

Relation between Gold Prices and US Dollar in Indian Rupees

Abstract

One of the most well-known relationships in currency markets is the inverse relationship between the U.S. dollar and the value of gold. This relation occurs because gold is typically used as a hedge against inflation through its intrinsic value. As the dollar's exchange value decreases, it takes more dollars to buy gold, increasing the value of gold. The dollar's value is largely determined by monetary policy enacted by the Federal Reserve Bank. Over the last few decades, the Fed has used the federal funds rate as a tool to control inflation and stimulate the economy and in doing so, has also impacted the price of gold. As the central bank lower interest rates, more money is printed. This lowers the value of the dollar and, consequently, raises the value of gold. Likewise, a rate increase strengthens the dollar and devalues gold.

The objective of this study is to examine extent of relation between Gold prices and USD/INR and to see the trend of return in gold prices and USD/INR rate for 10 years (2003 to 2013). Gold prices and USD/INR rates have moderate correlation and Gold is not a major factor which can co efficiently determine the movements in USD/INR rates. Correlation between Return in gold prices and return in USD/INR is insignificant. There are some other major factors which influence the movement of gold as well as USD/INR rates.

Keywords: Inflation, Intrinsic Value, Gold Price, Monetary Policy.

Introduction

US economy plays a major role in shaping the macroeconomics of the world. When the dollar is strong, people invest, buy and trade in dollars. However, in recent times, the US economy has suffered a lot. Dollar has not remained as powerful and promising as ever; this is the reason why people and nations start investing and hoarding in bullion. The high gold reserves strengthen the national economies and act as a hedge against inflation. Gold served as money until other forms of currency were devised and even now gold is bought as an investment. The innate high value of gold makes it a reliable form of wealth, no matter the conditions. This makes it a hedge against economical fluctuations. The actions of people based on this principle drive the price of gold. The relationship between the dollar and gold is tied to the concept of tangible assets vs. financial assets. To put it simply, gold has real value, while the dollar is a representation of real value.

Many academic studies as well as market and media reports refer to the negative relationship between gold and the US dollar. The argument goes that as gold is traded primarily in dollars, a weaker dollar makes gold cheaper for other nations to purchase and increases their demand for the yellow metal. This increase in foreign demand then drives up the dollar price of gold, giving gold and the dollar their negative relationship. While this argument gives us an explanation of the observed reality, there may be another reason. The foremost factor that governs the price of gold is the value of US Dollar. A stronger US dollar will keep the price of gold controlled and low. A weak dollar will set the price of gold spiraling to a very high price. The significance of the negative relationship between gold and the value of the dollar then seems to be another pointer towards gold's role as an internationally traded currency, rather than a way of explaining movements in the value of gold expressed in dollars.

Determinants for Movement of USD/INR Rate

1. Performance of Major Global currencies
2. Foreign Institutional Investments (FII)
3. Foreign Direct Investments (FDI)
4. Political Factors
5. Exports, Imports & Trade Surplus (deficit)



Bhawna Johri

Assistant Professor,
Deptt.of Applied Business
Economics,
Faculty of Commerce,
Dayalbagh Educational Institute,
(Deemed University)
Dayalbagh, Agra

6. Inflation
8. Forex
9. Economic Growth
10. Capital Flow
11. Policy Decisions
12. Gold demand and supply.

7. Change in Interest rates.

Determinants for Movement of Gold Price in India

1. US Dollar rate
2. Supply and Demand
3. Speculation
4. Rising and lowering import cost
5. Low bank deposit rates
6. Government policies
7. Money laundering
8. Large scale tax evasion.

Review of Literature

Cetin Ciner, ConstantinGurdgiev, Brian M. Lucey (2012): Hedges and Safe Havens: An Examination of Stocks, Bonds, Gold, Oil and Exchange Rates, they investigated the return relations between major asset classes using data from both the US and the UK, their first objective was to examine time variation in conditional correlations to determine when these variables act as a hedge against each other. Secondly, they provided evidence on whether the dependencies between the asset classes differ during extreme price movements by using quantile regressions. This analysis provided evidence on whether these asset classes can be considered as safe havens for each other. A noteworthy finding of study was that gold can be regarded as a safe haven against exchange rates in both countries, highlighting its monetary asset role.

Kuntara Pukthuanthonga, Richard Rollb (2011): Gold and the Dollar (and the Euro, Pound, and Yen) they studied that, gold and the Dollar are negatively related; when the Dollar price of gold increases, the Dollar depreciates against other currencies. This is intuitively puzzling because it seems to suggest that gold prices are associated with appreciation in other currencies. Why should the Dollar be different? They showed here that there is actually no puzzle. The price of gold can be associated with currency depreciation in every country. The Dollar price of gold can be related to Dollar depreciation and the Euro (Pound, Yen) price of gold can be related to Euro (Pound, Yen) depreciation.

A.G. Malliaris, Mary Malliaris (2009): Are Oil, Gold And The Euro Inter-Related? Time Series And Neural Network Analysis, this paper investigates inter-relationships among the price behavior of oil, gold and the euro using time series and neural network methodologies. They found that the markets for oil, gold and the euro are efficient but have limited inter-relationships among themselves.

Mita H. Suthar (2008): Determinants of Exchange Rate in India in this study an attempt was made to investigate the impact of bank rate policy of the Reserve Bank of India (RBI) and interest yield

differentials between the India and the US securities. A monthly time series from April 1996 to June 2007 was used for the purpose. It was observed that the monetary policy intentions depicted by the bank rate of the RBI, the short-term and long-term domestic interest differentials and interest yield differentials, and the rate of change of foreign exchange reserves have a significant impact on the monthly average of the exchange rate between Indian rupee and the US dollar.

Golaka C. Nath, G. P. Samanta (2004): Relationship between Exchange Rate and Stock Prices in India - An Empirical Analysis this study examines the causal relationship between returns in stock market and forex market in India. Using daily data from March 1993 to December 2002, we found that causal link is generally absent though in recent years there has been strong causal influence from stock market return to forex market return.

John L. Simpson (2002): The Relationship between Commodity Prices and the Australian Dollar, the purpose of this study was to examine the strength of the relationship between the nominal Australian/United States exchange rate and indexed commodity prices using monthly data between 1986 and 2001. Australian foreign exchange market-participants may use commodity price information to adjust their exchange rate expectations in the short-term in a sensible way.

Aim of the Study

1. To examine relation between Gold prices and USD/INR.
2. To analyze the trend of return in Gold prices and return in USD/INR during specified period.

Sample Design and Data

Sample Size: Two variable named

1. Gold prices
2. USD in INR(USD/INR)

Duration of Study

2003 to 2013*

Note

2013 includes January and February.

Secondary Data

Annual reports, journals, publications of Stock exchange Board of India, reports of commodity exchange

Hypothesis of the Study

H1

Gold prices and USD/INR are independent in India during the specified period.

H2

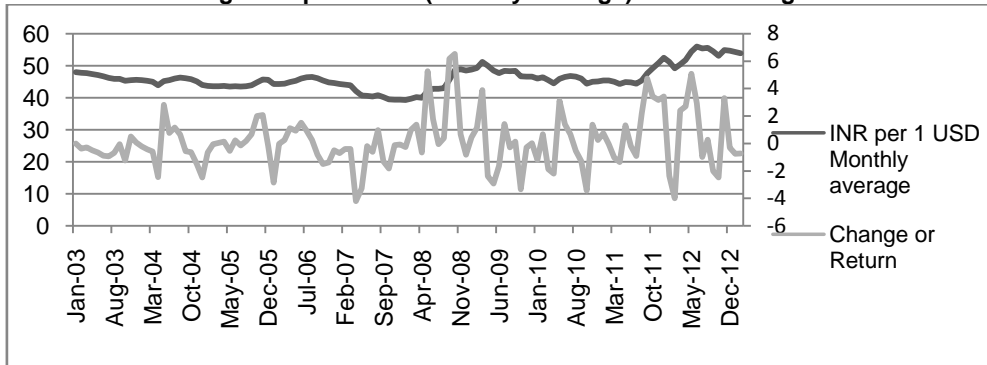
Return of Gold prices and Return of USD/INR are independent in India during the specified period.

Tools and Techniques Used

1. Correlation
2. Average
3. Probable Error

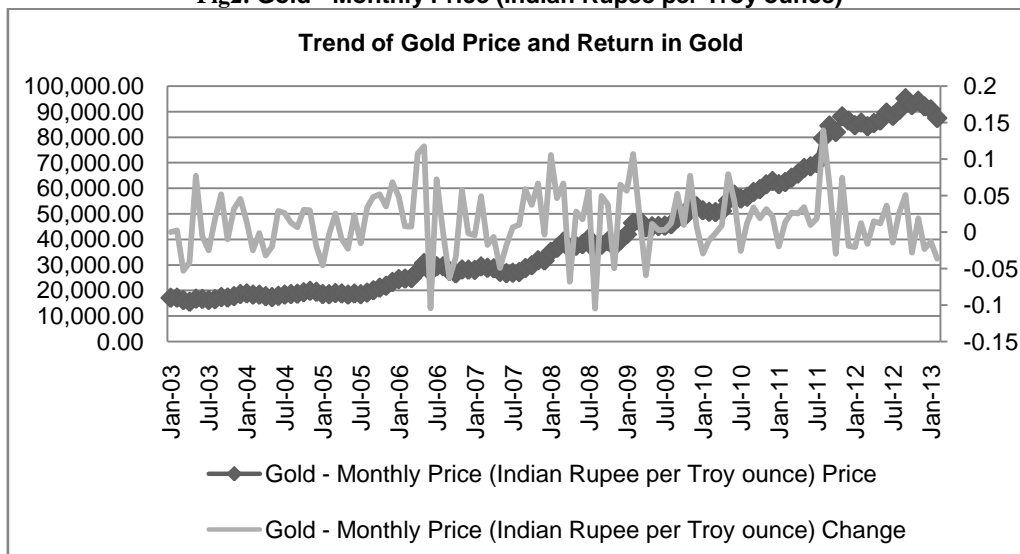
ANALYSIS
Empirical Data

Fig1:INR per 1 USD (Monthly Average) and its change



Source:www.x-charts.com and refer table 2.

Fig2: Gold - Monthly Price (Indian Rupee per Troy ounce)



Source:www.indexmundi.com and refer table 1.

Particular	Coefficients of Correlation
Correlation between Gold prices and USD/INR(r_1)	.65
Correlation between return of Gold prices and return of USD/INR(r_2)	.24

There is positive but moderate relationship between Gold price and USD rather there is low correlation between return in Gold price and return in USD/INR during the specified period.

Particular	Coefficients of Determination
Between Gold prices and USD/INR(r_1^2)	42.25%
Between return of Gold prices and return of USD/INR(r_2^2)	05.76%

To check the significance of correlation, we use probable error (P.E) criteria i.e.

1. If Coefficients of Correlation (r) is less than the probable error($r < P.E$), there is no evidence of correlation in two variables.
2. If Coefficients of Correlation (r) is more than six times the probable error($r > 6 P.E$), correlation will be considered significant.

Here,

Probable error for Gold prices and USD/INR	0.034785
Probable error for return of Gold prices and return of USD/INR	0.057549

Both probable errors is less than the correlation coefficients

Test of Significance of Correlation

1. For Gold prices and USD/ INR : $r > 6P.E.$ (.65 > .208) Hence, r_1 is Significant.
2. For return of Gold prices and return of USD/INR: $r < 6P.E.$ (.24 < .34)Hence, r_2 is insignificant.

Table 3- Highest and lowest return of Gold and USD/INR during the period

Particular	Month	Gold	Change(%)	USDINR	Change(%)	Inverse relationship
For USDINR	Aug-08	36,026.85	-10.51%	42.940145	↓ 0.37	
	Sep-08	37,815.02	↓ 4.96%	45.595626	↑ 6.1841454	✓
	Oct-08	39,235.79	↓ 3.76%	48.573085	↑ 6.53014173	✓
	Mar-07	28,832.08	-1.79%	43.889532	-0.4	
	Apr-07	28,636.08	↑ -0.68%	42.042291	↓ -4.2088419	✓
	May-07	27,220.91	↓ -4.94%	40.670057	↑ -3.263937	✓
For Gold	Feb-03	17,135.72	0.18%	47.74735	-0.38	
	Mar-03	16,224.16	↑ 13.94%	47.612381	↑ -0.2826733	
	Apr-03	15,548.35	↓ 11.73%	47.374219	↓ -0.5002102	
	Nov-12	94,207.98	-6.29%	54.823582	3.13	
	Dec-12	92,015.41	↓ -6.82%	54.652437	↓ -0.3121741	
	Jan-13	90,803.41	↓ -10.48%	54.244736	↓ -0.7459887	
	13-Feb	87,471.13	↓ -10.51%	53.84735	↓ -0.7325798	

When there was increase in the return of gold return of USD/INR was decreasing and when return of USD/INR was increasing then the return of gold had a decreasing trend as shown in Table 3.

Conclusion

As the above findings demonstrate, there's a converse relationship between the weighted U.S. dollar and the cost of gold. On the other hand, this reverse relationship isn't as exact as it used to be under the highest quality level. Despite the fact that the best quality level is gone, there's still a mental tilt towards gold at whatever point the estimation of the U.S. dollar diminishes. The reverse relationship remains on the grounds that:

1. A falling dollar builds the estimation of other nations' monetary forms. This builds the interest for items including gold. It additionally builds the costs.
2. At the point when the U.S. dollar begins to lose its quality, speculators search for option venture sources to store esteem. Gold is an option.

On the other hand, comprehend that it's workable for the U.S. dollar and gold cost to increment in the meantime. This can happen due to an emergency in some other nation or district. This would make financial specialists herd to more secure resources—the U.S. dollar and gold. The U.S. dollar is likewise determined by numerous elements—like money related approach and swelling in the U.S. versus different nations. It's likewise determined by monetary prospects in the U.S. versus different nations. Financial specialists need to consider these factors.

The importance of the negative relationship in the middle of gold and the estimation of the dollar then is by all accounts another pointer towards gold's part as universally exchanged cash, rather than a method for clarifying developments in the quality of gold communicated in dollars. The importance of the negative relationship in the middle of gold and the estimation of the dollar then is by all accounts another pointer towards gold's part as universally exchanged

cash, rather than a method for clarifying developments in the quality of gold communicated in dollars.

Appendix

Table1: Gold - Monthly Price (Indian Rupee per Troy ounce)

Month	Price	Change
Jan-03	17,104.25	
Feb-03	17,135.72	0.18%
Mar-03	16,224.16	-5.32%
Apr-03	15,548.35	-4.17%
May-03	16,746.68	7.71%
Jun-03	16,649.12	-0.58%
Jul-03	16,229.25	-2.52%
Aug-03	16,526.12	1.83%
Sep-03	17,374.81	5.14%
Oct-03	17,199.35	-1.01%
Nov-03	17,748.70	3.19%
Dec-03	18,553.38	4.53%
Jan-04	18,806.25	1.36%
Feb-04	18,329.50	-2.54%
Mar-04	18,306.02	-0.13%
Apr-04	17,716.56	-3.22%
May-04	17,362.97	-2.00%
Jun-04	17,859.21	2.86%
Jul-04	18,329.56	2.63%
Aug-04	18,560.59	1.26%
Sep-04	18,682.41	0.66%
Oct-04	19,250.39	3.04%
Nov-04	19,821.18	2.97%
Dec-04	19,442.83	-1.91%
Jan-05	18,554.21	-4.57%
Feb-05	18,490.66	-0.34%
Mar-05	18,954.91	2.51%
Apr-05	18,775.16	-0.95%
May-05	18,347.86	-2.28%
Jun-05	18,770.58	2.30%
Jul-05	18,480.70	-1.54%
Aug-05	19,105.09	3.38%
Sep-05	20,028.03	4.83%
Oct-05	21,062.00	5.16%

Nov-05	21,796.08	3.49%
Dec-05	23,290.06	6.85%
Jan-06	24,413.14	4.82%
Feb-06	24,603.51	0.78%
Mar-06	24,776.99	0.71%
Apr-06	27,448.49	10.78%
May-06	30,668.98	11.73%
Jun-06	27,455.73	-10.48%
Jul-06	29,439.75	7.23%
Aug-06	29,440.30	0.00%
Sep-06	27,588.91	-6.29%
Oct-06	26,634.49	-3.46%
Nov-06	28,162.44	5.74%
Dec-06	28,110.41	-0.18%
Jan-07	27,985.57	-0.44%
Feb-07	29,356.70	4.90%
Mar-07	28,832.08	-1.79%
Apr-07	28,636.08	-0.68%
May-07	27,220.91	-4.94%
Jun-07	26,726.01	-1.82%
Jul-07	26,892.24	0.62%
Aug-07	27,160.49	1.00%
Sep-07	28,748.42	5.85%
Oct-07	29,816.80	3.72%
Nov-07	31,798.42	6.65%
Dec-07	31,678.33	-0.38%
Jan-08	35,025.78	10.57%
Feb-08	36,642.46	4.62%
Mar-08	39,082.77	6.66%
Apr-08	36,416.00	-6.82%
May-08	37,435.38	2.80%
Jun-08	38,087.88	1.74%
Jul-08	40,256.56	5.69%
Aug-08	36,026.85	-10.51%
Sep-08	37,815.02	4.96%
Oct-08	39,235.79	3.76%
Nov-08	37,284.82	-4.97%
Dec-08	39,696.27	6.47%
Jan-09	41,938.42	5.65%
Feb-09	46,416.55	10.68%
Mar-09	47,387.48	2.09%
Apr-09	44,573.36	-5.94%
May-09	45,070.86	1.12%
Jun-09	45,178.09	0.24%
Jul-09	45,317.28	0.31%

Aug-09	45,872.80	1.23%
Sep-09	48,273.82	5.23%
Oct-09	48,737.49	0.96%
Nov-09	52,484.94	7.69%
Dec-09	52,912.18	0.81%
Jan-10	51,344.51	-2.96%
Feb-10	50,745.87	-1.17%
Mar-10	50,654.61	-0.18%
Apr-10	51,115.41	0.91%
May-10	55,173.35	7.94%
Jun-10	57,410.36	4.05%
Jul-10	55,916.83	-2.60%
Aug-10	56,616.02	1.25%
Sep-10	58,511.77	3.35%
Oct-10	59,609.35	1.88%
Nov-10	61,476.45	3.13%
Dec-10	62,809.82	2.17%
Jan-11	61,559.14	-1.99%
Feb-11	62,397.21	1.36%
Mar-11	64,065.11	2.67%
Apr-11	65,680.20	2.52%
May-11	67,908.18	3.39%
Jun-11	68,563.18	0.96%
Jul-11	69,830.14	1.85%
Aug-11	79,563.84	13.94%
Sep-11	84,523.72	6.23%
Oct-11	81,994.94	-2.99%
Nov-11	88,105.76	7.45%
Dec-11	86,427.38	-1.90%
Jan-12	84,638.12	-2.07%
Feb-12	85,650.02	1.20%
Mar-12	84,229.13	-1.66%
Apr-12	85,459.44	1.46%
May-12	86,460.52	1.17%
Jun-12	89,578.52	3.61%
Jul-12	88,281.52	-1.45%
Aug-12	90,579.25	2.60%
Sep-12	95,194.24	5.09%
Oct-12	92,496.06	-2.83%
Nov-12	94,207.98	1.85%
Dec-12	92,015.41	-2.33%
Jan-13	90,803.41	-1.32%
Feb-13	87,471.13	-3.67%

Table 2: INR per 1 USD (Monthly Average) and its change

Month	INR per 1 USD	Change (%)
Jan-03	47.929537	
Feb-03	47.74735	-0.38
Mar-03	47.612381	-0.28
Apr-03	47.374219	-0.50
May-03	47.060242	-0.66
Jun-03	46.643419	-0.88
Jul-03	46.199804	-0.951
Aug-03	45.880718	-0.69
Sep-03	45.851274	-0.064
Oct-03	45.276564	-1.25
Nov-03	45.510061	0.51
Dec-03	45.537501	0.060
Jan-04	45.439678	-0.21

Feb-04	45.245606	-0.427
Mar-04	44.980883	-0.58
Apr-04	43.880406	-2.44
May-04	45.121319	2.82
Jun-04	45.470016	0.77
Jul-04	45.994052	1.15
Aug-04	46.296259	0.65
Sep-04	46.037005	-0.55
Oct-04	45.740256	-0.64
Nov-04	45.051536	-1.50
Dec-04	43.928576	-2.49
Jan-05	43.637024	-0.66
Feb-05	43.608942	-0.064
Mar-05	43.621393	0.028
Apr-05	43.679833	0.13

May-05	43.440522	-0.54
Jun-05	43.540748	0.230
Jul-05	43.480494	-0.13
Aug-05	43.560269	0.18
Sep-05	43.848413	0.66
Oct-05	44.728734	2.00
Nov-05	45.65749	2.07
Dec-05	45.564128	-0.20
Jan-06	44.268237	-2.84
Feb-06	44.251207	-0.038
Mar-06	44.360197	0.24
Apr-06	44.853038	1.11
May-06	45.267188	0.92
Jun-06	45.953571	1.51
Jul-06	46.376133	0.91
Aug-06	46.488881	0.24
Sep-06	46.100732	-0.83
Oct-06	45.403806	-1.51
Nov-06	44.777288	-1.37
Dec-06	44.559106	-0.48
Jan-07	44.239435	-0.71
Feb-07	44.066073	-0.39
Mar-07	43.889532	-0.40
Apr-07	42.042291	-4.20
May-07	40.670057	-3.26
Jun-07	40.589642	-0.19
Jul-07	40.344953	-0.60
Aug-07	40.740901	0.98
Sep-07	40.205348	-1.31
Oct-07	39.466808	-1.83
Nov-07	39.416417	-0.12
Dec-07	39.387905	-0.072
Jan-08	39.284726	-0.26
Feb-08	39.679868	1.00
Mar-08	40.226752	1.37
Apr-08	39.956941	-0.67
May-08	42.058025	5.25
Jun-08	42.7986	1.76
Jul-08	42.778093	-0.047
Aug-08	42.940145	0.37
Sep-08	45.595626	6.18
Oct-08	48.573085	6.53
Nov-08	48.901467	0.67
Dec-08	48.503351	-0.81
Jan-09	48.711372	0.42
Feb-09	49.263209	1.13
Mar-09	51.184784	3.90
Apr-09	49.960748	-2.39
May-09	48.49682	-2.93
Jun-09	47.701162	-1.64
Jul-09	48.3825	1.42
Aug-09	48.249142	-0.27
Sep-09	48.313277	0.13
Oct-09	46.699247	-3.34
Nov-09	46.561197	-0.29
Dec-09	46.568731	0.016
Jan-10	46.006643	-1.20
Feb-10	46.317302	0.67
Mar-10	45.449033	-1.87

Apr-10	44.452294	-2.19
May-10	45.841174	3.12
Jun-10	46.475904	1.38
Jul-10	46.785163	0.66
Aug-10	46.533503	-0.53
Sep-10	45.93359	-1.28
Oct-10	44.357998	-3.43
Nov-10	44.964988	1.36
Dec-10	45.073034	0.24
Jan-11	45.407181	0.74
Feb-11	45.386213	-0.046
Mar-11	44.921586	-1.02
Apr-11	44.309851	-1.361
May-11	44.896258	1.32
Jun-11	44.804462	-0.20
Jul-11	44.391584	-0.92
Aug-11	45.367031	2.19
Sep-11	47.516484	4.7
Oct-11	49.148552	3.43
Nov-11	50.705561	3.16
Dec-11	52.436595	3.41
Jan-12	51.199382	-2.35
Feb-12	49.157835	-3.98
Mar-12	50.341695	2.40
Apr-12	51.7047	2.70
May-12	54.335202	5.08
Jun-12	55.935722	2.94
Jul-12	55.378541	-0.99
Aug-12	55.53411	0.28
Sep-12	54.415429	-2.01
Oct-12	53.062382	-2.48
Nov-12	54.823582	3.31
Dec-12	54.652437	-0.31
Jan-13	54.244736	-0.74
Feb-13	53.84735	-0.73

References

1. Blose, L. E. (2010), "Gold Prices, Cost of Carry, and Expected Inflation", *Journal of Economics and Business*, 62(1), 35–47.
2. Cappie, F., T. C. Mills, and G. Wood (2005), "Gold as a Hedge against the Dollar", *Journal of International Financial Markets, Institutions and Money*, 15, 343–352.
3. Cappiello, L., B. Gerard, and S. Manganelli (2005), "Measuring Comovements by Regression Quantiles," ECB Working Paper 501.
4. Christie-David, R., M. Chaudhry, and T. W. Koch (2000), "Do Macroeconomics News Releases Affect Gold and Silver Prices", *Journal of Economics and Business*, 52(5), 405–421.
5. Davidson, S., R. Faff, and D. Hillier (2003), "Gold Factor Exposures in International Asset Pricing", *Journal of International Financial Markets, Institutions and Money*, 13, 271–289.
6. Engle, R. F., and F. K. Kroner (1995), "Multivariate Simultaneous Generalized ARCH", *Econometric Theory*, 11, 122–150

Websites Referred

1. www.gold.org
2. www.xe.com
3. www.x-rates.com
4. www.indexmundi.com