

GLOBAL FOOD INFLATION MOVEMENT IN PRE AND POST RECESSION-

A STUDY

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ABSTRACT:

Global economy is experienced new trend after financial recession which got in the year 2008, inflation has economic variable in general economy on the countries such as G20 and BRICS countries are facing. This study has been focused global food inflation impact in pre and post recession for the period of 2000-08 (pre recession), and 2009-14(post recession). Johansen co integrated test has been applied for the stationary of the data. The granger causality test shows that global food inflation effected GDP Per capita income in both pre and post recession period. Regression, linear trend model shows that global food inflation did not effected the global economy growth in pre and post recession period. This study is useful to agriculture countries, which depends on exports, UNO, World Bank, and Global Investment Bankers.

KEY WORDS: Baltic dry index, Global agri index, Global food consumption, Global agriculture production, Food inflation, Global GDP Per capita income.

INTRODUCTION:

Food inflation has become major problem for global economy where it concerns not only for common man but also for policy makers. The global food crisis has affected many including the poor across the globe. The FAO Food Price Index has raised from 124.7 in June 2006 to 224.1 in just two years. Following the financial crisis, the food price has been dropped to as low as 141.2 in February 2009, but it again increased rapidly. In February 2011, the index has reached 237.7 exceeding the pre-crisis peak level, but by December 2014 it again dropped down to 186.2. Due to changes in demand pattern and increased money supply etc. is being treated as some main reasons behind this high food inflation. After November 2009 inflation has been moving upward due to increase in the prices of commodity, fuel, fruits and vegetables fuel. This rises in global food prices have created emergence of inflationary pressures and the appropriate policy formulation in many economies. World prices of wheat, coarse grains, rice and oilseeds

crops all nearly doubled between the 2008 and 2009 marketing years and continued increasing. So I considered this period as a recession period. Actually our analysis is from 2000-14 where we bifurcated the study in to two periods, in which 2000-08 is the pre recession and 2009-14 is post recession. With the help of movements in Baltic dry index we found that 2008-09 is a recession period as BDI is a global economy indicator. In this recession the global financial crisis of 2008 has impacted more on the economic fortunes of many countries, resulting in what has often been known as the 'Great Recession'. Overall, 2008 was the first year since World War II that the world was in recession. The crisis came largely as a surprise to many policy makers multilateral agencies academics and investors exceed its potential rate for the remainder of 2008 and 2009. The recession has affected the global output and volume of world trade. Virtually no country developing or developed has escaped from the impact of economic recession. So, under this study we considered food inflation data for period of 2000-14 to analyze food inflation impact on global economies pre and post recession period with the help of Baltic dry index.

REVIEW OF LITERATURE:

- 1. Elena I Ianchovichina, Josef L. Loening and Christina A. Wood (March 2012):** In this analysis they used regression analysis to estimate the effect of international food price movements on the food price of select countries in the Middle East and North Africa. They found that international food price increases having impact on domestic food prices of the countries. This study has been limited to only 18 countries in the middle east and north Africa, it has not been focused on global level hence this study is not having relevance to my study.
- 2. Christopher Adam (2011):** Under this study he examined how global food price rises are impacted on domestic food and non food market in low income countries. They considered only low income countries but we considered G20 countries hence, this study is not having relevance to my present study.
- 3. Ankie Scott-Joseph:** Under this study he examined causes for increase in food and fuel prices of eastern Caribbean countries and their affect on the families of these countries during the period of 2005-08. They find that due to increase in the prices of food and fuel prices have

impacted more on their cost of living. he considered only eastern Caribbean countries and its food inflation during the period 2005-2008, this analysis has been limited only to this period, but my study considered the food inflation for the period of 2000-2014. hence this study is not having relevance to my present study.

4 J. Davidson, A. Halunga, T.A. Lloyd, S. McCorrison and C.W. Morgan: In this analysis they examined how major drivers of food price inflation like world food prices, oil prices, exchange rate, manufacturing costs, unemployment etc impacted on UK food price inflation during the period of 1990-2010. but my study considered the period of 2000-2014, where this period is divided in to 2 periods, pre recession(2000-08) and post recession(2009-14), in this period I studied global food inflation impact on global economies hence, this study is not having relevance to my study.

5 David K. Bryngelsson, Anders Ahlen, Christian Azar, and U. Martin Person: In this study they considered four selected African countries to analyze the food production and consumption patterns in rural and urban population. They find that the population in rural and urban areas is spending more of their income on consumption of food. So this study is limited only to selected African countries, but my study considered global food consumption and I find out how it is impacted on global food inflation hence this study is not having relevance to my study.

6. Aleksandre Bluashvili (2014): In this study he examined what will be the impact of increase in global prices of wheat and sugar on the domestic prices of those products in Georgian. In this study they considered only two products they didn't focused on more products hence this study is not having relevance to my study.

7. Jayatilleke S. Bandara (2013): under this study he examined what are the factors and drivers for food inflation during the period 2010-11. They found that main drivers for food inflation in india are increase in demand for protein and vitamin based high value food items. This study has been limited only to India and not focused on global level hence this study is not having relevance to my study.

8. Antonio Surisadai Gomez Lopez and Maria Antonia Ortiz Gallardo (2014): Under this study they examined what will be the impact of selected food grain prices of international market on the Mexican domestic market. They found that international food grain prices have affected

the prices of domestic market in the long run but it doesn't affect in short run. This study considered only four products. Hence this study is not having relevance to my study.

9. Dr. S. B. Kishor and Dinesh Gabhane: Under this study they have examined whether consumption of milk by middle class households in thane city is affected by food inflation or not. They found that food inflation is not affected the consumption of milk. This study has been limited only to one product and one city hence this study is not having relevance to my study.

10. Min Bahadur Shrestha, Ph.D.and Shashi Kant Chaudhary(2012): Under this analysis they examined what will be the impact of food inflation on poverty in Nepal. They found that one percent increase in food inflation will push 1 lack more people into overall poverty and 180000 more people into food poverty. This study has been limited only to one nation it has been not focused on global level. Hence this study is not having relevance to my study.

OBJECTIVES:

1. To study the relationship of the global agriculture production, global agri index, global food consumption with Baltic dry index (BDI).
2. To know the food inflation impact on GDP Per capita income.
3. To measure the global food consumption, global agriculture production impact on global agri index in pre and post rescission.
4. Global agriculture production impact on global economy.
5. To know the food inflation impact on global economy in pre and post rescission.

NEED: As researchers had not considered the food inflation movements on global level hence under this study we considered the G20 countries data to analyze food inflation movements in pre and post recession period because this countries are having more than 80% of share in global market capitalization.

SCOPE: This analysis has been emphasized on G20 nations to measure the global food inflation movement in the pre and post recession. This study is confined to 2000-14 and based on Baltic Dry Index movement pre and post recession has been defined for the period of pre recession 8 years were considered i.e., 2000-08 and post recession 6 years i.e., 2008-14 has been considered. In G20 nations 13 countries were considered for the analysis. In this analysis macro level economic variables such as global agricultural production, global food consumption, global food inflation, global GDP per capita income, Baltic Dry index and global agri index.

Empirical study: USA, China, Germany, France, Japan, Brazil, Italy, European Union, UK, Canada, Indonesia, south Korea, Australia

Bananas, Barley, Beef, Canadian Wheat, Fish, Lamb, Maize, Oranges, Poultry, Rice, Shrimp Soft, Red Winter Wheat, Sorghum, Sugar Swine, Wheat

RESEARCH METHADODOLOGY: This study has been done on secondary data by using descriptive statistic tools. The tools are as follows

The Granger causality test: It is a statistical hypothesis test for ascertaining whether one time series can be used for forecasting another time series. It is originally considered that regressions reflect "mere" correlations, but Clive Granger on the other hand argued that causality in economics could be reflected by measuring the ability of predicting the future values of a time series using historical values of another.

$$\mathbb{P}[Y(t+1) \in A | \mathcal{I}(t)] \neq \mathbb{P}[Y(t+1) \in A | \mathcal{I}_{-X}(t)]$$

Johansen test: It is used for co integration that allows for more than one co integrating relationship i.e. large data samples. Therefore this test is more generally applicable than the Engle-Granger test which is based on the Dickey-Fuller (or the augmented) test for unit roots

$$X_t = \mu + \Phi D_t + \Pi_p X_{t-p} + \dots + \Pi_1 X_{t-1} + e_t, \quad t = 1, \dots, T$$

Augmented Dickey-Fuller test (ADF): It is for a unit root in a time series sample. It is an improved version of the Dickey-Fuller test for a larger and more complex set of time series models. In ADF statistic, a negative number is used in the test. The more negative it is, the greater the rejection of the hypothesis. It is given by the following Formula:

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \dots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t,$$

Partial correlation: the partial correlation between X and Y given a set of n controlling variables $\mathbf{Z} = \{Z_1, Z_2, \dots, Z_n\}$, written $\rho_{XY.Z}$, is the correlation between the residuals R_X and R_Y resulting from the linear regression of X with \mathbf{Z} and of Y with \mathbf{Z} , respectively. The first-order partial correlation (i.e. when $n=1$) is the difference between a correlation and the product of the removable correlations divided by the product of the coefficients of alienation of the removable correlations. Partial correlation is a method used to describe the relationship between two variables whilst taking away the effects of another variable, or several other variables, on this relationship.

The partial correlation of A and B adjusted for C is:

$$r_{ABC} = \frac{r_{AB} - r_{AC}r_{BC}}{\sqrt{(1 - r_{AC}^2)(1 - r_{BC}^2)}}$$

LIMITATIONS:

1. Agri index data has been considered from the year 2002.

2. Food inflation data has been considered of 13 countries out of G20 nations.
3. Agri production data is not available in few years for the selected countries of G20.
4. For global food consumption 16 commodities were considered.

DATA ANALYSIS:

1st objective

Correlations

Control Variables			GFC	GAP	GAI
BDI	GFC	Correlation	1	0.88	0.897
		Significance (2-tailed)	.	0	0
		Df	0	10	10
	GAP	Correlation	0.88	1	0.839
		Significance (2-tailed)	0	.	0.001
		Df	10	0	10
	GAI	Correlation	0.897	0.839	1
		Significance (2-tailed)	0	0.001	.
		Df	10	10	0

Interpretation: The above analysis of partial correlation has been applied to Global food consumption, global agri index, Global agriculture production along with the Global Economic Indicator Baltic dry Index (BDI). These Study depicts that all the variables, all the strongly correlated to each other by the considering the Global economy on the based Global economy Indicator(BDI).

2nd objective

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
	No				
Rank or	Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood					
0	-127.05	-127.05	-125.87	-125.87	-122.46
1	-126.56	-123.57	-123.09	-120.12	-117.42
2	-126.56	-123.08	-123.08	-117.34	-117.34
A I C Model	S C Rank				

0 26.21028 0 26.33131

Interpretation: The above analysis of Johansen co-integrated has been applied between Global Food inflation and GDP Per capita income before recession period .the long likely hood ranks for observe in decrease trend in all Lenoir Quadratic models along with the alpha levels which indicate that data is co integrated between Global food inflation and GDP Per capita income.

Null Hypothesis:	Obs	F-Statistic	Prob.
GDPP does not Granger Cause GFI	10	1.90556	0.2426
GFI does not Granger Cause GDPP		0.00661	0.9934

Interpretation: The above granger causality test result unveils between Global food inflation and GDP Per capita income Ho –Null hypothesis is reject because GFI does not Granger cause GDPP, with probability value 0.9934 >0.5 and accept the H1 –alternative hypothesis because GFI Granger cause GDPP, before recession period.

Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or No. of CEs	Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Log Likelihood					
0	-123.34	-123.34	-122.63	-122.63	-122.14
1	-121.02	-121.02	-120.33	-116.2	-115.97
2	-121.02	-119.9	-119.9	-114.74	-114.74
A I C		S C Rank			
0	25.46823	0	25.58926*		

Interpretation: The above analysis of Johansen co- integrated has been applied between global food inflation and GDP Per capita income after rescission period. The long likely hood ranks for observe in decreased trend in all Lenoir and Quadratic models along with the alpha levels which indicate that data is co integrated between Global food Inflation and GDP Per capita income.

Null Hypothesis:	Obs	F-Statistic	Prob.
GDPP does not Granger Cause GFI	10	0.45646	0.6575
GFI does not Granger Cause GDPP		4.3E-05	1.0000

Interpretation: The above granger causality test results between Global food inflation with GDP Per capita income Ho-Null hypothesis is rejected because GFI does not granger cause

GDPP with probability value 1.0000 >0.5, and accept the H1 alternative hypothesis because GFI granger cause GDPP. After recession period.

3rd objective

Model Summary

Multiple R	.967
R Square	.936
Adjusted R Square	.904
Std. Error of the Estimate	5.135E5
Log-likelihood Function Value	-49.255

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.539E13	2	7.697E12	29.195	.004
Residual	1.055E12	4	2.637E11		
Total	1.645E13	6			

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta	Std. Error		
(Constant)	-8880.262	3735.810			-2.377	.076
GFC	4.674	4.655	.307	.306	1.004	.372
GAP	.778	.350	.680	.306	2.223	.090

Interpretation: The above analysis of regression weight least square has been applied to measure the impact of Global food consumption and Global agriculture production on Global agri index .The `R square` is found to be stronger because it is $0.936 > 0.6$.end the analysis of variance is found to be significance as the probability value had fallen below 0.5 i.e. 0.004.the coefficient of GFC and GAP were also significance .hence both the variables before rescission influence the Global agri index.

Model Summary

Multiple R	.103
R Square	.011
Adjusted R Square	-.649
Std. Error of the Estimate	3.334E6
Log-likelihood Function Value	-46.606

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3.596E11	2	1.798E11	.016	.984
Residual	3.335E13	3	1.112E13		
Total	3.371E13	5			

Coefficients

	Unstandardized Coefficients	Standardized Coefficients	T	Sig.

	B	Std. Error	Beta	Std. Error		
(Constant)	5450.022	5444.985			1.001	.391
GFC	2.303	16.137	.107	.753	.143	.896
GAP	-.089	.507	-.132	.753	-.176	.872

Interpretation: The above analysis of regression weight least square has been applied to measure the impact of GFC and GAP on Global agri index. the R square is $0.011 < 0.6$, end the analysis of variance is found to be significance as the probability value had fallen below 0.5, that is i.e. 0.984. the coefficient of GFC and GAP were also significance. Hence both the variables after rescission influence the global agri index.

4th objective

Model Summary and Parameter Estimates

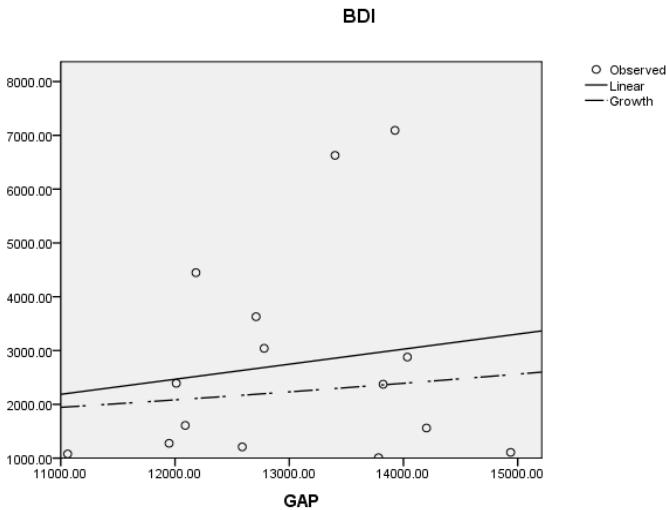
Dependent Variable:
BDI

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.024	.315	1	13	.584	-892.632	.280
Growth	.013	.170	1	13	.687	6.813	6.902E-5

The independent variable is
GAP

Interpretation: The above analysis as linear trend modal has been applied to measure the impact of global agri production on BDI during the period 2000-14. the significance value is found to be

more than 0.5 i.e. 0.687. which indicates that Global agri production impact is not observed on global economy.



Interpretation: The above Graph of linear trend modal depicts that observed variance were followed higher than leaner trend line during the study period. This analysis reflects that's Global economy movement is not influence by the Global agri production.

5th objective

Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or No. of CEs	Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Log Likelihood					
0	-104.61	-104.61	-103	-103	-102.49
1	-102.32	-102.1	-100.49	-85.78	-85.763
2	-101.45	-100.47	-100.47	-83.273	-83.273
AIC	S C				
0	21.72229	0	21.84332		

Interpretation: The above analysis of Johnson co-integration has been applied between Global food inflation and Global GDP Per capita income before rescission period. the long likelihood ranks for observe in decreased trend in all Lenoir and quadratic modals along with the alpha levels which indicates that data is co integrated between Global food inflation and Baltic dry index.

Null Hypothesis:	Obs	F-Statistic	Prob.
BDI does not Granger Cause GFI	10	1.64213	0.2830
GFI does not Granger Cause BDI		0.15717	0.8586

Interpretation: The above granger causality test result unveils between global food inflation with Baltic dry index. Ho-Null hypothesis rejected because GFI does not granger cause BDI, with probability value 0.8586 >0.5 and accepted the H1-alternative hypothesis because GFI granger cause BDI before rescission period.

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood					
0	-97.109	-97.109	-96.588	-96.588	-96.471
1	-37.543	-37.521	-37.195	-34.796	-34.679
2	-37.479	-36.362	-36.362	-31.894	-31.894
0	20.22177	0	20.34280		

Interpretation: The above analysis of Johnson co-integrated has been applied between Global food inflation and Baltic dry index after rescission period. The long likelihood ranks for observe in decreasing trend in all Lenoir and quadratic models along with the alpha levels which indicate that data is co integrated between Global food inflation and Baltic dry index.

Null Hypothesis:	Obs	F-Statistic	Prob.
BDI does not Granger Cause GFI	10	1.45196	0.3183
GFI does not Granger Cause BDI		0.26575	0.7768

Interpretation: The above Granger causality test results unveil between Global food inflation with Baltic dry index. Ho-Null hypothesis is reject because GFI does not granger cause BDI, with probability value 0.7768>0.5 and accept the H1-alternative hypothesis because GFI granger cause BDI after rescission period.

FINDINGS:

1. This study has been observed Global food consumption Global agriculture production and Global agri index were moving along with the Global economy i.e. Baltic dry index (BDI).
2. Global food inflation had influenced GDP Per capita income across the world during the study period 2000-14.
3. Global economy had experience rescission in the year 2008-09. In the pre rescission period i.e. 2002-08, Global food consumption and agriculture production had influence global agri index, but in the post rescission period global agri index were not influence by global food consumption and global agri production.
4. Global economy is largely depends on global agriculture production, this analysis had observed that global agriculture production these not effected much to the global economy as it has expected during the study period of 2000-14.
5. These study and a global economy result unveils that global food inflation not effected in pre and post rescission period

CONCLUSION:

We conclude the analysis of global food inflation impact in pre and post rescission on the economy. This study had been emphasized from the period 2000-14. the analysis has been bifurcating in pre and post recession period based on BDI movement. In this study Global agriculture production, consumption and inflation were considered and observed the global economy not influence by the global food inflation. GDP Per capita income got influenced by the global food inflation before recession but after recession these effects not observe .hence there is further research need to be done because in spite of less agriculture production due to increase of infrastructure and procurement facility .the agriculture production data is showing higher values year on year (yoy). In this study we have not consider other economic variables which influence the global economy.

BIBLIOGRAPHY:

1. <http://www.indexmundi.com/commodities/?commodity=rice>
2. <http://www.indexmundi.com/agriculture/>
3. <http://itg.snetglobalindexes.com/indexdata-form.php>
4. <http://ieconomics.com/food-inflation>
5. http://marine-transportation.capitallink.com/indices/baltic_exchange_history.html?ticker=BDI&date_r=1yr&c=1&s=BDI
6. <http://www.tradingeconomics.com/country-list/gdp-per-capita>
7. <http://monthlyreview.org/2009/07/01/the-world-food-crisis-in-historical-perspective/>

8. http://www.slowfood.com/international/slow-stories/191523/food-movements-unite/q=A4CA5E?-session=query_session:42F94E0618b5e24C6COHqMD08550
9. <http://cacp.dacnet.nic.in/ViewQuestionare.aspx?Input=2&DocId=1&PageId=42&KeyId=473>

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