

## Gold Investment in Malaysia: Refuge from Stock Market Turmoil or Inflation-Protector?

**Mohd Fahmi Ghazali\***

Labuan Faculty of International Finance, Universiti Malaysia Sabah, 87000 Federal Territory of Labuan, Malaysia

**Hooi Hooi Lean**

School of Social Sciences, Universiti Sains Malaysia, 11800 USM Penang, Malaysia

**Zakaria Bahari**

Centre for Islamic Development Management Studies, Universiti Sains Malaysia, 11800 USM Penang, Malaysia

### Abstract

This research aims to analyse the roles of gold as a hedge or safe haven against stock and inflation, simultaneously. The standard TGARCH and quantile techniques in the TGARCH models are proposed. Based on the standard TGARCH model, this study demonstrates that gold generally displays little evidence of a strong hedge property against the stock market and inflation in the full sample (2001-2014). Nevertheless, this study reports some strong hedging roles for local gold (but not international gold) in the shorter sample (2010-2014) during the period during which particular attention was given to the European debt crisis. For the quantile relations, although we can detect some evidence of a strong safe haven in some quantiles, gold, at best, tends to be a weak safe haven during extreme movements in stock return, for both periods. Concerning gold-inflation relationships, this study reveals that gold, at best, is a less viable haven instrument. This study also reveals that various types of gold are essential to determine the hedge and safe haven effects, while gold in various weights only plays a minor role. In conclusion, these results demonstrate that gold only plays a minor role during stock market slumps and inflationary episodes in the context of Malaysia.

**Keywords:** Gold; Hedge; Safe haven; Stock; Inflation; European debt crisis.



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### 1. Introduction

In various religious and cultural areas, gold represents royal and honourable features. It possesses a critical position among the class of major precious metals, and is even considered the leader of the precious metal pack. Increases in the price of gold tend to cause parallel movements in the prices of other precious metals, e.g., palladium, platinum, and silver (Sari *et al.*, 2010) It has represented the ultimate standard of value in large part of the world for many years, attributable to its divisibility and durability, among other valuable features. Not only that, it was a standard that held steady its purchasing power in terms of goods for a long time (Capie *et al.*, 2005)

Furthermore, in countries in which financial systems are in early stages of development, the range of investment opportunities may only be starting to grow, and confidence in financial markets and institutions may be less than full. Therefore, it remains of significant interest to investigate whether assets such as gold can be held outside the financial system, and maintain their original value in times of uncertainty (Starr and Tran, 2008).

The high prices of gold can be linked to “fear” trade; to wit, the price of gold rises due to investors’ fears of the weak future of the stock market or overall economic performance. The latter may include higher expected inflation due to lax central bank policies, and purchases of gold motivated by “fear” occur anytime, but are unlikely to happen in the same month every year.

In times of uncertainty, due to investors’ unwillingness to trade, asset values become ambiguous. However, the trades on gold may increase due to the relative simplicity of the gold market (Dee *et al.*, 2013). Fears of a global economic recession caused stock markets to plummet in October 2008. Since then, the price of gold has soared, indicating a positive response to the intensification of the financial crisis. Therefore, since the start of the financial crisis triggered by poorly performing subprime mortgages and subsequent failures of large investment banks, investment funds on precious metals have significantly increased. This indicates that investments in gold are not only driven by inflation hedge consideration, as mentioned by Jensen *et al.* (2002), and Kat and Oomen (2007), but also by the consideration of tactical values in portfolio allocation.

Despite the reputation of gold as a protection during stock market distress and store of value, studies relevant to gold hedging against stock and inflation in the existing literature are commonly separated (Bampinas and Panagiotidis, 2015); (Baur and McDermott, 2010); (Ghazali *et al.*, 2015a); (Ghazali *et al.*, 2015b). The separate regression analysis has a limitation. For instance, in reality, investors usually face not only stock risk in certain periods, but inflation risk as well. Therefore, it is crucial to evaluate the potential of gold to multiple sources of risk, jointly or simultaneously. Another difficulty with this approach is in the case an attempt is made to examine the

question on whether some properties disappear, and others become stronger, therefore revealing the true relationship of the variables with the gold return.

Second, although many researchers find that gold is a good inflation hedge over the long-term, e.g., (Ghosh *et al.*, 2004), McCown and Zimmerman (2006), Narayan *et al.* (2010) and Worthington and Pahlavani (2007), one criticism in a large portion of the related literature is on whether this precious metal can maintain its purchasing power value under extreme conditions. Most previous studies investigate the hedging ability of gold, on average, and do not take into account the length of the effect Adrangi *et al.* (2003); Blose (2010); Chua and Woodward (1982); Taylor (1998). In other words, the analysis does not capture the issue of gold as a safe haven in times of extreme conditions (i.e., during high inflation). For example, does the price of gold increase during periods of high inflation? If the price of gold increases in a larger magnitude during high inflation, this indicates that the real price of gold faced by the investor increases during the same period, and it is thus better to invest in gold.

Third, it is still not known whether the gold account can serve as a sound investment. Due to many difficulties of transporting and storing gold bullion, the gold account becomes an alternative and popular method, and thus provides a valuable solution for small investors to allocate their gold holding. Nevertheless, much uncertainty still exists about the ability of the gold account to work as a hedge or a safe haven during extreme conditions. What remains unclear is whether investors should regard gold accounts as exact surrogates for gold bullion; and whether they can generally rely on it, particularly during financial and inflation uncertainty; or whether they should instead take a position directly in gold bullion.

Finally, while there is a torrent of studies that focus on the impact of global financial crises on the role of gold (Baur and McDermott, 2010); (Bredin *et al.*, 2015); (Choudhry *et al.*, 2015); (Ciner *et al.*, 2013); (Gürkün and Ünalımsı, 2014); (Ibrahim and Baharom, 2011); (Miyazaki and Hamori, 2013), very few researches exist that specifically analyse the effects of the European debt crisis on gold returns. While the global financial crisis was characterised by crashing real estate, stock market valuations and bank failures, the European sovereign debt crisis was marked by a substantially increased default risk of several Euro areas. Białkowski *et al.* (2014) contend that the crisis in the Eurozone could be seen as one potential driver of the recent gold price hike. Arguably, this might intensify the flight-to-quality and, accordingly, change the role of gold as an investment vehicle. There are a number of arguments on why the debt crisis is of importance to capital markets participants and gold investors. First, the evidence advocates that the debt crisis has a contagion effect, and spread cross-border with relative ease (Arghyrou and Kontonikas, 2012). Second, the government solvency and the financial sector fortunes are closely intertwined. (Caruana and Avdjiev, 2012) show that banks have direct portfolio exposures to sovereign risk, while governments frequently face the need to recapitalise distressed banks. This vicious circle is referred to by Lane (2012) as a "diabolic loop". Third, the fiscal trouble at the periphery endangers the very existence of the Euro area. Viewing the situation through the prism of existing systemic risks, it is easy to understand the reason investors may have a preference for gold, and why its price has appreciated over time (Białkowski *et al.*, 2014).

This study is structured into five sections, including this introductory section. We briefly discuss the central issues of the study (i.e., the role of gold as a diversifier, a hedge or a safe haven against stock, as well as the characteristics of gold as a tool for hedging and as a safe haven against inflation) in the next section. The third section presents in detail the practical methodology carried out to satisfy the research objectives, as well as the data source. Section four reports the empirical findings of the full sample (2001-2014) and a shorter sample period, covering 2010 to 2014. Section five aims to draw a conclusion to the study.

## 2. The Two Main Issues

This study investigates two main issues. The first issue deals with gold as a diversifier, a hedge and a safe haven against stock. It then goes on to the investigation of gold as a hedge and as a safe haven against inflation.

### 2.1. Gold as a Diversifier, a Hedge or a Safe Haven Against Stock

Generally, in a group of similar assets, assets will react correspondingly among each other during the transformation of the economy and financial system. Besides the typical investment drivers such as company shares, bonds, and mutual funds, gold investment is an option for investors to diversify their investment portfolio. Therefore, a significant and growing body of literature investigate the role of gold in portfolio allocation (Chua *et al.*, 1990); (Hillier *et al.*, 2006); (Jaffe, 1989); (Sherman, 1982), due to the for centuries, gold is alleged to be important in providing valuable diversifying qualities beyond those achievable in a portfolio devoted solely to financial assets.

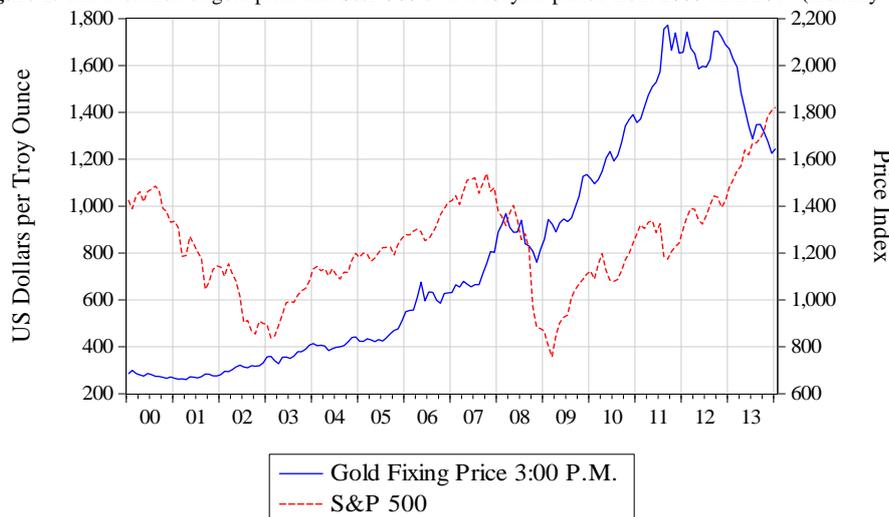
Due to its unique nature, gold has always been regarded as a safe asset. A drastic shift in recent years towards investment demand from jewellery demand reflects the concept that gold can be considered a safe haven asset in times of economic turmoil, since investors construct their portfolios to include more gold as an alternative to riskier assets. During financial distress in which stock and bond markets endure a severe downturn, the price of gold rises typically steadily. For example, gold reached an all-time high record of US\$ 1896.50 an ounce on 5th September 2011, mainly due to a poor jobs report, the Euro debt crisis and lingering uncertainty around the United States (US) debt ceiling crisis (Amadeo, 2013). The price of gold has demonstrated this pattern in past crises as well (e.g., the last peak in 1980 during another period of economic recession).

In contrast to gold, the stock market is negatively affected by an economic crisis. Despite the development of several tools and techniques to predict stock prices, the stock market is still regarded as the most volatile and unpredictable market for investment purposes. Investors buy and sell stocks on a frequent basis to earn returns from, and exploit, the fluctuation in stock prices. The stock market has been exceedingly volatile less than a decade ago,

particularly during the crisis in 2008, which caused many companies to become bankrupt, and even the big economies of the world could not save themselves. The real panic began in 2008 when the most significant US financial institutions such as Fannie Mae, Freddie Mac, Merrill Lynch, Lehman Brothers and American International Group (AIG) were either put up for sale, taken over by the US government, or became bankrupt. The Standard & Poor's 500 (S&P 500) fell 56.8% from its peak on 9th October 2007, to a low point on 9th March 2009. Much of the decline in the US occurs in a brief period. For instance, from its peak of 1,300.68 on 28th August 2008, the S&P 500 fell 48% in a little over six months, to its low of 676.53 on 9th March 2009.

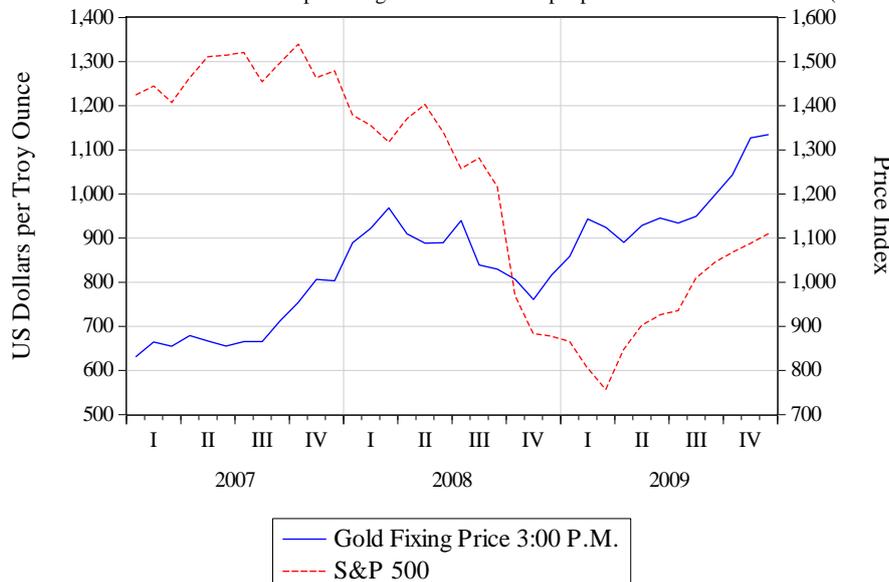
Figure 1 presents the evolution of the S&P 500, and the price of gold through time, for the 15-year sample period. The figure illustrates that the price of gold and the level of the S&P 500 move in the opposite direction during certain times, particularly during the US recessions (i.e., a burst of the dot-com bubble in 2001, and the global financial crisis in 2007-2009) and co-move in others (e.g., from 2004 to 2007). This figure suggests that the relation between gold and the equity portfolio is not constant; i.e., the beta changes over time. Obviously, the periods in which gold and the equity portfolio move in opposite directions are consistent with gold as a hedge against changes in the equity portfolio. Gold gains value in the S&P 500 bear markets (from March, 2000-September, 2001; January, 2002-October, 2002; October, 2007-November, 2008; January, 2009-March, 2009) and loses value in the S&P 500 bull markets (from September, 2001-January, 2002; November, 2008-January, 2009; March, 2009-March, 2013). Some periods are not consistent with a hedge, since there is strong co-movement between the two assets (from 2003-2007). In these periods, gold was potentially driven by growth-related factors, especially demand from emerging markets. It is also possible that investors anticipated a crash, and bought gold as a hedge against such an event. After the stock market slump in 2008, gold regained its status as a hedge or a safe haven asset. Figure 2 focuses on the period in which gold moves in directions opposite to those of the S&P 500. This pattern is evident in 2008, when stock markets fell significantly, and gold increased by a similar magnitude. The figure also shows that there is considerable noise in both the stock price index and the price of gold.

**Figure-1.** The evolution of gold price and S&P 500 over a 15-year period from 2000 until 2014 (monthly data)



**Source:** Gold price data comes from the LBMA homepage. The S&P 500 data comes from Economic Research, Federal Reserve Bank of St. Louis homepage.

**Figure-2.** The evolution of S&P 500 and price of gold over a sub-sample period from 2007 until 2009 (monthly data)



**Source:** Gold price data comes from the LBMA homepage. The S&P 500 data comes from Economic Research, Federal Reserve Bank of St. Louis homepage.

The financial crisis not only puts the US into a deep financial problem, but Asia and Europe as well. The collective losses of the London, Paris and Frankfurt markets alone amounted to over US\$ 350 billion (Times, 2008). The Financial Times-Stock Exchange (FTSE) 100 plunged by 391 points (almost 8%) on 6th October 2008. This fall was the most substantial points drop in history, and the most significant percentage drop since the stock market crash of 1987 (Winnett, 2008).

Figure 3 shows the time series plot of domestic gold price and stock price from 2001 to 2014. The figure shows that the price of local gold has shown a dramatic growth for about 300%. Since October 2008, the price of gold has surged, while it shows a downward trend since 2012 due to investors shift from gold market to stock market as economy around the globe improving. Although the impact of the crisis on the economy was relatively small, the KLCI fell in January to March 2008; May to October 2008; and March 2009. After it had fallen below 1000 percentage points from October 2008 to April 2009, the index grew over the period from May to July 2009. In general, during the last ten years, the stock market experienced extremely high volatility.

**Figure-3.** The evolution of gold price and KLCI over a 14-year period from 2001 until 2014 (monthly data).



**Source:** Gold price data comes from the Central Bank of Malaysia homepage. The KLCI data comes from Datastream.

The view on whether gold provides a diversifier, a hedge or a safe haven against stock market return is the core focus of this study. To fully appreciate the scope of the analysis, it is crucial to distinguish between each key investment concept. While a variety of definitions of the term 'asset hedge' have been suggested, this research uses the definition proposed by Baur and McDermott (2010) and Baur and Lucey (2010); who perceive it as an asset that is uncorrelated (weak hedge) or negatively correlated (strong hedge) with another portfolio or asset, on average. A diversifier asset refers to an asset that is positive, but not perfectly correlated (smaller than one) with another asset or portfolio, on average (Baur and Lucey, 2010); (Pullen *et al.*, 2014). A hedge and diversifier do not have the (specific) property of reducing losses in extreme adverse market conditions, since the asset could display a positive correlation in such periods, and a negative correlation in normal times with a negative correlation or no correlation, on average.

A distinguishing feature between a hedge asset and a diversifier asset with a safe haven asset is the length of the effect. A safe haven asset also can be divided into two types; strong and weak. A strong safe haven asset can be defined as an asset that is negatively correlated with another asset or portfolio in times of market stress or turmoil. On the other hand, an asset is a weak safe haven if it is uncorrelated with another asset or a portfolio in times of extreme market movements (Baur and Lucey, 2010); (Baur and McDermott, 2010). A haven is a place of safety, refuge, and offering for favourable opportunities or conditions (Webster, 2013). In times of stormy weather, ships seek out the safe haven of a harbour or port that provides investors shelter to ride out the storm. A safe haven asset must, therefore, be some asset that holds its value in 'stormy weather' or adverse market conditions. This characteristic does not force the correlation to be negative or positive, on average, but only to be zero or negative during specific periods. Thus, in normal times, or bullish market conditions, the correlation can be either negative or positive. Such an asset provides investors with the opportunity to protect wealth in the event of adverse market conditions, and to compensate investors for losses, since the price of the safe haven asset increases when the price of the other asset or portfolio drops. Moreover, the existence of such an asset is expected to benefit and improve the stability of capital markets by reducing the severity and the duration of extreme market conditions.

## 2.2. Gold as an Inflation Hedge

The debate among investors about the types of assets that best protect investors against inflation is ongoing. It is paramount for individual and institutional investors to keep up with inflation, since their obligations are often, to a certain degree, inflation-linked. Moreover, the ability of assets to protect inflation is prominent, particularly during economic uncertainty.

Inflation hedging was an essential topic in the 1970s among researchers when inflation was considerably higher than it currently is. Thus, why is inflation once again a hot issue when it is low and stable in most evolved markets over

the last decade? The price of gold tends to increase as demand increases, since there is a loss of confidence in the currency, which manifests in the form of inflation. The policymakers and central banks of the world's largest economies are allowing their currencies to depreciate. They start their attempt to stabilise output and stave off deflation by introducing a huge amount of liquidity operations after the recent financial crises. By 'printing' enormous quantities of money via quantitative easing, central banks are aiming to debase the value of their currency, and in turn, increase the competitiveness of their industry overseas. Due to these liquidity operations, investors fear that inflation is likely to be unpredictable, and may become unusually high within a few years, which would motivate consumers to spend and invest (Kelleher, 2011). In practice, nevertheless, this is a hazardous attempt to manipulate the value of fiat currencies, which could lead to severe currency and inflationary crises during which consumers lose confidence in the value of paper money (Jones, 2013).

Gold, like all precious metals, can be used as a hedge against currency devaluation, inflation or deflation. As explained by Joe Foster, a portfolio manager of the New York-based Van Eck International Gold Fund in September 2010: "The currencies of all the major countries, including ours, are under severe pressure because of massive government deficits. The more money that is pumped into these economies – the printing of money basically – the less valuable the currencies becomes" (Deener, 2010).

If the returns on equities, bonds, and real estate do not adequately compensate for inflation risk, the demand for gold and other alternative investments such as commodities are expected to rise.

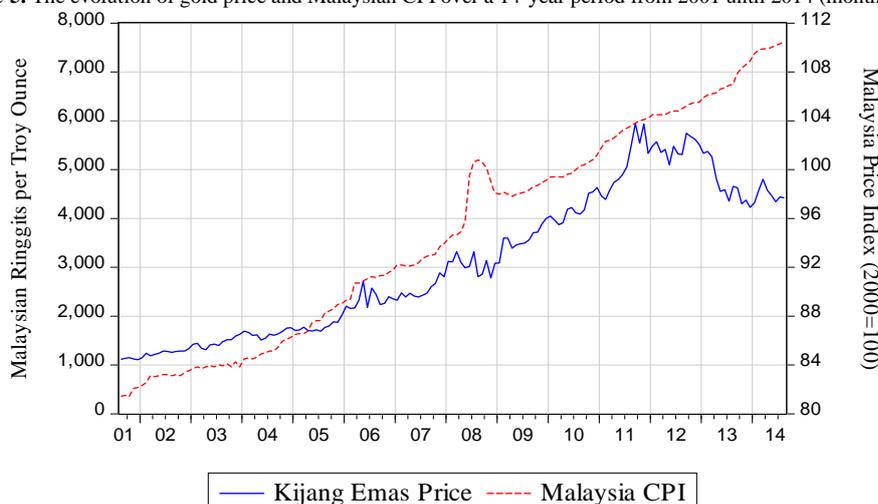
Figure 4 and Figure 5 illustrate the movements of the price of gold for a better understanding of the relationship between consumer price index (CPI) and the price of gold in the US and Malaysia, respectively. It is seen that CPI is generally on an upward trend and moves in the same direction with the price of gold in the US. The Federal Reserve (FED) has continuously raised the interest rate since September 2005, and the price of gold has gone up at the same time. The price of gold surged to a new peak every month since then, driven by the weak dollar, global inflationary fears and strong oil prices persist. The time series plots of both series in Malaysia, on the other hand, show that the domestic gold price and CPI move concurrently in most years except in 2008. Obviously, when gold price and CPI move in tandem, it is consistent with gold as a hedge against inflation. In contrast, the year 2008 is different because there was an opposite movement between the two prices.

Figure 4. The evolution of gold price and the US CPI (seasonally adjusted) over a 15-year period from 2000 until 2014 (monthly data)



Source: Gold price data comes from the LBMA homepage. The US CPI data comes from Economic Research, Federal Reserve Bank of St. Louis homepage.

Figure-5. The evolution of gold price and Malaysian CPI over a 14-year period from 2001 until 2014 (monthly data)



Source: Gold price data comes from the Central Bank of Malaysia homepage. The Malaysia CPI data comes from IFS

Several arguments were given by the financial media on the reason gold can be used as a form of protection against inflation. First, gold supply is quite stable over time, where, on average, mined gold has increased by 1.5% over the last 100 years. The finite amount of gold has helped to keep the annual addition of gold at low levels. Second, during the gold standard, when the currencies were fixed to gold, and their values were determined by the amount of gold the countries had in their vaults, domestic inflation usually increased by not more than an annual 2%.<sup>1</sup> Third, due to inflation, all currencies lose their value over time. Nonetheless, gold retains its value, or even experienced an increase.

The view on whether gold provides an effective inflation hedge is another focus of this study. Inflation hedge is a defensive investment that protects against the risk of loss that is caused by inflation, and the loss of purchasing power associated with it (Farlex, 2012). For the capability of an asset to hedge against inflation, the value must move, adjust and correlate with inflation. If inflation and gold returns are positively correlated during times of higher inflation, gold investments can play the role of a safe haven asset.

When inflation occurs, people are less likely to hold cash, since, over time, it loses value. Alternatively, people will put cash into interest-earning investments and precious metals such as gold to combat the effects of inflation.

### 3. Methodology and Data

This study evaluates multiple sources of risk, namely, stock and inflation risk, by combining both variables in the same model. In reality, investors are usually faced with, not only stock risk, but also inflation risk, in certain periods. This study uses monthly data<sup>2</sup> to examine these marginal effects. In the first step, this study analyses how gold reacts to shocks in the stock market and inflation, on average. The results provide evidence for a hedge. In the second step, we examine the reaction of gold to shocks under extreme conditions. Since the analysis condition is in extreme events, the empirical framework examines the existence of a safe haven characteristic.

#### 3.1. Systematic Analysis

This analysis is based on the APT of Ross (1976),<sup>3</sup> combined with the ARDL model used by Capie *et al.* (2005), to evaluate multiple sources of risk. It provides a framework with which to assess an asset's potential to multiple sources of risk simultaneously, by running the following regression:

$$r_{g,t} = \alpha_0 + \sum_{i=1}^l \alpha_{1i} r_{g,t-i} + \sum_{j=0}^m \beta_{1j} r_{s,t-j} + \sum_{k=0}^n \beta_{2k} \pi_{t-k} + \varepsilon_t \quad (1)$$

where  $r_{g,t}$  in Equation (1) denotes gold return at time  $t$ . The returns are regressed on a constant  $\alpha_0$  and its own lagged returns. The contemporaneous and lagged stock market and inflation shocks are captured by the variables  $r_s$  and  $\pi$ , respectively. Error term or innovation  $\varepsilon_t$  follows a TGARCH or a GARCH process. The parameters to be estimated are  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ . The lag lengths  $l$ ,  $m$  and  $n$  are included to capture the evolution of gold return through time. Parameter  $\beta_1$  verifies whether gold is a diversifier or a hedge asset for stock. Gold is deemed a diversifier if  $\beta_1$  is statistically significant and positive, and less than unity. Gold is characterised as a weak (strong) hedge for stock if  $\beta_1$  is non-positive (negative) and statistically insignificant (significant). On the other hand, gold is a weak (strong) hedge for inflation if  $\beta_1$  is positive and statistically insignificant (significant). Alternatively, gold return is a perfect hedge against inflation if  $\beta_2$  equal to one. If  $\beta_2$  is larger than one, the hedge is more than complete. Gold returns that provide an incomplete hedge or partial hedge will yield a  $\beta_2$  between zero and one. A negative  $\beta_2$  suggests that gold acts as a perverse hedge against inflation.

#### 3.2. Conditional Analysis

This research examines the reaction of gold to shocks under extreme conditions individually, as suggested by (Baur and McDermott, 2013). We estimate the safe haven characteristic conditional on the extreme stock market and inflation shocks.

This model includes regressors that contain stock returns that are in the  $q\%$  lower quantile, and inflation that are in the  $q\%$  upper quantile, as follows:

$$r_{s,t(q)} = \theta_{(q)} + \mu_{t(q)} \quad (2a)$$

$$\pi_{t(q)} = \theta_{(q)} + \mu_{t(q)} \quad (2b)$$

<sup>1</sup> Nevertheless, a comparison of the gold standard period with the post gold standard period is invalid if only the monetary system and no other factor is taken into account.

<sup>2</sup> One reason that is CPI data is obtained with only monthly or quarterly data.

<sup>3</sup> The APT model can be explained as follows: Suppose that asset returns are driven by a few common systematic factors and non-systematic noise, which can be expressed as:  $r_i = \alpha_i + \beta_{i1}F_1 + \beta_{i2}F_2 + \dots + \beta_{in}F_n + \varepsilon_i$ ; where  $\alpha_i$  is a constant for asset  $i$ ,  $F_1, \dots, F_n$  are the latest data on common systematic factor driving all asset returns,  $\beta_{i1}, \dots, \beta_{in}$  are the sensitivity of the return on asset  $i$  with respect to news on the  $n$ -th factor (factor loading), and  $\varepsilon_i$  is the idiosyncratic noise component in asset  $i$ 's return that is uncorrelated across assets and uncorrelated with the factors; it has a mean of zero. One of the requirements of APT is that the number of factors must be no greater than the number of assets. Several assumptions and characteristics are required in potential factors. First, the factors are macroeconomic in nature, and thus create risks that cannot be easily avoided through diversification. Second, their impact on asset prices through shocks (unexpected movements). Third, all information about each factor is well-known and accurate. Finally, the relationship should be theoretically justifiable on economic grounds.

$$r_{g,t} = a + \sum_{p=0}^w B_p [Dr_{s,t(q)}(r_{s,t-p})] + \sum_{v=0}^x C_v [D\pi_{t(q)}(\pi_{t-v})] + \mu_t \quad (2c)$$

In order to obtain the extreme values of stock returns and inflation, we estimate the thresholds of stock returns and inflation via quantile regression, as in Equation (2a) and (2b), respectively.  $r_{g,t}$  in Equation (2c) denotes gold return at time  $t$ . The returns are regressed on a constant  $a$ , and the error term is given by  $\mu_t$ . Error term  $\mu_t$  follows a TGARCH or a GARCH process. The terms  $Dr_{s,t(q)}(r_{s,t-p})$  and  $D\pi_{t(q)}(\pi_{t-v})$  account for extreme stock return and inflation movements, and are included in order to focus on falling stock market and rising inflation, respectively. If the stock market returns exceed lower tail thresholds, that is, 10%, 5%, 2.5% and 1%, the value of  $Dr_{s,t(q)}(\dots)$  is one, and zero otherwise. On the other hand, if inflation exceeds upper tail threshold (90%, 95%, 97.5% and 99%), the value of  $D\pi_{t(q)}(\dots)$  is one, and zero otherwise.

The parameters  $B_p$  verifies whether gold is a safe haven asset for stock. If  $B_p$  in an extremely falling stock market are negative and statistically significant, gold serves as a strong safe haven asset for stock, since they are negatively correlated with each other. If  $B_p$  in an extremely falling stock market are non-positive and statistically insignificant, gold serves as a weak safe haven asset for stock, since they are uncorrelated with each other. Parameter  $C_v$ , on the other hand, verifies whether gold is a safe haven asset for inflation. If  $C_v$  in extremely rising inflation is positive and statistically insignificant (significant), gold serves as a weak (strong) safe haven asset for inflation, since they are weakly (positively) correlated with each other.

### 3.3. Data

The data are based on the availability, which cover the period from July 2001 until August 2014; except for gold account data, which cover the period from February 2010 until August 2014. The gold account is not included in the full sample, as it was only introduced in 2010. Specifically, the first sample covers the global financial crisis and the current European debt crisis, excluding the gold account. The shorter sample includes the gold account, and focuses thoroughly on the current Eurozone crisis.

The data for stock is the monthly prices of KLCI, representing stock market performance or uncertainty. The KLCI is a key benchmark index used in Bursa Malaysia. It is a price index that contains a basket of 100 leading companies in Malaysia. The CPI (in 2000 base index) is monthly, and is denominated in local currency (i.e., Malaysian ringgit). The CPI measures the average change in prices of a basket of goods and services for consumers. CPI is used as a proxy for inflation, since it is one of the most frequently used statistics, and most closely watched economic indicators by policymakers, analysts and the public. For local gold, this study uses monthly prices of *Kijang Emas* and KFH Gold Account-i, which are denominated in Malaysian ringgit. International gold is based on P.M. fixing of London gold prices, denominated in US dollar and United Kingdom (UK) pound.

This study focuses on the rapidly developing economy of Malaysia, and compares the results with two large financial markets (the US and the UK) to examine the differences and similarities of the role of gold in these markets. The inclusion of the US and the UK is self-evident, being large capital markets that also have significant roles in the gold market (Baur and Lucey, 2010). In May 2013, the US held the largest official gold reserve, where the Federal Reserve (FED) continues to hold 8,133.5 tonnes of gold, or a 75.6% share in gold of total foreign reserves. The US is also among the leading players in mining gold (Chossudovsky, 2013). The UK, on the other hand, plays a significant role in the global market as an intermediary gold trader, and has a high demand of gold for financial purposes (Collins, 2011). Unlike the US and the UK, Malaysia does not have a significant role in the gold trading market. Nevertheless, Malaysia is chosen due to the deep interest in gold shown by Malaysian policymakers and academicians in the face of the 1997-1998 Asian financial crisis, as it is seen as a stable and profitable tool for successful investments. The recent financial and debt crises, and the attendant strength of the price of gold, also lead to profound interest in this precious metal in Malaysia. Thus, answering the question on the role of gold as a diversifier, a hedge or a safe haven would provide valuable information to Malaysian investors.

Furthermore, in an attempt to examine how the differences in gold yield different results, this study employs different types of gold (gold bullion coin and gold account) and different weights of gold (1 ounce, ½ ounces, ¼ ounces, and 1 gramme). Data for various weights of gold bullion coin (*Kijang Emas*) were collected from the Central Bank of Malaysia, while the data of the worldwide benchmark of gold were collected from the LBMA, the largest gold market in the world. On the other hand, for data for the gold account, this study uses prices of Kuwait Finance House (KFH) Gold Account-i per gramme (in Malaysian ringgit), gathered from the KFH website. KLCI represents the domestic stock price, which is extracted from Datastream, while the domestic CPI is taken from International Financial Statistics (IFS).

## 4. Empirical Results

The results of hedge analysis in Table 1 show that gold acts as a weak hedge against stock return, since all the coefficients are statistically insignificant. The estimated hedging coefficients for inflation, on the other hand, are statistically insignificant. Hence, this study finds evidence of a weak hedge, or no hedge, of gold against inflation. For instance, all *Kijang Emas* coins and gold in the US dollar act as a weak hedge in contemporaneous inflation due to statistically insignificant and positive coefficients, while all *Kijang Emas* coins do not work as a hedge in once-lagged inflation, since the hedging parameters are statistically insignificant and negative.

**Table-1.** Estimation Results of Simultaneous Systematic Analysis: 2001-2014

	KE (1 oz)	KE (½ ozs)	KE (¼ ozs)	US (1 oz)	UK (1 oz)
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Constant	0.9997**	0.9991**	0.9996**	1.0080**	0.8337*
$r_{g,t-1}$	-0.1079	-0.1066	-0.1058	-0.1295	-0.0517
$r_{s,t}$	-0.0089	-0.0045	-0.0017	0.1044	0.0539
$r_{s,t-1}$	0.1143	0.1079	0.1070	0.1313	0.1090
$\pi_t$	0.2888	0.3462	0.3497	0.1050	-0.8203
$\pi_{t-1}$	-0.0823	-0.1110	-0.0998	0.4356	0.1868

Notes: (\*\*) and (\*) denote significant at 5% and 10% levels, respectively.

Table 2 demonstrates the results of simultaneous safe haven analysis. Gold, at best, acts as a weak safe haven during stock market turmoil due to insignificant negative and positive coefficients in most of the contemporaneous and lagged effects in each quantile. Nonetheless, there are significant negative parameters between gold denominated in the UK pound and lag domestic stock in the 5% quantile, indicating that a strong safe haven ability still exists during this period.

For gold-inflation relationships, the results show that investors that hold gold do not receive compensation for losses caused by extreme inflation. For example, all contemporaneous parameters in the 99% quantile are statistically insignificant and negative, indicating that gold is not a safe haven during most extreme inflation conditions. Gold is also not a safe haven in the 97.5% quantile (contemporaneous inflation). In the 95% quantile, even though the safe haven parameters are significant for *Kijang Emas* (1 ounce and ¼ ounces) and the US gold in contemporaneous relation, the signs are not in line with the safe haven characteristic. Meanwhile, all categories of gold only act as a weak safe haven for the lagged effect in 95%, 97.5%, and 99% quantiles.

**Table-2.** Estimation Results of Gold Return Analysis (Conditional on Extreme Stock Market and Inflation Shocks): 2001-2014

	KE (1 oz)	KE (½ ozs)	KE (¼ ozs)	US (1 oz)	UK (1 oz)
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
$D_{10}(r_{s,t})$	0.0504	0.0492	0.0535	0.1499	0.0149
$D_{10}(r_{s,t-1})$	-0.1207	-0.1168	-0.1245	0.0153	-0.2999
$D_{90}(\pi_t)$	0.1312	0.1648	0.1451	-0.8565	-1.8174
$D_{90}(\pi_{t-1})$	-0.5360	-0.5479	-0.5492	0.1777	2.2868
$D_5(r_{s,t})$	0.0731	0.1204	0.0770	0.2946	0.4860***
$D_5(r_{s,t-1})$	0.0114	-0.0914	-0.0034	-0.1009	-1.0231***
$D_{95}(\pi_t)$	-1.5148*	-1.3414	-1.4891*	-2.5408*	-1.9721
$D_{95}(\pi_{t-1})$	0.4151	0.3122	0.4006	1.1206	2.2815
$D_{2.5}(r_{s,t})$	-0.0389	-0.0425	-0.0353	0.1124	-0.1140
$D_{2.5}(r_{s,t-1})$	0.1138	0.1297	0.1013	0.1033	0.3070
$D_{97.5}(\pi_t)$	-0.8428	-0.8323	-0.8595	-0.9769	-2.4339
$D_{97.5}(\pi_{t-1})$	0.4550	0.4592	0.4434	0.8097	3.1569
$D_1(r_{s,t})$	-0.1332	-0.1368	-0.1538	-0.0936	-0.1996
$D_1(r_{s,t-1})$	-0.5457	-0.5220	-0.5188	-1.2192	-0.2929
$D_{99}(\pi_t)$	-3.7756	-5.2351	-0.4070	-1.5596	-1.0868
$D_{99}(\pi_{t-1})$	14.1609	20.9987	5.3589	1.4376	2.1191

Notes: (\*\*\*) and (\*) denote significant at 1% and 10% levels, respectively.

Table 3 presents the estimation results of simultaneous systematic analysis from 2010 until 2014. The results show that the values and the statistical significance of the hedging coefficients vary across different types of gold. All *Kijang Emas* coins and Gold Account-i offer a strong hedge against stock return, as the contemporaneous hedging parameters are significantly negative in these four cases. The coefficients in all *Kijang Emas* equations lie within the range of -0.4257 to -0.4639. The estimated coefficient for Gold Account-i, on the other hand, is less negative, i.e., -0.3986. Gold appears to be a weak safe haven in the remaining coefficients.

In the case of inflation hedge parameters, the results show that the contemporaneous hedging coefficients for all types of gold are statistically insignificant. The findings imply that gold does not allow investors to hedge against inflation, since their returns do not co-move with inflation. Nevertheless, all *Kijang Emas* coins serve as a strong hedge against lagged inflation, since the hedging coefficients are statistically significant and positive. The positive linkage between all *Kijang Emas* coins and once-lagged inflation lie within the range of 5.9616 to 6.7006. Nonetheless, Gold Account-i is statistically insignificant with the hedging parameter of 2.2872. This indicates that the ability of the gold account to protect investors from losses in purchasing power is still disputable. Gold denominated in the US dollar and the UK pound, on the other hand, still perform poorly against lagged inflation in light of statistically insignificant positive coefficients.

**Table-3.** Estimation Results of Simultaneous Systematic Analysis: 2010-2014

	KE (1 oz)	KE (½ ozs)	KE (¼ ozs)	GA-i (1 g)	US (1 oz)	UK (1 oz)
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Constant	-0.4872	-0.9713	-0.4590	0.5667	-0.0207	0.7044
$r_{g,t-1}$	-0.0844	-0.0857	-0.0932	-0.1830	-0.1332	-0.1748
$r_{s,t}$	-0.4257*	-0.4531**	-0.4639**	-0.3986*	-0.0366	-0.1708
$r_{s,t-1}$	0.1997	0.2368	0.1760	-0.1672	0.0001	0.0173
$\pi_t$	-2.0476	-0.8379	-2.2210	-1.2115	-2.7181	-3.7389
$\pi_{t-1}$	5.9616*	6.7006**	6.4199**	2.2872	4.0740	1.8381

Notes: (\*\*) and (\*) denote significant at 5% and 10% levels, respectively.

Table 4 presents the safe haven analysis from 2010 to 2014. It shows that gold provides a slightly better protection against stock and inflation during extreme conditions. For instance, while gold mainly works as a weak safe haven against stock return in all quantiles, 1 ounce and ½ ounces of *Kijang Emas* do act as a strong safe haven in 5% quantile with the parameter estimates of -1.3629 and -1.3749, respectively. The results of gold-inflation relationships, on the other hand, show that gold, at best, does not serve as a safe haven during high inflation, while in some quantiles, it can act as a weak safe haven. For instance, even though gold does not provide a good store of value during most extreme inflation conditions (99% quantile), it still can work as a weak safe haven in 90%, 95% and 97.5% quantiles, particularly for gold in domestic currency.

**Table-4.** Estimation Results of Gold Return Analysis (Conditional on Extreme Stock Market and Inflation Shocks): 2010-2014

	KE (1 oz)	KE (½ ozs)	KE (¼ ozs)	GA-i (1 g)	US (1 oz)	UK (1 oz)
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
$Dr_{s,t(10)}(r_{s,t})$	-0.9089	-0.8658	-0.6851	-0.9135	0.0158	0.0307
$Dr_{s,t(10)}(r_{s,t-1})$	-0.9897	-1.0115	-0.9402	-0.7169	-0.3504	-0.8728
$D\pi_{t(90)}(\pi_t)$	0.1347	0.2415	-0.7535	0.1269	-2.2263	-5.7290
$D\pi_{t(90)}(\pi_{t-1})$	1.0657	1.8868	-0.4086	-0.4796	2.9125	6.8876
$Dr_{s,t(5)}(r_{s,t})$	-1.3629***	-1.3749**	-1.0111	-1.1855	-0.6151	-0.7373
$Dr_{s,t(5)}(r_{s,t-1})$	-0.8451	-0.6593	-0.8377	-0.5055	0.1461	-0.5894
$D\pi_{t(95)}(\pi_t)$	-0.2953	2.1636	0.1701	-0.8946	-0.6525	-3.5989
$D\pi_{t(95)}(\pi_{t-1})$	-7.2541	-12.0973	-3.7092	3.9769	-3.8187	0.1298
$Dr_{s,t(2.5)}(r_{s,t})$	-1.6516	-1.6423	-1.6455	-1.5642	-1.5016	-1.4186
$Dr_{s,t(2.5)}(r_{s,t-1})$	-0.0348	-0.0326	-0.0271	-0.0200	0.9588	0.2364
$D\pi_{t(97.5)}(\pi_t)$	0.8913	0.7068	0.1501	0.4790	-0.6672	-4.0297
$D\pi_{t(97.5)}(\pi_{t-1})$	-10.8830	-11.8835	-9.4066	-9.5169	-3.5243	-2.2143
$Dr_{s,t(1)}(r_{s,t})$	-1.6240	-1.6096	-1.6185	-1.5305	-1.7449	-1.3208
$D\pi_{t(99)}(\pi_t)$	-0.6379	-0.8183	-0.3417	-0.6690	-1.0131	-3.6677

Notes: (\*\*\*) and (\*\*) denote significant at 1% and 5% levels, respectively.

## 5. Conclusions

The results of the first sample examine the characteristics of domestic and international gold bullion against domestic stock market risk and inflation risk, how it has changed over the past 14 years, and how these changes shed light on the role of gold as an investment hedge and a safe haven. Gold, under the best of conditions, only exhibits a weak hedge, or a diversifier characteristic, against the domestic stock market. Based on the quantile techniques to determine the safe haven feature, this study finds the minor support of a strong safe haven characteristic for gold in the UK pound during adverse stock market condition, but not for local gold. This means that, under extreme conditions, gold co-moves with the stock market, establishing a market of one, (i.e., both assets move in tandem). These findings indicate that gold plays a minor role in emerging markets such as Malaysia, when the stock market enters a steep fall, in line with the contention of [Baur and McDermott \(2010\)](#). In terms of gold-inflation relationships, the general findings from this period show that gold as a store of value against domestic inflation is not justified, since gold only acts, at best, as a weak hedge and a weak safe haven. Thus, although gold value increases in times of crisis, and can be used as a hoarding vehicle, it is not a store of value in Malaysia.

The shorter sample was designed not only to accommodate gold account, but also to examine the stability of the parameters through time, including a specific investigation of the current Euro sovereign debt bond crisis. The diversifier and hedge analyses demonstrate some support of a strong hedge for local gold, but not for international gold. The safe haven analysis provides a similar conclusion. The results show that the international gold tends to be a weak safe haven against the stock market. On the other hand, domestic gold (1 ounce and ½ ounces of *Kijang Emas*) can serve as a strong safe haven during moderate degree of the stock market downturn, although in most cases it only acts as a weak safe haven. In other words, the strength of the safe haven effect differs across market conditions. With regard to gold-inflation relationships, this study reports some support for the strong hedge characteristics for local gold, but not for international gold. Thus, the results in this period demonstrate that the role of gold changed through time. Arguably, the recent European sovereign debt crisis seems to suffice as an explanation for the recent

gold price hike, since the empirical estimations that consider the impact of the crisis can capture the actual behaviour of the price of gold quite closely.

Different weights of gold only play a minor role in determining a diversifier, a hedge or a safe haven characteristic. Different currency denominations, on the other hand, are essential in influencing the ability of gold as a diversifier, a hedge or a safe haven. Generally, gold denominated in Malaysian ringgit performs better as a hedge and a safe haven against the domestic stock market in the shorter sample if compared to gold denominated in the international currencies. Nevertheless, gold denominated in Malaysian ringgit only acts as an inflation hedge, but not inflation safe haven. These results suggest that the domestic stock market is more influenced by the global market scenario, while domestic inflation is more affected by domestic cost factors. For investors, the difference in the magnitude of parameters among the different types of gold is important in valuing investment decisions. With respect to this statement, the gold bullion investment performs better than the gold account investment, because it provides investors with more evidence of the compensating property of a strong hedge and strong safe haven in some extreme market conditions. Therefore, investors who are keen on securing hedge and safe haven features of gold investment cannot rely on the gold account. Alternatively, they could take a position directly in gold bullion.

This study has several implications for investors and the government. Albeit gold appears as an attractive asset to diversify a portfolio away from stock and protection against inflation, it remains to be a risky investment. Thus, investors should hold a well-diversified portfolio to earn sustainable and reasonable returns, since gold investment may seem riskier from a stand-alone perspective. For gold investors, in particular, the investment decisions should be based on whether they want to hold gold, on average, or during specific periods, and whether their purpose is for protection against losses in stock, or protection against inflation. Investors can hold domestic gold if their objective is to protect losses in the domestic stock market, and to preserve purchasing power due to inflation, on average, in order to sustain their capital gains over time. Nevertheless, during times of severe losses in the domestic stock market, domestic gold bullion seems to be a profitable asset to hold. Holding domestic or international gold during high inflation periods in Malaysia, on the other hand, is an inferior choice.

The Malaysian government can still encourage market participants to invest in gold as an alternative tool for saving on the long-term basis. The authorities should introduce more investment channels to mobilise the capital resources accumulated in gold. The diversity of gold-backed and gold-related products can be offered not only by banking institutions, but also through government-linked institutions such as *Tabung Haji*. The Central Bank of Malaysia, on the other hand, should continue issuing *Kijang Emas*, given the fact that this asset is a strong hedge against stock and inflation, and distributes them through conventional banks and Islamic banks.<sup>4</sup> The increasing demand for financial products in Malaysia should not only be seen as a window of opportunity to exploit the trend by offering gold-related products, but more importantly, should be viewed as a stable and profitable tool for successful investments.

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<sup>4</sup> At present, *Kijang Emas* is only distributed by Maybank.

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