Is Consumer Confidence Index useful in Forecasting Household Consumption in Nigeria? Evidence from Survey Data

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Abstract

This paper examines the usefulness of the Consumer Confidence Index (CCI) in predicting household consumption in Nigeria. This study differs from past works on Nigeria as it employs the Autoregressive Distributed Lag (ARDL) model, an appropriate methodology for models that include both I(0) and I(1) variables. The estimated ARDL model allows us to gain insight into the short and long run dynamics driving the relationship amongst the included variables. The work investigates whether incorporating consumer confidence and retail trade indices into the consumption model improves its goodness of fit. First, the coefficients of two consumer sentiments variables, namely: consumer confidence index and retail trade index are statistically significant. The results show that the model with the consumer sentiments variables provides the best fit to the data based on the information criterion. The out-of-sample forecast indicates that the model with the two consumer sentiment variables outperformed the other models. This study concludes that the consumer confidence index is a critical determinant of consumer spending in Nigeria.

Key words: Consumer confidence index, forecast, household consumption, survey data

JEL Classification: C22, C32, E27, E37.

1. Introduction

The consumer confidence index is widely used in economic journals as an indicator of future consumption spending. When consumers are optimistic about the future, they consume more and save less than when they are pessimistic about future expectations. Hence, forecasters, policy makers and other analysts find it useful to know the future expectations of consumers about the economic situation, family financial situation and family income. A brief drops and gains in income will leave consumption behaviour unchanged resulting in less volatile short-run fluctuations of aggregate demand. As a result of the little delays in release of National Accounts data in many part of the world, many consumer leading indicators are necessary for effective monitoring and proper planning.

Many empirical research studies have investigated the effectiveness of consumer confidence indices as leading indicators of consumer spending in United States of America and Canada. In Canada for instance, the old paper of Sparpiro and Angevine (1969) discovered that the composite index of consumer mood derived from the Financial Post's quarterly Survey of Consumer Buying Intensions is a very useful tool for predicting consumer spending on durable goods. Many other

studies have since be conducted. In the field of econometric, studies have conventionally shown that measures of consumer confidence are correlated with real consumption (see Carrol et al., (1994) and Olowofeso and Doguwa (2014)), and may have some short-term predictive capability of real consumption model. In fact, Olowofeso and Doguwa (2014) demonstrated that predictive power of consumer confidence in forecasting household spending over the past few decades in Nigeria.

In the studies of Carroll *et al.* (1994); Acemoglu and Scott (1994) examined the question of whether consumer sentiment accurately forecast household spending and presented evidence in the US and Britain, respectively, and discovered that lagged consumer sentiment has significant explanatory power for the current changes in household spending. These important findings do not only contribute to the empirical examination of the forward looking theories of consumption but also provide a guide to the prediction of business cycles.

Easaw and Heravi (2004) suggested new approach, they applied a nonparametric directional approach to test the value of the Consumer Sentiment Index (CSI) in the UK. They examined whether the CSI is a useful predictor of household consumption behavior by looking into the direction of changes in consumption. Easaw and Heravi (2004) identified the CSI as a useful indicator if it is able to predict actual directions of changes or turning points in consumption. This kind of qualitative analysis complements the previous regression based quantitative analysis. Since it is very difficult to find reliable quantitative forecasts for consumption growth, qualitative forecasts such as high growth or low growth in consumption could be valuable information.

The purpose of this paper is to provide a fresh empirical solution to the question of whether consumer confidence index is useful in forecasting household consumption in Nigeria by using survey data. This study will complement the previous empirical quantitative analysis on the Nigerian consumer confidence index by providing qualitative answers for the value of the CCI in predicting directions of household consumption. This study is to improve the understanding of the Nigerian consumer confidence index by comparing the test results with previous regression based studies in Nigeria. This study therefore is an attempt to address issue relating to whether consumer confidence data could be useful in forecasting consumption in Nigeria. To the best of our knowledge, this paper is the first in Nigeria to assess the usefulness of regional consumer confidence indices in forecasting household spending. The paper also examines whether the inclusion of confidence data and other relevant economic indicators improve the fit of consumption model by using data from the consumer expectations survey of the Central Bank of Nigeria.

This study is precisely an extension of the work by Olowofeso and Doguwa (2014) in which they examined the relevance of the consumer confidence index in forecasting future consumption changes in Nigeria. However, unlike Olowofeso and Doguwa (2014), the study employs the autoregressive distributed lag model to estimate the relationship between the included variables. This is done within the framework of cointegration and error correction methodology. The rest of the paper is structured in four sections. Section 2

reviews on the related literature. The methodology is presented in section 3, while section 4 presents the empirical results. The fifth section presents the concluding remarks of the paper.

2. Literature Review

Despite the widespread attention given to the construction and analysis of consumer sentiment index in economic literature, the question regarding its impacts on household spending remains controversial. Thus, since the seminal work of Mueller (1963) who proposed the use of the CSI in forecasting consumer spending, many economists have examined the predictive power of the index for future consumption expenditures without reaching a consensus. For instance, while Acemoglu and Scott (1994), Fan and Wong (1998) and Choi (2002) found the usefulness of the CSI in predicting consumption, other studies such as Kim and Goo (2005) failed to find any empirical support for the usefulness of the index in predicting future consumption. In Nigeria, only a few studies have been conducted to analyze the consumer confidence index and investigate its impact on household consumption in the country.

So far, most studies on consumer attitudes as a leading indicator of household spending have focused primarily on the predictive power of the Michigan Index of Consumer Sentiment (ICS). The results of these studies have, however, been mixed. For example, an early study by Lovell (1975) found that the measures of consumer attitudes based on the Michigan Survey of Consumers are unreliable predictors of future consumption. Mishkin (1978), using a stock adjustment model, showed that the ICS provided good explanatory power for changes in consumer durables. In another study, Souleles (2001), using the microdata of the Michigan Survey, reported that consumer sentiment is useful in forecasting future consumption, even when controlling for a number of macroeconomic variables. On the other hand, Howrey (2001) found that both lagged and current-quarter monthly values of the ICS were generally insignificant when control variables were presented in the equations of total personal consumption expenditures (PCE), consumer spending on durable goods as well as on services.

The work of Ludvigson (2004) examined the main issues surrounding the measurement and reporting of consumer confidence, as well as its relationship with the real economy. The study concluded that the most popular surveys do help predict future consumer expenditure, but the extra predictive power beyond that of other economic and financial indicators is modest.

In another related study, Lovell (2001) suggested that the Index of Consumer Expectations (ICE) developed by the University of Michigan may be a better proxy for consumer confidence than the ICS. This is because the ICE is derived solely from a subset of forward-looking questions, in contrast to the ICS, which is based on both forward-looking questions and current-conditions questions. Many other studies particularly for developed countries give emphasis on the forecasting power of sentiment indices on macroeconomic trends of the economies. With the pioneers of Acemoglu and Scott (1994) and Carroll *et al.* (1994), the studies

focuses on consumer confidence indices since the predictive power of the indices are generally noticed via several analysis. Matsusaka and Sbordone, (1995) employed US quarterly data within the period 1953-1988 to analyze the relationship between consumer sentiment and GNP. Using Granger causality, they find that there is causality from consumer sentiment to GNP. Similarly, Utaka (2003) used vector autoregression, analyzed consumer confidence as a factor in explaining the economy using quarterly Japan data. He discovered that the consumer confidence only has an effect on short-term economic fluctuations; however, no effect is detected in the long run. Afshar and Zomorrodian (2007), using quarterly data for the U.S. from 1980 to 2005, analyze the relationship between three confidence measures and economic fluctuations. They find causality from confidence measures to GDP and that these three measures play crucial roles in economic fluctuations. Nadenichek (2007) investigates whether expectation can play a role in the creation of economic downturns using Japan's stagnation period of 1990s. Olowofeso and Doguwa (2012, 2014) developed and estimated the consumer sentiment model and conference board confidence model for Nigeria. They cited several factors that can affect the consumer confidence in an economy like Nigeria. Using simulation techniques, they discovered that consumer or business confidence indices take a part in explaining the economic fluctuations. The approach here concentrates on monthly data instead and uses a related but somewhat different methodology.

3. The Data and Econometric Methodology

The data used in this paper are obtained from the surveys of the Consumer Expectations Survey (CES) of Central Bank of Nigeria from Q2 2008 to Q2 2014 covering the six geopolitical zones of Nigeria. Other data are obtained from the surveys of business expectations and Statistical Bulletin of the Central Bank of Nigeria. The confidence data are taken from consolidated quarterly expectations surveys data of both households and firms in Nigeria. The major sectors cover 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 are obtained from various publications of the National Bureau of Statistics, 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.

3.1 Method of Data Analysis

The data collected were analyzed using the Microfit software. Given the paucity of monthly data, cubic spline interpolation algorithm was used to convert the quarterly data to monthly series. The ARDL approach to cointegration was employed and the performances of the models were evaluated based on information criterion (AIC) and Root Mean Square Error (RMSE). The data used for the estimation covers the period 2008M4-2013M12 while the forecast sample spans 2014M01 to 2014M06.

3.1.1 Computation of Confidence Indices

Overall Consumer Confidence Index is computed as the average of three indices: Economic condition index (ECI), Family financial condition index (FFCI) and Family income index (FII). The ECI, FFCI and FII are diffusion indices computed as the percentage of respondents that answered in the affirmative less the percentage share of the respondents that answered negative in a given indicator. A negative diffusion index indicates that the respondents with unfavourable view outnumber those with favourable view except for unemployment, changes in prices and interest rate for borrowing money, where a negative index indicates the opposite.

Buying condition and buying intention indices refer to the assessment of consumers as to whether it is good time, neither good nor bad or bad time to buy assets (i.e. consumer durables, house and lot, and motor vehicles) during the quarter. An index above 50 means more respondents indicated that it is a good time to buy assets; below 50 means more respondents believe that it would not be an appropriate time to make purchases; and 50 means the number of respondents on both sides is equal. The BCI is defined as 0.5(100+DI), where DI = diffusion index.

The retail trade confidence index is based on the following three questions from the business expectations survey: We consider the present volume of business activity index with volume of total order book index as well as business trend over the next 3 months; the retail trade confidence index is calculated as the unweighted average of the scores for the three questions.

Table1 below presents the summary of Consumer Confidence Indicator and the other macroeconomic indicators, the corresponding IDs and the corresponding sources from which the data are collected.

Table 1: Macroeconomic factors, respective IDs and data sources

Economic Factor	ID	Source
Real consumption	C_t	National Bureau of Statistics
Growth rate of consumption	ΔC_t	National Bureau of Statistics
Real personal disposable income	RPDI	National Bureau of Statistics
Financial deepening	FD	CBN, Statistical Bulletin
Consumer confidence	CC	CBN, Statistical Bulletin
Retail trade confidence	RTC	CBN, Statistical Bulletin

3.1.2 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 examined in this work. 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 Econometric Specification

This section clearly describes the econometric models developed for this work. In order to investigate the predictive ability of the identified consumer sentiments indices on the growth in household consumption, we employed an autoregressive distributed lag model, similar to the simple autoregressive version estimated by Carrol *et. al*. (1994). The nature of the question contained in the expectations questionnaire of the CBN makes it possible that the indicators contain information captured by other macroeconomic variables. Based on this, the standard equation adopted is specified as follows:

$$\Delta C_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta C_{t-i} + \varepsilon_t \quad (1)$$

where ΔC_t represents the growth rate of consumption and ε is the error term that is identically and independently normally distributed with zero mean and constant variance. Consequently, by adding consumer confidence index (CCI) and retail trade index (RTI) to equation (1) separately, we have equations (2) and (3) respectively. Thus, the two confidence-augmented equations are respectively written as:

$$\Delta C_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta C_{t-i} + \sum_{i=1}^{2} \theta_i \Delta CCI_{t-i} + \varepsilon_t \quad (2)$$

$$\Delta C_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta C_{t-i} + \sum_{i=1}^{2} \gamma_i \Delta RTI_{t-i} + \varepsilon_t \quad (3)$$

We adopted the technique used by Nahuis and Jansen (2004) to investigate whether incorporating consumer confidence, retail trade confidence or both improves the performance of the consumption model. In other words, taking equation (1) as the baseline model, we examine the relative reduction in the unexplained variance of equations (3) and (4) compared to that of equation (1). This measure shows the relative contributions of the survey based consumer sentiments variables to the explanation of consumption growth in Nigeria, besides lagged values of consumption growth itself. The F-statistic testing ($F: \beta_0 = \beta_1 = \beta_2 = \cdots, \beta_n = 0$) will be used to examine whether all the coefficient are jointly zero. This test shows whether the relative reduction in unexpected variance is statistically significant. Thus, in order to assess the contribution of consumer sentiments to household spending/consumption, we include the CCI and RTI to the baseline model (equation 1) to give a model stated as:

$$\Delta C_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta C_{t-i} + \sum_{i=1}^{p} \theta_i \Delta CCI_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta RTI_{t-i} + \varepsilon_t \quad (4)$$

The Autoregressive Distributed Lag Model of Pesaran, et. al. (2001) was used to estimate equations (1) to (4), with a view to obtaining the regression coefficients as well as the adjustment coefficients.

4. Empirical Results

Table 2 summarizes the results of the unit root carried out. The results showed that CCI, FD and RTI are all I(1) and needs to be differenced once to achieve stationary. However, GRPDI and RTI are I(0) variables at 5 per cent level of significance. Since there is a combination of both I(1) and I(0) variables in our model, we choose the ARDL approach.

Table 2: Unit Root Tests (Augmented Dickey-Fuller)

	CCI		FD		GRPDI		RTI		RCG	
	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.3736	0.1528	-1.2441	0.6511	-3.3760	0.0155	-1.6498	0.4518	-5.8938	0.0000
Test critical values: 1% level	-3.5270		-3.5229		-3.5366		-3.5316		-3.5216	
5% level	-2.9036		-2.9018		-2.9077		-2.9055		-2.9012	
10% level	-2.5892		-2.5883		-2.5914		-2.5903		-2.5880	

Source: Data Analysis

4.1 Correlation Analysis

Before we report the other empirical results of the models specified 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. Table 3 shows the correlations between real consumption, real personal disposable income, consumer confidence, retail trade confidence, growth rate of consumption and financial deepening. All of the correlations are in the expected direction except for RTI and GRC that gave negative value of -0.0265. The confidence indices correlate well with GRC, RPDI and RTI. In addition, there are moderate and statistically significant correlations in the expected directions between the indices and the other economic variables: the RPDI and FD as well as between CCI and RPDI. As can be seen from this Table 4, these series reveal a close association for the period under consideration.

Table 3: Correlations between CC Indicator and Key Macroeconomic Variables

	FD	*GRC*	*RPDI*	*CCI*	*RTI*	*DGRC*
FD	1					
GRC	0.573**	1				
RPDI	-0.017	0.380**	1			
CCI	-0.526**	-0.187	0.331**	1		
RTI	-0.178	-0.265*	0.578**	0.634**	1	
DGRC	0.103	0.079	-0.158	0.088	0.275*	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4 presents the results of the estimated error correction models corresponding to the equations specified in equation (1) to (4). Model 1 represents the baseline consumption model, with no consumer sentiments variables. Model II introduces

CCI into the baseline model while Model III incorporates RTI into the baseline model. Model IV presents the results of the complete model, incorporating both the CCI and RTI into the baseline model. The F-statistic shown under the respective models showed that the included variables in the estimated models are jointly significant in determining household consumption in Nigeria.

Table 4 also shows the goodness of fit of each model, as measured by the adjusted R-squared and the information criterion. The adjusted R-squared for the baseline model was 85.1 per cent. The incorporation of CCI led to an improvement in the adjusted R-squared to 87.2 per cent while the adjusted R-squared associated with Model III was 82.9 per cent. This implies that the CCI adds more explanatory power to the model than the RTI. Based on the adjusted R-squared, Model IV outperformed the other models as it recorded the highest adjusted R-squared of 87.9 per cent. Based on the information criterion (AIC), model IV also outperformed the others as it recorded the least AIC. This implies that, of the four models, model IV provides the best statistical representation of the consumption model.

Table 4: Results of the estimated Error Correction Models

Independent Variables	**Model 1**	**Model II**	**Model III**	**Model IV**
D(GRC(-1))	-0.4766***	-0.5203***		-0.2874***
D(GRC(-2))	-0.4315***	-0.4661***		-0.2268***
D(FD(-1))	2.2542***	2.6479***	3.2843***	3.0759***
D(GRPD(-I))	0.5927***	0.5497***	0.5794***	0.6289***
D(GRPDI(-1))	0.2483**	0.2117**		
D(GRPDI(-2))	0.3103**	0.2781***		
D(RTI)			-0.0171***	-0.0105**
D(CCI)		0.0843***		0.0877***
Intercept	-0.15203	0.022274	-0.30875	0.0394
ecm(-1)	-0.4146***	-0.3822***	-0.5672***	-0.5925***
R-Bar-Squared	0.851	0.872	0.829	0.879
Prob(F-statistic)	0.000	0.000	0.000	0.000
Akaike info criterion	43.065	38.162	44.574	35.614
Durbin-Watson stat	1.946	1.941	1.677	1.896
RMSE	0.1334	0.1276	0.1839	0.1150

(*) Significant at 10%, (**) significant at 5%, (***) significant at 1%;

Source: Data Analysis

The error correction coefficients of the models are negative and highly significant, implying that the models are stable. Furthermore, it showed some level of speed in the adjustment process towards long run equilibrium. For instance, at -0.4146, the error correction coefficient for the baseline model implies that about 41.5 per cent of disequilibrium error is corrected within a month. At -0.5925, the error correction term associated with the preferred model IV indicated that the speed of adjustment was faster in model IV relative to the baseline model (Table 4).

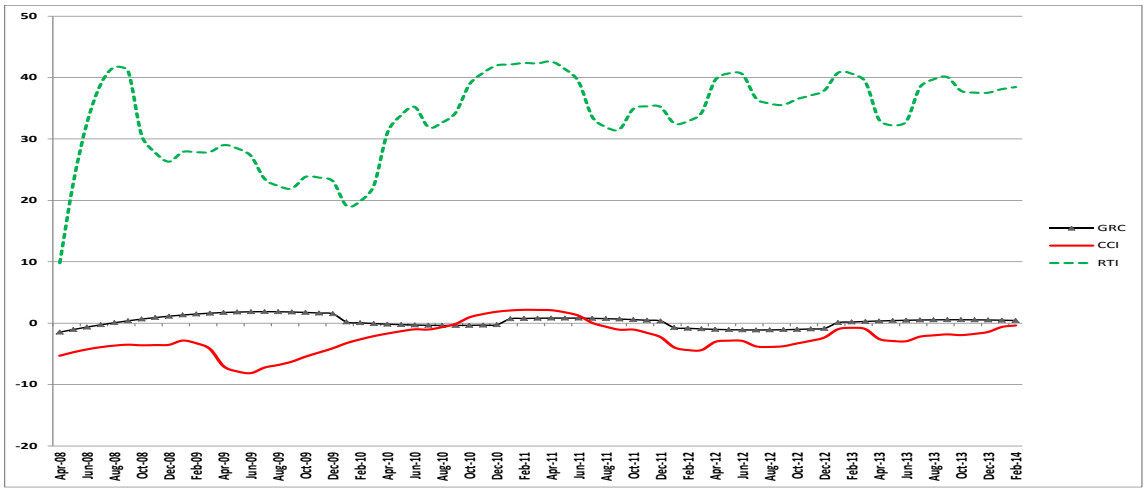

Fig. 1: Trends of Consumer Confidence index, retail trade index and GRC.

The relevance of the consumer sentiment variables in the consumption model is further buttressed by the time series plot presented in Fig. 1. It shows that the consumer confidence index mimics the behavior of household consumption quite well.

From the quarterly data we observed that the consumers' overall outlook in Q2, 2014 remained downbeat. At -2.4 points, it inched up by 6.0 points above the level achieved in the corresponding quarter of 2013. 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 stood at -14.5 points. The indices for next quarter and the next twelve months rose by 1.5 and 4.8 points, respectively, from the level attained in the corresponding quarter 2013. The positive outlook of consumers in these quarters could be attributable largely to the optimistic outlook of consumers in their family income. The retail trade index fell slightly above CCI from August, 2011 as shown in Figures 1and 2.

Consumers have more confidence in the economy when there is increase in the output of goods and services. Historically, the overall conference outlook index was 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.

The negative values displayed by the consumption data used in the model could be as a result of consumers spending less on consumption items at the expense of other pressing needs like payment of school fees, accommodation, housing and transportation costs which are autonomous.

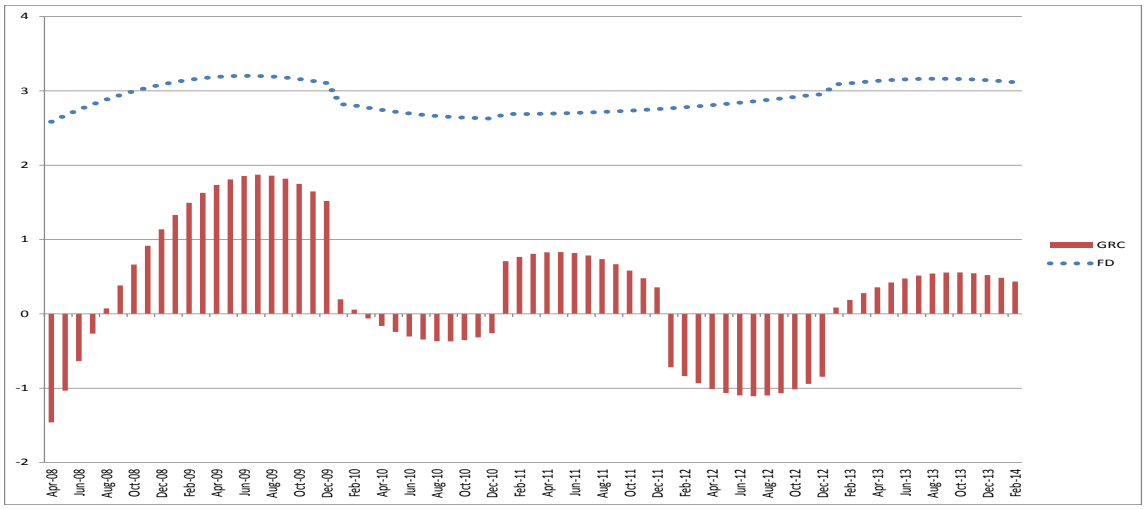

Fig. 2: Trend of financial deepening verses real consumption.

4.2 Forecast Evaluation

In terms of forecast performance, the root mean square error for the baseline model (Model I) was 0.1334. However, the inclusion of CCI in the baseline model led to some improvements in the forecast power of the model as the RMSE decreased to 0.1276 (Table 4). Overall, in terms of forecast power, the model with the two consumer sentiment variables (model IV) performed best. The improvement in the forecast performance due to the consumer sentiment variables was to the tune of about 13.8 per cent. Our results are broadly in line with those of Al-Eyd (2009), who found that the information content of confidence indicators to be relevant for future consumption in the U.S. In other words, the models containing the confidence indicator improve the DGRC forecasts.

5. Concluding Remarks

This paper examined the predictive ability of consumer confidence index that contains a summary information on households' expectation of their future well-being for consumption in Nigeria. Using monthly data covering the period 2008M4 – 2013M12, the study applied the ARDL approach to modeling short and long run relationships. Data for the period 2014M01-2014M06 was used for out of sample forecast. The results of the error correction models showed that the consumer confidence index and retail trade index are statistically significant determinants of household consumption in Nigeria. Based on information criteria and forecast performance, the model with the consumer sentiment variables outperformed the others. The results of the out-of-sample forecast showed that the model generated an improvement of about 13.8 per cent in the forecast performance of the baseline consumption model.

This study concludes that the consumer confidence index is a critical determinant of consumer spending in Nigeria and its inclusion in the consumption model yielded significant increase in its forecast performance. Broadly speaking, our

results are in tandem with Al-Eyd (2009), who finds the information content of confidence indicators useful for predicting future consumption in the U.S. Thus, our empirical analyses showed that including consumer confidence index in a model of consumption can help improve the statistical fit of the model. Thus, the paper concludes that consumer confidence index has predictive power for consumption growth in Nigeria. These findings are of important implications for policy-makers and business owners, who have to plan ahead and anticipate market trends. The study strongly recommends that the Monetary Policy Committee (MPC) of the Central Bank of Nigeria continues to keep an eye on consumer sentiments while taking decisions that have economy-wide implications. For future investigation, this preliminary analysis could however be extended on various reasons. First, it is unclear how robust the results will be by including other relevant macroeconomic variables. Secondly, there is a need for a comparative study of expectations data in modeling consumption in the West African zone.

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