



Is gold a Sometime Safe Haven or an Always Hedge for equity investors? A Markov-Switching CAPM approach for US and UK stock indices



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ABSTRACT

This paper re-examines gold's role as a tool for investors to manage their portfolio risk. We begin by assessing gold's average relationship to an investor's diversified equity portfolio by applying the basic Capital Asset Pricing Model (CAPM) to UK and US equity indices. Next, we apply a Markov-switching CAPM to assess whether two distinct states exist between gold's relationship with the Market Portfolio. This approach allows the data to determine if two separate states exist and, if so, whether one state matches the definition of a Safe Haven from the literature. Using this new approach, we find that gold is consistently a Hedge, but that no distinct Safe Haven state exists between gold and UK or US stock markets.

1. Introduction

Gold has had a long and unique history as a financial asset over the last 6000 years. Recently there has been a growing body of research assessing whether gold acts as a Safe Haven for investors in times of severe market stress. Since the 2008 financial crisis, gold has gained a renewed prominence for investors and researchers as its price rose from \$252 in July 1999 to \$1900 dollars an ounce briefly on the 5th of September 2011 and many Exchange Traded Funds (ETFs) were set up to make it easier for smaller investors to buy gold.

Since gold prices have floated freely after 1968, gold's allure for speculators has waxed and waned in tandem with its price changes. Simultaneously gold has maintained a core group of investors often referred to as “gold bugs” who see it as the ultimate safe asset (Siomon, 2013), one of the few assets with no counterparty risk once physically you hold it. The majority of recent research finds that gold does have a role as a hedge and/or a Safe Haven for investors (see O'Connor, Lucey, Batten, and Baur (2015) for a review).

The first contribution of this paper is to offer an estimate of the Hedge characteristic in gold in a CAPM setting and assess whether gold's beta is zero, as is often assumed (Baur & McDermott, 2010; Blöse, 2010; Reboredo, 2013). This assumption is based on gold's unusual economically inert nature. Unlike other assets it does not have any fundamental driver of its own. For example, dividends act as a driver

for equity prices, because they should drive these prices lower or higher. However, macroeconomic drivers do affect its price, such as inflation (O'Connor et al. 2015), but if you buy an ounce of gold it will remain an ounce of gold. It cannot default or go bankrupt as it has no offsetting liability.

Secondly, though there has been a large amount of recent research on whether gold acts as a Safe Haven for a number of asset classes, all these studies choose an arbitrary quantitative cut-off point to define when a Safe Haven period should be present. Generally it is defined as when an asset's returns being in the bottom 5% or 1% quartile of the sample. Authors then test the relationship between gold and the asset in that quartile; see for example Baur and Lucey (2010). The usual definition of Safe Haven comes from Baur and McDermott (2010:1889) which states that a “strong (weak) Safe Haven is defined as an asset that is negatively correlated (uncorrelated) with another asset or portfolio in certain periods only, e.g. in times of falling stock markets” (our emphasis). Note that these periods can only be observed *ex post* as they depend on returns over the entire sample period. That severely reduces the use of such studies to guide investors' decisions.

Using a Markov-switching model, rather than an arbitrary cut off point, we allow the data itself to determine whether two natural and separate “regimes” exist between gold and other asset prices. If two states do exist in the Markov-switching approach, then the next step is to see whether there is any relationship between one of the states and

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periods of extreme stock market movements. We found that gold is always a Hedge, but that neither state corresponds to what might be thought of as a separate safe haven characteristic. We conclude that gold is always a Hedge for stock market risk. Neither state estimated by the model maps clearly onto times of large equity market price falls. This finding that there is no change in the relationship during is in keeping with a re-reading of the results in the literature on this topic, which is discussed in the following sections.

In Section 2 we review the previous research on gold, its Beta and its Safe Haven status. Section 3 presents the data used and the applied methodologies. Section 4 presents the empirical results and Section 5 presents our conclusions.

2. Literature review

2.1. Gold's Beta under the CAPM

Despite the popularity of the Capital Asset Pricing Model (CAPM) it has been applied to gold in very few papers. Chua, Sick, and Woodward (1990) discuss the application of CAPM using monthly gold prices, Toronto Stock Exchange (TSE) gold stock index, S&P gold index and S&P 500 index from September 1971 to December 1988 but the variables in the model are returns rather than excess returns as should be used per the CAPM (Lintner, 1965; Sharpe, 1964). Although the results suggest that gold's Beta, using the S&P 500 as a proxy for the market portfolio, is insignificantly different from zero in two sub-periods examined, the difference between two estimated Betas (0.03 and 0.22) is relatively large. These results may be due to a lack of power in the tests related to the small number of monthly observations.

Similarly, Dee, Li, and Zheng (2013) have applied a variant of the original CAPM by the application of arbitrage pricing theory (APT) (Ross, 1976) as they an inflation factor to the original CAPM. There has not been an application of the actual CAPM to gold to date in the literature.

2.2. Gold as a Hedge and a Safe Haven

Gold has been shown to be a hedge against a large number of primarily financial risks and offers significant diversification benefits within a portfolio. Baur & Lucey (2010: 220) define a hedge as “an asset that is uncorrelated or negatively correlated with another asset or portfolio on average.” Lucey, Tully, and Poti (2006) point to gold's returns being positively skewed, in contrast to almost all other financial assets, as a major driver of its ability to reduce portfolio risk. Emmrich and McGroarty (2013) find that adding gold to a range of portfolios reduces their risk level.

Gold also hedges macroeconomic risks, such as inflation risk over the longer term (see Batten, Ciner, and Lucey (2014) for example). Some authors have also found it to be a hedge against exchange rate risk, such as Reboredo and Rivera-Castro (2014), but our focus here will be on gold's ability to hedge asset price risks.

Baur and Lucey (2010) and Baur and McDermott (2010) both define a Safe Haven in their analysis of whether gold serves as a hedge or a Safe Haven to stocks and bonds. These two papers have formed the basis of the research that has followed on the issue.

Using a GARCH model, Baur and Lucey (2010) assess whether the relationship between gold returns and other asset returns is different in the lowest quantiles of returns (1%, 2.5% and 5%). They find, for example, that the average relationship between gold and US equities is -0.0475 i.e. an almost zero correlation between gold and US equities, which is indicative of a hedge based on their definition above. In the three countries examined for stocks and bonds their average relationship with gold is between -0.18 and $+0.1$. These all indicate that gold offers significant diversification benefits when added to a portfolio due to the low or negative correlation with a diversified portfolio. In looking at the safe haven aspect they find that the relationship between

gold and stock returns for the US in the extreme end of the distribution (the 1% quartile) is -0.0183 which does fit the definition of a safe haven above. But this a less negative relationship than the average described above (-0.0475). For the UK the figure for the 1% quartile is a lot lower at -0.29 (versus 0.18 on average) and the German estimate in the 1% quartile is -0.0727 versus 0.04 on average.

Looking at the definition of a Safe Haven above this means that while for the US your portfolio does benefit from gold in times of severe market falls, it does not act differently at these times. It remains a hedge rather than becoming a Safe Haven. For the UK it has a negative relationship in crisis periods, but also on average. So again, gold seems to remain an excellent hedge at all times rather than there being a significant shift in the relationship, at times of large share price falls, into a Safe Haven.

Baur and McDermott (2010), using daily, weekly and monthly data, also determine that gold is a Safe Haven. Similarly to Baur and Lucey (2010), no average relationship with the market examined in greater than 0.1 , implying gold is a Hedge for all these markets. While most of these estimates are statistically significantly different from zero at a daily level, when the analysis is run at a monthly level far fewer are, suggesting that the statistical significance is due to the large sample size employed. As the estimates still give gold a strong diversifier role, perhaps the definition that to be a Hedge it must have zero correlation with the market portfolios is too strong.

Baur and McDermott (2010) also assess gold's relationship in specific market crashes. For the October 1987 crash four of nine markets examined have a higher correlation with the market at this time than the average relationship. Of the remaining five only one has a statistically significant lower correlation (the US). Many do have a significantly lower correlation around the bankruptcy of Lehman brothers in 2008, but for the Asian crisis in 1997 no country has a statistically significant change in relationship between gold and markets. This again seems to imply that gold's ability to diversify risk is something of a constant even during extreme stock market moves, rather than an increased or new ability.

Other studies also find a Safe Haven role for gold. Ciner, Gurdgiev, Lucey (2013) use a dynamic conditional correlations (DCC) GARCH model for the S&P500 and FTSE100 and confirm gold's role as a Safe Haven by breaking the equity returns in to quantiles. Bredin, Conlon and Poti (2015) use wavelet multiscale analysis and find that gold offers a longer Safe Haven facility over a longer period than other studies at one year. Beckmann, Berger, and Czudaj (2015) also find a Safe Haven role for gold.

Lucey and Li (2015) examined gold's role as a Safe Haven in a time-varying manner with the extension of three other precious metals: silver, platinum and palladium. Their results suggest that gold may not act as a Safe Haven at all times but that when it is not other precious metal can fill in for the role in an investor's portfolio.

All of the above research then agrees that in times of extreme stock market movement gold's low or even negative correlation with broader asset markets makes it valuable for investors. A re-reading of the results however implies that the safe have characteristic of gold is simply that it always remains a hedge.

3. Data and methodology

3.1. Data

All the data used was collected at a daily frequency, which we convert to weekly or monthly frequencies when required. Sources are listed in Table 1. We use the US Dollar and Pound Sterling PM gold prices from the London market, known as the Gold Fixing until March 2015 as London has been found to be the dominate market for price formation in the global gold market (see Lucey, Larkin, and O'Connor 2014).

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