HOW PRICES OF GOLD HARMONIZE TO STOCK INDEX: ANALYSIS OF SOUTH ASIAN STOCK EXCHANGES

Waseem Aamir[*]

Dr. Nadeem Sohail[**]

Muhammad Sajid (Corresponding Author)[***]

Umar Kibria[***]

ABSTRACT: The ambition of the study goes to investigate a long term relationship among variables, where bullion prices is independent while dependent variables are South Asian Stock Exchanges which include Colombo Stock Exchange (CSE), Bombay Stock Exchange (BSE), Chittagong Stock Exchange (CHSE), Karachi Stock Exchange (KSE), Maldives Stock Exchange (MSE), by using monthly closing values from 30 October 2008 to 30 October 2013. Gold prices are taken as per ounce in US $. We used statistical techniques Unit Root (Augmented Dickey and Fuller, 1979, 1981) and (Phillip Peron, 1988) test to check the stationary of the data and (Johansen-Juselius, 1990) to scrutinize the long-term relationship among gold prices and CSE, KSE, CHSE, BSE and MSE. The Correlation results indicated that there is negative and weak relationship among Gold price with KSE, MSE. The results of co-integration test stipulated that a long-term relationship exist between monthly average gold prices and other South Asian stock indexes.

Keywords: Gold Prices, South Asian Stock Exchanges, Co-integration.

JEL Classification: C22, C32, E44

[*] Government College University Faisalabad, Pakistan

[**] Principal, College of Commerce, Government College University, Faisalabad, Pakistan

[***] Lecturer, Department of Banking & Finance, Government College University, Faisalabad,

1. Introduction

1.1 Significance of the Study

Gold and other precious metal considered an important role and used as a store of wealth for ancient time and used which was generally accepted as measure of value as well as store of value instead of money. But now a day's gold is used approximately fifty percent of their production for jewelry and secondly used for investment purpose and thirdly favorable usage for financial sector holdings (Bilal, 2013). Participants used gold for the purpose of store of wealth, in investment and for collaterals as a highly liquidity against financial dealings. According to Geological Survey 2012 China, Australia, United States of America, Russia and South Africa are the big giant in production of gold.

 In a time of global financial crisis, bank collapse and in case of adverse economic indicators people scrutinize gold as a strong as well as safe heaven asset for investor and they invest in such treasury metal as reported by (Opdyke, 2010). Gold is safe guard in a time of financial crises for developed markets and a hedge as well as for European countries and the US markets but not for Australia, Canada, Japan and large emerging markets such as the Brazil, Russia, India and China (BRIC) countries (Baur & McDermott, 2009). According to (Mpofu, 2010) USA, china and India consumed major part of gold which is produced globally.

1.2 Brief History of South Asian Stock Markets

In Asia, The second oldest Karachi Stock Exchange by market capitalization was came into being on Sep 18, 1947 in Karachi with introductory capital of 37 million rupees include four indices are KSE 100, KSE all share KSE 30and KMI 30 index. And use currency in pak Rupee (PKR).There was 651 companies listed but now a day's 581 companies are listed in KSE. In 2002 Karachi stock exchange become a major Stock Exchange of Pakistan was stated as a best market (Bloomberg Business Week, 2002) and Sheth, (2008) KSC got a leading status in international emerging markets before 2007. In current KSE situation, United States newspaper describes KSE as one of the best operation in the world.

Bombay stock exchange (BSE) is the 11th largest stock market in globally by their market capitalization with US$1.203 trillion (October, 2012) and largest stock exchange in India

established in 1875.By using the currency in Indian rupee (IND).Its index are BSE (SENSEX), BSE (Mid Cap), BSE (Small Cap), BSE (100 index) and (BSE 500 index). And according to Wikipedia, there are 5163 numbers of listing companies performing in September 2012.

Colombo stock exchange (CSE) was founded in1985 and the leading stock market in Sri-lanka as well looking one of the most modern Stock exchanges in South Asian countries. Currency used by this stock exchange in Sri Lankan Rupees (LKR).the stock exchange had 287 listed companies and indices are all share price (ASPI) and S&P Sri-lanka 20 index (S&P SL20).

Chittagong stock exchange commonly abbreviation as (CSE) located in business hub in Chittagong Bangladesh. This stock exchange started its operation in 1995 in Bangladesh. The currency used in Bangladesh is TAKA. There are 250 companies listed with more than 50 billion US$. And indices are 30 Index, X index and all share price index.

Maldives stock exchange (MSE) started their operation as a stock exchange in 23 Jan 2008 with market capitalization was 2.2 billion Maldivian rufiyaa (MVR) in December 2008.There are 5 listing companies and index is MASIX.

The main objective of the study is check out the impact of Gold Prices on Stock Exchanges. The Gold Prices has crossed the limit of 1900 US $ per Ounce in SEP 2011. The increasing trend is attracting the potential investors and changes their direction from Stocks. In these circumstances it is important to scrutinize the stress of this factor on major Stock Exchanges in South Asia.

1.3 Problem Statement

The problem of the research is that Gold Prices significant affect on Stock Exchanges or insignificant affect. And what is the relationship between Gold Prices and Stock Exchanges means that they have positive or negative relationship with each other.

1.4 Research Objectives

The general objectives of the study are

- To identify the various aspects of Gold Prices on different South Asian Stock Exchanges.
- To check the long term relationship among Gold Prices and (CSE, BSE, CHSE, KSE, MSE).
- Find out the correlation between dependent and independent variables.

1.5 Research Questions

- Is gold price affected on different south Asian stock markets?
- How they effected on each other?
- Any long term relationship between Gold Price and Stock Exchanges?

2. Literature Review

Smith, (2001) explore the impact between two variables the gold price and and the price of stock in United States from 1991 to 2001. The analysis used to check the impact is Granger causality tests. The analysis showed that there is a short term negatively correlation between gold returns and US stock price and find out unidirectional causality from US stock returns to returns on the gold price

(Andrew T. Levin and Robert E. Wright, 2006) According to this study find out the relationship in both short term as well as long term between gold and inflation and the data was taken from 1976 to 2005 do not include the risk variable. Co integration regression techniques were used for this purpose. There is a long-term one of one relationship between two variables the price of gold and the general price level in the USA. The hypothesis in this study showed that gold is a long-term safeguard against inflation.

(Hamad Sadri and Ahsan TayebiSani, 2012) check the impact of commodity prices & Their Volatilities on Stock Markets. The variables are Crude Oil, gold price & Volatilities on Stock Markets in Organization of the Petroleum Exporting Countries (OPEC). ARCH, GARCH model used to check out the uncertainty among variables the empirical results showed that crude oil prices have a significant positive effect on stock exchange index of selected (OPEC) countries and on the other hand this effect is negative for gold prices.

(Bilal et al., 2013) examined the long term relationship between commodity prices & stock exchanges. The variables are gold prices, Pakistani Stock Exchange and Indian Stock Exchange. Monthly data from 2005 till 2011.Techniques that were used for this purpose Unit Root test (Phillips-Perron, 1988 and Augmented Dickey fuller 1979, 1981), Johnson Co-integration and Granger's Causality tests. Indicates that no long-term relationship exist between monthly price of

gold and Karachi stock exchange index meanwhile significant relationship between Bombay Stock Exchange index and average gold prices.

(Ray, 2012) find out the relationship among Macroeconomic Variables and Stock Price in India from 1990-91 to 2010-11. The analysis used for this purpose is multiple regression model and granger causality test. No unidirectional causality among these variables stock price and interest rate, index of industrial production, but unidirectional causality seemed between stock price and inflation, foreign direct investment, gross domestic product, exchange rate, and gross fixed capital formation. As well as bi- directional causality among stock price and foreign exchange reserve, money supply, crude oil price. Hence conclude that oil and gold prices have a significant negative effect on stock price, while trade balance, interest rate, exotic exchange reserve, gross domestic product, industrial manufacture index and supply of money positively effect on Indian stock price. On the other hand no significant effect have seen between inflation rate, foreign direct investment, exchange rate and wholesale price index

(Baur, Dirk G and Thomas K. McDermott, 2009) find out the importance of gold commodity in the financial system around the world. Data was taken from 1979-2009. Results shows that gold is safe guard in a time of financial crises for developed markets and a hedge as well as for European countries and the US markets but not for Australia, Canada, Japan and large emerging markets such as the Brazil, Russia, India and china (BRIC) countries.

(Naeem Muhammad and Abdul Rasheed, 2002) check out the long term and short term relationship among stock prices and exchange rates. Monthly data used of Asian countries for this purpose from Jan 1994 to Dec 2000. Co integration technique used also Granger causality tests explore. In short run no unidirectional causality seems in 4 Asian countries Pakistan, India, Bangladesh and Sri-lanka also in long run relationship between these variables in only 2 countries Pakistan and India but in Bangladesh and Sri-lanka bi-directional causality of these variables.

(Bilal et al., 2012) check out the relationship Terrorism with Macro-economic factors (Inflation & Interest Rate) on Pakistani Stock Exchange (KSE 100 Index) data from 2005 to 2010 for this research different techniques use which includes unit root test (Phillip Peron and Augmented Dickey Fuller), Johansen juselius co-integration and Granger's causality test hence concluded that There is a negative relationship between Terrorism & Karachi Stock Exchange (KSE-100 Index)stock return in a Pakistani equity market. Hence no relationship is found with inflation.

(Ray, 2013) investigates bullion gold price and stock price in India. For this purpose data were taken for the years among 1990-91 until 2010-11. Unit root test and Granger Causality Test techniques use to check out the impact between two variables. Hence the results shows that when gold price goes down investor invest their investment in stock market and when stock market moves down investor invest their money in gold. Both gold price and stock market moves in opposite direction.

(Baur, Dirk G and Brian M. Lucey, 2010) inspect the relationship between gold, stock and bonds from the years 1995 to 2005. The regression model used for this purpose and find out the results that gold as a safe haven for stock but not for bonds in a short lapse of time hence in long lapses of time gold not acting safe haven assets for investors.

(Martin Surya Mulyadi and Yunita Anwar, 2012).In this study identify the impact of two variables one is gold and second is stock from time period 1997 till 2011. probit econometric analysis model used for this research hence They found that investors are going to diversify their investment in different types of instruments they conclude that gold is a good diversified portfolio and suggest that gold is a more profitable commodity then stock investment. Although gold is a hedge against intense stock market condition.

(Mohamed El Hedi Arouri and Julien Fouquau, 2009) inspect the relationship among stock market and oil prices in gulf co operation council (GCC) countries for the years of June 2005 to October 2008. And check the short term relationship between stock market and oil prices. Hence, concluded that there is positively relationship among these variables in most of gulf countries.

(Baur Dirk G and Brian M. Lucey, 2006) examined the short term as well as long term relationship between gold, stock and bonds data was taken from 1995 to 2005 and regression model used for this research moreover results showed that gold is a safeguard asset against stock. Hence safe haven asset for investors in extreme market condition and gold safe haven against stock only fifteen days after shock occurred although gold is not a hedge or safe haven against bonds in any market. in addition Gold perform as a hedge or safe haven only in short time of periods and gold not perform as a safe haven for investors in a long periods

(Muhammad et al., 2002) investigate the long term as well as short term impact between prices of the stock & exchange rates whether they are related or not. for this research monthly data was taken from 1994 to 2000 among south Asian countries (Pakistan, Bangladesh, India & Sri Lanka) the final results showed that there is no short run relationship have seen for all four Asian

countries also no long term relationship found in Pakistan and India but however in Bangladesh and Sri Lanka.

(Orawan Ratanapakorn and Subhash Sharma, 2007) explore the long and short run relationship between Islamabad (10-Index) and five other variables which include CPI, production index, exchange rates, supply of money, and three months T-bill rates. the data was taken from the period 2004 to 2008 and results showed that there are three long term negative relationship find out between stock prices and (CPI, real exchange rate and supply of money) while positive long term relationship among production index and three months T-bill rates

3. Data and Research Methodology

3.1 Data

For research methodology, monthly gold price are taken in ounce as a sample rather than in per tola and grams because the gold price in ounce are considered in international markets and KSE and BSE (100 index), Chittagong Stock Exchange index (CSEX), Colombo Stock Exchange (ASPI) and Maldives Stock Exchange (MASIX) are taken as a sample because of accuracy and availability of data moreover, we excluded Bhutan and Nepal because unavailability of data sources

To check out the impact of long-term relationship between time-series variables, dependent and independent where's independent variable is gold bullion because a number of large international bodies considered gold as a production, reserves and investing point of view and data is taken from online web site (FOREX, 2011). Dependent variables data are taken from the different stock exchanges of south Asian countries which include Pakistan, Indian, Bangladesh, Maldives and Sri-lanka stock exchanges. We used Eviews7 software for extracting the results and synthesize rate of returns are calculated by using this formula:

$$RT = In\,(pt/pt - 1)$$

Where,

Rt = Returns on a day (t)

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Pt   = Index closing rate of day (t)

Pt-1 = Index closing rate of day (t-1)

ln = Natural Logarithm

To check appropriate results, a large level of samples is taken. Last five years average monthly gold prices are taken (October 2008 to October 2013) from online web page (FOREX, 2012) for methodology and five years monthly closing values of KSE as well as BSE 100 index data are taken from (yahoo finance).

3.2 Unit of Analysis

In an effort to test the connection among all these variables, different methods are obtainable. In the following study an emphasis is presented to test the connection between the stock prices of South Asian countries by using that with historical gold bullion prices, utilizing (i) Illustrative Statistics which includes Probability, Variance, Kurtosis, Skewness, Standard. Deviation, Minimum, Maximum, Median, Mean, (ii) Correlation technique (iii) Johansen Co Integration lab tests (iv) Unit Root Analysis used. These techniques are also used by (Bilal, 2013 and Sadri and TayebiSani, 2012).

Correlation matrix is used to find out the relationship between the variables either negative or positive. If the positive correlation, means that the value of one variable increases, other variable also will be increases; and if a variable decreases the other will also be decreases. A negative correlation means that as one variable increases, the other will also be decreases, and vice-versa. Co Integration exploration requires this period series has to be integrated within the same structure. Co Integration experiment is analyzed by means of the Johansen-Juselius (1990). This must be used to evaluate the long run relationship somewhere between variables. Unit Root technique has long been used to be sure of the stationarity of the time series data. Augmented Dickey-Fuller Experiment (ADF) together with Phillips-Perron test has already been employed for this specific purpose. This experiment analyzes any lag contribute relationship during the sample. The independent variable Gold data is taken from online web site FOREX and dependent variables data are taken from yahoo finance as well as their original stock exchange web sites. Two countries exclude due to not availability of data sources.

4. Empirical Results

4.1 Descriptive Statistics

Table 1 shows descriptive statistics that used to calculate Mean, Standard deviation, Median, variance, minimum and maximum, Skewness, Jarque Bera, Probability of the given data and results indicated that mean values of RBSE, RCHSE, RCSE, RGLD, RKSE, RMSE are 0.007996, 0.005855, 0.019685, 0.008161, 0.015046 and -0.01329 respectively moreover the standard deviation of these variables are 0.076507, 0.092973, 0.075409, 0.040218, 0.081002 and 0.081277 respectively

Table 1: Descriptive Statistics

	RBSE	RCHSE	RCSE	RGLD	RKSE	RMSE
Mean	0.007996	0.005855	0.019685	0.008161	0.015046	-0.013293
Median	0.005887	0.012	0.009865	0.010535	0.021801	-0.015017
Maximum	0.272253	0.189856	0.212441	0.110066	0.180467	0.227391
Minimum	-0.247757	-0.381017	-0.114657	-0.070063	-0.448796	-0.216891
Std. Dev.	0.076507	0.092973	0.075409	0.040218	0.081002	0.081277
Skewness	0.044289	-1.103982	0.548195	0.179967	-3.120086	0.451116
Kurtosis	5.759131	6.714669	2.847547	2.573844	19.29354	4.651852
Jarque-Bera	19.05162	46.68467	3.063284	0.777904	761.048	8.856595
Probability	0.000073	0	0.21618	0.677767	0	0.011935
Sum	0.47977	0.351281	1.181091	0.489636	0.902779	-0.797566
Sum Sq. Dev.	0.345342	0.51	0.335503	0.095433	0.387116	0.389753
Observations	60	60	60	60	60	60

Table 2 shows correlation matrix that used to calculate the direction of the variables either positive or negative and results indicated that a negative but not perfectly negative correlation RCHSE with RKSE is -0.03775,RGLD with RKSE is -0.33751 and RMSE with RGLD is 0.03274.And other remaining variables are positive correlated with each other.

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Table 2: Correlation Matrix

	RGLD	RKSE	RCSE	RCHSE	RBSE	RMSE
RGLD	1					
RKSE	-0.33751	1				
RCSE	0.115571	0.071076	1			
RCHSE	0.227963	-0.03775	0.084827	1		
RBSE	0.039051	0.37159	0.453977	0.065925	1	
RMSE	-0.03274	0.055337	0.054601	0.001712	0.037901	1

Correlation co efficient technique is not a strong technique because it does not discuss the effect and cause relationship. In order to further analysis a fair picture of the relationship we perform Johansen Co Integration tool that tests the co-movement of dependent and independent variables. Before the execution of the Co Integration technique the time series data should be stationary. So, first of all the stationary of the time series data has been tested. Table 3 and Table 4 Dickey Fuller test exposed that the error which has constant variances are statistically independent (Dickey and Fuller, 1979, 1981) and the same results with (Shahzadi, 2010).

Table 3: Unit Root Analysis (ADF) Level

Variables	Intercept	Trend & intercept	None
BSE	-6.159467	-6.447516	-5.881210
CHSE	-7.956860	-8.316549	-7.972723
CSE	-6.850416	-7.462850	-6.421303
GLD	-6.140673	-7.209764	-5.924270
KSE	-6.479928	-9.145586	-6.340957
MSE	-9.812172	-9.827211	-9.586647
Critical values			
1% level	-3.548208	-4.124265	-2.605442
5% level	-2.912631	-3.489228	-1.946549
10% level	-2.594027	-3.173114	-1.613181

An alternative Unit Root Tests (Phillip Perron, 1988) used to check out the stationarity of data. Table 3 proves the results of previous test that all series are stationary level. So, Co Integration test can be applied on these variables. And the same results showed (Bilal, 2013 and Shahzadi, 2010).

Table 4: Unit Root Tests (Phillip-Perron) Level

Variables	Intercept	Trend & intercept	None
BSE	-7.146767	-7.273543	-7.047898
CHSE	-7.952809	-8.398907	-7.972723
CSE	-6.854480	-7.462850	-6.562896
GLD	-6.183530	-7.249478	-5.973205
KSE	-6.571875	-3.614654	-6.262891
MSE	-12.61355	-15.16790	-10.21536
Critical values			
1% level	-3.546099	-4.121303	-2.604746
5% level	-2.911730	-3.487845	-1.946447
10% level	-2.593551	-3.172314	-1.613238

Johansen & Juselius, (1990) Co Integration techniques (Max Eigen value and Trace Statistics) is used to scrutinize the co integrating among dependent variables KSE,BSE,CSE,CHSE, and MSE with independent variable average Gold price time series. It shows a long term relationship among these variables. Results of this analysis (Trace Statistics) are given in the Table 4. Through Schwarz criterion, the length of lag in Vector Auto Regression (VAR) is determined which used to minimize the negative value of Schwarz. The minimum negative value of Schwarz is used. In 1969.The results for lag lengths are exhibited in Table 5. This gives the lag length of 6 for our analysis.

Table 5: Vector Auto Regression

Estimate VAR at Lag 1-0	
Akaike information criterion	-16.39502
Schwarz criterion	-16.17604
Estimate VAR at Lag 1-1	
Akaike information criterion	-16.16441
Schwarz criterion	-14.63153
Estimate VAR at Lag 1-2	
Akaike information criterion	-15.83053
Schwarz criterion	-12.98377
Estimate VAR at Lag 1-3	
Akaike information criterion	-15.26631
Schwarz criterion	-11.10565
Estimate VAR at Lag 1-4	
Akaike information criterion	-15.31316
Schwarz criterion	- 9.83861
Estimate VAR at Lag 1-5	
Akaike information criterion	-15.70726
Schwarz criterion	-8.91881

Table 6: Co-integration Analysis (Trace Statistics)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.724807	242.5475	95.75366	0.0000
At most 1 *	0.661975	167.7110	69.81889	0.0000
At most 2 *	0.476855	104.8021	47.85613	0.0000
At most 3 *	0.424135	67.22414	29.79707	0.0000
At most 4 *	0.307939	35.21493	15.49471	0.0000
At most 5 *	0.212643	13.86624	3.841466	0.0002

Trace test indicates 6 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

Table 7: Co-integration Analysis (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.724807	74.83650	40.07757	0.0000
At most 1 *	0.661975	62.90892	33.87687	0.0000
At most 2 *	0.476855	37.57797	27.58434	0.0019
At most 3 *	0.424135	32.00921	21.13162	0.0010
At most 4 *	0.307939	21.34869	14.26460	0.0032
At most 5 *	0.212643	13.86624	3.841466	0.0002

Max-Eigen value test indicates 6 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values'

5. Conclusion

The current imperious volatility of gold prices, we scrutinized that there is negative correlation between gold prices with KSE and MSE but no perfectly negative relationship with them. To shape the data in stationary time series unit root (Philip perron and augmented dickey fuller) test used. The main objective of this study was found out the corresponding relationship between bullion prices and comprehensive stock values of BSE, CHSE, CSE, KSE and MSE. For this

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purpose we used Johansen-Juselius co integration technique and findings revealed that presence of long term relationship exist between monthly average bullion prices and all other dependent variables. In this tool, we used Maximum negative values of Schwarz information criterion that gives Lag length 6 for Scrutinize the stuff along the period of time. Results of the paper provide significant view for academic researchers as well as for local and international business investors specifically who are interested to invest in Asian capital markets for sensible decision making.

Future Directions

Future researchers can study these variables (Average gold prices and South Asian Stock Exchanges) in short term relationship. More studies can also be conducted by using the average Gold prices in ounce and other Asian, European or American countries.

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