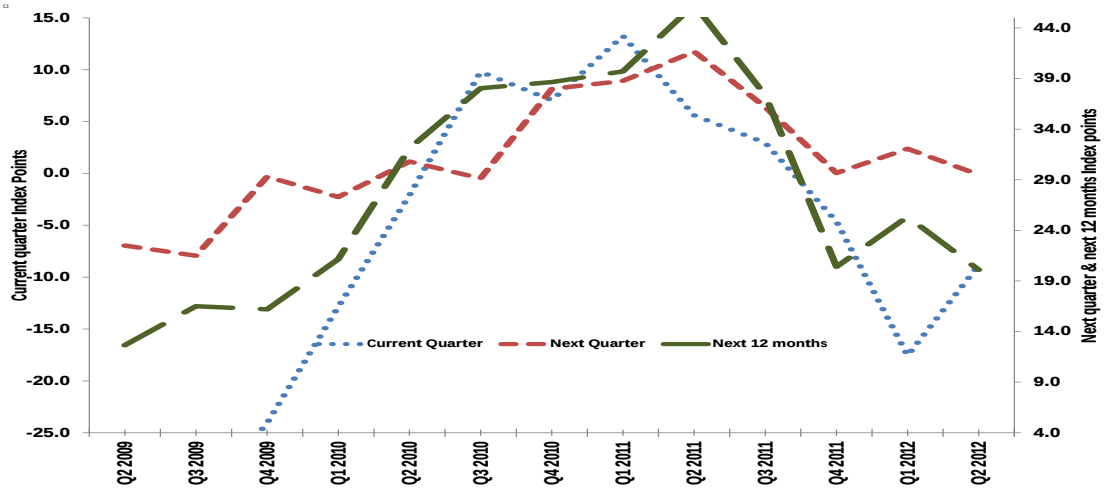


Fig 5: Consumer outlook indices on the economic condition

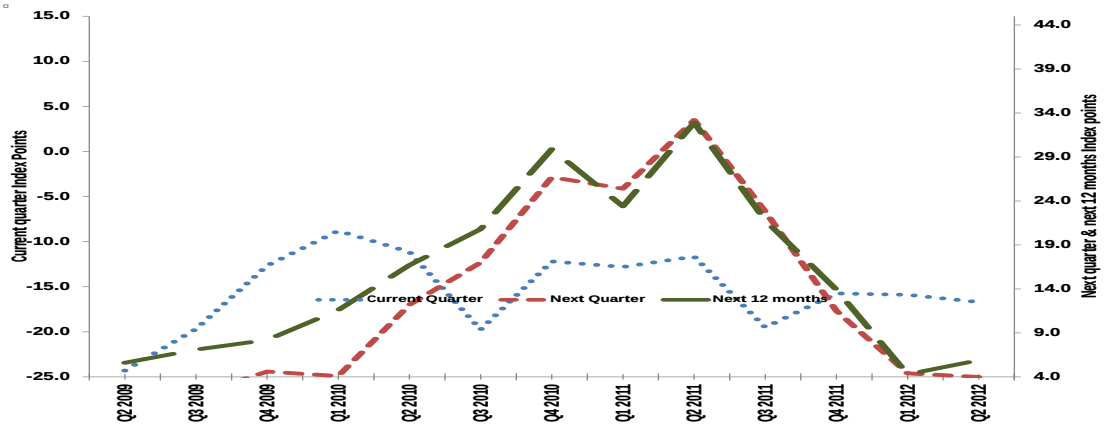


Fig 6: Consumer outlook indices on the family financial situation

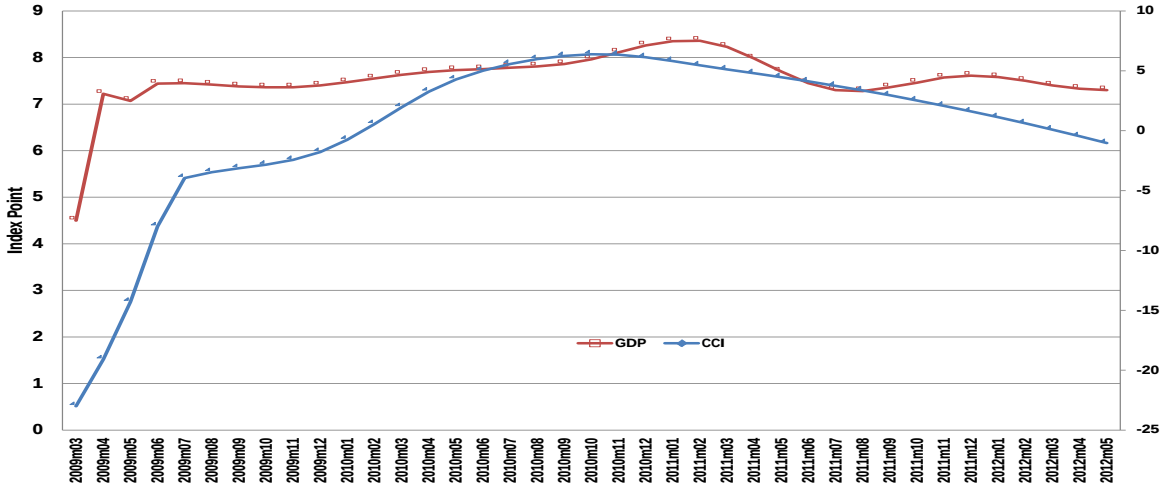


Fig.7: Evolution of CCI and GDP Indices

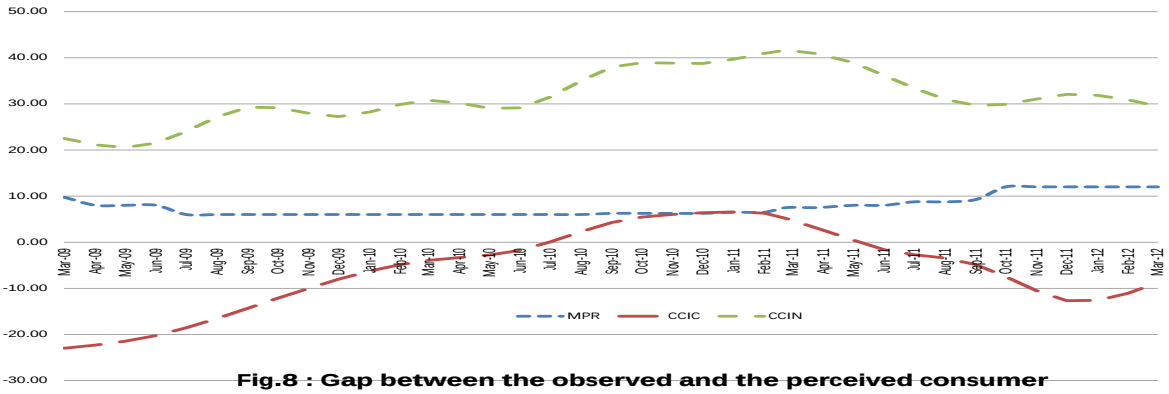


Fig.8 : Gap between the observed and the perceived consumer expectations and monetary policy rates.

Fig. 7 shows the evolution of the Consumer Confidence Index and the GDP growth rate from March 2009 to May, 2012. From the graph, there is clear indication that the GDP and CCI are mirroring each other. Consumers have more confidence in the economy when there is increase in the output of goods and services. Fig. 8 shows the level is consistency in the monetary policy rate and the confidence indices for both the current and the next quarter. Obviously, the stance of consumer confidence during the period under consideration and the opportunity of credit to the real sector on households and enterprises would reduce risks of the growth outlook.

The other function examined in this work is Consumer Confidence Index as dependent variable and the GDP growth rate as the independent variable

$$CCI = f(GDP) \quad (6)$$

From the analysis carried out, the consumer confidence improved from -12.7 in Q1 2012 to 8.8 in June of 2012. Historically, the overall conference outlook index is a barometer of the health of the economy from the perspective of the consumer. The CCI and its related series are among the earliest sets of economic indicators available each quarter and are closely watched as indicators by the monetary policy committee members and other stakeholders for the Nigeria economy.

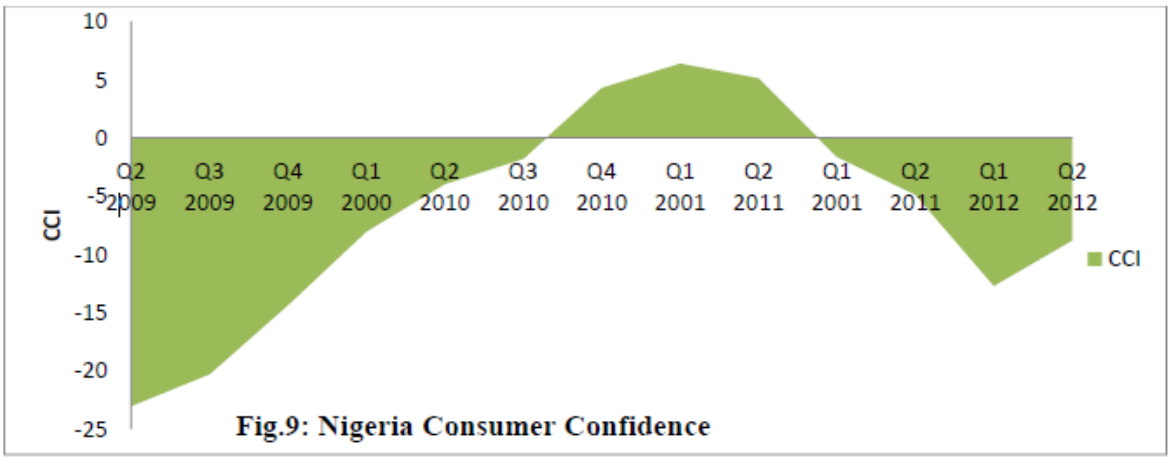


Fig.9: Nigeria Consumer Confidence

The results obtained by using the Michigan's Consumer Sentiment model and Conference board's confidence model specified in equation (4) and (5) with E-views software and based on the minimum selection criterion are given in the Table 6 below.

All the coefficients are statistically significant at 5 per cent level with the exception of unemployment rate and private sector credit. However, all the variables are significant at 10 percent significance level. The R- squared for the Michigan method produces 89.2 percent; this represents the variation in the response variable that can be explained by explanatory variables. They key variables in the model have appropriate signs and magnitudes with the exception of GDP in this case. The model developed for Michigan consumer sentiment shows that the consumer demand for petrol is highly inelastic in Nigeria. In Nigeria, most of the consumers always buy petrol for their vehicles, domestic usage (both for powering home generators) and other industrial usage. When Government remove petrol subsidy and increase the price of petrol in Nigeria, households have to pay additional charges. Several previous governments have tried to remove the subsidy but have backed down in the face of widespread public protest and reduce it instead. Analysts say many Nigerians regard cheap fuel as the only benefit they get from the national oil wealth. During the period considered in this paper, price of petrol have increased from N65.00 (US$ 0.40; £0.26) per litre to at least N140.00 in filling stations and from N100 to at least N200 on the black market, where many Nigerians buy fuel. To be able to pay for additional charges, consumer have to dip into their saving to be able to meet up with these additional charges. Consumers have to adjust their budgets equations to be able to cope with instantaneous price increase in all goods and services. The results shows that 10 per cent increase in the price of petrol will lead to 5.7 percent reduction in consumer sentiment as shown by Michigan consumer sentiment model estimated. In addition, a unit increase in government spending reduces consumer sentiment by 1.4 percent. One possible reason for this is that consumers might not have confidence in the judicious spending pattern of government because of the level of transparency and proper accountability over the years. The test for the series CCI, INR, PEP GSP shows that there is co-movement in the series. The results of the Johansen cointegration test are presented in the appendix.

Table 5

Unit Root test of the Consumer Confidence indicators and the other economic variables

VARIABLE	LEVEL OF INTEGRATION	ADF Value	TEST STATISTIC	Prob.
ASI	I(1)	ADF -4.523187	1% -3.621023 5% -2.943427 10% -2.610263	0.0009
BII	I(1)	ADF -6.69977	1% -3.632900 5% -2.948404 10% -2.612874	0.0000
CBA	I(1)	ADF -4.289087	1% -3.626784 5% -2.945842 10% -2.611531	0.0017
CMI	I(0)	ADF -4.246862	1% -3.639407 5% -2.951125 10% -2.614300	0.0021
CCI	I(1)	ADF -3.205680	1% -3.679322 5% -2.967767 10% -2.622989	0.0299
CEX	I(1)	ADF -7.837279	1% -3.626784 5% -2.945842 10% -2.611531	0.0000
EXR	I(1)	ADF -7.837279	1% -3.621023 5% -2.943427 10% -2.610263	0.0000
XRS	I(1)	ADF -4.651290	1% -3.621023 5% -2.943427 10% -2.610263	0.0006
GSP	I(0)	ADF -5.238255	1% -3.679322 5% -2.967767 10% -2.622989	0.0002
INR	I(1)	ADF -5.414476	1% -3.699871 5% -2.976263 10% -2.627420	0.0001
PEP	I(0)	ADF -6.400217	1% -3.626784 5% -2.945842 10% -2.611531	0.0000
PCI	I(1)	ADF -3.205680	1% -3.679322 5% -2.967767 10% -2.622989	0.0299
PSC	I(1)	ADF -8.028541	1% -3.621023 5% -2.943427 10% -2.610263	0.0000
GDP	I(1)	ADF -4.296524	1% -3.646342 5% -2.954021 10% -2.615817	0.0019
UER	I(1)	ADF -4.090807	1% -3.621023 5% -2.943427 10% -2.610263	0.0029
VAR	I(1)	ADF -10.87470	1% -3.621023 5% -2.943427 10% -2.610263	0.0000

Source: Authors' Calculation

Table 6

Comparison of Michigan's consumer sentiment model and Conference board's confidence model

	Michigan's consumer sentiment model		Conference board's confidence model	
	Estimated Parameter	Prob.	Estimated Parameter	Prob.
C	13.289 (1.012)	0.0000	0.238 (0.0574)	0.0003
Δ^2GDP			0.073 (0.00024)	0.0900
GDP(-1)	-0.186 (0.0959)	0.0655		
GSP	-0.014 (-0.003)	0.0000	-0.00049 (0.00024)	0.0475
ΔINR			0.132360 (0.0647)	0.0505
Δ^2(INR)	-11.071 (1.467)	0.0000		
ΔUER(-1)	-0.476 0.234	0.0543	-0.05026 (0.0161)	0.0041
ΔBII	-1.187 (0.306)	0.0009	-0.03282 (0.0106)	0.0045
ΔPSC	-1.954 (1.074)	0.0833	0.002152 (0.0011)	0.0618
PEP	-0.057 (0.014)	0.0004	-0.00289 (0.00078)	0.0009
ΔPCI	-0.760 (0.288)	0.0154	0.084769 (0.0105)	0.0000
ΔEXR(-1)	0.190 (0.071)	0.0139		
CEX(-1)	-0.054 (0.023)	0.0249		
ΔVAR	-6.42E-05 (3.03E-05)	0.0460		
R-squared	0.892		0.871	
Adjusted R-squared	0.835		0.834	
Akaike info criterion	2.544		0.395	
Schwarz criterion	3.088		0.978	
Hannan-Quinn criter.	2.727		0.594	
Durbin-Watson stat	1.779		1.796	

Source: Authors' Calculation

Table 7

Result of the regression of CCI model with GDP as independent variable

Dependent Variable: D(CCI)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045086	0.178358	0.252782	0.8021
D(GDP(-1))	3.935088	0.560884	7.015869	0.0000
AR(1)	0.479678	0.067779	7.077064	0.0000
MA(1)	0.999986	5.97E-08	16737735	0.0000

R-squared	0.963837	Mean dependent var	0.368611
Adjusted R-squared	0.960446	S.D. dependent var	1.352135
S.E. of regression	0.268914	Akaike info criterion	0.315590
Sum squared resid	2.314074	Schwarz criterion	0.491536
Log likelihood	-1.680617	Hannan-Quinn criter.	0.377000
F-statistic	284.2911	Durbin-Watson stat	1.506953
Prob(F-statistic)	0.000000		

Inverted AR Roots	.48
Inverted MA Roots	-1.00

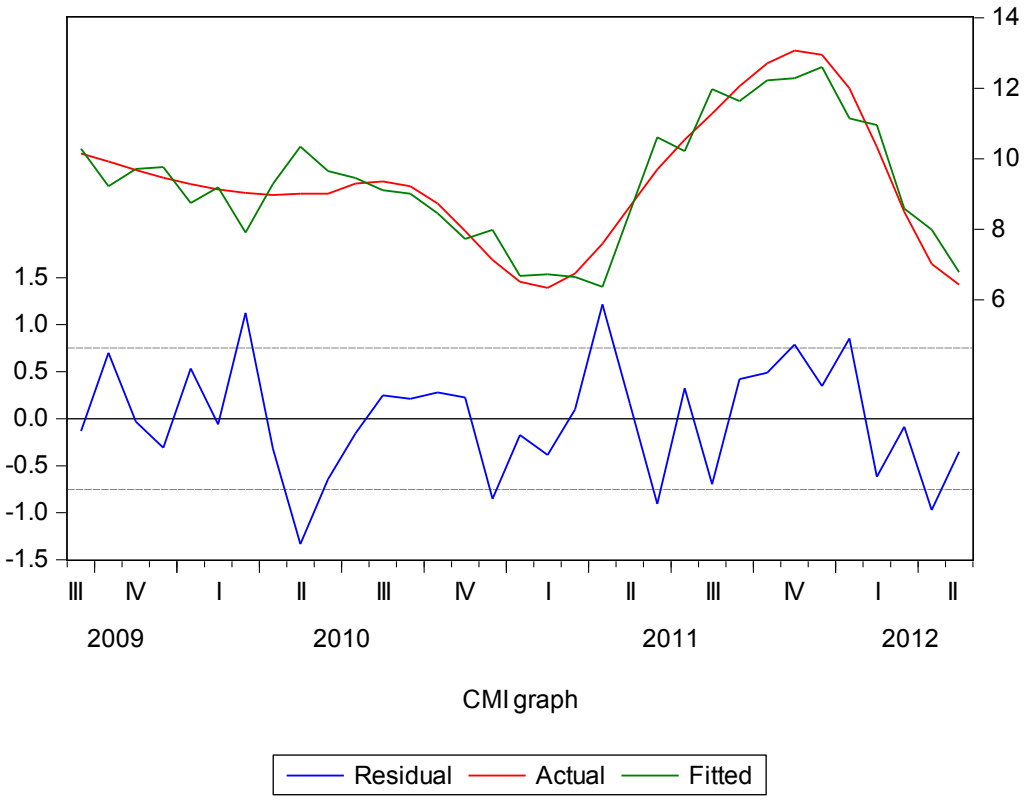
Source: Author's calculation

The estimated consumer confidence index model when regressed with the GDP shows that a unit increases in the GDP growth rate will have a positive effect on CCI with. This satisfied the *a priori* expectation in term of output and consumer confidence index.

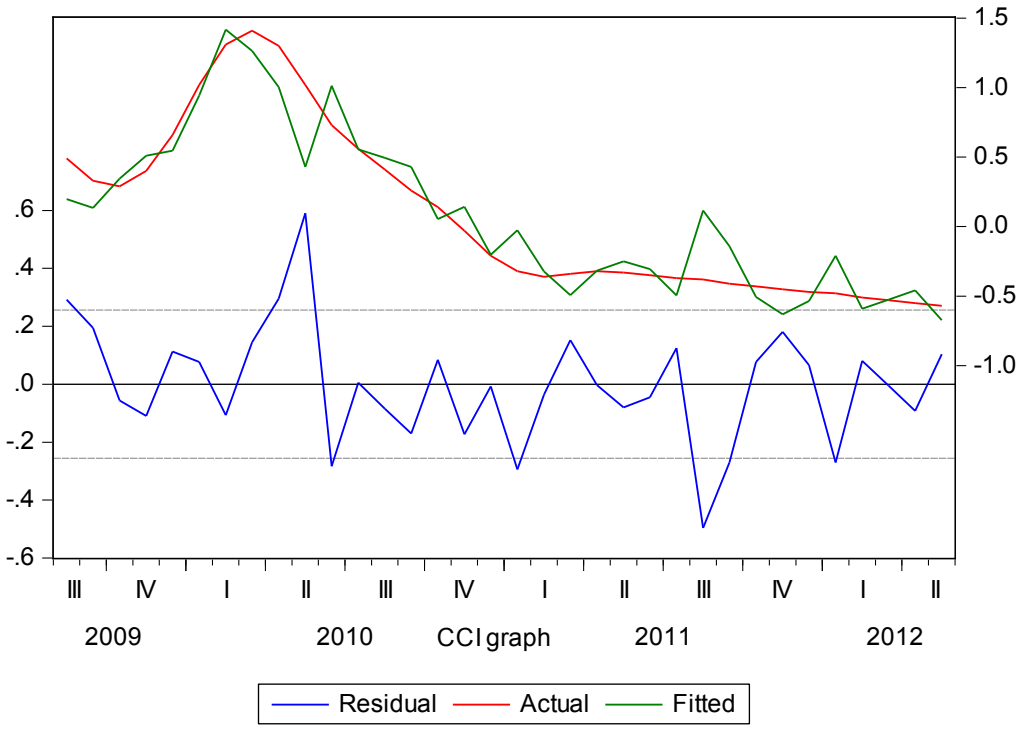
5. Concluding remarks

This study assesses the consumer confidence indices, the outlooks variables and the inter-linkages between consumer confidence and selected macroeconomic variables in Nigeria. Furthermore, we developed and estimated the consumer sentiment model and conference board confidence model for Nigeria with time series methods and these are novel in the literature. We noticed that a change in economic growth have a strong impact on consumer confidence. The study has also shown that several factors are likely to affect the consumer confidence in an economy like Nigeria. Among these are unemployment, petrol prices, financial market indicators like the movements in stock exchange markets (ASI), exchange rates, interest rates, government spending, terrorist attacks etc. Our findings equally suggest that movements in exchange rate and interest rates are negatively affecting consumer confidence in all the six geo-political zones of the country. For instance, rising interest rates and exchange rates usually reflects negative economic and political news. These are quickly priced in money particularly in domestic market and foreign exchange markets. Empirical findings have shown that the movements of some economic variables in these markets are closely watched by consumers and negatively reflected in their behaviors and budget equations. When sufficient monthly data are available, it is expected that the results may be more robust than the one obtained by the cubic spline decomposition method used for the conversion of quarterly data to monthly series. Further study to examine consumer confidence and other key macroeconomic variables across the West Africa zone will be examined in phase two of this work.

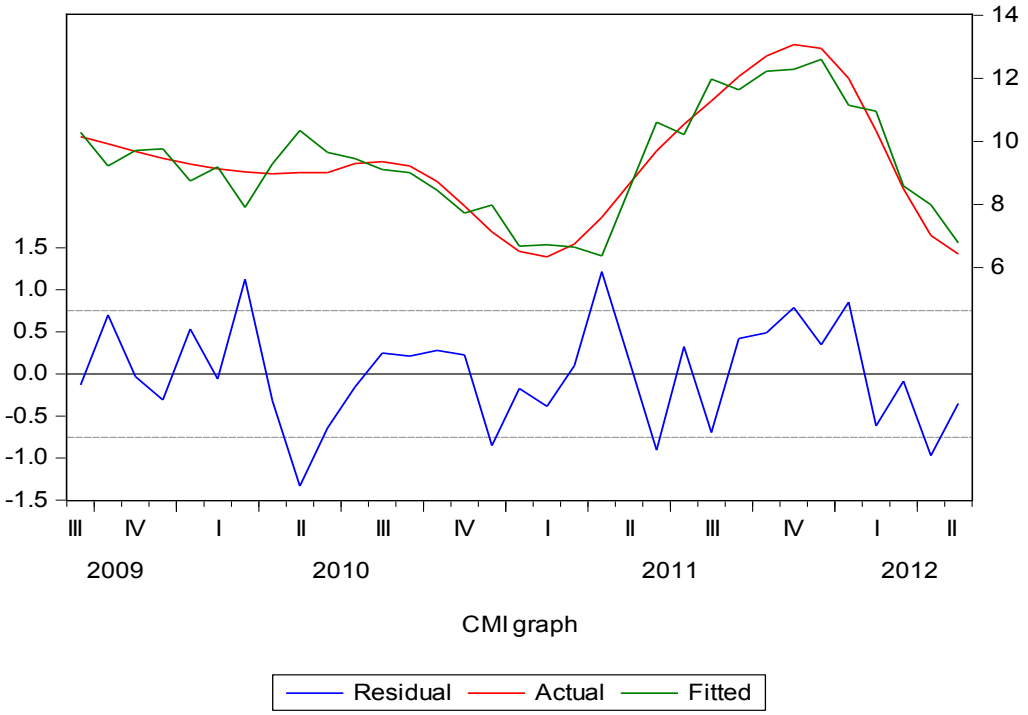
Appendix



CMI graph



CCI graph



Date: 07/24/12 Time: 16:58
Sample (adjusted): 2009M05 2012M05
Included observations: 37 after adjustments
Trend assumption: Linear deterministic trend
Series: CCI INR PEP GSP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.729917	107.0656	47.85613	0.0000
At most 1 *	0.662018	58.63169	29.79707	0.0000
At most 2 *	0.296108	18.49549	15.49471	0.0171
At most 3 *	0.138214	5.503672	3.841466	0.0190

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.729917	48.43393	27.58434	0.0000
At most 1 *	0.662018	40.13620	21.13162	0.0000
At most 2	0.296108	12.99182	14.26460	0.0786
At most 3 *	0.138214	5.503672	3.841466	0.0190

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CCI	INR	PEP	GSP
-0.122873	0.728822	0.035437	3.88E-06
-0.197440	0.263122	-0.086476	6.08E-07
0.078473	-0.569417	-0.044195	9.84E-06
-0.305364	0.106853	0.049242	4.92E-06

Unrestricted Adjustment Coefficients (alpha):

D(CCI)	-0.088613	0.414464	-0.154828	0.126760
D(INR)	-0.107026	-0.005288	0.008737	0.004420
D(PEP)	-3.127795	4.951404	5.831097	1.122200
D(GSP)	-5227.323	-22768.85	-21301.40	24299.43

1 Cointegrating Equation(s): Log likelihood -598.0197

Normalized cointegrating coefficients (standard error in parentheses)

CCI	INR	PEP	GSP
1.000000	-5.931490	-0.288403	-3.15E-05
	(0.70243)	(0.10096)	(9.9E-06)

Adjustment coefficients (standard error in parentheses)

D(CCI)	0.010888
	(0.01496)
D(INR)	0.013151
	(0.00151)
D(PEP)	0.384323
	(0.28313)
D(GSP)	642.2988
	(1792.56)

2 Cointegrating Equation(s): Log likelihood -577.9516

Normalized cointegrating coefficients (standard error in parentheses)

CCI	INR	PEP	GSP
1.000000	0.000000	0.648479	5.17E-06
		(0.09556)	(8.7E-06)
0.000000	1.000000	0.157951	6.19E-06
		(0.02609)	(2.4E-06)

Adjustment coefficients (standard error in parentheses)

D(CCI)	-0.070944	0.044472
	(0.02241)	(0.07466)
D(INR)	0.014195	-0.079394
	(0.00285)	(0.00949)
D(PEP)	-0.593283	-0.976785
	(0.49434)	(1.64713)
D(GSP)	5137.781	-9800.765
	(3256.60)	(10851.0)

3 Cointegrating Equation(s): Log likelihood -571.4557

Normalized cointegrating coefficients (standard error in parentheses)

CCI	INR	PEP	GSP
1.000000	0.000000	0.000000	0.001638
			(0.00037)
0.000000	1.000000	0.000000	0.000404
			(9.0E-05)
0.000000	0.000000	1.000000	-0.002519
			(0.00057)

Adjustment coefficients (standard error in parentheses)

D(CCI)	-0.083093	0.132633	-0.032138
	(0.02264)	(0.08871)	(0.00954)
D(INR)	0.014880	-0.084369	-0.003721
	(0.00298)	(0.01168)	(0.00126)
D(PEP)	-0.135701	-4.297113	-0.796723
	(0.45401)	(1.77875)	(0.19123)
D(GSP)	3466.202	2328.622	2725.133
	(3306.26)	(12953.6)	(1392.61)

Date: 07/24/12 Time: 16:19
Sample (adjusted): 2009M05 2012M05
Included observations: 37 after adjustments
Trend assumption: Linear deterministic trend
Series: CMI EXR GSP INR PEP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.811231	152.2484	69.81889	0.0000
At most 1 *	0.708766	90.56080	47.85613	0.0000
At most 2 *	0.615711	44.91658	29.79707	0.0005
At most 3	0.152995	9.531211	15.49471	0.3185
At most 4	0.087486	3.387403	3.841466	0.0657

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.811231	61.68765	33.87687	0.0000
At most 1 *	0.708766	45.64422	27.58434	0.0001
At most 2 *	0.615711	35.38537	21.13162	0.0003
At most 3	0.152995	6.143808	14.26460	0.5948
At most 4	0.087486	3.387403	3.841466	0.0657

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CMI	EXR	GSP	INR	PEP
1.191552	0.058864	-5.23E-06	1.482369	0.045898
0.202702	-0.698679	4.91E-06	0.053659	0.203227
-0.105869	0.005872	-4.84E-06	-0.392339	0.051185
0.494145	-0.479053	8.19E-06	-0.383292	0.083112
0.395509	-0.134667	9.85E-06	0.046650	0.094392

Unrestricted Adjustment Coefficients (alpha):

D(CMI)	-0.223031	0.117107	-0.070770	-0.022431	0.003718
D(EXR)	0.018643	-0.089724	0.153226	0.030245	0.288375
D(GSP)	-456.6313	-7524.788	31087.71	-24722.35	1343.554
D(INR)	0.022022	-0.049361	0.080042	0.012564	-0.000845
D(PEP)	0.070452	-9.892160	-2.318250	2.013590	-0.079723

1 Cointegrating Equation(s): Log likelihood -599.4704

Normalized cointegrating coefficients (standard error in parentheses)

CMI	EXR	GSP	INR	PEP
1.000000	0.049402	-4.39E-06	1.244066	0.038519
	(0.06047)	(1.1E-06)	(0.07586)	(0.01596)

Adjustment coefficients (standard error in parentheses)

D(CMI)	-0.265753
	(0.04485)
D(EXR)	0.022214
	(0.21821)
D(GSP)	-544.0998
	(16374.0)
D(INR)	0.026241
	(0.02664)
D(PEP)	0.083947
	(2.86441)

2 Cointegrating Equation(s): Log likelihood -576.6483

Normalized cointegrating coefficients (standard error in parentheses)

CMI	EXR	GSP	INR	PEP
1.000000	0.000000	-3.98E-06	1.230228	0.052142
		(8.3E-07)	(0.05737)	(0.00692)
0.000000	1.000000	-8.19E-06	0.280116	-0.275745
		(1.9E-06)	(0.13027)	(0.01571)

Adjustment coefficients (standard error in parentheses)

D(CMI)	-0.242015	-0.094949
	(0.03744)	(0.02172)
D(EXR)	0.004027	0.063786
	(0.22046)	(0.12789)
D(GSP)	-2069.392	5230.533
	(16526.0)	(9586.82)
D(INR)	0.016235	0.035784
	(0.02473)	(0.01435)
D(PEP)	-1.921217	6.915593
	(1.91759)	(1.11240)

3 Cointegrating Equation(s): Log likelihood -558.9556

Normalized cointegrating coefficients (standard error in parentheses)

CMI	EXR	GSP	INR	PEP
1.000000	0.000000	0.000000	1.431775	0.007571
			(0.08847)	(0.01205)
0.000000	1.000000	0.000000	0.694460	-0.367374
			(0.19327)	(0.02633)
0.000000	0.000000	1.000000	50594.83	-11188.67
			(18975.0)	(2585.12)

Adjustment coefficients (standard error in parentheses)

D(CMI)	-0.234522	-0.095364	2.08E-06	
	(0.03416)	(0.01974)	(2.4E-07)	
D(EXR)	-0.012195	0.064686	-1.28E-06	
	(0.21868)	(0.12638)	(1.6E-06)	
D(GSP)	-5360.619	5413.095	-0.185030	
	(15092.4)	(8722.10)	(0.10766)	
D(INR)	0.007761	0.036254	-7.45E-07	
	(0.01738)	(0.01004)	(1.2E-07)	
D(PEP)	-1.675786	6.901979	-3.78E-05	
	(1.85517)	(1.07212)	(1.3E-05)	

4 Cointegrating Equation(s): Log likelihood -555.8837

Normalized cointegrating coefficients (standard error in parentheses)

CMI	EXR	GSP	INR	PEP
1.000000	0.000000	0.000000	0.000000	0.001504
				(0.05049)
0.000000	1.000000	0.000000	0.000000	-0.370317
				(0.03306)
0.000000	0.000000	1.000000	0.000000	-11403.08
				(2579.28)
0.000000	0.000000	0.000000	1.000000	0.004238
				(0.03723)

Adjustment coefficients (standard error in parentheses)

D(CMI)	-0.245607	-0.084618	1.90E-06	-0.287967
	(0.03649)	(0.02366)	(3.3E-07)	(0.04405)
D(EXR)	0.002751	0.050197	-1.03E-06	-0.048887
	(0.23601)	(0.15299)	(2.1E-06)	(0.28491)
D(GSP)	-17577.05	17256.41	-0.387544	-3801.725
	(15185.5)	(9843.43)	(0.13813)	(18331.8)
D(INR)	0.013969	0.030235	-6.42E-07	-0.006223
	(0.01852)	(0.01200)	(1.7E-07)	(0.02236)
D(PEP)	-0.680780	5.937363	-2.13E-05	-0.288617
	(1.94437)	(1.26037)	(1.8E-05)	(2.34723)

Date: 07/24/12 Time: 16:21
Sample (adjusted): 2009M05 2012M05
Included observations: 37 after adjustments
Trend assumption: Linear deterministic trend
Series: CBM EXR GSP INR PEP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.920893	192.3017	69.81889	0.0000
At most 1 *	0.797642	98.43452	47.85613	0.0000
At most 2 *	0.506503	39.31905	29.79707	0.0030
At most 3	0.252962	13.18821	15.49471	0.1081
At most 4	0.062744	2.397575	3.841466	0.1215

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.920893	93.86717	33.87687	0.0000
At most 1 *	0.797642	59.11546	27.58434	0.0000
At most 2 *	0.506503	26.13085	21.13162	0.0091
At most 3	0.252962	10.79063	14.26460	0.1650
At most 4	0.062744	2.397575	3.841466	0.1215

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CBM	EXR	GSP	INR	PEP
-2.437223	0.206110	-2.09E-06	-0.617902	-0.163958
2.783838	-0.094667	-1.70E-06	-0.462563	0.062713
-0.990185	-0.761354	5.95E-06	-0.812183	0.103679
-2.956647	0.128487	-8.65E-06	0.343601	0.013086
2.166413	0.297434	-1.11E-05	0.719295	-0.085985

Unrestricted Adjustment Coefficients (alpha):

D(CBM)	0.032651	-0.016116	0.005403	0.017234	-0.000265
D(EXR)	0.122918	0.171210	-0.065449	-0.037715	-0.239547
D(GSP)	-10468.74	14889.49	-24064.98	32725.96	-2133.631
D(INR)	0.084259	0.086622	-0.009228	0.005328	0.002610
D(PEP)	7.914454	-1.210047	-4.999944	-3.465589	0.196296

1 Cointegrating Equation(s): Log likelihood -531.2648

Normalized cointegrating coefficients (standard error in parentheses)

CBM	EXR	GSP	INR	PEP
1.000000	-0.084568	8.59E-07	0.253527	0.067272
	(0.01881)	(3.4E-07)	(0.02949)	(0.00476)

Adjustment coefficients (standard error in parentheses)

D(CBM)	-0.079579
	(0.01808)
D(EXR)	-0.299578
	(0.43750)
D(GSP)	25514.66
	(33703.9)
D(INR)	-0.205359
	(0.04539)
D(PEP)	-19.28929
	(4.55238)

2 Cointegrating Equation(s): Log likelihood -501.7070

Normalized cointegrating coefficients (standard error in parentheses)

CBM	EXR	GSP	INR	PEP
1.000000	0.000000	-1.60E-06	-0.448426	-0.007566
		(6.4E-07)	(0.05653)	(0.00776)
0.000000	1.000000	-2.91E-05	-8.300490	-0.884957
		(8.8E-06)	(0.77545)	(0.10642)

Adjustment coefficients (standard error in parentheses)

D(CBM)	-0.124443	0.008255
	(0.02519)	(0.00154)
D(EXR)	0.177043	0.009127
	(0.65402)	(0.04009)
D(GSP)	66964.60	-3567.255
	(50167.9)	(3075.33)
D(INR)	0.035783	0.009166
	(0.03639)	(0.00223)
D(PEP)	-22.65786	1.745800
	(6.86250)	(0.42068)

3 Cointegrating Equation(s): Log likelihood -488.6416

Normalized cointegrating coefficients (standard error in parentheses)

CBM	EXR	GSP	INR	PEP
1.000000	0.000000	0.000000	0.233405	0.044416
			(0.02201)	(0.00321)
0.000000	1.000000	0.000000	4.091741	0.059824
			(0.37933)	(0.05525)
0.000000	0.000000	1.000000	426063.1	32482.95
			(35342.1)	(5147.97)

Adjustment coefficients (standard error in parentheses)

D(CBM)	-0.129793	0.004142	-8.83E-09
	(0.02580)	(0.00535)	(4.4E-08)
D(EXR)	0.241849	0.058956	-9.38E-07
	(0.67549)	(0.14010)	(1.2E-06)
D(GSP)	90793.38	14754.71	-0.146545
	(49131.2)	(10190.3)	(0.08378)
D(INR)	0.044920	0.016192	-3.79E-07
	(0.03712)	(0.00770)	(6.3E-08)
D(PEP)	-17.70699	5.552527	-4.43E-05
	(6.18400)	(1.28263)	(1.1E-05)

4 Cointegrating Equation(s): Log likelihood -483.2463

Normalized cointegrating coefficients (standard error in parentheses)

CBM	EXR	GSP	INR	PEP
1.000000	0.000000	0.000000	0.000000	0.021166
				(0.00315)
0.000000	1.000000	0.000000	0.000000	-0.347766
				(0.04242)
0.000000	0.000000	1.000000	0.000000	-9958.365
				(3762.97)
0.000000	0.000000	0.000000	1.000000	0.099613
				(0.01202)

Adjustment coefficients (standard error in parentheses)

D(CBM)	-0.180747	0.006356	-1.58E-07	-0.011187
	(0.02882)	(0.00479)	(6.5E-08)	(0.00698)
D(EXR)	0.353358	0.054111	-6.12E-07	-0.114949
	(0.85268)	(0.14182)	(1.9E-06)	(0.20653)
D(GSP)	-5965.722	18959.56	-0.429571	30371.19
	(54922.3)	(9134.54)	(0.12302)	(13302.7)
D(INR)	0.029167	0.016876	-4.25E-07	-0.082807
	(0.04665)	(0.00776)	(1.0E-07)	(0.01130)
D(PEP)	-7.460472	5.107244	-1.43E-05	-1.460541
	(7.18725)	(1.19537)	(1.6E-05)	(1.74082)

Here is Matlab code to plot a cubic spline:

```
function plot_cubic_spline(x,s0,s1,s2,s3)
                n = length(x);
              inner_points = 20;
                for i=1:n-1
  xx = linspace(x(i),x(i+1),inner_points);
     xi = repmat(x(i),1,inner_points);
     yy = s0(i) + s1(i)*(xx-xi) + ...
   s2(i)*(xx-xi).^2 + s3(i)*(xx - xi).^3;
        CCIgraph= plot(xx,yy,'b')
            plot(x(i),0,'r');
                  end
```

References

Acemoglu, D. & Scott, A., (1994). "Asymmetries in the Cyclical behaviour of UK Labour Markets" Economic Journal, Royal Economic Society, vol. 104(427), pages 1303-23

Adams, F.G. (1964), "Consumer Attitudes, Buying Plans and Purchases of Durable Goods: A Principal Components, Time Series Approach", *Review of Economics and Statistics*, 46 (4), pp. 347–355.

Associated Press (2002). "Shares Fall on Report of Drop in Consumer Confidence." The Attention to Consumer Confidence Surveys?" Economic Review, May/June, pg. 57-71.

Banerjee, A., J. J. Dolado, J. W. Galbraith, and D. Hendry (1993). Co-integration, Error Correction, and the Econometric Analysis of Non-Stationary Data. Advanced Texts in Econometrics. Oxford: Oxford University Press.

Carroll C.D., J.C. Fuhrer and D.W. Wilcox (1994), "Does Consumer Sentiment Forecast Household Spending? If So, Why?", *American Economic Review*, 84(5), pg 1397–1408.

Conference Board (2003). "The Conference Board's Consumer Confidence Index Rebounds in April." April 29.

Desroches, B. and Gosselin, M. (2002) "The Usefulness of Consumer Confidence Indexes in the United States." Working Paper no. 2002-22. Ottawa: Bank of Canada.

Dickey, D. A., Fuller, W. A. 1979. Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association, 74,* 427-31.

Emerson, R. A., and Hendry, D. F. (1994). An evaluation of forecasting using leading indicators. Mimeo, Nuffield College, Oxford.

Estrella A (1998), "A New Measure of Fit for Equations with Dichotomous Dependent Variables", *Journal of Business and Economic Statistics*, 16(2), pg 198–205.

Estrella A and F.S. Mishkin (1998), "Predicting US Recessions: Financial Variables as Leading Indicators", *Review of Economics and Statistics*, 80(1), pg 45–61.

Friend I. and F. G Adams (1964), "The Predictive Ability of Consumer Attitudes, Stock Prices, and Non-Attitudinal Variables", *Journal of the American Statistical Association*, 59(308), pg 987–1005.

Gulley, O. D., Sultan J. (1998). Consumer Confidence Announcements: Do They Matter? *Applied Financial Economics, 8*(2), 155-66.

Jansen, W. J., and Nahuis, N. J (2003). The Stock Market and Consumer Confidence: European Evidence. *Economics Letters* 79,): 89-98.

Johansen, S. (1988). Statistical analysis of cointegration vectors. Journal of Economic Dynamics and Control 12, 231–254.

Johnson D.S. , J. A. Parker and N. S. Souleles, (2004). "Household Expenditure and the Income Tax Rebates of 2001," NBER Working Papers 10784, National Bureau of Economic Research, Inc.

Johansen, S. and Juselius, K. (1990), "Maximum Likelihood Estimation and Inference on Cointegration – with Applications to the Demand for Money", Oxford Bulletin of Economics and Statistics 52, 169-210.

Juster F. T and P. Wachtel (1972a), "Anticipatory and Objective Models of Durable Goods Demand", *American Economic Review*, 62(4), pg 564–579.

Juster F. T and P. Wachtel (1972b), "Uncertainty, Expectations and Durable Goods Demand Models", in B. Strumpel, J.N. Morgan and E. Zahn (eds), *Human Behaviour in Economic Affairs: Essays in Honor of George Katona*, Elsevier Science, Amsterdam.

Langer, G. (2003). “Confidence Its Best in Seven Months.” ABC News Polling Unit, April 22.

Leeper E. M (1992), “Consumer Attitudes: King for a Day”, *Federal Reserve Bank of Atlanta Economic Review*, 77(4), pg 1–15.

Lemmon, M and E. Portniaguina (2006) “Consumer Confidence and Assets Prices: Some Empirical Evidence” , *The Society of Financial Studies* pp1499-1529

Lovell, M. C and P. L Tien (2000), “Economic Discomfort and Consumer Sentiment”, *Eastern Economic Journal*, 26(1), pg 1–8.

Matsusaka, J.G. and A.M. Sbordone (1995), “Consumer Confidence and Economic Fluctuations”, *Economic Inquiry*, 33(2), pg 296–318.

Mishkin, F.S. (1978) “Consumer Sentiment and Spending on Durable Goods”, *Brookings Papers on Economic Activity*, 1, pg 217–232.

Mueller, E. (1963), “Ten Years of Consumer Attitude Surveys: Their Forecasting Record”, *Journal of the American Statistical Association*, 58(304), pg 899–917.

Phillips, P.C.B., and P. Perron (1988) Testing for a Unit Root in Time Series Regressions" Biometrika 75, 335-346.

Said, E. S and D. A. Dickey(1984). Testing for unit roots in Autoregressive moving average models of unknown order. Biometrika, pg 599-604

Stock J. H and M.W. Watson (1992), “A Procedure for Predicting Recessions with Leading Indicators: Econometric Issues and recent Experience”, in J.H. Stock and M.W. Watson (eds), *Business Cycles, Indicators, and Forecasting*, University of Chicago Press, Chicago, Studies in Business Cycles Vol 28, pg 95–153.

Throop A.W. (1992), “Consumer Sentiment: Its Causes and Effects”, *Federal Reserve Bank of San Francisco Economic Review*, 1, pg 35–59.

Weale, M. 2004. "Policy Targeting with Model-Consistent Expectations," NIESR Discussion Papers 231, National Institute of Economic and Social Research.

Yasemin, O. and Sadullah Ç. (2010) “The Link between Government Spending, Consumer Confidence and Consumption Expenditures in Emerging Market Countries” *Panoeconomicus*, 2010, 4, pp. 471-485.