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DOLLAR INDEX IMPACT ON GLOBAL ECONOMY

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ABSTRACT: This study has been emphasized to find the effect of dollar index fluctuations on the global economy in the post recession period. After 2009 global economic indicator BDI had improved a lot but the dollar fluctuations were not observed during the study period. Augmented Dickey Fuller test has been applied for the stationary of the data on all economic variables which were considered for the analysis. Granger Causality test has proven that the Dollar index is having significant impact on various factors. The volatility of MSCI and CRI is not influenced by the Dollar index. All the selected models of Arch test have rejected. Regression weight estimation had indicated that the global GDP and World exports imports were effected by the Dollar index. This analysis is useful for the FII's, overseas mutual fund managers, portfolio managers and Global financial institutions.

KEY WORDS: Dollar index, Inflation, MSCI, Gold, Crude oil, CRI, PMI, BDI and Harpex

INTRODUCTION:

Dollar has a magnificent value throughout the world and it is considered as global currency by the economists in the world. The value of US Dollar is related to US Dollar Index (USDX). In mid-2007, the United States entered a severe recession during a housing market correction and a subprime mortgage crisis. This is a termed as Great Recession due to the economic decline observed in world markets around. The Dollar Index (USDX) is a measure of the value of the United States dollar corresponding to a basket of six major foreign currencies. It measures the index of strength and weakness of the US dollars against the six other major currencies which are Euro (EUR), Japanese (YEN), Pound sterling (GBP), Canadian dollar (CAD), Swedish krona (SEK), Swiss franc (CHF). Generally these six countries give the more scope by contributing to global GDP. These countries also contribute more to the PMI. The world growth depends mainly on performance of these countries economic behavior. All most all countries in the world depend on these six countries for their imports. Crude oil is a major import for all countries but all the crude oil exporting countries accept U.S dollar and Euro only. Many countries depend on US for crude oil imports. The USDX started in March 1973 after the Bretton Woods system. The base

value of the US Dollar Index was 100.000. It has since traded as high as 164.720 in February 1985 and as low as 70.698 on March 16, 2008. The USDX goes up as the US dollar gains strength when compared to other currencies

The IMF figured out that it was the worst global recession since World War II. This recession had a great impact on the world and its economy especially on Europe and Asian markets. Many of the European country's currency is Euro. Due to recession many people had lost their jobs which led to high unemployment problem. The National Bureau of Economic Research (NBER) of America, dates the beginning of the recession as December 2007 to June 2009, where unemployment rose from 4.7% in November 2007 to peak at 10% in October of 2009. The exchange rates made exports expensive, so that the demand of goods has been reduced. These factors led to the increase in the cost of the basic commodities. The demand went up and supply was not up to the requirement. So by considering Dollar index (USDX) as Global currency, its influence on Global economy from post recession i.e. from 2009 can be studied by comparing with other factors like Commodity, Equity ,Inflation, Gold, Crude oil, PMI, BDI and Harpex.

OBJECTIVES:

1. To measure the relation between crude oil, inflation, gold, PMI based on dollar index.
2. To measure the volatility of global equity index and global commodity index and if it got influenced with dollar index.
3. To know the impact of dollar index on global economy.
4. To know the performance measure of Harpex on BDI and how these two indicators were moving with dollar index.

SCOPE: Dollar index is considered as global currency by economists in the world. In this analysis, how the global currency is having influence on global economy from post recession has been studied. This analysis is confined to the period of five years (2009-2014).

EMPERICAL STUDY:

PMI: Production Manager Index
MSCI: Morgan Stanley Capital International
BDI: Baltic Dry Index
CRBI: Commodity Research Bureau Index
USDX: US Dollar Index
Harpex: Harper Petersen Charterraten Index

NEED OF STUDY: In this analysis we can find the relationship existing between the dollar index and global economy. We can estimate the future predicted value of the global equity index and global commodity index based on dollar index movement. We can measure and also know the performances of BDI and HARPEX indicators, crude oil and gold prices along with the dollar index.

LITERATURE REVIEW:

1. **Menzie D. Chinn** In his study he stated that the dollar has fallen relative to its peak in 2002 but the extent of decline depends upon the composition of basket of currencies used in calculating dollar's value. The basket of currencies consists of 6 major currencies. Euro (EUR) 57.6% weight, Japanese yen (JPY) 13.6% weight, Pound sterling (GBP) 11.9% weight, Canadian dollar (CAD) 9.1% weight, Swedish krona (SEK) 4.2% weight, Swiss franc (CHF) 3.6% weight. He also discussed various measures of dollar value and compared them.
2. **Gurdip Bakshi:** In their paper they showed that BDI has ability to predict range of stock markets with the help of in sample and out of sample statistics. They found that BDI growth rate also predicts the returns of commodity indexes and have seen some evidence for joint predictability of stock and commodity returns in a system of predictive regressions. They concluded that BDI growth rate predicts the global economic activity and it also has a link between real and financial sectors.
3. **Peter Brust:** In their paper they said that as global economy is growing, the interaction between value of US dollar and key commodity prices also tend to change. They evaluated the changing relationship between trade weighted dollar index and dollar price of oil from 1986 to 2009. They noticed an inverse relationship between value of dollar index and crude oil prices from the year 1999.
4. **Feixue huang:** In their paper, the impact of Dollar index closing price for Chinese spot gold market closing price from 31th Oct 2002 to 30th Sep 2009 has been studied. They applied Co integration method and found, as the dollar depreciated the closing price of gold went up. They concluded that the US dollar dominated the closing prices of Chinese spot gold market.
5. **Subarna K. Samanta:** In this paper they considered the co movements of several macro-variables in the world economy over a long period of more than twenty years. The Long-term co movements are examined by tracking the co integration, and common trend factor and the spillover index over these variables (gold price, stock price, real exchange rate for dollar and the oil price of crude oil). Primary examination suggests the possibility of co integration among these variables indicating co movements, although the spillover indices are they found to be very small.
6. **Craig K. Elwell:** Due to fluctuation of dollar rate is largely determined by market the supply and demand .dollar in foreign exchange markets associated with the buying and selling of dollar dominated goods and service and assets like stock, bonds, real property on global markets .in most circumstances however ,internationals assets markets, will tends to be dominant, with the size and strength of inflow and outflow of capital ultimately determining whether the changes rates are appreciates or depreciates.
7. **Chuck Kowalski:** In their paper on the dollar impact on commodity prices, they said that US dollar dominating the commodity prices (CRB index) and there is opposite relation between dollar index and commodities (CRB). If dollar goes up, commodities

fall down. There is no perfect correlation but it is somewhat close to the dollar index. They also noticed that Commodities typically follow an inverse relationship with the value of the dollar index.

8. **Mutita kaewkheaw:** In this paper he analyzed the relationship between the US dollar index and gold price. They applied correlation method (bi-variate) and found the measuring of the dependences structure between the return on gold price and US dollar index.
9. **Ki-ho kim** In this paper the impact of dollar index on inflation from 1973-95 period has been studied and the dollar exchange rate has a negative impact on the inflation. They applied co-integration method and stated that the problem by employing an up-to-date data. It is further established that he exchange rate granger causes the inflation.
10. **Divyang J.Joshi:** In this paper states the long term relationship between commodities price (gold, crude oil) with US dollar (exchange rate). They applied correlation - regression analysis and ADF test and found out the negative relationship between us dollar and commodities price. He also said that the closing price of dollar index has been taken as independent variable and commodities prices are taken as dependent variable.

RESEARCH METHODOLOGY: This analysis has been done on secondary data by using descriptive statistical tools. The following formulas were considered for the analysis.

1. Co-integration: Co-integration is a statistical property of time series variables. Two or more time series are co-integrated if they share a common stochastic drift. If two time series x and y are co-integrated, a liner combination of them must be stationary.

$$Y - Bx = u, \text{ Where } u \text{ is stationary.}$$

2. Granger causality test: Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. A time series X is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y.

- **Null hypothesis:** The null hypothesis refers to a general statement or default position that there is no relationship between two measured phenomena. Rejecting or disproving the null hypothesis- and thus concluding that there is a relationship between two phenomena.

- **Alternative hypothesis:** In statistical hypothesis testing, the alternative hypothesis is applicable when probability is > 0.5. Alternative hypothesis is that the quality is poorer in the second half of the record.

3. MAR Ratio: A measurement of returns adjusted for risk that can be used to compare the performance of commodity trading advisors, hedge funds and trading strategies. The MAR Ratio is calculated by dividing the compound annual growth rate (CAGR) of a fund or strategy since inception by its biggest drawdown. The higher the ratio, the better the risk-adjusted returns. The MAR Ratio gets its name from the Managed Accounts Report newsletter, which developed this metric.

$$MAR = \frac{\text{Compound Annual Growth Rate (CAGR)}}{\text{Maximum Drawdown (Absolute Value)}}$$

CAGR- The compound annual growth rate is calculated by taking the nth root of the total percentage growth rate, where n is the number of years in the period being considered. Maximum Drawdown - The maximum of the peak-to-trough declines during a specific period. Going sequentially through time with a manager's cumulative return, it is the loss from the highest portfolio value to its lowest point. This is a commonly used hedge fund measure since such funds often employ hedging strategies to protect returns in down markets. Hence, the max drawdown is expected to be low.

5. Augmented Dickey-Fuller Test: Augmented Dickey-Fuller Test is a test for a unit root in a time series sample. It is an augmented version of the Dickey-Filler test for a larger and more complicated set of time series models.

LIMITATIONS:

1. CRI data has been considered from October 2009.
2. Harpex data has been considered from July 2010.
3. World GDP, World exports imports and Inflation data has not been considered for the year 2014.
4. CPI has been considered for the inflation data.

DATA ANALYSIS:

1. To measure the relation between crude oil, inflation, gold, PMI based on dollar index.

Control Variables			INFLATION	CRUDE	GOLD	PMI
DOLLARINDEX	INFLATION	Correlation	1.000	.219	.047	-.292
		Significance (2-tailed)	.	.368	.850	.226
		Df	0	17	17	17
	CRUDE	Correlation	.219	1.000	.053	.024
		Significance (2-tailed)	.368	.	.828	.923
		Df	17	0	17	17
	GOLD	Correlation	.047	.053	1.000	-.131
		Significance (2-tailed)	.850	.828	.	.593
		Df	17	17	0	17
	PMI	Correlation	-.292	.024	-.131	1.000

	Significance (2-tailed)	.226	.923	.593	.
	Df	17	17	17	0

Interpretation: The above table shows the partial correlation between Inflation and Crude oil, significance value is found to be in an acceptable level. Thus the two variables are slightly correlated. Inflation and Gold but there no correlation between thus variables and also applied same co relation applied to Inflation and PMI they are moderately co related. Crude oil and gold but there is no co relation between gold and crude oil. Crude oil and PMI they are related to slightly co related and the gold and PMI there is slightly co related.

2. To measure the volatility of global equity index and global commodity index and if it got influenced with dollar index.

CRI and Dollar index

Heteroskedasticity Test: ARCH

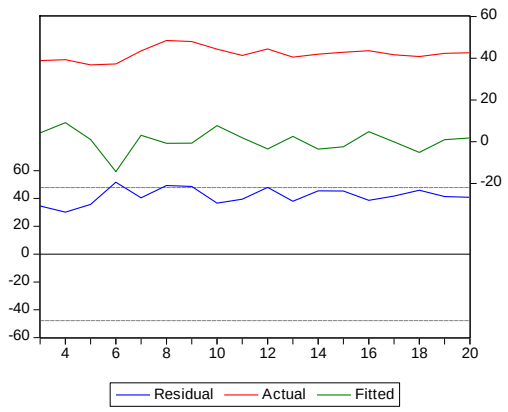
F-statistic	0.512249	Prob. F(1,15)	0.4852
Obs*R-squared	0.561378	Prob. Chi-Square(1)	0.4537

MSCI and Dollar index

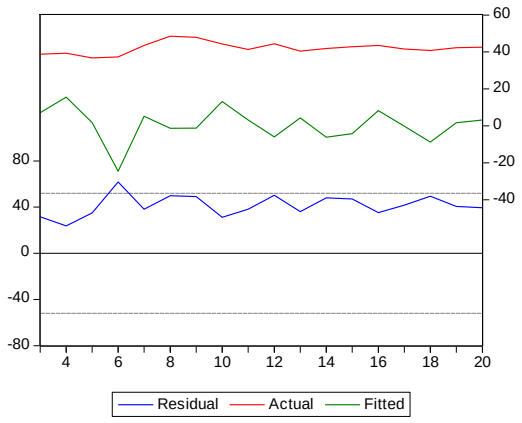
Heteroskedasticity Test: ARCH

F-statistic	0.590749	Prob. F(1,15)	0.4541
Obs*R-squared	0.644147	Prob. Chi-Square(1)	0.4222

ARCH CRI Dollar Index

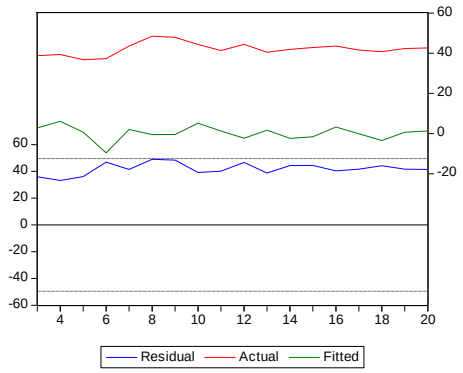


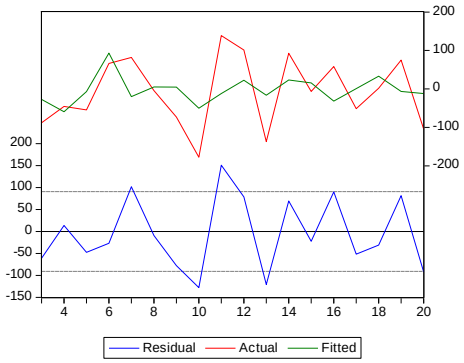
PARCH Dollar Index



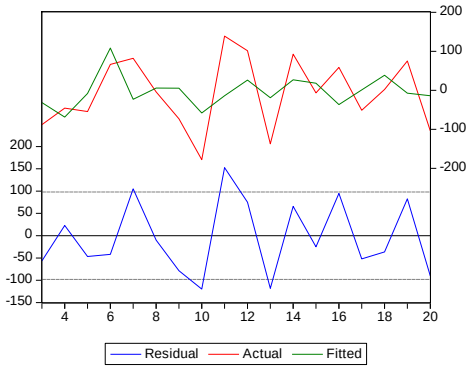
EGARCH CRI Dollar Index

ARCH MSCI Dollar Index

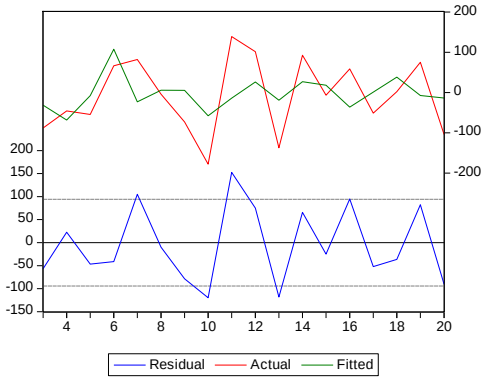




PARCH MSCI Dollar Index



EGARCH MSCI Dollar Index



TEST VALUES

Variables		ARCH	PARCH	EGARCH
CRI	Prob	0.7506	0.5533	0.8024
	AIC	10.75661	10.96364	10.87806
	SC	10.95447	11.26043	11.12538
MSCI	Prob	0.4541	0.1873	0.1756
	AIC	12.00949	12.17376	12.02868
	SC	12.20735	12.47055	12.27601

Interpretation: Various models of Arch test have been applied on MSCI and CRI with Dollar index. Models like Arch, Parch and Egarch were rejected because the probability is found to be non significant i.e., $p>0.05$. So Dollar index does not show any impact on volatility of MSCI and CRI.

3. To know the impact of dollar index on global economy.

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	1	2	1	2
Max-Eig	2	1	2	1	2

*Critical values based on MacKinnon-Haug-Michelis (1999)

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or No. of CEs	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
	Log Likelihood by Rank (rows) and Model (columns)				
0	-167.9254	-167.9254	-167.8761	-167.8761	-167.2986
1	-156.5551	-156.5213	-156.5117	-156.2561	-156.2449
2	-154.0272	-153.5854	-153.5854	-151.5261	-151.5261

Interpretation: Johansen co integration test has been applied on Dollar index and BDI. The Log Likelihood values appear to be in descending order row wise and column wise. The variables are co integrated. So now, the Granger test has been applied.

Granger Causalty Test:

Null Hypothesis:	Obs	F-Statistic	Prob.
DBDI does not Granger Cause DDDOLLARINDEX	16	1.26814	0.3195
DDDOLLARINDEX does not Granger Cause DBDI		0.04137	0.9596

Interpretation: The above table shows that there is no impact of BDI over Dollar index i.e., $p<0.5$ so accept the Null hypothesis. There is an impact of Dollar index over BDI i.e., accept Alternative hypothesis as $p>0.5$.

4. To know the performance measure of Harpex on BDI and how these two indicators were moving with dollar index.

MAR Ratio		
Year	Harpex	BDI
2009	0.005092849	0.001317575
2010	0.004655654	0.000646419
2011	0.001972514	0.00049301
2012	0.001848453	0.000560856
2014	0.001941125	0.000667813
Total	0.015511	0.003686

Interpretation: The above table shows performances of two indicators BDI and Harpex. MAR ratio has been applied on them. The result shows that the performance of Harpex is more than that of BDI.

FINDINGS:

1. The study has been observed that the dollar index is having impact on BDI
2. With this analysis we found that Dollar index has highest correlation with world exports imports and CRI with exports imports has lowest correlation. We also found that Inflation and crude oil are moderately correlated.
3. World GDP and world exports imports are influenced with Dollar index.
4. The Global commodity index will underperform in the near future.
5. CRI and MSCI are not influenced by Dollar index.
6. The world exports imports and GDP are influenced with PMI.
7. Harpex index shows better performance than BDI.

CONCLUSION:

We conclude the of Dollar index impact on global economy. In this study Dollar index has been considered as the global currency. The fluctuation of this currency is having significant impact on global economic movement. The movements of world exports imports were having relationship with currency fluctuations. Various economic factors of macro level like world GDP, Commodity and Equity indices are effected with Dollar index during the analysis period.
During the study period Dollar index is not having wide fluctuations in its trading pattern. Due to this less volatility global economy had recovered from financial recession. Hence there is further scope to do research on Dollar index effect on macro factors of global economy.

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