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Gold As Investable Commodity-An Inquiry

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Abstract
This paper examines potential benefits of investing in various gold investment vehicles in terms of risk and return from a typical South African investor's perspective. Furthermore, the study examines the relationship between gold price and South African macroeconomic variables. Data used in the study comprises of monthly closing share price data of JSE listed gold mining companies, gold price, Krugerrand coin, New Gold ETF, FTSE/JSE all share index, gold mining index, unit trust index (gold & precious metals), real GDP, rand/dollar exchange rate, repo rate and CPI. It was found that gold bullion produced superior abnormal returns and yielded greater capital growth compared to the JSE all share index. However, the JSE all share index exhibit lower volatility compared to gold bullion. Abnormal returns for JSE listed gold mining companies tend to differ substantially from gold bullion abnormal returns. Gold mining companies exhibit added risk which cannot be attributed to the gold bullion. Gold has a potential to reduce systematic risk when added to a portfolio of stocks. A multiple regression model was estimated which relates gold price to South African macroeconomic variables. It was found that gold price depends on real GDP and rand/dollar exchange rate.
Key Words: capital, commodity, companies, exchange, macroeconomic, market, value

Introduction

Gold as a commodity played a crucial role in the economic development of South Africa historically. About 12% of mining income in the year 2009 was due to gold & uranium mining (Statistics South Africa, 2009). However, the role of gold in the South African economy reduced through the years as South Africa's position as a leading producer of gold diminished due to a drop in production and growth of other sectors such as information and telecommunication sector. South African gold production (extraction) has decreased from 675 tons in 1980 to 198 tons in 2009 (Statistics South Africa, 2022). South Africa is now the fifth largest producer of gold with China being the leading producer followed by Australia. Following the long history of success as one of the world's largest producers of gold, the question is whether the current and prospective future South African based investors should consider gold as an asset that has value and that can assist them to diversify their portfolios.

There are various reasons why investors buy gold. Some investors regard gold as a strategic asset that can be used as a means of portfolio diversification, others regard gold as an inflation hedge and a currency hedge such as hedging against the American (U.S.) dollar. One of the reasons why gold is considered a valuable investment option is due to its low or lack of correlation with main stream financial assets. Studies such as that undertaken by Dempster (2008) found the correlation coefficient between gold and other assets in the U.S. (such as S&P 500 and Dow Jones Industrial average) to be close to zero. The lack of correlation between gold and other financial assets makes gold an attractive option especially during financial and economic downturns during which equities tend to be volatile and experience significant loss of value. Investors tend to move away from equities during a recession towards gold as gold is often perceived as a "safer" asset during a recession. Shafiee and Topal (2010) attributed the increase in gold price during a recession due to switching to the gold market as a result of lack of trust in financial markets by investors.

There are various ways in which to South African based investors can invest in gold. These investment avenues are typically accessible to ordinary individual investors due to low cost and simplicity. Investors can take part in the gold market via the purchase of gold coins and gold ETF's.

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pp: 2236 - 2242

Gold coins

One of the simplest ways of investing in gold is by purchasing the gold bullion in the form of gold coins. A wide variety of merchants are available to S.A investors. The merchant sells gold coins to the general public and can also buy them back from the public. For example, Invest gold offers investors, private or institutional, the option to purchase gold bullion by buying a range of coins. The price of the coins is linked to directly to the price of the gold, rand dollar exchange rate, time of trade and quantity of coins traded. The most common coin is the Krugerrand. According to Invest gold (2022), Krugerrands are one of the most successful bullion coins with more than 50 million Krugerrands minted thus far. Rare gold coins may also be purchased from Invest gold. The Rare gold coins include the Natura, Protea, Mandela and other coins. Rare coins are different from the normal Krugerrands since their value is not only linked to the price gold but also to the scarcity of the coin. The coins may be purchased using different payment options which makes investing in gold more accessible to a typical individual investor. For instance the golden mile plan offered by Invest gold allows investors to purchase gold coins at a minimum fee of R300 per month. There are other companies which deals in gold coins such as The South African Gold Exchange.

Gold exchange traded funds

A number of gold ETF's have been developed in major world stock exchanges in the recent past. Examples of gold ETF's (apart from New Gold) include, AGOL which is U.S based and listed on the New York stock exchange, GOLD which is traded at Australian stock exchange and Gold Bullion Securities (GBS) which listed on multiple securities such as London stock exchange and Frankfurt Stock Exchange (Exchange Traded Gold securities, 2022). The ETF's are backed by physical gold and provide investors with a means of participating in the gold spot price. Gold ETF's seem to be the latest way of investing in gold and are becoming increasing popular. Nel (2009) studied how the recent development of gold ETF's on major stock markets around the world influenced analyst's recommendations for direct investment in gold in favour of SA gold stocks at a premium. Nel (2009) concluded that introduction of gold ETF's takes away the attractiveness of SA gold stocks. Moreover, he suggested that investing in gold ETF's is another way of participating in the gold price movement which is of lower risk in comparison to gold equities.

The price of gold is influenced mainly by market supply and demand forces. The supply of gold comes from mine production, recycled gold and gold issued by central banks. Demand for gold may be divided into the following broad categories: jewellery manufacturing, industrial applications and investment uses. The gold market involves a myriad of issues ranging from mining legislation in gold mining countries throughout the world to various gold related investment instruments which have been developed over time. For example, the ABSA New Gold Exchange Traded Fund (ETF) in South Africa offers the opportunity to invest directly in the gold bullion. The ETF offers investors a means of investing in gold via the JSE. This study aims to explore potential benefits that can be derived from investing in different gold investment vehicles, and the relationship between gold and major macroeconomic variables.

Research Problem

Mohamed (2008) noted that most households in S.A. do not invest directly when they have savings, instead most put their savings into banks or retirement funds and a few will buy stocks and bonds. Also, legislations such as Black Economic Empowerment (BEE) Act of (2003) highlight and promote ownership of shares in companies, making shares/stock appear to be more important than other forms of investment. The problem is, although a number of financial instruments relating to gold have been developed in S.A., the emphasis on these instruments is relatively low and for some of them, the market tends to be small locally. For example, Gold in South Africa (2006) noted that the Absa Gold Exchange Traded Fund (ETF) formed in 2004 allowed South African investors to trade in shares representing gold on the stock exchange as easily as any other exchange-listed security but the local market is too small. Investors, especially individual investors, are not fully aware of the type of return they would yield from investing in gold, but most importantly they are not aware of what the effect of gold will be on their portfolios. The need for individual investors to become conversant with different ways of investing such as investing in gold has become necessary. The knowledge about gold investing and different gold investment vehicles can in turn be used as a tool against the plight of poverty as investing provides a means for long term wealth creation for S.A communities.

Research Objectives

Objectives of the study are to:

1. Assess the abnormal return derived from investing in gold overtime.
2. Compare the performance of gold investment instruments to the performance of otherinstruments such as shares for JSE listed companies.
3. Assess whether the inclusion of gold in the portfolio increases or

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Volume 11 Issue 1, 2023
pp: 2236 - 2242

decreases portfolio risk.

4. Investigate the correlation relationship between gold price and macroeconomic variables suchas GPD, interest rates, exchange rate and inflation, and test for significance using S.A.
5. Develop a model that will predict the macroeconomic variables that influence the price of gold.

Research Questions

1. What are the different gold investment avenues accessible to South African investors and howdo they perform in comparison to the domestic equities market?
2. How does investment in gold affect portfolio risk?
3. What is the relationship between gold price and South African macroeconomic variables (GDP,interest rates, exchange rates and inflation)?

Significance of the Study

The study will benefit various parties. Investors will be aware of the different types of gold investments available out there, how these instruments have performed over time, what economic factors influence the performance of gold and how investing in gold will affect their portfolios.

Policy makers such as reserve/central banks normally keep gold as a reserve asset. The International Monetary Fund is the largest holder of gold globally and held 90.5 million ounces (2,814.1 metric tons) of gold at designated depositories at end February 2022 which amounted to $160.1 billion at market prices as at February 29, 2022 (International Monetary Fund, 2022). Locally the South African Reserve bank monitors the gold market. This research will help the bank to understand better the value of the gold they keep and the extent to which that value is affected by various macroeconomic factors, and thereby inform better their policy formula.

Companies that are based on gold such as gold mining companies will benefit from this study in different ways. For example, they can see how the performance of gold has and will affect company's financial performance and the creation of value for shareholders.

The Role Of Gold As An Investment Asset

Diversification benefits of gold

Correlation is the extent to which the returns on two assets move together (Jordan et. al., 2022). Positively correlated assets tend to move up or down together, negatively correlated assets tend to move in opposite directions and there is no obvious relationship between uncorrelated assets. The primary goal of portfolio diversification is to reduce risk. Diversification can only be achieved if assets held in a portfolio are not highly positively correlated. For investors to realise diversification benefits, it is vital to include assets which are not positively correlated with assets held in a typical portfolio of stocks and bonds.

Hiller et al. (2006) noted that diversification is most important to investors when equity markets are experiencing high volatility and poor performance. There is a slew of research on gold as an investment asset. For example, Chua et al. (1990) explored the possibility of diversifying a portfolio with gold stocks and conclude that investors can rely on gold as a useful asset for portfolio diversification in the short and long term. Baur and Lucey (2010) studied hedging[1] and safe haven[2] properties of gold against stocks and bonds in United States, United Kingdom and Germany. The study found that gold acts as a hedge against stocks on average and a safe haven in extreme stock market conditions. The safe haven property was limited to around 15 trading days after the shock. They further found that gold does not serve as a safe haven for bonds. Ratner and Klein (2008) studied portfolio implications of gold and established that correlations between gold and U.S equities were mainly low or negative. Dempster and Artigas (2010) compared investment viabilityof gold against commodities, real estate and inflation linked bonds and found gold to be the most effective portfolio diversifier among these assets which are typically referred to as inflation hedges by U.S investors. Dempster and Artigas (2010) also noted that the strategic case for gold rests mainly on its effectiveness as a portfolio diversifier. Johnson and Soenen (1995) established that gold, due to its negative/low correlation with bonds and stocks presents a potential benefit for reducing risk through portfolio diversification. Conover et al. (2009) found that the benefits of precious metals derive from their diversification potential rather than their attractive returns. Hiller et al. (2006) analysed the roles of gold, silver and platinum in the capital markets and found that portfolios which contain precious metals perform better than standard equity portfolios.

The aforementioned authors have collectively established that gold can be considered a portfolio diversifier. Diversification potential of gold stems mainly from the metal's lack/low correlation with other assets. It is thus evident that gold has a role to play in modern portfolio management and

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Volume 11 Issue 1, 2023
pp: 2236 - 2242

adding gold to an investment portfolio has the potential of improving portfolio performance.

Performance of gold against other major assets

The role of gold in an investment portfolio as a diversifier has been addressed thoroughly, but how has gold performed in comparison to other major assets? A number of studies have been undertaken to check how returns on gold compares with returns on equities and bonds. Ratner and Klein (2008) evaluated the value of holding gold to U.S investors. Returns of gold were compared with U.S total stock market index returns. The study found that even though gold experienced notable appreciation in certain periods, the long-term return performance of the U.S total stock market index exceeded that of gold. As such gold was found to be an inferior investment. Dempster and Artigas (2010) evaluated performance of gold against typical inflation hedges (commodities, real estate and inflation linked bonds). Real returns of gold were found to be notably higher than those of other assets in the period between 1997 and 2009. Volatility of gold returns was inferior to the volatility inflation linked bond (Barclay's aggregate U.S. Treasury Inflation-Protected Securities Index) which produced the lowest volatility of all assets considered. The study also found that gold on average offered the best reward-to-risk and minimum variance portfolio.

Potential benefits of investing in gold from the U.S investor's perspective are well documented in the investment management literature. However, Johnson and Soenen (1997) studied whether investing in gold was beneficial for countries such as Canada, France, and others, during the period between 1978 and 1995. It was established that investing in gold from all countries underperformed stocks and bonds and emphasised that gold returns tend to be more time depended. The issue of time dependency on gold was further emphasised by Riley (2010) who noted that current market conditions should be taken in to account when evaluating the attractiveness of precious metals. Hoang (2010) studied the returns of investment in gold assets traded at Paris Stock exchange and reached a conclusion that gold presented lower levels of return at higher levels of risk compared to stocks and bonds.

It appears that gold as a stand-alone investment is an inferior choice in comparison to stocks and bonds in the long term when markets are performing well. Gold seems to be a profitable asset to hold during times of market distress when stocks and bonds are underperforming.

Gold and Economic Activity

Economies throughout the world go through cycles. Investors should be wary of times in which it is profitable to hold gold in order to avoid major losses and when to limit exposure to the metal in order to profit from rising equities. For example, Riley (2010) established that financial assets (such as shares and property) outperform commodities (such as gold and silver) in times of economic growth and that commodities outperform financial assets in times of economic contraction. Conover et al (2009) discovered that returns on precious metals (such as platinum, silver and gold) were notably higher during periods of restrictive policy than in periods of expansionary policy. Unlike metals such as platinum, which are used mainly for industrial usage and consumption, gold is less susceptible to demand shocks which may arise from reduced industrial consumption and offers investors a means of hedging during periods of poor economic performance. As a result gold price is not expected to drop significantly when the economy is in distress.

Constable and Wright (2011) propose that investors do not buy gold when the economy is robust, when the financial system is sound and when the world is not involved in major upheavals. As a result, the gold price can be used as measure of sentiment. The gold price is therefore regarded as a leading economic indicator. Constable and Wright (2011) also support the notion that gold acts as insurance against economic disasters and investors should hold a certain degree of gold in their portfolios especially when future economic outlook is not positive.

Gold and Inflation

Adrangi et al. (2003) explored the relationship between gold and silver returns and inflation in the U.S. They found that there was a positive relationship between expected inflation and gold price. The reason provided for the positive relationship is that the gold price increases due to a rise in demand of gold as a result of hoarding caused by inflationary fears. Jaffe (1989) also found a positive relationship between returns of gold and percentage change in CPI but cautions that gold cannot be used as a hedge against inflation due to low R-square (less that 2%). Tkacs (2007) assessed the leading indicator properties of gold prices using data from fourteen countries and concluded that gold prices lead inflation in many countries for up to two years in advance. However, Shafiree and Topal (2010) did not find a significant positive relationship between gold price and inflation in the U.S. Dempster and Artigas (2010) asserted the role of gold as an inflation hedge and suggested that gold is likely to increase in value if the world economy

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Volume 11 Issue 1, 2023
pp: 2236 - 2242

experienced inflation.

There seems to be a general consensus about the positive relationship between gold and inflation. This implies that gold will tend to increase in value as inflation rises thereby maintaining its buying power over time.

Gold and GDP

The relationship between gold price and GDP was studied by Sharma and Aggarwal (2022). They studied the impact of GDP on gold price using data from leading gold-holding countries such as US, UK, France, Germany, Italy, Brazil, and others. The study established that, individually, Brazil's GDP and gold price were highly correlated and Italy's GDP and gold price were the least correlated of all countries studied. Collectively, it was also found that seven countries' GDPs were reliable in predicting gold price movement and that GDP for U.S and France were poor predictors of gold price movements.

Gold and Exchange Rate

Capie et al. (2005) assessed the possibility of using gold as a hedge against exchange rate. Specifically, they considered the degree to which gold acted as an exchange rate hedge using sterling-dollar and yen-dollar exchange rates. The broad conclusion of the study was that gold acted as a hedge against the dollar. They attributed the hedging property of gold to the ease of trade in the open market of gold and the inability of authorities to produce gold (in contrast to currencies).

Sjaastad and Scacciavillani (1996) investigated the relationship between the major exchange rate and prices of internationally-traded commodities. They concluded (among others) that the world gold market is influenced by appreciations or depreciations of European currencies.

Twite (2002) found the relationship between weekly rates of return for US dollar denominated gold price, Australian dollar denominated gold price and Australian dollar/US dollar exchange rate to be statistically significant.

Gold Mutual Funds

A gold mutual fund is a fund which typically invests in gold stocks and gold bullion. Gold mutual funds enable investors to own gold without taking possession of the physical gold. Blose (1996) examined the extent to which returns on gold bullion influenced returns on mutual funds which invest in gold and gold related stocks. He found that investors wishing to make use of gold returns to hedge a portfolio or to speculate in the price of gold can achieve the same objective by using gold mutual funds. He also found that returns on gold mutual funds are at least the same amount or greater than returns on the price of gold and established that gold mutual funds exhibited risk which is cannot be attributed to either gold price or market price.

Gold Derivatives

An investment asset is an asset held for investment purposes. Gold can be classified as an investment asset (Hull, 2022). Gold derivatives are traded in major stock exchanges around the world. For example, gold was one of the largest traded commodities by volume in India in the year 2006 (Bhattacharya, 2007). Cross (2000) noted that market participants with greatest influence in the gold derivatives market were central banks through lending and gold mining companies through hedgingto manage price risk and to raise revenue. Gold derivatives are traded in many locations around world. London is the largest market for gold in the world for over-the-counter derivative transactions and New York is the main exchange-traded futures market for gold (Schofield, 2007). Schofield (2007) summarised some the gold derivative products such as forward agreements and options thatare typically used by gold market participants.

Gold Price Forecasting

A vast number of econometric models with varying levels of complexity have been developed to forecast the price of gold over the years. Shafiree and Topal (2010) provided an account of some ofthe models. Mouls (1986) examined which models were used in S.A and which ones of those were most useful. Raftopulos (1981) investigated which economic variables influenced the price of gold with the aim of incorporating such variables into a model that could be used to predict the gold price. A multiple regression model was specified. The model comprised of the gold price as the depended variable and explanatory variables included U.S economic data such as inflation, prime overdraft rate, money supply, dollar, oil price and dummy variables (to capture government's monetary and fiscal policies). Although the model yielded an R^2 of 0.9522, which is significant, it was found that the model over-reacted to historical trends. One of the reasons given for the poor performance of the model was that economic and political environments had changed. The study concluded that the gold price is influenced primarily by investor's inflation expectations.

Baker and van Tassel (1984) examined the monthly change of the gold price in U.S dollars. The regression model revealed that changes in gold price can be described by changes in the price of other commodities, changes in the U.S prices and changes in the value of the dollar, and future rate of inflation. The analysis also found the influence of interest rate on the price of gold to be insignificant.

It was found that gold assets (gold bullion, New Gold ETF and Krugerrands) produced superior abnormal returns compared to the JSE all share index and the unit trust index in all periods considered. Gold bullion tends to yield higher returns compared to some gold mining stocks but not all the time. Gold bullion returns tend to be uncorrelated with the JSE all share index. The JSE all share index exhibits the least volatility of all assets considered. Adding gold to a portfolio of stocks tends to increase return/risk ratio. Gold is a useful asset to include in a portfolio of stocks from a risk management perspective as it reduces systematic risk. Gold tends to be highly correlated with real GDP followed by the rand/dollar exchange rate. A regression model was estimated which relates the gold price to real GDP and rand/dollar exchange rate.

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