Goldmoney | Wealth

# Goldmoney Insights®

## The demise of volatility has extended to the gold market

Both realized and implied volatility in most asset classes are close to all-time lows. One of the most interesting aspects of the low volatility phenomenon is that has extended to the gold market, where the implied volatility of gold in USD in the front end of the curve has set an all-time low. It seems bizarre that volatility in general – and gold volatility in particular – is so low despite heightened economic, political, and monetary uncertainty, and we believe it isn't a coincidence that realized and implied volatility are depressed across most asset classes and currencies. It is our view that central bank policy is at the core of this phenomenon, but buying volatility as a hedge for potential future market turmoil has been a losing trade. It is our opinion that the better protection is simply to be long gold.

Low volatility is the topic of the day in financial markets. Volatility in U.S. equity markets is flirting with all-time lows despite considerable economic, political, and monetary uncertainty. In this report, we describe gold volatility in relation to other markets in part one, and then discuss the nature and risks of low volatility across assets in part two.

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## REAL INTEREST RATES VS. GOLD PRICE

%(LHS), USD/OZT (RHS)


*Source: Bloomberg, Goldmoney Research*

## UPCOMING IMPORTANT DATA RELEASES AND POLICY MEETINGS

| | |
|---|---|
| May 25 | OPEC Ordinary Meeting |
| May 26 | University of Michigan sentiment |
| June 2 | US non-farm payrolls |
| June 5 | ISM non-manufacturing composite |
| June 8 | ECB monetary policy meeting |
| June 13-14 | FOMC meeting |
| June 14 | US CPI |
| June 15 | US IP |
| June 15 | Philly Fed Business outlook |
| June 15-16 | BOJ monetary policy meeting |

## GOLD RETURNS IN VARIOUS CURRENCIES

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | ytd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US dollar | 23% | 31% | 6% | 24% | 30% | 10% | 7% | -28% | -1% | -10% | 8% | 3% |
| Euro | 11% | 18% | 10% | 21% | 39% | 14% | 5% | -31% | 12% | 0% | 12% | 4% |
| Japanese yen | 25% | 23% | -14% | 27% | 13% | 4% | 21% | -13% | 12% | -10% | 5% | 4% |
| British pound | 8% | 29% | 44% | 12% | 34% | 11% | 2% | -30% | 5% | -5% | 29% | 10% |
| Canadian dollar | 24% | 12% | 29% | 7% | 23% | 13% | 4% | -23% | 8% | 7% | 5% | 4% |
| Swiss franc | 14% | 22% | 0% | 20% | 17% | 11% | 4% | -30% | 10% | -10% | 10% | 4% |
| Swedish krona | 6% | 24% | 28% | 14% | 22% | 13% | 1% | -29% | 20% | -3% | 17% | 6% |
| Norwegian krone | 14% | 14% | 35% | 4% | 30% | 13% | 0% | -22% | 21% | 6% | 6% | 3% |
| Danish krone | 10% | 18% | 10% | 21% | 39% | 13% | 6% | -31% | 12% | 0% | 11% | 4% |
| Indian rupee | 21% | 17% | 31% | 19% | 25% | 31% | 10% | -19% | 1% | -6% | 11% | 0% |
| Russian rouble | 13% | 23% | 26% | 27% | 32% | 16% | 2% | -23% | 74% | 13% | -9% | 10% |
| Brazilian real | 13% | 9% | 38% | -6% | 23% | 24% | 18% | -17% | 11% | 34% | -11% | -2% |
| Mexican peso | 25% | 32% | 33% | 19% | 22% | 24% | -1% | -27% | 12% | 4% | 30% | 5% |
| Singapore dollar | 14% | 23% | 5% | 22% | 18% | 11% | 1% | -26% | 3% | -4% | 10% | 8% |
| Chinese yuan | 19% | 22% | -1% | 24% | 25% | 5% | 6% | -30% | 1% | -6% | 16% | 9% |
| Kongkong dollar | 24% | 31% | 5% | 24% | 30% | 10% | 7% | -28% | -1% | -10% | 8% | 5% |
| Australian dollar | 14% | 18% | 32% | -3% | 14% | 10% | 5% | -16% | 8% | 1% | 9% | 8% |
| New Zealand dollar | 20% | 20% | 40% | 0% | 20% | 11% | 0% | -28% | 4% | 2% | 7% | 11% |
| Turkish lira | 29% | 8% | 39% | 22% | 33% | 35% | 1% | -14% | 7% | 12% | 31% | 2% |
| Korean won | 13% | 32% | 42% | 15% | 25% | 14% | -2% | -29% | 2% | -4% | 11% | 4% |

## PREVIOUS GOLDMONEY INSIGHTS HIGHLIGHTS

Gold Price Framework Vol. 1: Price Model
October 8, 2015 by Stefan Wieler and Josh Crumb

End of an Empire
April 27, 2017 by Alasdair McLeod

Gold is breaking free of Fed rate expectations
March 20, 2017 by Stefan Wieler

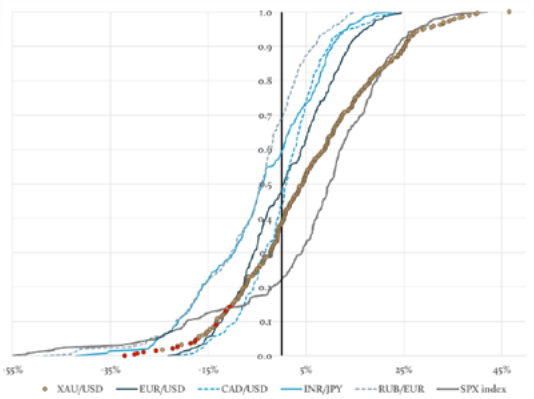
America's financial war strategy
April 20, 2017 by Alasdair McLeod

Silver price framework: Both money and a commodity
March 9, 2017 by Stefan Wieler

Gold - A primer for 2017
January 4, 2017 by Alasdair McLeod

## RETURN DISTRIBUTION OF CURRENCIES AND GOLD

YEAR-OVER-YEAR CHANGE, MONTHLY DATA (HORIZONTAL AXIS); DISTRIBUTION, CUMULATIVE (VERTICAL AXIS)




*Source: Bloomberg, Goldmoney Research*

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## 1. GOLD VOLATILITY IN RELATION TO OTHER MARKETS

What is volatility? In finance, volatility describes the degree of variation in the price of an asset. It is typically expressed by the annualized standard deviation (σ) of (log) returns. The standard deviation of a data set is the square root of its variance (σ2). In mathematical terms:

$$\text{Variance} = \sigma^2 = \frac{\Sigma(X-\mu)^2}{N}$$

Where X are the returns, μ is the mean of the returns and N is the number of return observations, hence:

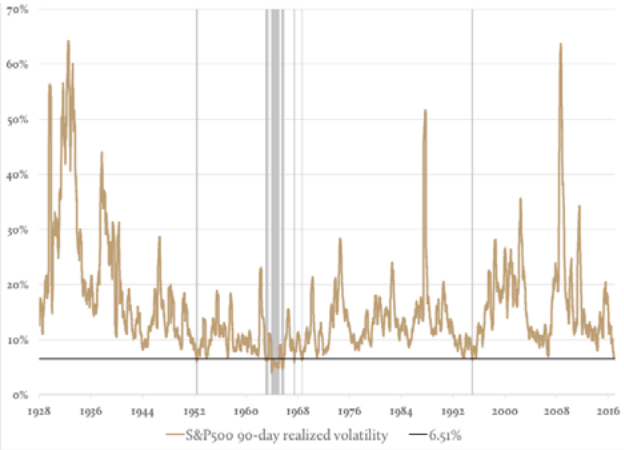
$$\text{Standard deviation } \sigma = \sqrt{\sigma^2} = \sqrt{\frac{\Sigma(X-\mu)^2}{N}}$$

$$\text{Annualized standard deviation of daily returns} = \sigma\sqrt{252}$$

Volatility comes in two basic flavours: historical volatility and implied volatility. Historical volatility is simply the measured (realized) price volatility of a security over a specific time horizon. Implied volatility is the expected volatility that is priced into the options traded on that security. Options can be valued in many ways. One common approach is to use the Black-Scholes model, a framework in which the value of an option is determined by five parameters: The current price of the underlying security, the options strike price, time until expiration, risk-free interest rates, and the implied volatility. The latter reflects the market's expectations of what the volatility of an underlying security will be over an option's lifetime. As the four other parameters can be observed, one can back out the implied volatility of the security from observed option prices. This implied volatility itself can be traded. The famous VIX index (Chicago Board Options Exchange Volatility Index) reflects the 30-day implied volatility in the S&P 500 Index market using a wide range of options on the S&P 500 Index futures. The VIX is widely regarded as a risk index; a rising VIX reflects market expectation for higher price volatility.

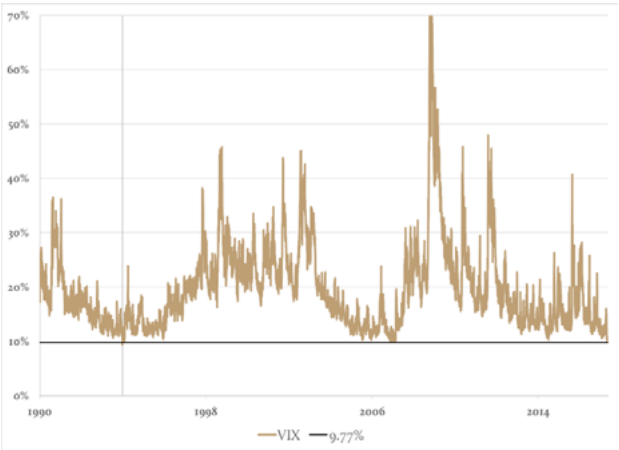
Realized volatility in the equity markets had dropped to extremely low levels. For example, the 90-day realized volatility of the S&P 500 index dropped as low as 6.5% at the end of April, a 22-year low. As from three single days in 1995 with lower volatility, one must go back to 1968 to find an environment with lower realized equity volatility (see Figure 1). The VIX shows a similar picture, dropping to 9.77% on May 8, 2017. Aside from a brief three-day period in December 1993, during which the index dropped to 9.31%, the VIX had never been lower (see Figure 2).

**Figure 1: Realized volatility of the S&P 500 index has dropped close to all- time lows**
%, 90-days annualized




*Source: Bloomberg, Goldmoney Research*

**Figure 2: The VIX dropped close to its 1993 all-time low**
%




*Source: Bloomberg, Goldmoney Research*

Low volatility is not only an equity phenomenon. Volatility in the fixed income space is also very low. The TYVIX (CBOE/CBOT 10-year U.S. Treasury Note Volatility Index), a cousin of the VIX index in the fixed income space, dropped to 4.36% – just shy of the all-time low of 3.62% – more than 2% below the long-term average, and over 10% below the all-time high in 2008. Commodities have also been languishing in ultra-low volatility for a while now. The 90-day realized volatility of the GSCI commodity index had dropped to an all-time low[1] by mid-2014. Even though the sharp sell-off in oil that started in mid-2014 led to a temporary spike in realized volatility, volatility in the commodity space has been trending sharply lower again over the past 12 months.

Having now reached the gold market, gold price volatility has dropped to very low levels. For example, 90-day realized volatility of XAU/USD prices dropped to the lowest levels in 12 years. Aside from a period in the 1990s, gold volatility has rarely been that low. Over the past 10 years, gold volatility has only been below the recent lows for 0.23% of all trading days (see Table 1). It's important to note that this is not due to low volatility in the denominator (USD), but gold itself. Looking at gold priced in other currencies, volatilities have rarely been that low over the past 40-plus years (see Table 1) and are currently well below the long-term average (see Figure 3). For the currencies in which gold price volatility isn't near all-time lows, the reason lies in the denominator as those currencies go through some turmoil (e.g. Brazilian real, Mexican peso etc.).

1 There is data available for the GSCI TR back to 1970 on data services such as Bloomberg which implies that there have been periods of even lower volatility in the past. However, the GSCI has only been introduced in 1991. It is also not possible to accurately back-test what returns would have been because many components of the GSCI (Future markets) didn't much further back.

**Table 1: Percentage of days when gold price volatilities in various currencies were below current levels.**

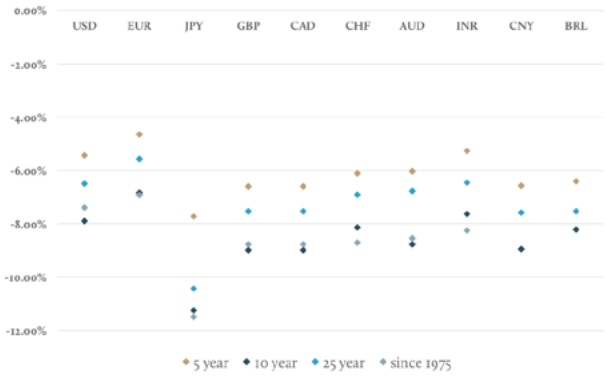
Vertical - currency against which gold is measured; horizontal - percentage of days during which gold volatility was below current levels over different time-horizons

| | 5 year | 10 year | 25 year | since 1975 |
|---|---|---|---|---|
| USD | 0.46% | 0.23% | 6.15% | 13.74% |
| EUR | 13.96% | 6.98% | 10.81% | 10.71% |
| JPY | 1.00% | 0.50% | 0.25% | 0.62% |
| GBP | 0.31% | 0.15% | 0.19% | 4.97% |
| CAD | 0.31% | 0.15% | 0.19% | 4.97% |
| CHF | 6.90% | 3.45% | 4.89% | 3.62% |
| AUD | 5.44% | 2.72% | 6.80% | 8.50% |
| INR | 8.05% | 4.41% | 8.11% | 10.31% |
| CNY | 1.84% | 0.92% | 2.22% | n/a |
| BRL | 12.42% | 7.86% | 14.76% | n/a |

*Source: Bloomberg, Goldmoney*

**Figure 3: The current volatility of gold priced in various currencies is significantly below longer-term averages.**

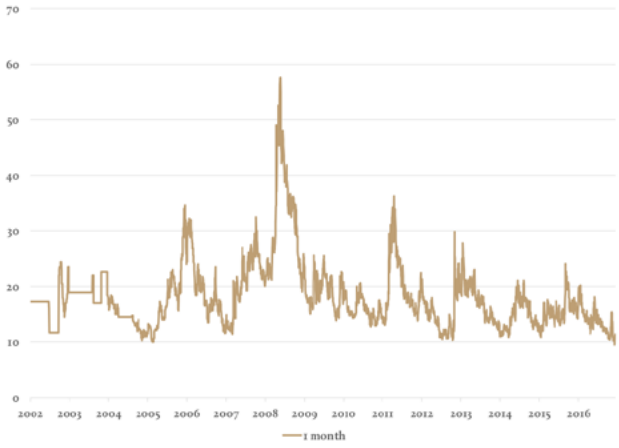
Vertical - Delta current volatility vs. average; horizontal - currency against which gold is measured




*Source: Bloomberg, Goldmoney*

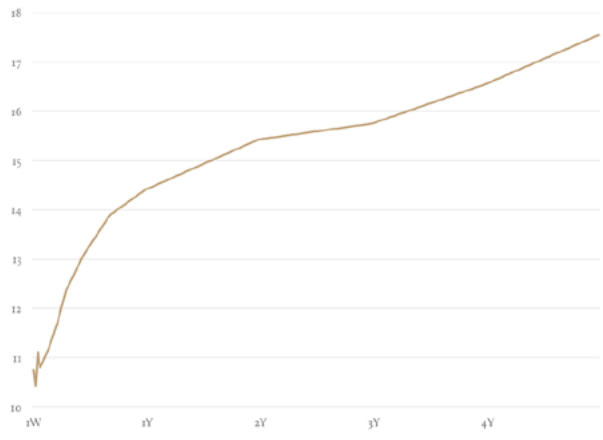
Because there is an options market for gold, one can also calculate implied volatility in gold prices. Implied volatility for gold in USD is also extremely low and near-dated volatility (1-month) dropped to less than 10 for the first time, at least since the beginning of recorded data (see Figure 4). Implied gold volatility also highlights an important aspect of the current low-volatility phenomenon. Even though implied volatility is low, the volatility curve remains quite steep (see Figure 5). We will discuss how this helps to explain the low volatility environment overall later in our report.

**Figure 4: Front end implied gold volatility is at an all-time low.**
XAU/USD % implied volatility




*Source: Bloomberg, Goldmoney Research*

**Figure 5: Despite volatility being very low, the volatility curve remains quite steep.**
XAU/USD % implied volatility




*Source: Bloomberg, Goldmoney Research*

## 2. THE NATURE AND RISKS OF LOW VOLATILITY ACROSS ASSETS

It seems bizarre that volatility in general – and gold volatility in particular – is so low despite heightened economic, political, and monetary uncertainty, and we believe it isn't a coincidence that realized and implied volatility are depressed across most asset classes and currencies. It is our view that central bank policy is at the core of this phenomenon, as central bank market intervention has reached unprecedented levels in the aftermath of the financial crisis.

From the late 1980s, the Fed, under chairman Allan Greenspan, had the tendency to lower interest rates every time the economy (and thus markets) hit a bump. Traders and investors became increasingly convinced that for as long as Greenspan remained chairmen of the Fed, the Fed would come to the rescue if markets turn sour. They referred to it as the "Greenspan put". While the Greenspan Fed tried to navigate the economy and markets by moving interest rates up and down, central banks now use a much more brachial approach. As most central banks already slashed interest rates to zero years ago (or in some cases below zero), they can't influence monetary conditions any further by fiddling with key interest rates; instead, they began to directly purchase assets in the hope that it would ease monetary conditions and stimulate their respective economies. For traders and investors, this once again means that there is always a buyer of last resort if things turned against them. It would be natural to call this the "Yellen put", but this would be a gross understatement as this time it is not just the Fed that gives traders and investors the reassurance that any sell-off would be promptly responded to with more stimulus. Essentially, all major central banks – from the ECB to the BOJ, BOE, SNB, and the PBC – have been buying vast amounts of assets, from government to corporate bonds, mortgages, and even equities. The six major central banks alone have together now purchased nearly 20 trillion dollars in assets, which is equivalent to almost 40% of the combined GDP.

The market's conviction that central banks would intervene if markets fall too far has created an environment in which investors see a buying opportunity in every dip. If central banks keep buying assets, a good trading strategy is to buy assets before them and then sell those assets back to them later. There is no other reason to buy a 10-year government bond with negative yield to maturity. In addition, because of the ultra-low interest rate environment, investors don't really have anywhere to go. Even if investors come to realize that an asset is overpriced and should be sold, when all assets are overvalued, including – and we would argue especially – currencies themselves, what else is there to buy?

Investors have also been trained like Pavlov dogs to simply sell volatility. Selling volatility has been one of the most successful trading strategies in the past several years. Although it seems odd that investors keep selling volatility when the VIX has dropped to record low levels, implied volatility is still significantly above realized volatility and near-dated volatility is trading below longer-dated volatility; therefore, investors still ending up making money when they sell longer-dated volatility and roll down the curve.

When investors sell volatility, the dealer (usually a bank) that sells them the volatility becomes long volatility if he remains unhedged. As explained, that has been a losing trade; therefore, dealers will try to hedge their exposure by buying the underlying assets when prices fall and selling them when they rise, as the hedging smooths out assets prices and thus leads to lower volatility. This creates a feedback loop through which investors selling implied volatility leads to lower realized volatility and thus, somewhat like a self-fulfilling prophecy, reinforces the volatility shorter's conviction that this is the right trade. Obviously, when volatility suddenly spikes for whatever reason, and traders try to unwind their short volatility position, this works in the other direction as well. Banks stop hedging their positions as being long volatility suddenly pays off, which is why an important player that used to cushion asset price moves will disappear overnight.

Selling volatility is also no longer limited to the domain of hedge funds and professional traders at prop desks, as it has increasingly found its way into the retail space. Sources working in the structured product space at some major banks informed us that products that are inherently short volatility are currently bestsellers in the retail space. These products are not necessarily being bought to gain short volatility exposure; instead, the retail investor is usually trying to get exposure to a trade idea in a more cost-effective way and (perhaps unknowingly) ends up buying products that are short options. Because realized volatility has been in a prolonged downward trend, products that were structured to be short implied volatility have generally done well over the past years. As a result, these products are becoming ever more popular, though one cannot help but assume that a lot of these retail investors are unaware that these products may move in conjunction with volatility. They might not even know what volatility is.

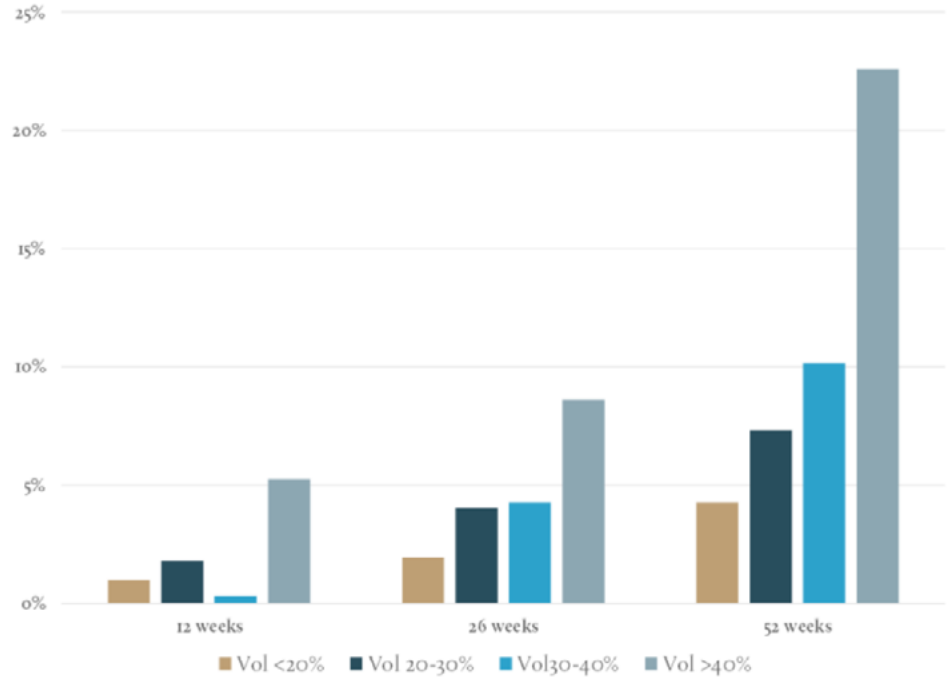
Neither BREXIT nor the political turmoil that followed the U.S. elections, increased geopolitical tensions, or the Fed's departure from NIRP had any lasting impact on volatility, both implied and realized. Last week's media report regarding a memo from

former FBI director James Comey that implied president Trump may have interfered with an ongoing FBI investigation seemed to have awoken the VIX from its slumber, but after initially shooting up to 16 on May 18 from less than 10 a week earlier, it dropped back to 12 the next day and was trading at 10.72 at the time of writing.

Shortly after Alan Greenspan became Fed Chairman, U.S. equity markets crashed by more than 10% in one day. It seems that the preceding Fed policy was designed to avoid spooking markets at all costs to avoid a repetition of the 1987 crash. As a result, volatility in the equity markets continuously fell for several years until the mid-1990s. When volatility began to rise again later in the decade on the back of the Asian crisis and turmoil in the wake of the failing LGTM fund, equity markets nevertheless kept on moving higher. Eventually, the Greenspan put era ended with the burst of the dotcom bubble in 2000, which wiped out close to 80% of the NASDAQ's value and sent the U.S. economy into a recession. It's naïve to assume that the outcome will be more benign this time around, given the vastly larger scale of central bank intervention. Low volatility is simply the symptom of a market that is no longer able to react to price signals.

Being long volatility can work over the short run to hedge a portfolio if the timing is right. You can view an example of successful timing provided by our guest contributor Omer Rozen (Market Update: Hedge Your Portfolio Now with VIX Futures on the Cheap, April 28, 2017). On the other hand, the buy and hold volatility strategy as a hedge for potential future market turmoil has been a losing trade. However, we found that elevated volatility (higher levels of the VIX) tend to be followed by rising gold prices. Figure 6 shows the return of the gold price in USD at 12, 26, and 52 week intervals after the VIX hit certain levels, starting with the creation of the VIX in 1990. The higher implied volatility, the stronger gold rallies in the subsequent weeks. It is our opinion that the better long term strategy for protection against a sharp rise in volatility might simply be long gold.

**Figure 6: High VIX levels tend to be followed by strong gold returns**
Gold returns (vertical axis); period over which gold return is measured (horizontal axis); colours of bars reflect the VIX level prior to gold return




*Source: Bloomberg, Goldmoney Research*

# FAQ

## WHAT IS INFLATION?

The original definition of inflation is an increase in the amount of money in circulation. Today the term inflation is mostly used to refer to the rate at which the price level, however defined, is rising. For example, a good that costs $100 today and $110 a year later experienced inflation of 10%. When referring to the original meaning, economists therefore often use the term 'monetary inflation' to distinguish from 'price inflation'. Economists create weighted baskets of goods and services to estimate overall consumer price inflation. For example, the consumer price index (CPI) reflects the price development of a basket of goods and services that aims at replicating the typical consumer's cost of living.

## WHAT IS THE CURRENT INFLATION RATE?

There is no straightforward answer for this. Price inflation can be estimated in many different ways. The two most widely accepted price inflation indices are PCE (personal consumption expenditure) and CPI (consumer price index). The former is used by the Federal Reserve when setting US monetary policy and the latter applies to cost of living adjustments for US Social Security and certain other federal government benefits. We find that CPI inflation expectations have been a key driver for gold prices. CPI inflation also usually tends to be higher than PCE inflation. CPI (urban consumers) inflation in February 2017 came in at 2.7% year-over-year which is a sharp pick-up from just 1% half a year ago.

## WHAT IS THE NOMINAL INTEREST RATE?

Nominal interest rates are simply the interest paid on an investment in percentage terms. For example, a bond that sold for $100 and pays a $2 coupon per annum has a 2% interest rate. However, the value of a bond deviates from its face value over time when overall interest rates change. When interest rates decline, (all else equal) the bond above would increase in value as it now pays a higher interest than bonds that are issued today. Therefore, in financial markets one would usually refer to the yield of a bond—which is simply the return on the bond (coupon / price)—for comparison purposes. If the bond is trading at par (price is the same as the face value), the interest rate and the yield are the same. What makes things more complicated is that the two terms are often used interchangeably. In that case, the term interest rate is usually used to describe the yield of a fixed income instrument. Most people are not active

investors in bonds (although they might be via their pension funds) and know interest rates only from their bank account. The interest paid on a savings account is equivalent to its yield and is a nominal interest rate.

## WHAT IS THE REAL INTEREST RATE?

In contrast to nominal interest rates, real interest rates also take the level of price inflation into account. Broadly speaking, real interest rates = nominal interest rates + price inflation. Hence real interest rates measure the return on an investment in actual purchasing power. Why do real interest rates matter? For example, when interest rates are at 5% p.a. but inflation is 10% p.a. , after one year the lender has earned 5% in nominal terms, but he actually has lost value. More specifically, with an initial investment of $100 he would end up with $105 after one year. But those $105 would only buy him 95% of the goods and services the original $100 bought a year ago. Thus when price inflation is higher than the nominal interest rate on savings accounts, savers are de facto paying to lend out their money to the bank. Currently the national average money market account rate is 0.27% while inflation is 2.7%, hence savers lose 2.4% of their purchasing power per year if price inflation stays at this levels.

## WHAT IS THE FED?

The Fed is short for the US Federal Reserve, which was established in 1913 by the US Congress. The Fed is headed by the Board of Governors of the Federal Reserve, consisting of 7 presidential appointees serving 14 year terms. It's most important body however is the Federal Open Market Committee (FOMC). The Current chairwoman of the Fed and FOMC is Janet Yellen.

The Fed has several functions. It acts as the lender of last resort to financial institutions that temporarily lose access to the capital markets in a crisis. It exerts other banking functions such clearing the transfer of funds from one bank to another. It also acts as the US government's bank and sells and redeems government securities. However, what receives the most attention is that the Fed determines monetary policy, that is, the level of nominal interest rates. The monetary policy decisions of the Fed, such as setting interest rates, are made by the FOMC.

## WHAT IS THE FOMC?

There are 12 voting members of the FOMC: the seven members of the Board of Governors, the president of the Federal Reserve Bank of New York and the presidents of four other regional Reserve Banks (on a one-year rotating basis). There are eight scheduled FOMC meetings per year. When the FOMC sets interest rates, it actually sets the lower and upper bounds of the federal funds rate, the rate at which banks either lend out or borrow reserves in order to meet statutory reserve requirements.

## WHAT IS THE FEDERAL FUNDS RATE?

The federal funds rate is the overnight interest rate at which a depository institution (a bank) lends funds to another depository institution. The Fed only sets a target band; the banks can in theory charge each other what they want. However, in practice the rate at which banks lend to each other is always within this band. The Fed uses open market operations to ensure that the fed funds rate stays within the target band. This means that it buys and sells securities (normally US Treasuries) from its member banks and replaces them with Federal Reserve credit. The upper band is called the discount rate. Even though the Fed prefers that banks to borrow from each other, the fed funds rate should in theory not be able to exceed the discount rate as otherwise the banks may simply borrow directly from the Fed itself. What makes the fed funds rate so important is that it necessarily influences all other interest rates as well. Hence by setting the fed funds rate target, the Fed is able to influence credit conditions throughout the economy.

## WHAT IS FORWARD GUIDANCE?

At the end of an FOMC meeting, the Fed announces its outcome and releases a statement that aims to provide the public with information about the FOMC members' views in regards to current macroeconomic conditions as well as their expectations thereof. Among other data, the Fed publishes a so called dotplot which shows where the FOMC members believe the Fed funds rate will be at the end of each year for the next few years and over the long run. The median projection is regarded as the Feds forward guidance for the interest rate path. Often the market is more interested in the Feds forward guidance than in the most recent monetary policy decision itself. For example, when the Fed announced its third rate hike in 11 years on March 15, 2017, the market reaction implied that the Fed had become more

dovish rather than hawkish. The reason for this was that the Fed left its interest rate projections largely unchanged while the marked had expected the adoption of a more hawkish outlook.

### WILL THE FED RAISE INTEREST RATES?

At the moment it seems likely that the Fed will continue to raise rates. Since the Fed began to depart from zero interest rates in December 2015 it has raised rates three times by 25bps (0.25%) each. According to the Fed's own dotplot forecasts the Fed is anticipating raising rates to 3% by the end of 2019. However, the market is not expecting the Fed to be able to raise rates as quickly as the Fed's forward guidance suggests.

### WILL REAL INTEREST RATES RISE?

Unlikely. We believe the Fed will only continue to raise nominal interest rates as long as the US economy keeps expanding and inflation remains above the 2% target. This suggests that at the end of the current hiking cycle, realized real interest rates will not exceed 1%. However, we are currently already in the second longest period of economic expansion in US history. Should the US economy slow down or even fall into recession, the Fed would more probably have to cut rates rather than raise rates, in our view. We would expect real-interest rates to go sharply lower in such a scenario.