International Journal of Economics & Management Sciences

Abdirahman, Int J Econ Manag Sci 2017, 6:5
DOI: 10.4172/2162-6359.1000463

Research Article

Determinants of Commodity Prices: Banadir, Lower Shabelle and World Commodity Prices

Mustaf Abdullahi Abdirahman*

College of Business, Alfaisal University, Saudi Arabia

Abstract

The purpose of this study is to unveil the relationship between commodity prices of Banaadir region, Lower Shabelle, the World food prices, and world agricultural prices between the period of 2000M01 to 2016M12. The study will elucidate if the composite commodity prices of Banaadir region has an association with the world commodity prices (food and agriculture) and Lower Shabelle as well. Johansen cointegration test along with VECM and Pairwise Granger Causality are applied. For the cointegration, trace statistics indicate one cointegrating equation, therefore, there a long run association for about in 4 month equilibrium. VECM supported the existence of long run relationship with a speed of adjustment of 19%. For Granger Causality, the results show, no causality between Lower Shabelle CCPI and Banaadir region CCPI, unidirectional causality between world food index and Banaadir CCPI, unidirectional causality for world agricultural commodity price index and Banadir CCPI, unidirectional causality for world food price index and Lower Shabelle CCPI, unidirectional causality for world agric index and Lower Shabelle CCPI and finally no causality between world food index and agricultural index.

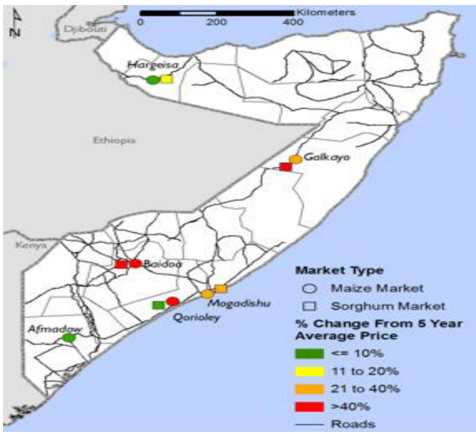
Keywords: Composite commodity price index (CCPI); World food price (WFP); Vector error correction model (VECM); Granger causality; Johansen cointegration

Introduction

International markets have experienced declines in commodity prices in 2015 and 2016. Thanks to global weak demand, low investment, and turbulences in financial markets (UN, 2016). During the same time, however, prices in Somalia have varied considerably by commodity and region. Maize and sorghum prices have vastly elevated in the last quarter of 2016 across the country. Thanks to below average Deyr harvest (Figure 1). While, imported rice and wheat flour remained stable in 2016 nationwide (Figure 2). (FEWSNET, 2017).

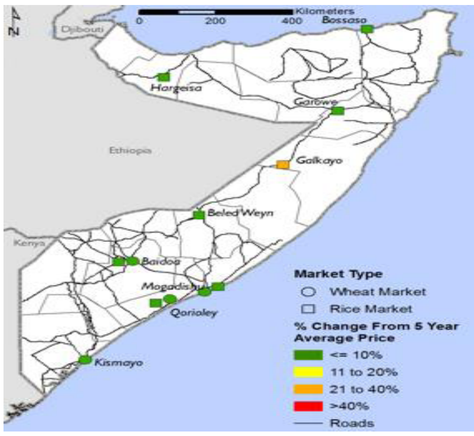
As Figure 1 depicts in December 2016, the southern part of the country, especially, the main maize producing Qoryooley Market was 87 and 50% above December 2015 estimates, as well as 2011 to 2015 average prices. Moreover, Sorghum prices in main producing Baidoa market were 68 and 88% above 2015. Maize and sorghum prices in central and Northern Somalia have also soared. These figures have signaled domestic increase in agricultural commodity prices, particularly maize and sorghum. In addition, a stable condition has been reported in the two mostly imported commodity prices- namely rice and wheat flour. This study will consider 11 mostly used commodities that include food, agriculture and oil for Banaadir region and lower Shabelle. These commodities were average weighted to produce composite commodity prices index (CCPI). The world food and agricultural price index will also be considered in the study.

Furthermore, from our knowledge, no research have been made



Source: Authors' calculations based on FSNAU data.

Figure 1: Dec 2016 Maize and Sorghum prices.



Source: Authors' calculations based on FSNAU data.

Figure 2: Dec 2016 Rice and Wheat prices compared to average compared to average.

***Corresponding author:** Mustaf Abdullahi Abdirahman, College of Business, Alfaisal University, Saudi Arabia, Tel: 966112155663; E-mail: musdhafa06@gmail.com

Received July 18, 2017; **Accepted** September 26, 2017; **Published** September 27, 2017

Citation: Abdirahman MA (2017) Determinants of Commodity Prices: Banadir, Lower Shabelle and World Commodity Prices. Int J Econ Manag Sci 6: 463. doi: 10.4172/2162-6359.1000463

in the determinants of commodity prices and the impact of world commodity prices to the domestic (Banaadir and Lower Shabelle) commodity prices. Our research will focus on finding; if there's an association between Banaadir, Lower Shabelle commodity prices and international commodity prices as well. The following part of the study will give a nutshell of the literature broadly related to the determinants of commodity prices. The literature will range from real to monetary determinants of commodity prices. Data, results, interpretations and conclusion will follow the discussion.

Literature Review

This section will focus concisely on what has been said so for from the determinants of commodity prices. Real determinants like GDP and monetary determinants like exchange rate, interest rate will be further detailed.

Carmen and Eduardo [1] jointly studied the macro economic determinants of commodity prices. The study have stressed on a structural approach to determine the impact of commodity prices on the macroeconomic variables. The theoretical model built on this study took into account, commodity supply as a determinant of commodity prices and the world aggregate demand. The results seem to comply the prior information provided by the theory. The structural model outperformed the random walk prediction over a longer term forcast horizon (5-31) quarters.

Frank and David [2], conducted a study in an attempt to establish long run relationship between commodity prices, consumer prices and money. Cointegration tests have been made and Vector Autoregression framework for US data was built. Results elucinated the existence of such relationship between commodity prices and consumer prices samely to money supply in the long run.

Paul, Hong, and Cai [3] examined the persistent of shocks to world commodity prices. A monthly data from the International Financial Statistics from January 1957 to December 1988 was used in the study. The medium unbiased procedure was adopted. The results depict that shocks to commodity prices are consistent over a long term period.

Akram [4], investigated commodity prices, interest rate and the dollar- the study is about whether a decrease in interest rates and the US dollar cause an increase in commodity prices. Structural Vector Autoregressive analysis adopting an estimated quarteraly data was used. The findings of the study showed prices increase significantly to offset a reduction in real interest rates, and a decline in the US dollar lead to a sudden and great increase in commodity prices.

Joseph, Giorgio, and Norbert [5], investigated determinants of primary commodity prices: co-movements, common factors and fundamentals. The study applied nonstationary panel method to make sure the existence of statistically significant degree of co-movement due to a common factor. Results from factor Augumented VAR approach reveal real interest rate and uncertainty are negatively related to the common factors.

Jeffrey and Andrew [6] studied the determinants of agricultural and mineral commodity prices; especially, macroeconomic determinants. The study utilized world GDP and real interest rates as the macroeconomic variables that can determine the commodity prices whlist, inventory, uncertainty and spot-forward spread were considered as the microeconomic determinant. Unitvariate and bivariate regression analysis for eleven individual commodity prices was applied. The results show that global GDP and inflation positively effect real commodity prices whereas, inventory, volatility and spot-forward spread have strong and consistent effect. Ozge revisited The Dynamics of Commodity Prices, he used an endogenously clustered dynamic factor model to gain a better under-standing of commodity price co-movements and their determinants. From a large dataset of commodity prices, he extracted the fundamental sources behind the price dynamics and found that commodity price co-movements are mostly the result of sparse cluster factors that represent correlations of distinct group of commodities. Moreover, his results showed that a wide range of macroeconomic variables like crude oil prices, fertilizer prices, and the federal funds rate as possible sources of commodity price co-movements.

David and Martin [7] explored what drives commodity price booms and busts? They provided evidence on the dynamic effects of commodity demand shocks, commodity supply shocks, and inventory demand shocks on real commodity prices. In particular, they analyzed data set of price and production levels for 12 agricultural, metal, and soft commodities from 1870 to 2013. Their results indicated that the contribution of commodity demand shocks to real price varies across the different commodities. However, they indicated commodity demand shocks exhibit common patterns with respect to timing across the markets for agricultural, metal, and soft commodities. Inventory or commodity-specific demand shocks are the most important driver in commodity price fluctuations for most of our agricultural and soft commodities. Finally, they concluded that commodity supply shocks play some role in explaining fluctuations for particular commodities, but in the main, their influence on real commodity prices is limited in impact and transitory in duration.

Jan and Paolo [8] Researched to produce forecasts of commodity price movements that can systematically improve on naive statistical benchmarks. They revisit how well changes in commodity currencies perform as potential efficient predictors of commodity prices, a view emphasized in the recent literature they considered different types of factor-augmented models that use information from a large data set containing a variety of indicators of supply and demand conditions across major developed and developing countries. They found that, of all the approaches, the exchange-rate-based model and the PLS factor-augmented model are more likely to outperform the naive statistical benchmarks, and across their range of commodity price indices, they are not able to generate out-of-sample forecasts that, on average, are systematically more accurate than predictions based on a random walk or autoregressive specifications.

Ardian et al. [9] carried a joint research in attempt to examine the relationship between primary agricultural commodities, exchange rate and oil prices. Johansen cointegration method was applied to check the existence of long run relationship between the mentioned variables to estimate a monthly data from 2000 to 2008. The results from this research confirm a consistent long run relationship between crude oil and commodity prices and for the exchange rate - it's role for the relationship to prices exists over time.

Berna and Gabriel [10] explained short and longrun determinants of commodity price volatility in the US agricultural, energy and metal markets. The General Autoregressive Conditional Hetroskadesticity model has been applied to check volatility that may exist in the commodity prices. The study depicts the persistence of volatility shocks is weaker than the requirement of the prior information (i.e. GARCH assumptions), the study also found that decomposing realized volatility into high- and low-frequency components better reveals the impact of slowly-evolving aggregate variables on price volatility. Moreover, over the period 1990-2005, most of the macroeconomic variables had similar effects within the same commodity category but, their effects differed across commodity groups.

Data and Results

Monthly time series data of world food index and world agriculral commodity price index is sourced from the World Bank historical data and the data for the commodity prices of Banadir and Lower Shabelle region is orginated from FSNAU. But further derived for calculation. For example, The composite commodity price index for both regions is based on our calculation from a selected group of eleven commodity prices. These commodities were selected because of the availability of their data in full. We have calculated the weighted average for these commodities to obtain a single composite commodity price index (CCPI). The study period is from 2000M01 to 2016M12. On the other hand, Banaadir region which is a hub for trade with a fine scale seaport that can accommode international trade is selected among the other regions of Somalia. Lower Shabelle region that supply enormous agricultural commodities to Banaadir region and to the world is included in the study. The aim is to check if there is a long run relationship between them and if theirs is a causality between these variables. Johansen cointegration test along with VECM is tested for long run and short run relationship and Granger Causality test is employed to verify causation as well as the leading variable. For the cointegration results, Trace statistics indicate one cointegrating equation. This means we reject the null hypothesis of no cointegration among these variables as seen in Table 1, therefore, there's a statistically significant degree of co-movement between these variables. VECM supported the long run association meaning the whole system gets back to long run equilibrium at the speed of 19%, and p-value of (0.0034) (Table 2).

Granger Causality tests indicate that the null hypothesis of Lower Shabelle CCPI doen't Granger Cause Banadir CCPI is rejected at 5% significance level and vice-versa. We don't reject the null hypothesis that indicates World food index doesn't Granger Cause Banadir CCPI, therefore, there's causation at 1% significance level. But , rejected the null hypothesis of Banadir doesn't Granger Cause WFI. However, this relationship is unidirectional because its only coming from one side. The null hypothesis of API doesn't Granger Cause Bandir CCPI is failed to reject at 1% significance level. But, for the other side, we can reject the null hypothesis of Banadir CCPI doesn't Granger Cause API at 5% critical value. For Lower Shabelle CCPI and WFP, we fail to reject the null hypothesis for WPI doesn't Granger Cause Lower Shabelle CCPI, but we reject the null hypothesis of the vice versa. We also failed to reject the null hypothesis for API doesn't Granger Cause Lower Shabelle CCPI, but, rejected the null hypothesis of the vice versa. Finally, the null hypothesis of WFI and API for both directions is rejected and there's no causality between them (Table 3).

Conclusion

The study elucidated the relationship and causality of Banadir CCPI, world food index, Lower Shabelle and World agricultural price index. The aim of this study was to check the existence of cointegration and causality between the aforementioned variables. Johansen method of Cointegration was run to find long run relationship whilst, Pair wise Granger Causality test was run to explore causality. Vector error correction model was also checked for short run relationship. The cointegration results showed that variables are cointegrated. Further, the findings for the causality test revealed that no causality between Lower Shabelle and Banaadir, unidirectional causality between world food index and Banaadir, unidirection al causality for world agricultural commodity price index and Banadir, unidirectional causality for world food price index and Lower Shabelle, unidirectional causality for world agric index and Lower Shabell and finally no causality between world food index and agricultural index.

Date: 05/15/17 Time: 12:57				
Sample (adjusted): 2000M06 2016M12				
Included observations: 199 after adjustments				
Trend assumption: Linear deterministic trend				
Series: CCPI_BANADIR CCPI_SHABELLE WORLD_FOOD_INDEX AGRIC_INDEX				
Lags interval (in first differences): 1 to 4				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None*	0.108879938	48.01294568	47.8561272	0.04832427
At most 1	0.074675457	25.07299963	29.7970733	0.15884692
At most 2	0.035474386	9.628461144	15.4947129	0.31040691
At most 3	0.012190424	2.440801968	3.8414655	0.11821413
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level.				
*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	0.108879938	22.93994605	27.5843378	0.1760583
At most 1	0.074675457	15.44453849	21.1316163	0.25896744
At most 2	0.035474386	7.187659176	14.2646002	0.4671828
At most 3	0.012190424	2.440801968	3.8414655	0.11821413
Max-eigenvalue test indicates no cointegration at the 0.05 level.				
*Rejection of the hypothesis at the 0.05 level.				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 1: Johansen Cointegration Test.

Dependent Variable: D(CCPI_BANADIR)				
Method: Least Squares (Gauss-Newton/Marquardt steps)				
Date: 05/15/17 Time: 13:12				
Sample (adjusted): 2000M04 2016M12				
Included observations: 201 after adjustments				
D(CCPI_BANADIR)=C(1) × (CCPI_BANADIR(-1)+3.00762931045 × CCPI_SHABELLE(-1) - 142868.111977 × WORLD_FOOD_INDEX(-1) - 102272.612844 × AGRIC_INDEX(-1)+6340246.29981)+C(2) × D(CCPI_BANADIR(-1))+C(3) × D(CCPI_BANADIR(-2))+C(4) × D(CCPI_SHABELLE(-1))+C(5) × D(CCPI_SHABELLE(-2))+C(6) × D(WORLD_FOOD_INDEX(-1))+C(7) × D(WORLD_FOOD_INDEX(-2))+ C(8) × D(AGRIC_INDEX(-1))+C(9) × D(AGRIC_INDEX(-2))+C(10)				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(1)	-0.01930233	0.015804735	-1.22130064	0.003477571
C(2)	-0.15846214	0.07084084	-2.23687549	0.026450742
C(3)	-0.14880069	0.071461781	-2.08224162	0.038652754
C(4)	0.170915601	0.106739328	1.601242995	0.110975735
C(5)	0.043378359	0.105236842	0.412197461	0.680656951
C(6)	26208.57491	19367.06041	1.353255185	0.177573582
C(7)	-15146.5116	19098.47189	-0.79307453	0.428718454
C(8)	-36341.3798	23746.55072	-1.53038562	0.127575828
C(9)	49085.45058	24085.55447	2.037962242	0.042932574
C(10)	-17829.5117	40522.54934	-0.43998988	0.660441912
R-squared	0.095434222	Mean dependent var		-5831.98991
Adjusted R-squared	0.052810703	S.D. dependent var		583448.5793
S.E. of regression	567833.4567	Akaike info criterion		29.38551496
Sum squared resid	6.15851E+13	Schwarz criterion		29.54985849
Log likelihood	-2943.24425	Hannan-Quinn criter.		29.45201548
F-statistic	2.239003851	Durbin-Watson stat		2.067572467
Prob(F-statistic)	0.021234039			

Table 2: Vector error correction model.

Pairwise Granger Causality Tests			
Date: 05/15/17 Time: 13:20			
Sample: 2000M01 2016M12			
Lags: 4			
Null Hypothesis	**Obs**	**F-Statistic**	**Prob.**
CCPI_SHABELLE does not Granger Cause CCPI_BANADIR	200	1.6818888	0.1558079
CCPI_BANADIR does not Granger Cause CCPI_SHABELLE		0.703783	0.590252
WORLD_FOOD_INDEX does not Granger Cause CCPI_BANADIR	200	4.8041624	0.0010282
CCPI_BANADIR does not Granger Cause WORLD_FOOD_INDEX		1.0367207	0.3894986
AGRIC_INDEX does not Granger Cause CCPI_BANADIR	200	6.224343	9.95E-05
CCPI_BANADIR does not Granger Cause AGRIC_INDEX		0.8564967	0.4911787
WORLD_FOOD_INDEX does not Granger Cause CCPI_SHABELLE	200	2.6903042	0.032476
CCPI_SHABELLE does not Granger Cause WORLD_FOOD_INDEX		0.7909929	0.5323249
AGRIC_INDEX does not Granger Cause CCPI_SHABELLE	200	3.6163731	0.0072433
CCPI_SHABELLE does not Granger Cause AGRIC_INDEX		0.4088901	0.80211
AGRIC_INDEX does not Granger Cause WORLD_FOOD_INDEX	200	1.6789885	0.1564838
WORLD_FOOD_INDEX does not Granger Cause AGRIC_INDEX		0.7799049	0.5394978

Table 3: Pairwise granger causality test.

References

1. Carmen C, Eduardo B (1994) The Macroeconomic Determinants of Commodity Prices. International Monetary Fund 41: 236-261.
2. Frank B, David D (2007) Commodity Prices, Money and Inflation. European Central Bank, Working Paper no - 738.
3. Paul C, Hong L, Cai JM (2000) How Persistent are shocks to world Commodity Prices. International Monetary Fund.
4. Akram F (2008) Commodity Prices, Interest Rates and The Dollar. Norges Bank, Working Paper.
5. Joseph PB, Giorgio F, Norbert F (2010) Primary Commodity Prices: Co-movements, Common Factors and Fundamentals. Scottish Institute for Research in Economics.
6. Jeffrey F, Andrew KR (2010) Determinants of Agricultural and Mineral Commodity Prices. Faculty Research Working Paper Series RWP10-038, John F. Kennedy School of Government, Harvard University.
7. David SJ, Martin S (2016) What Drives Commodity price Booms and Busts. Working paper.
8. Jan JG, Paolo P (2009) Commodity Prices, Commodity Currencies, and Global Economic Developments. Federal Reserve Bank of New York.
9. Ardian H, Lanier N, Darren H (2009) The Relationship between Oil, Exchange Rates, and Commodity Prices. Journal of Agricultural and Applied Economics 41: 501-510.
10. Berna K, Gabriel JP (2013) Short- and Long-Run Determinants of Commodity Price Volatility. American Journal of Agricultural Economics 95: 724-738.