Does gold hedge stock market, inflation and exchange rate risks? An econometric investigation

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ABSTRACT

This paper conducts a comprehensive empirical study of hedging potential of gold against adverse movements of stock prices, inflation and exchange rate for India, Pakistan and the United States. Using daily and monthly data covering the period of 1990 to 2013, this paper first explains the average gold returns using an EGARCH model. The paper also investigates whether hedging potential of gold remains equally strong in several bearish and bullish conditions of gold market using a quantile regression approach. It was found that there is a fairly robust evidence of gold acting as a safe haven against exchange rate risk in Pakistan and India. However, the evidence of gold hedging stock market risk is not uniformly strong in varying gold market conditions in the three countries. Also the evidence that gold hedges inflation risk in the US is realized only during the average and bearish conditions of gold market but not during bullish trends. The paper found robust evidence of gold acting as a safe haven against deteriorating local currency in Pakistan using daily data. The hedging and safe have benefit of gold against currency risk is also fairly strong in India as evidenced in the daily data. Thus, the empirical findings of gold acting as either a hedge or a safe haven against the risks in other asset markets need some qualification pertaining to the gold market condition itself.

1. Introduction

This paper investigates the hedging potential of investment in gold to the risks of adverse movements of stock prices, commodity prices and exchange rates. Theoretically, any asset, which when added to a portfolio *P,* reduces the variance of the portfolio without reducing average returns is desirable for investors. Assets having negative correlations between them especially enhance this diversification property. Following Baur and McDermott (2010) and Baur and Lucey (2010) this paper investigates whether gold has negative or zero correlation with stock prices and positive correlation with commodity prices and exchange rates on average i.e. whether gold has ability to hedge the investment risks in these assets. The paper also investigates whether gold is a safe haven i.e. whether gold returns have negative or zero correlation with stocks in the circumstances of extremely bearish stock market and positive correlation with inflation and exchange rate (local currency per unit of foreign currency) in their adverse conditions. If this is so, gold will be a desirable asset in the portfolio of investors being a friend in rainy days. The losses due to extremely adverse stock market movement will be compensated by the upward movement of gold prices. Also, any deterioration in purchasing power due to inflation or currency depreciation will be compensated by gold.

This paper extends the work of Baur and Lucey (2010) and Baur and McDermott (2010) in several ways. Firstly, it investigates the hedging potential of gold with respect to financial asset prices and commodities price inflation for two South Asian emerging markets in particular India and Pakistan and compare the same with a developed market of the United States. Secondly, the analysis

extends to investigate whether hedging potential of gold investment differs in different bullish and bearish conditions of gold market. The dummy variable approach adopted by Baur and McDermott (2010) and Baur and Lucey (2010) of modeling gold returns addresses the question whether gold serves as a hedge against other assets on average conditions and during certain extreme conditions for these assets. Specifically their investigation relates average gold returns to centre and to extreme quantiles of the distribution of assets against which gold is held to serve as hedge or haven. A question of equal interest is whether the hedging potential of gold is different under varying bullish and bearish conditions of gold market itself. Recently Wang, Xie, Jiang, and Stanley (2016) found that extreme risk is more quickly transmitted in the post-crisis era than in the pre-crisis era, an effect that was related to the safe-haven or risk-hedging property or the speculative value of gold.

The quantile regression enables us to investigate such relationship for several lower and higher quantiles of the gold return distribution. Thus, whereas the regression approach adopted in the literature presents a partial picture of the relationship between gold and the asset to be hedged, the quantile regression portrays a more comprehensive and refined picture. Accordingly, this study investigates whether the hedge coefficients are altered significantly if we consider several bullish and bearish periods in the gold market.

This paper employed data from India, Pakistan and the US. The countries selected for analysis in the paper have some notable features. The US has the highest reserves of official gold holdings (8133.5 tonnes as on July 2014, source: World Gold Council). India is traditionally the largest consumer of gold in the world especially due to demand for gold jewellery which amounted to 746 tonnes in 2010. Recently China is replacing India as the largest jewellery market for gold (www.goldfacts.org). Pakistan possesses typical features of an emerging market. See Iqbal (2012) for comparison of various aspects of stock markets of Pakistan and India with a selected set of countries including the US.

2. Literature review

The relationship of gold to stock market is a popular issue for the financial analysts who often assess the intensity of economic recession by the extent of drop in the ratio of Dow Jones Industrial Average to the gold price (ounces), see Gutiérrez et al. (2013). Hedging potential of gold and other precious metals against stock market has recently been investigated in several papers. Baur and Lucey (2010) and Baur and McDermott (2010) were first to formally define an asset to be a hedge or a safe haven against another asset. According to Baur and McDermott (2010) a weak (strong) hedge is defined as an asset that is uncorrelated (negatively correlated) with another asset on average. A weak (strong) safe haven is defined as an asset that is uncorrelated (negatively correlated) with another asset in adverse conditions of the market for the later. In their empirical analysis Baur and Lucey (2010) investigated whether gold is a hedge and safe haven for stocks and bonds in the UK, US and German markets. Using daily data from November 1995 to November 2005, they employed a time series regression model where gold returns was used as dependent variable and stock and bond returns and two interactive dummy variable terms were used as explanatory variables to capture extreme stock market decline. The time variations in the gold volatility was modeled using a GARCH (1,1) model. Their results show that gold appears to act as a safe haven for stocks in the United States, the United Kingdom and Germany. Gold is also found as a hedge for stocks in the United States and the United Kingdom. However, gold is found neither as a hedge nor a safe haven for bonds in both the United States and the United Kingdom. Their analysis reveals that gold is not a safe haven for stocks at all times but only in extreme bearish stock market and that the safe haven property is short-lived. Baur and McDermott (2010) examined the role of gold in the global financial system. They tested the hypothesis that gold acts as a hedge and safe haven for stocks of emerging and developed markets. Covering a sample of 30 years of daily, weekly and monthly data from March 1979 to March 2009 and employing a model similar to Baur and Lucey (2010), they found that gold acts a safe haven for most of the developed country stock markets with strongest finding being for the daily data especially for extreme shocks occurring with a probability less than one percent. They also found that investors of developed and emerging markets react in different ways to shocks. Gold is found to be a weak safe haven for some emerging markets. Thus, their results corroborate the hypothesis that the safe haven asset plays a relatively minor role in emerging markets. They interpret this finding to imply that investors, suffering losses in emerging market stocks, simply readjust their portfolios to average returns rather than seeking an alternative haven asset. Hood and Malik (2013) compared the hedge and haven property of gold, silver and platinum with the volatility index (VIX) for the US market using daily data from November 1995

Table 3.1
Descriptive statistics of log percentage change of gold prices, CPI and stock market of Pakistan, India and US (Monthly Data).

		Obs	Mean	Median	Standard deviation	Minimum	maximum
PAKISTAN	Gold	275	1.05	1.14	4.49	-14.64	15.98
	CPI	275	0.72	0.65	0.73	-0.87	3.28
	KSE-100 Index	253	1.20	1.63	9.67	-44.87	28.94
INDIA	Gold	285	0.85	0.75	4.63	-13.93	18.28
	CPI	285	0.64	0.66	0.85	-2.12	4.47
	BSE-100 Index	253	1.15	1.60	9.05	-30.06	43.16
US	Gold	285	0.40	0.36	4.60	-19.08	15.99
	CPI	285	0.21	0.20	0.33	-1.93	1.21
	S & P-500 Index	285	0.58	1.09	4.31	-18.56	10.57