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Does gold act as a hedge or a safe haven for stocks? A smooth transition approach ☆

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ABSTRACT

This study deals with the issue whether gold actually exhibits the function of a hedge or a safe haven as often referred to in the media and academia. In order to test the Baur and Lucey (2010) hypotheses, we contribute to the existing literature by the augmentation of their model to a smooth transition regression (STR) using an exponential transition function which splits the regression model into two extreme regimes. One accounts for periods in which stock returns are on average and therefore allows to test whether gold acts as a hedge for stocks, the other one accounts for periods characterized by extreme market conditions where the volatility of the stock returns is high. The latter state enables us to test whether gold can be regarded as a safe haven for stocks. The study includes a broad set of 18 individual markets as well as five regional indices and covers a sample period running from January 1970 to March 2012 on a monthly frequency. Overall, our findings show that gold serves as both a hedge and a safe haven. However, this ability seems to be market-specific. In addition, by applying a portfolio analysis we also show that our findings are useful for investors.

1. Introduction

Since the breakdown of Bretton Woods gold is no longer a central cornerstone of the international monetary system, but nevertheless it still attracts considerable attention from investors, researchers, and the media. Owing to the increasing uncertainty of financial markets, diversifying a portfolio through hedging becomes more and more important. Especially, during the global financial and economic crisis that started in 2007 the gold price experienced an intense increase while other assets (in particular stock prices) exhibited losses (see Fig. 1). Given the surge in the price of gold following the global financial crisis and the most recent decline in the price of gold as stock markets have started to hit new highs (for example in April 2013), understanding the relationship between gold and stock markets is an interesting task.

In the era of globalization correlations among most types of assets increased dramatically, however gold is still known to be frequently uncorrelated with other assets (Baur and Lucey, 2010) and is said to be a zero-beta asset (McCown and Zimmerman, 2006). In this vein, gold seems to be appropriate to be considered as a hedge or a safe haven for financial assets or portfolios. The reason is that, in contrast to many other commodities, gold is well-known to be durable, easily recognizable, storable, portable, divisible, and easily standardized (Baur, 2013). Particularly, the financial media often refers to gold as a safe haven asset for portfolio investors.[3] However, Baur and Lucey (2010) are the first to formulate empirically testable definitions for a hedge and a safe haven with regard to financial assets such as bonds and stocks. Following their definitions, a hedge (safe haven) is an asset that is uncorrelated (negatively correlated) with another asset or portfolio on average (only in times of market stress or turmoil). Baur

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[3] For instance, see the article 'Gold: Haven turns riskier but retains its appeal' (Financial Times, December 20, 2011) by Jack Farchy.

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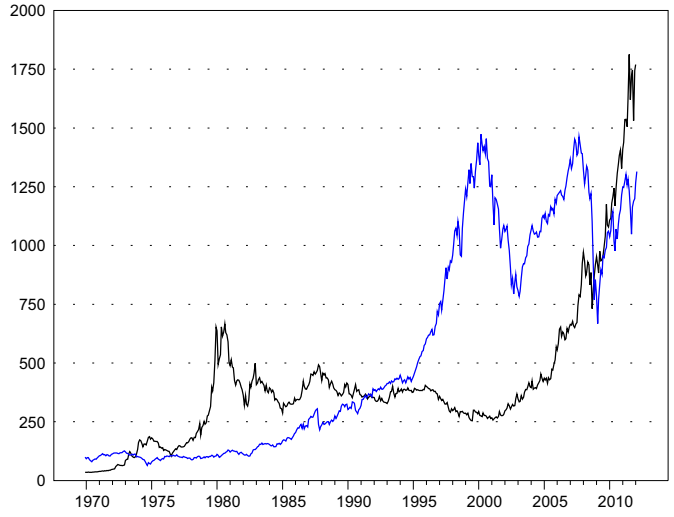

Fig. 1. Gold prices (black line) and US stock prices (blue line) both in US dollar.

and McDermott (2010) also distinguish between a strong and a weak form of the hedge and the safe haven property.[4] With regard to this distinction, the question is whether a negative correlation of the returns on gold and on stocks occurs on average or in extreme market conditions. The former (latter) would indicate a strong hedge (safe haven) function of gold. This implies that the gold price increases after a fall of stock prices in such conditions and therefore compensates investors for losses incurred with stock investments.

This study builds on the work of Baur and Lucey (2010) as well as Baur and McDermott (2010) by augmenting their empirical testing procedure. Our econometric framework is based on a regression of gold returns on stock returns as suggested by Baur and Lucey (2010). To test the safe haven hypothesis they apply the lower 5%, 2.5%, and 1% quantiles of the stock and bond returns as regressors which take a value of zero if the particular return is larger than the quantile in a given period. Instead of adopting this ad hoc procedure, we contribute to the existing literature by the augmentation of the model to a smooth transition regression (STR) inspired by the work of Teräsvirta (1994) using an exponential transition function which splits the regression model into two extreme regimes. One accounts for periods where stock returns are on average and allows to test whether gold acts as a hedge for stocks, the other one accounts for periods of 'extreme times', where the magnitude of the difference between stock returns and their averages is large. The latter state enables us to test whether gold can be regarded as a safe haven for stocks. Hence, the question is whether different regimes can be identified without relying on a priori thresholds. In addition, STR models allow not solely for a discrete switching from one scenario to the other, but account for a smooth transition between them. A discrete switching pattern seems inadequate in cases where investors with different expectations and risk assessments are involved, since market participants may not all act promptly and uniformly as they are confronted with heterogeneous information and opportunity costs which imply different bands of inaction. Moreover, their reaction to new information might also exhibit different delays. Therefore, our framework allows to test the Baur and Lucey (2010) hypotheses in a more flexible and thus realistic fashion.[5] In doing so, we include a broad set of 18 individual markets as well as five regional indices that comprise the largest developed countries, the largest emerging markets as well as the major gold consumers and producers. We cover a sample period running from January 1970 to March 2012 on a monthly frequency. As will be shown, our findings indicate that the ability of gold to serve as a hedge or a safe haven is frequently observed but differs across countries. We also confirm that our approach fits the data well, since two extreme regimes with different characteristics can be distinguished. Finally, we show that our results are useful for an investor based on a simple portfolio exercise and the assessment of Sharpe ratios.

The reminder of this paper is organized as follows. The following section provides a brief summary of previous empirical studies. Section 3 describes our dataset as well as our econometric framework and presents our findings. Section 4 concludes.

2. Review of the literature

The gold price literature is both vast as well as manifold and the most important strands should be introduced briefly before turning to the specific studies closely related to ours. Firstly, Sherman (1982, 1983), Ariovich (1983), Fortune (1987), Dooley et al. (1995), Sjaastad and Scacciallani (1996), Faff and Hillier (2004), Lucey et al. (2006), and Wang and Lee (2011) provide studies which are concerned with impacts of macroeconomic variables such as output, exchange rates, and interest rates on the price for gold. Secondly, Koutsoyiannis (1983), Diba and Grossman (1984), Baker and van Tassel (1985), Pindyck (1993), and Aggarwal et al. (2014) give attention to prediction of the gold price. In general, evidence for different relationships and causalities has been provided, however a detailed description of the corresponding outcomes is beyond the scope of this paper. Thirdly, Tschoegl (1980), Solt and Swanson (1981), Ho (1985), Basu and Clouse (1993), and Smith (2002) performed tests of the market efficiency hypothesis for the gold market. More recently, motivated by the lately gold price boom Bialkowski et al. (2012) test whether the gold price is subject to a speculative bubble by conducting a Markov regime-switching augmented Dickey–Fuller test and conclude that the high value of the gold price seems to be fundamentally justified. In contrast, Baur and Glover (2012) identify that the price of gold followed an explosive price process between 2002 and 2012 using a test developed by Phillips et al. (2011). Lucey and O'Connor (2013) and Baur and Glover (2014) come to a similar conclusion.

Fourthly, studies which examine the inflation hedge effectiveness of gold have been carried out by Kolluri (1981), Moore (1990), Laurent (1994), Chappell and Dowd (1997), Mahdavi and Zhou (1997), Harmston (1998), Ghosh et al. (2004), Levin and Wright (2006), Worthington and Pahlavani (2007), and Beckmann and Czudaj (2013b). These surveys are often based on the analysis of a long-run relationship between the price for gold and the general price level by means of cointegration techniques. The results are not clear-cut and vary depending on the sample period and the country under investigation. Early studies are based on the estimation of a conventional vector error correction model (VECM). However, Beckmann and Czudaj (2013b) recently demonstrate that conducting a Markov-switching VECM is more appropriate in this context. They indicate that gold is partially able to hedge future inflation in the long-run and this ability tends to be stronger for the USA and the UK compared to Japan and the Euro Area.

Finally, we now turn to studies related to the key question of our investigation: Does gold act as a hedge or a safe haven with regard to financial assets such as stocks (or bonds)?[6] The issue of correlation between gold and other major assets has previously been tackled in earlier studies by Sherman (1986), Jaffe (1989), Chua et al. (1990), Upper (2000), Ciner (2001), Michaud et al. (2006), Hillier et al.

[4] Aizenman and Inoue (2012) also point out that central bank's gold position signals economic might, and that gold retains the stature of a safe haven asset at times of global turbulence.

[5] In addition, in our study the thresholds are determined endogenously in contract to Baur and Lucey (2010).

[6] It should be pointed out that our analysis solely focuses on stocks. Testing the hedging and safe haven hypotheses with regard to bonds is also promising, however we abstain from that, since the available data basis for bonds is not that profound than the one for stocks.