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| **Research paper name** | **Authors** | **Year** | **Journal name** | **Data applied** | **Data source** | **Period** |
| **Is gold a safe haven? International evidence** | Dirk G. Baur, Thomas K. McDermott | 2010 | Journal of Banking & Finance | Gold | Database | Mar 2, 1979 – Mar 2, 2009 |
| **Research method/**  **Models applied** | Assumption:  -Gold price is dependent on changes in the stock market  -Relationship is not constant but is influenced by specific, extreme, market conditions.  Relation of gold and stock returns  Potential non-linearities of the gold-stock index return relationship  GARCH(1,1) model to account for heteroscedasticity | | | | |
| **Results** | -Gold is not a hedge for most indices except North America  -Gold acts as a hedge for North American stocks  -Safe haven for developed markets in times of extreme market conditions in European and US markets.  -Neither a hedge or a safe haven for BRIC countries, Australia, Canada and Japan | | | | |
| **A Comparative Analysis of the Investment Characteristics of Alternative Gold Assets** | Tim Pullen, Karen Benson, and Robert Faff | 2014 | ABACUS | Gold | Database | 1 Jul 1987 – 30 Jun 2010 |
| **Research method/**  **Models applied** | Model 1 (Regression model)  Assumption: gold bullion, stocks, mutual funds, and ETFs are dependent on changes in the stock market and that this relationship is conditional on specific, extreme, market conditions  GARCH(1,1) model to account for heteroscedasticity  Model 2 (analyzes predefined periods of financial crisis)  -1987 US stock market crash, Asian currency crisis, dot-com bubble, 9.11 terrorist attacks  , 2008 collapse of Lehman brothers  GARCH(1,1) model to account for heteroscedasticity | | | | |
| **Results** | -Gold bullion exhibits a clear and strong hedging role over a mere diversifying capability  -Gold stocks, gold mutual funds and gold ETFs tend to be diversifiers  -Gold bullion and gold ETFs show support for the safe haven property while gold stocks and gold mutual funds display very little evidence of the characteristic | | | | |
| **Is Gold a Hedge or a Safe Haven? An Analysis of Stocks, Bonds and Gold** | Dirk G. Baur and Brian M. Lucey | 2010 | The Financial Review | Gold |  | Nov 30, 1995 – Nov 30, 2005 |
| **Research method/**  **Models applied** | Regression on returns of stock and bond prices that are in the q%(q=5,2.5,1) quantile  Assumption  -contemporaneous and lagged stock or bond prices can affect the price of gold  -price of gold does not influence stock or bond prices which rules out any feedback effect in the above model | | | | |
| **Results** | -Gold is a safe haven for stocks, but not for bonds in any market  -Gold only functions as a safe haven for a limited time, around 15 trading days  -In the longer run, gold is not a safe haven | | | | |
| **Do Precious Metals Shine? An Investment Perspective** | David Hillier, Paul Draper and Robert Faff | 2006 | Financial Analysts Journal | Gold, Platinum, Silver | Database | 1 Jan 1976 – 1 Apr 2004 |
| **Research method/**  **Models applied** | Consider the conditional variance properties of each series and applying the standard GARCH(1,1) model  Regress the daily return on precious metal on daily return on the S&P 500 market index for the corresponding period  A modified equation that differentiates between periods of high and low market volatility | | | | |
| **Results** | -Gold, platinum and silver have the potential to play a diversifying role in the broad-based portfolios  -The precious metals exhibit some hedging capability, particularly during periods of abnormal stock market volatility  -Financial portfolios containing a moderate weighting of gold perform better than portfolios consisting only of financial assets | | | | |
| **Hedges and safe havens: An examination of stocks, bonds, gold, oil and exchange rates** | Cetin Ciner, Constantin Gurdgiev, Brian M. Lucey | 2012 | International Review of Financial Analysis | Gold |  | Jan 1990 – June 2010 |
| **Research method/**  **Models applied** | Dynamic conditional correlation approach with a GARCH specification  Time varying variances of the series are estimated using a univariate GARCH specification  Regression of gold return on contemporaneous and one period lagged return on each asset (stocks, bonds, oil and the dollar) and a dummy variable that indicate whether these were in the lower 5th, 2.5th, or 1st percentile of the distribution  Variance of the error term is specified as an asymmetric GARCH(1,1) process with a GED distribution to capture any thick tailed behavior, estimated with robust standard errors | | | | |
| **Results** | -Gold market can be regarded as a hedge against the exchange rate fluctuations, supported in both the US and UK data  -Gold consistently acts as a safe haven when exchange rates drop significantly in both the US and the UK cases | | | | |
| **Is gold a safe haven or a hedge for the US dollar? Implications for risk management** | Juan C. Reboredo | 2013 | Journal of Banking & Finance | Gold | Website | 7 Jan 2000 – 21 Sep 2012 |
| **Research method/**  **Models applied** | Copula function to capture different patterns of dependence and tail dependence  Hypothesis 1: if average dependence between the value of gold and USD depreciation >=0, gold is a hedge  Hypothesis 2: if upper tail dependence >0, gold is a safe haven  Estimate the VaR of portfolio composed of gold and currencies to evaluate the usefulness of gold in providing protection against downside risk and possibly dangerous tail-risk events  Calculate the expected shortfall if VaR is exceeded | | | | |
| **Results** | -Gold can hedge against USD movements  -Gold can act as an effective safe haven in periods of extreme USD market movements  -Portfolio composed of both gold and currencies experienced VaR and ES reductions and performed better | | | | |
| **God and the US dollar: Hedge or haven?** | Mark Joy | 2011 | Finance Research Letters | Gold | Database & Website | 10 Jan 1986 – 29 Aug 2008 |
| **Research method/**  **Models applied** | DCC-GARCH model to account for time path of the price of gold | | | | |
| **Results** | -Increase in the price of gold tend to be associated with decrease in the value of the US dollar, however, this correlation has not remained constant over time  -Gold is a hedge against the US dollar  -Does not act as an effective safe haven from market stress | | | | |
| **Gold and the Dollar (and the Euro, Pound, and Yen)** | Kuntara Pukthuanthong, Richard Roll | 2011 | Journal of Banking & Finance | Gold | Database | 2 Jan 1971 – 10 Dec 2009 |
| **Research method/**  **Models applied** | Covariances between each pair of currencies, and covariances between each currency and gold  Standard GARCH(1,1) model to test whether thick tails is caused by non-constant volatility | | | | |
| **Results** | -Gold price is negatively associated with not only US dollars, but the Euro, Yen and Pound as well, a higher gold price was correlated with a weaker currency for all of them  -Gold price expressed in different currencies are highly correlated | | | | |
| **Is gold the best hedge and a safe haven under changing stock market volatility?** | Matthew Hood, Farooq Malik | 2013 | Review of Financial Economics | Gold, Silver, Platinum | Website | 30 Nov 1995 – 30 Nov 2010 |
| **Research method/**  **Models applied** | Regression model, asset returns (gold, silver, platinum or volatility) are regressed on stock returns and interaction terms that test whether the particular asset indeed serves as a hedge or safe haven if the stock market declines | | | | |
| **Results** | -Platinum and silver do not serve as a hedge or safe haven for the US stock market but gold serves both of these functions  -Gold does not have a negative correlation with the US stock market in extremely low volatility periods or in extremely high volatility periods | | | | |
| **Gold as a hedge against the dollar** | Forrest Capie, Terence C. Mills, Geoffrey Wood | 2005 | Journal of International Financial Markets, Institutions & Moneys | Gold |  | 8 Jan 1971 – 20 Feb 2014 |
| **Research method/**  **Models applied** | Autoregressive distributed lag models to evaluate the response of gold price to changes in exchange rates  Assumption: Current change in the gold price is assumed to depend linearly on the current and past change in the exchange rate and the past change in the gold price itself  The conventional GARCH process, the threshold GARCH process, and the exponential GARCH process to account for error variances  Error variance equation was found to be best modelled as an EGARCH(1,2) process with Student’s t-distributed innovations | | | | |
| **Results** | -Gold has been a hedge against fluctuation in the foreign exchange value of the dollar, but it has done so to a degree that seems highly dependent on somewhat unpredictable political attitudes and events | | | | |
| **Is Gold a Zero-Beta Asset? Analysis of the Investment Potential of Precious Metals** | James Ross McCown, John R. Zimmerman | 2006 |  | Gold, Silver | Database & Website | 1970 – 2003 |
| **Research method/**  **Models applied** | Estimate of CAPM for gold and silver  Arbitrage Pricing Model to evaluate gold and silver’s exposure to market risk, default spread, term spread, change in US industrial production and change in the log US CPI inflation rate  Dicky-Fuller-GLS test and KPSS test to examine if the unit root is stationary  Johansen trace test and Johansen maximum eigenvalue test to test for cointegration relation between gold prices and the CPI, and also between silver prices and the CPI | | | | |
| **Results** | -Gold shows the characteristics of a zero-beta asset  -Silver has the return slightly lower than treasury bills, with mean return slightly higher than that of treasury bills  -Gold and silver bear virtually no market risk  -Both gold and silver show evidence of inflation-hedging ability, with the case being much stronger for gold than for silver  -Both gold and silver prices are cointegrated with consumer prices | | | | |
| **Gold prices, cost of carry and expected inflation** | Laurence E. Blose | 2010 | Journal of Economics and Business | Gold | Website | Mar 1988 – Feb 2008 |
| **Research method/**  **Models applied** | Two sets of models to regress bond yields as well as the return on gold on announced change in CPI, unexpected change, and both expected and unexpected changes respectively. Squared explanatory variables are included.  Hypothesis 1: unexpected changes in CPI will not affect the price of gold on the day of the announcement  Hypothesis 2: unexpected changes in CPI will cause change on the price of gold on the day of the announcement | | | | |
| **Results** | -Gold price do not change as a result of changes in expectations regarding future inflation  -Investors should use the bond markets not the gold spot market, to speculate in changes in inflation expectations  -Investors cannot determine market inflation expectations by examining the spot price of gold | | | | |
| **The price of gold and the exchange rate** | Larry A Sjaastad, Fabio Scacciavillani | 1996 | Journal of International Money and Finance | Gold | Website | Jan 1982 – Dec 1990 |
| **Research method/**  **Models applied** | International pricing model to predict that changes in major currency exchange rates will impact on the prices of many commodities in all currencies  Stationary tests based on spot and forward gold prices and the original US dollar exchange rate data  …………. | | | | |
| **Results** | -Real appreciations or depreciations of the European currencies have profound effects on the price of gold in all other currencies  -The US dollar bloc has but a small influence on the dollar price of gold, the major producers of the world appear to have no significant influence on the world price of gold  -Gold continues to be a store of value as world inflation increases the demand for gold  -Floating exchange rates among the major currencies contributed substantially to the instability of the world price of gold | | | | |
| **What precious metals act as safe havens, and when? Some US evidence** | Sile Li, Brian M. Lucey | 2014 | Applied Economic Letters | Gold, Silver, Platinum, Palladium | Website | Jan 1989 – Jul 2013 |
| **Research method/**  **Models applied** | Dynamic Conditional Correlation Multivariate GARCH Model to examine cross-market dynamic correlations  For all four assets a simple mean equation where the returns are individually regressed on an error term is estimated, and GARCH(1,1) is specified for the variances with t-distribution | | | | |
| **Results** | -At times silver, platinum, and palladium act as safe haven when gold does not  -Sometimes precious metals are stronger havens than gold | | | | |
| **Dynamics of oil price, precious metal prices, and exchange rate** | Rmazan Sari, Shawkat Hammoudeh, Ugur Soytas | 2010 | Energy Economics | Gold, Silver, Platinum, Palladium | Website | 1 Apr 1999 – 19 Oct 2007 |
| **Research method/**  **Models applied** | Generalized forecast error variance decompositions and the generalized impulse response functions  Bounds testing to check for cointegration between data  Autoregressive Distributed Lag (ARDL) technique to model the variable relationship | | | | |
| **Results** | -Strong mirror-image relationship between palladium and platinum  -There does not seem to be long-run equilibrium relationships between those spot price returns and changes in the exchange rate  -There is evidence that spot precious metals’ prices and exchange rate may be closely linked in the short run after shocks occur, traders may benefit in the short run from the information content of an innovation in one spot market over the others in the regard  -Shocks in the precious metals and oil markets have mutual but small positive impact on each other | | | | |