The impact of macroeconomic factors on stock market returns: A case of lead-lag relationship of gold prices and index return

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Abstract

This paper focuses on the long term relationship between the macroeconomic variable and returns in Karachi stock exchange. The explanatory variable used in this study is gold prices. This study is conducted with an objective to whether the gold prices serve as an indicator of changes in stock returns or stock returns determine the hike in gold prices. For this study data is being analyzed for the time period from July 1997 to November 2011. Using Unit root test, Johansen and Juselius (1990) co-integration test and the granger causality (1995) tests, we have examined the long-run as well as the causal relationship between the gold prices and stock returns. The results confirm a significant long term and bidirectional causal relationship between gold prices and stock market returns. It suggests that the changes in gold prices determine changes in stock market returns. This study is significantly important for investors, financial analyst and policy makers because gold prices play an important role in determining stock market returns.

***Keywords*:** Karachi stock exchange, gold prices, APT.

Introduction

The economic activity, financial variables and performance of stock market have been the center of research after financial crisis and declined output. The relation between the stock return and the economic growth has been studied. A number of researchers studied and developed models for the relationship between real economic activity and the changes in US stock prices (Abdullah & Hayworth 1993; Fama, 1981; Roll, 1983), while other researchers examined such relation in UK (Poon & Taylor, 1991; Cheng, 1995). Still other researchers made an attempt to find the relation in Japan (Hamao, 1988; Mookerjee & Naka, 1995), Singapore (Maysami et. al., 2004) and Canada (Darrat, 1990). The relationship has been studied in the emerging economies. It has been documented in the results of all these studies that changes in macroeconomic variables have an impact on the stock market returns. Researchers have incorporated different macroeconomic variables in their studies to examine the relationship. Pilinkus (2010) studied the relationship between stock market returns and macroeconomic variables like GDP deflator, net export and foreign direct investment. Intensity of trade relations, the degree of financial integration and the nature of exchange rate regime is studied in relation to stock market (Walti, 2005).

This paper studies the impact of gold prices on the stock returns in Pakistan. The variable of gold prices is chosen because any fluctuation in the gold price is important in determining the performance of stock market. So it is checked in this paper whether any change in gold prices has an impact on the stock returns. This paper is checking this relation in Pakistan for the first time.

The rest of the paper is organized as follows. Existing literature has been reviewed in section 2. Data used and the methodology applied has been discussed in the section 3. Results and conclusions are given in section 4.

Literature Review

To study stock market returns in relation to macroeconomic variables has been of interest to researchers and policy makers for so long. It is known that the stock market is very

important in channelizing funds. Arbitrage theory of asset pricing presented by Stephen Ross in 1976 has been used to analyze the impact of macroeconomic variables on stock market returns. The impact of macro and micro economic variables has been supported by empirical testing. The earliest work on this theory is that of Nelson (1976). He studied the relation between inflation and stock market returns in USA and documented a negative relation. Chen et al. (1986) tested the APT by taking the macroeconomic variables and studied their impact on stock market in USA. Chan et al. (1991) used the earning yield, cash flow, size and book to market ratio of equity to predict stock market return in Japan. The results have revealed significant relationship between the variables and market returns. Gan et al. (2006) studied the relation between the macroeconomic variables and stock market return in New Zealand. They documented that the New Zealand stock market returns is affected by the macroeconomic variables like interest rate, money supply and real GDP. The same relation has been studied by incorporating the macroeconomic variables i-e inflation, interest rate and capital investment by Fama & Gibbon (1982) and impact of inflation rate and real economic activity has been studied by Geske & Roll (1983). They found the negative relation of the variables with the stock returns. Hamao (1988) and Mookherjee and Naka (1995) have analyzed the relationship in Japan and showed that a short run relation exist between the macroeconomic variables and the Japan stock market returns. Flannery and Protopapadakis (2002) found inflation and money growth as important variables in explaining the returns in stock market.

The relationship between stock market returns and the fundamental variables has been analyzed by the researchers in different countries. Cheung and Ng (1998) studied the relation in the stock market index of five countries and also checked their relation to the real variables like oil price, consumption and output. Moradoglu et al. (2000) investigated the relationship between macroeconomic indicators and stock market returns in nineteen emerging economies. They documented correlation between variables and returns in stock markets of these emerging economies. Garcia and Juarez (2010) investigated the impact of macroeconomic indicators of China and America on the stock market indices of three countries namely Brazil, Chile and Mexico. They documented that the Chinese macroeconomic indicators have become more important to influence stock market returns in Latin America.

The relationship has also been studied in developing economies. Consumer price index (CPI), industrial production index, foreign remittances, market price to earning P/E and monthly average growth have been used as macroeconomic variables to study their impact on stock market returns in Bangladesh by Ali (2011). He documented that the inflation and foreign remittances have negative relation and other variables have positive relation with stock returns. There is long run relationship between the Istanbul stock exchange and the macroeconomic variables used i-e changes in GDP, foreign exchange rate and current account balance (Acikalin et. al., 2008). Co-integration exists between money supply and stock market returns in Malaysia (Ibrahim, 1999). Agarwala and Tuteja (2007) examined the relation of the stock market returns and economic growth in India. Their result document a long run relation between developments in stock market and economic growth. Chancharat et al., (2007) investigated whether international stock market and different macroeconomic variables have an effect on the stock market of Thai. They found that Thai stock market is affected by the changes on stock markets of Singapore, Malaysia and Indonesia before the financial crisis and Singapore, Philippines

and korea after the financial crisis of 1997. They also documented that oil prices have a negative impact on Thai stock market. The relationship has been analyzed in the Pakistani context by Nishat and shaheen (2004) studied the relationship among macroeconomic variables and Karachi stock exchange and found that significant positive relation exist between industrial production and stock market and significant negative relation between inflation and stock returns. Sohail and Hussain (2009) found that there exists long run relation between stock returns in Lahore stock exchange and macroeconomic variables. Significant relationship has been found among different macroeconomic variables and stock returns in Pakistan (farooq & keung, 2004; Mehar, 2005; Ihsan et. al., 2007).

Small amount of work has been done to examine the impact of changes in gold prices in stock market returns. Tursoy et al. (2008) has studied in combination with other macroeconomic variables the impact of gold prices on stock returns in Istanbul. Their results are consistent with the study of Poon and Taylor (1991) that the pricing relation between stock returns and macroeconomic variables is not significant. Bayuksalvarci (2010) examined the relation of macroeconomic variables including gold prices to its impact on Turkish stock market returns. Mishra et al. (2010) examined the relation between the domestic prices of gold in India and its impact on stock market returns and concluded by documenting that a long run equilibrium relation exist between the variables.

This paper checks the linkage between stock market and the gold prices. The direction of the causality has also been checked.

Methodology

This study aims to determine the relationship between the changes in gold prices and stock returns. Monthly data for the variables are taken from 1997 to 2011. The dependent variable of this study is monthly stock returns of Pakistan. Data for stock returns is taken from Karachi stock exchange 100 index. The independent variable of the study is monthly prices of gold. The gold price data is taken in US dollar for the reason that any change in prices of gold in US dollar has an effect on the prices of gold in Pakistan. The data for gold is taken from World gold council website. The data is analyzed using ADF, co-integration, granger causality and impulse response function.

Data analysis and discussion

Unit root test is used to check the stationarity in the data. For that purpose augmented

Table 1

Null hypothesis: variable has a unit root.

	At Level		
Variables	ADF statistics		
Stock Returns	-15.1324	-2.87831	0.000
Gold prices	-12.6062	-2.87831	0.000

Dickey Fuller (ADF) test is used. Data is stationary when it has no trends in it. The

Results of the ADF test show that variables are stationary at level. It can be seen in table 1 that the t-statistics values are greater than 2 (in absolute terms) and p-value is less than 0.05, so we reject the null hypothesis and document that the data is stationary.

Johansen"s and Juselius multivariate test is then applied to check the long term relation between the variables. We find from the results that long term relation exists between the stock market returns and gold prices.

Tabel 2

HypothesizedNo. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.239081	65.59857	15.49471	0.0000
At most 1	0.112705	19.96952	3.841466	0.0000

As it can be seen in table 2 that long term relation exist between the variables, as the trace statistics value are critical at 0.05 as shown by the probabilities. We now use the granger causality test. Granger causality is the test of lead and lag. It tells which variable comes first. So once we have found that relationship exists, we now find the direction of relationship. Results of granger causality show that the F- stat value for gold return with index return is greater than 2 and p-value is less than 0.05, so we reject the null hypothesis and conclude here that gold returns granger cause index returns. On the other hand the granger causality value for index return with gold return is less than 2 and its p-value is 0.25729. So we cannot reject the null hypothesis in this case. So we concluded that the direction of relation is from gold prices to stock returns. Any change in prices of gold will cause change in the stock market returns.

Table 3

Null Hypothesis:	F-Statistic	Probability
GOLD_RETURN does not Granger Cause INDEX_RETURN	3.34427	0.03769
INDEX_RETURN does not Granger Cause GOLD_RETURN	1.36878	0.25729

Conclusion and future research direction

This papers aims to study the relationship between the macroeconomic variable i-e gold prices and the returns in stock market. The variable of gold prices has its importance in determining the changes in stock returns as after capital market; the investors are now looking towards the gold market. So this paper is an attempt to study the relation. Empirical results reveal that there exists long term relation between these variables. Moreover the direction of relation is from gold prices to stock returns. Any change in the gold prices has an effect on the stock prices.

Future studies can be conducted by incorporating other variables in addition to gold prices to examine the impact in stock market. This study has used the data for fourteen years. Future studies can be conducted by using data for an extended period for generalizing results.

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