What is the effect of inflation on consumer spending behaviour in Ghana?

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Abstract

The paper examines the effect of inflation on consumer spending behaviour in Ghana during the period 1964 to 2013 using annual data. The analysis of the results was done using Ordinary least square test (OLS), the Johansen test (JH), and Vector Error Correction (VECM) test. The findings of the studies based on the JH tests showed stable significant long run relationship between inflation and consumer spending behaviour. The findings of the study shows significant short run relationship between inflation and consumer spending using the VECM. The results of the OLS test show there is positive relationship between inflation and consumer spending behaviour. Policy makers should take into account the findings of the study in managing the economy. Future studies on causality and structural break are worth undertaking.

Keywords: Inflation, consumer spending behaviour, long run, short run
Jel classification: D11, D12, E31, P24, P44, P46, L67, L68

1 Introduction

The effect of inflation on the consumption patterns of consumers unlike the effect of income on consumer expenditure has not received the needed attention in the marketing environment literature both theoretically and empirically. The effect of inflation on consumer spending is both direct and indirect (Katona, 1975).

Periods of inflation influences consumers to save rather than consume because of pessimism and uncertainty in the economy. Inflation again influence consumer spending behaviour by influencing both liquid and illiquid assets since in period of inflation, there is motivation to hold real assets and not assets fixed to nominal values or not indexed to inflation.

Household's income distribution (employers, employees, debtors and creditors) is changed by inflation (Howard, 1978). Inflation may erode the real value of nominal assets and reduces the real value of wealth held in those assets by the households. Cash-out mechanism (mortgage equity withdrawal) in the presence of a long term interest rate in an economy may results from inflation since inflation determines nominal interest rate and savings.

Studies have examined the conditions under which inflation influence consumer spending in an economy using both survey data and time series data. The findings are found in the works of researchers such as Eggertsson and Woodford (2003); Eggertsson (2006); Eggertsson (2008); Malmendier and Nagel (2009); Piazzesi and Schneider (2009); Eggertsson (2011); Christiano, Eichenbaum, and Rebelo (2011); Woodford (2011); Coibion and Gorodnichenko (2012); Werning (2012); Correia, Farhi, Nicolini, and Teles (2013); Dr¨ager and Lamla (2013); Romer and Romer (2013); Carvalho and Nechio (2014); Hausman and Wieland (2014); Cashin and Unayama (2015); Farhi and Werning (2015); Jalil and Rua (2015).

According to researchers (Doepke and Schneider, 2006; Mian, Rao, & Sufi, 2013) if consumers expect inflation rates to be higher they increase present consumption as a results of a wealth-redistribution channel, given that they have higher marginal propensities to consume out of their wealth.

Higher inflation serve as implicit tax on paper money use by households as a medium

of exchange and as a results higher inflation periods leads to lower consumer spending in an economy since disposable income reduces (Aruoba & Schorfheide, 2011).

Another channel through which inflation pressures influence consumer spending is through the precautionary savings (Bloom, 2009; P´astor & Veronesi, 2013; Taylor, 2013).

The findings of the empirical studies in the literature are inconsistent. Some studies suggest inflation and inflation expectations leads to higher consumer spending, whereas other studies seem to suggest that inflation and inflation expectations leads to lower or no effect on consumer spending. These mixed findings motivated the current studies and the fact that very few empirical studies in the area of marketing environment on the effect of inflation on consumer spending exist in Ghana.

The aim of the study is therefore to examine the effect of inflation on consumer spending (both long run and short run) to contribute to the body of knowledge in literature on the factors that influence consumer spending using the OLS, JH, and VECM.

The paper is based on research question such as what is the nature of the association between inflation and consumer spending. The hypothesis underlying the paper is that there is significant positive association between inflation and consumer spending. There is significant long run and short run relationship between consumer spending and inflation. The paper uses secondary data in the empirical studies and as such, challenges of using secondary data may influence the results of the study. The findings are also limited by the criticisms of the estimation methodologies used such as ADF, OLS, JH, and VECM.

The rest of the paper is organised as follows. The methodology is given in section 2. The empirical results are discussed in section 3. Section 4 concludes the study.

2 Methodology

2.1 Estimation methodology

The current paper is based on quantitative research design using time series data. The relationship between inflation and consumer spending is quantitatively explained in the study. The Johansen test is used to analyse the long run effect of inflation on consumer spending. The error correction model (ECM) is used to examine the short run effect of inflation on consumer spending. The stationarity properties of the variables (inflation and consumer spending) is investigated by the Augmented Dickey-Fuller (ADF) test. The OLS test is used to investigate the association between inflation and consumer spending.

2.2 Data

The data for the empirical study of the effect of inflation on consumer spending is based on annual secondary data for Ghana for the period 1964 to 2013. The source of the data is the World development indicators (WDI). The sample size for the study is 50.

Table 1 Data Description, Proxies and Sources

Data Description	Source
Inflation (INF) (proxied by consumer price index)	WDI
Consumer spending HCSN (proxied by household consumption expenditures)	WDI

2.3 Empirical Model

The empirical model is as specified in equation (1). The models shows a priori positive association between inflation and consumer spending. The dependent variable in the model is consumer spending (HCSN), whereas the independent variable is inflation.

$$HCSN_t = \alpha_0 + \beta_i INF_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where HCSN= consumer spending behaviour; INF=Inflation; and ε_t = error term; α=constant; and β=coefficient.

3 EMPIRICAL RESULTS

3.1 Descriptive Statistics

Table 2 shows the summary statistics of the data in the estimated model. The mean is a measure of the central tendencies of the data, and the values of the mean show a good fit for inflation and consumer spending. The spread of the data set is measured by comparing the minimum and maximum values of the data set. The consumer spending is more spread than inflation.

The coefficients of variation (C.V) measure the volatility of the data set. The higher the value the more volatile the data and the lower the value the less volatile the data set. The results show that inflation is more volatile than consumer spending is. The standard deviation *measures* the dispersion of the data set from their mean values. The more spread apart the data, the higher the *deviation and the higher the value of the standard deviation*. The results show that consumer spending is more spread than inflation.

The coefficient of skewness is a measure of the nature of distribution of the data set (the nature of normality). The results indicate all the data set are positively skewed. The coefficient of kurtosis measures the nature of peakness of the data distribution. The values for the data set are in absolute terms larger than zero. These indicate more peaked-topped distribution with consumer spending been more peaked than inflation. The values of the kurtosis and skewness show that the data set are not normally distributed.

Table 2 Summary Statistics

Summary Statistics, using the observations 1905/05/18 - 1905/07/06				
Variable	Mean	Median	Minimum	Maximum
HCSN	7.08393e+009	4.41165e+009	1.20998e+009	3.09279e+010
INF	21.5255	1.5745	0.0017	132.4650
Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
HCSN	7.68920e+009	1.0854	1.8271	1.9625
INF	35.9587	1.6705	1.7312	1.8355

Source: Author's calculation, March 2017

3.2 Unit Test Results

The stationarity properties of the data set were examined using the time series plots and the ADF test.

3.2.1 Time Series Plots

Figure 1 to figure 4 show the time series plots results of the data set. The figures indicate the data set are non-stationary in levels (figure 1 and figure 2) and attained stationarity after differencing (figure 3 and figure 4). The stationarity properties were further scientifically investigated by employing the ADF test. Table 3 shows the ADF test results.

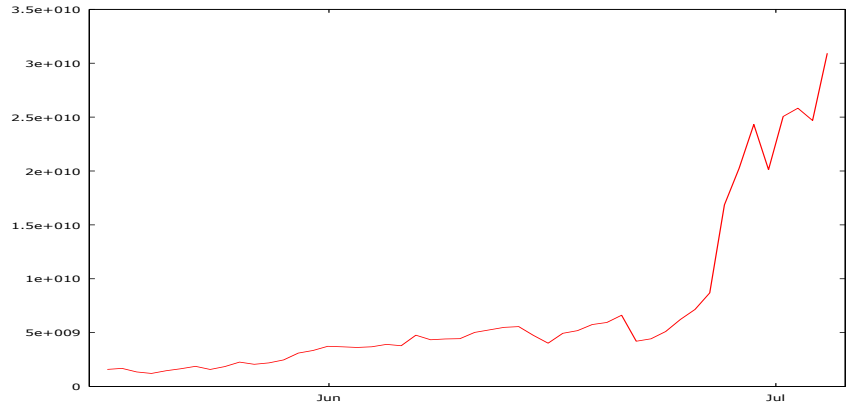

Figure 1. Plots of consumer spending (levels)

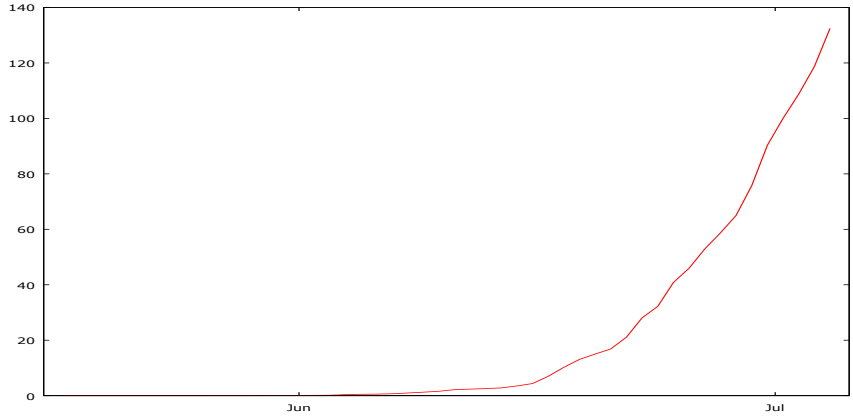

Figure 2. Plots of inflation (levels)

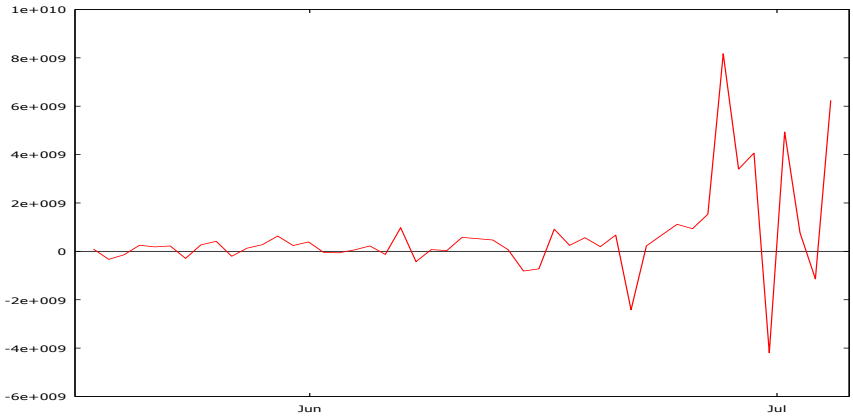

Figure 3. Plots of consumer spending (first difference)

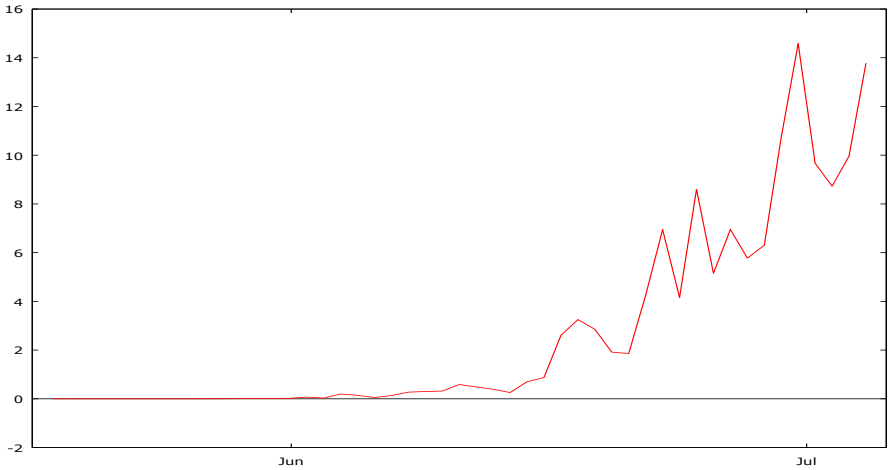

Figure 4. Plots of inflation (first difference)

3.3 Unit Root Test Results

The results of the ADF test for stationarity are shown in Table 3. The ADF test is based on the null assumption that the data set are non-stationary in levels. The data set are integrated of order one, I(1). The more negative the ADF test results, the stronger the rejection of the null hypothesis that the data set are non-stationary in levels for various level of confidence (1%, 5%, and 10%). The results show the variables (HCSN, and INF) are non-stationary. However, the data achieved stationarity on first differenced. The results indicate shock to inflation and consumer spending are permanent and not temporary.

Table 3 ADF Stationarity Test Results with a Constant, Time Trend, and Trend Squared

Variables	T-statistic	Results	Max Lag
HCSN (levels)	-1.4431	Not stationary	1
HCSN (1st diff.)	-7.3725	Stationary	1
INF (levels)	1.0683	Not stationary	1
INF (1st diff.)	-5.4295	Stationary	1
Critical values	-4.04(1%) -3.45(5%) -3.15(10%)		

Source: Author's calculation, March 2017

3.4 Ordinary Least Squared Test Results (OLS) of the relationship between inflation and consumer spending

Table 4 reports the OLS test results on the relationship between inflation and consumer spending. The results show that there is significant positive relationship between inflation and consumer spending at 1% level of significance. The results indicate that 1% increase in inflation leads to about 19.2% increase in consumer spending.

Table 4 OLS Regression Results

OLS, using observations 1905/05/18-1905/07/06 (T = 49)					
Dependent variable: lnHCSN					
	Coefficient	Std. Error	t-ratio	p-value	
const	22.3342	0.0961	232.4694	<0.00001	***
lnINF	0.1920	0.0241	7.9545	<0.00001	***
Mean dependent var	22.2704	S.D. dependent var	0.8586		
Sum squared resid	7.2999	S.E. of regression	0.3941		
R-squared	0.7937	Adjusted R-squared	0.7893		
F(1, 47)	63.2746	P-value(F)	0.0000		
Log-likelihood	-22.8808	Akaike criterion	49.7617		
Schwarz criterion	53.5453	Hannan-Quinn	51.1972		
rho	0.9529	Durbin-Watson	0.1899		

Source: Author's calculation, March 2017: Note *** denote significance at 1% level

3.5 The Diagnostic Test Results

The diagnostic test results on the OLS are reported in Table 5. The test results are on, normality of the errors, autocorrelation, heteroskedasticity, parameter stability, and model specification. The estimated model passed only the normality test and the parameter stability test.

Table 5 Diagnostic Test Results of the OLS Regression

Test	Results
RESET test for specification - Null hypothesis: specification is adequate Test statistic: F(2, 45) = 38.3239 with p-value = P(F(2, 45) > 38.3239) = 1.91618e-010	Specification is not adequate
White's test for heteroskedasticity - Null hypothesis: heteroskedasticity not present Test statistic: LM = 32.4323 P-value = P(Chi-square(2) > 32.4323) = 9.06585e-008	Heteroskedasticity is present
Test for normality of residual - Null hypothesis: error is normally distributed Test statistic: Chi-square(2) = 1.1166 P-value = 0.5722	Error is normally distributed
LM test for autocorrelation up to order 7 - Null hypothesis: no autocorrelation Test statistic: LMF = 28.7165 P-value = P(F(7,40) > 28.7165) = 1.08428e-013	There is autocorrelation
CUSUM test for parameter stability - Null hypothesis: no change in parameters Test statistic: Harvey-Collier t(46) = 1.1641 P-value = P(t(46) > 1.16409) = 0.2504	There is no change in parameters

Source: Author's calculation, March 2017

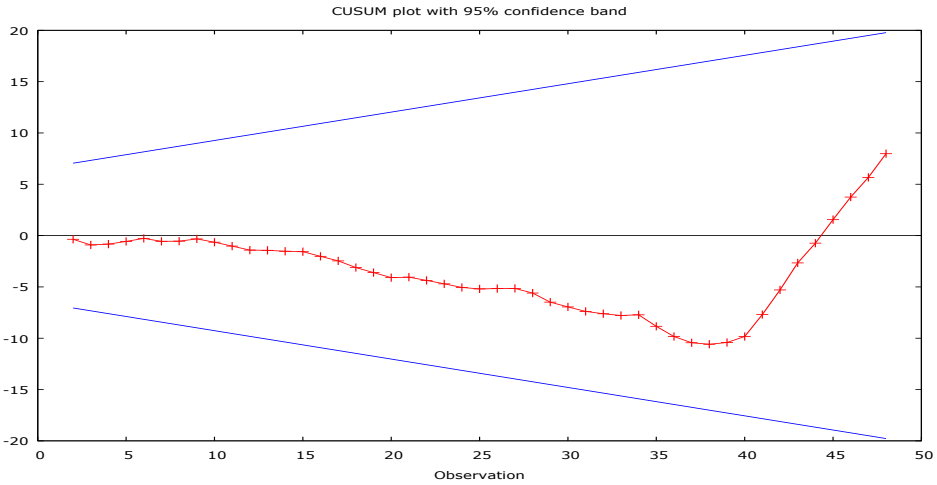

Figure 8 Plots of CUSUM

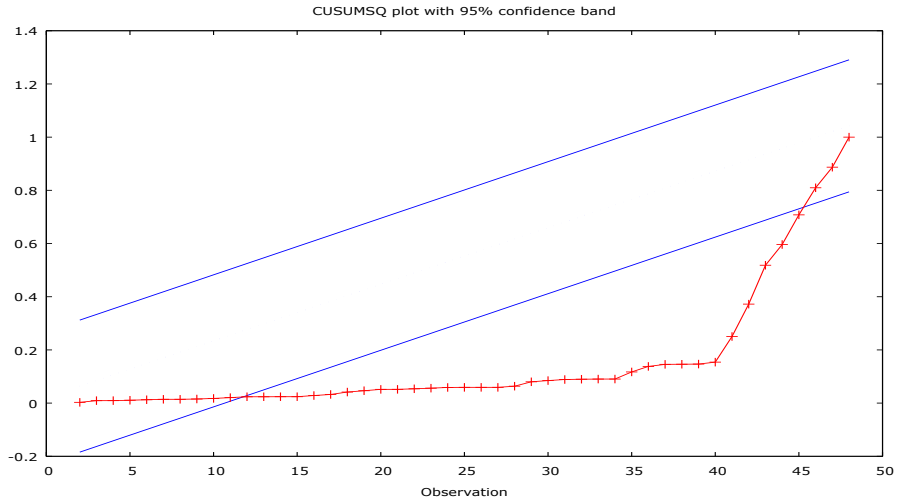

Figure 9 Plots of CUSUMSQ

3.6 Johansen Test Result for the long run link between inflation and consumer spending

The results on the examination of the stable long run relationship between inflation and consumer spending are reported in Table 6. The results of the test indicate that there is significant long run relationship between inflation and consumer spending since both the trace test and the maximum Eigen value test passed the test of stability. There is at least one cointegration rank at 1% level of significance.

Table 6 Long run relationship between inflation and consumer spending

Johansen test **Lag order = 1** **Estimation period: 1905/05/19 - 1905/07/06 (T = 48)** **Dependent variable: consumer spending** **Independent variable: Inflation**			
Rank	Eigenvalue	Trace test/p-value	Lmax test p-value
r=0	0.87273	107.7700[0.0000***]	98.9500 [0.0000***]
r=1	0.16787	8.8206[0.0030***]	8.8206 [0.0030***]

Source: Author's calculation, March 2017

Note *** denotes significance at 1% level of significance

3.7 The short run link between inflation and consumer spending

The short run association between inflation and consumer spending was examined using error correction test (ECM). The results indicate that the short run relationship between inflation and consumer spending explode since the error correction term (ECM-1= 0.0259; p=0.0009) is significant at 1% level of significance. The value is rightly signed since the expected a priori theoretical sign is negative. The value of the adjusted R-squared (0.1986) indicate that in the short run model estimated, only about 19.9% of the changes in consumer spending is explained by inflation.

Table 7 Short run relationship between inflation and consumer spending behaviour

VECM system, lag order 1 **Maximum likelihood estimates, observations 1905/05/19-1905/07/06 (T = 48)** **Cointegration rank = 1** **Unrestricted constant** **Dependent variable: Consumer spending** **Independent variable: Inflation**				
	coefficient	**std. error**	**t-ratio**	**p-value**
const	1.49238e+08	2.82143e+08	0.5289	0.5994
EC-1	-0.0259	0.0073	-3.5560	0.0009 ***
Mean dependent var	6.11e+08	S.D. dependent var	1.94e+09	
Sum squared resid	1.39e+20	S.E. of regression	1.74e+09	
R-squared	0.2157	Adjusted R-squared	0.1986	
rho	-0.1548	Durbin-Watson	2.2341	

Source: Author's calculation, March 2017: Note *** denotes significance at 1% level

4 CONCLUSIONS

The aim of the current paper is to examine the effect of inflation on consumer spending for Ghana for the period 1964 to 2013 using the ADF test (for stationarity properties), Johansen test (for long run relationship), and VECM test (for short run dynamics), and the OLS test (for degree of correlation). The findings of the OLS test suggest the variables are not stationary in levels but on first differenced. The findings of the Johansen test indicate stable long run relationship between inflation and consumer spending. The findings of the VECM shows stable link between inflation and consumer spending. There is positive relationship between inflation and consumer spending.

The findings of the positive association between inflation and consumer spending of the study are in support of the findings of previous studies such as Support Hausman and Wieland (2014) that reported of significant positive effect of inflation on consumer spending. The findings are however contrary to the findings of researchers such as Burke and Ozdagli (2014), Bachmann et al. (2015), and Ichiue and Nishiguchi (2015).

Policy makers should take the findings of the current study into consideration in managing the economy since inflation induces consumer spending behaviour. Marketers should also take into consideration the findings of the study in influencing consumer spending since inflation which is one of the variables in marketing environment positively influences consumer spending behaviour. Future studies should take into account the direction of causality between inflation and consumer spending behaviour. The effect of structural breaks on the link between inflation and consumer spending behaviour to determine whether the findings of the current study will be replicated.

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