# Gold: Facts and Myth

Gold and shares in gold mines are often recommended to investors when there are signs of inflation or a crisis on the financial markets and as an advantageous means of diversification. In this study, we shall look primarily into the question of whether gold and gold equities proved favorable for investors with internationally diversified portfolios and who calculate in Swiss francs (we shall refer to them hereinafter as "Swiss investors") in the period of ten years and seven months from January 1, 1979, to July 31, 1989. We use the word "favorable" above to reflect whether gold and gold mine shares produced positive results from the standpoint of diversification. In addition, we shall see whether gold – with its price expressed in Swiss francs – offered protection against inflation during the years mentioned and if it proved of value in periods of financial crisis.



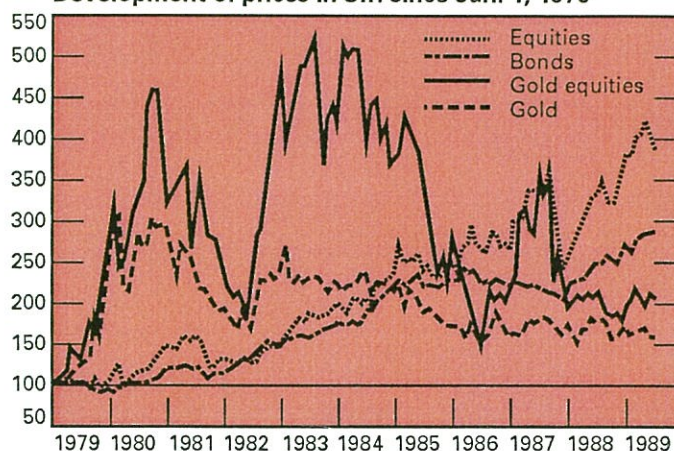**Development of prices in Sfr. since Jan. 1, 1979**

## Procedure

As stated, we are approaching this subject from the viewpoint of the investor calculating in Swiss francs with a globally diversified portfolio in bonds, equities (including gold mine shares) and physical gold. As a surrogate for these investments, we shall make use of the appropriate indexes [1], whose month-end values were converted into Swiss francs.

## Performance of the Four Types of Investment

### Growth of the Value of Gold

Our examination begins with the year 1979 as we approached the end of the first gold cycle (1976–1980), in which gold was pushed up to $ 835 per ounce (Fr. 42,900 per kilogram) in 1980 by a combination of political and economic events, the hostage affair in Iran and the Russian invasion of Afghanistan. In this connection, the main factor was the price of oil, which rose from $ 12½ per barrel in 1978 to over $ 35 in 1981, thus triggering a stronger-than-expected increase in inflation. This explosion in the oil price came as a surprise to investors, which explains why it was not included in inflation estimates. As a result, the actual inflation rate exceeded prognoses (unanticipated inflation) and interest in real terms was negative. Negative real interest increases the attractiveness of gold insofar as the opportunity costs (lost income) of gold – which, of course, provides no steady yield – are smaller.

A new gold cycle began in 1982, when unexpected inflation again materialized. In addition, there were further psychological factors, such as the problems associated with third world loans and concern that the recession might develop into an uncontrollable situation with a high rate of bankruptcies and so forth.

### The Development of Gold Mine Share Prices

If we examine the price trends of gold and gold mine shares, we see that the curves are largely analogous, whereby the interim highs of gold and gold mine equities were almost simultaneous in both cycles. In the first cycle the price of gold mine shares departed from the gold price in 1980 when talk began of gold hitting $ 1,000 per ounce and the leverage effect of the gold price on the profits of the mines was taken into consideration.

In the second cycle, the high flight of gold mine shares was sparked by both the mounting price of gold and the bullish stock market, whereby gold mine shares boasted favorable multiples relative to the overall market.

When the gold price again began to move up slightly in mid–1986 as a result of mounting concern about political

unrest and a shortfall in South African gold production, investors refocused their attention on gold mine shares. During the preceding two years, prices of mine stocks showed a negative trend, with the multiple in comparison with the market average reaching a historical low. Moreover, the mines had meanwhile reduced their costs and begun to raise their production. Along with the simultaneous rise in the gold price, expectations of strong profit growth mounted, which combined with the bullish mood of the stock market to push the price of gold mine shares up.

We attempted to do a statistical analysis of the influence of the gold price on gold mine shares, but we could not ascertain any significant connection for the entire period analyzed.

Despite the explosion of both the gold price and the price of gold mine shares in the meantime, neither of these investments succeeded in keeping pace with bonds or equities over the period analyzed.

## Performance Comparison Adjusted for Risks

Previously, we considered the development of the indexes only in absolute terms, without taking into account the risk factor. The risk coupled with an investment can be measured by means of the variability/standard deviation[2], that is, the smaller the standard deviation, the smaller the risk. To put it simply, the standard deviation measures the spread of values around the arithmetic mean. To arrive at an appropriate adjustment for the risk factor, we measured both the monthly yield and the standard deviation of the monthly yield:

| In percent | Equities | Bonds | Gold | Gold equities |
|---|---|---|---|---|
| Average monthly yield | 1.07 | 0.84 | 0.36 | 0.58 |
| Standard deviation | 5.99 | 2.90 | 8.43 | 12.20 |
| Annualized yield | 13.67 | 10.51 | 4.36 | 7.20 |

From the above graph it can be seen that shares with an annualized monthly yield of 1.07% or 13.7% clearly produce the highest income, although, as expected, the risks were higher than in the case of the second-place bonds. Gold mine equities entail the greatest risk and generate a poorer yield than bonds and shares, but they beat physical gold. It is already clear that gold and gold mine shares were uninteresting in general, as equities and bonds produced higher yields at a lower risk. It therefore follows that **shares and bonds provide better yields, in absolute terms and after being adjusted for risk, than gold and gold mine equities.**

# Do Gold and Gold Mine Shares Offer Diversification Advantages?

In practice, investors who are adverse to risks do not take only one form of investment into account but several in order to diversify their portfolios and to benefit from the advantages offered by diversification. Such advantages result if, by adding an investment with a specific risk, a portfolio produces a higher yield or a specific yield with a lower risk. After considering the yield for every investment, it is now a question of viewing the yields together with the risks to obtain a diversified portfolio.

To analyze the diversification advantage of physical gold, we compiled three portfolios containing different percentages of gold. Portfolio 1 has 80% of its assets in bonds (Salomon World Bond Performance Index in Swiss francs) and 20% in equities (MSCI in Swiss francs). Portfolio 2 also consists of bonds and equities but it also has 5% in gold. Portfolio 3 has the same basic structure, except that gold accounts for 10% of its assets instead of 5%.

| Share in percent | Portfolio | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Bonds | 80 | 76 | 72 |
| Equities | 20 | 19 | 18 |
| Physical gold | 0 | 5 | 10 |
| | 100 | 100 | 100 |

For these portfolios we calculated the monthly and yearly yields, including the monthly standard deviation.

| In percent | Portfolio | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Monthly yield | 0.88 | 0.86 | 0.83 |
| Standard deviation | 3.02 | 3.05 | 3.12 |
| Annualized yield | 11.14 | 10.79 | 10.44 |

As the the above table shows, portfolio 1's monthly yield of 0.88% (11.14% annualized) is the highest and with a standard deviation of 3.02% entails the lowest risk. By adding gold to portfolios 2 and 3, the yield is reduced and the risk enlarged. In other words, during the period covered by the analysis, **physical gold produced no diversification advantage.**

The next step in our study is to see whether by adding **gold mine equities** (Morgan Stanley Gold Mine Share Index) to the same portfolios any diversification advantages were achieved.

| In percent | Portfolio | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Monthly yield | 0.88 | 0.87 | 0.85 |
| Standard deviation | 3.02 | 2.90 | 2.92 |
| Annualized yield | 11.14 | 10.94 | 10.74 |
| Risk adjustment [3] | 0.164 | 0.166 | 0.160 |

With the inclusion of gold mine shares, the yield dropped, but the risk declined, too. In order to assess the advantages of diversification, we must consider the net effect, that is, the yield must be adjusted for the risk. Once it has been adjusted for the risk factor[3], portfolio 2 displays the highest yield. Or to put it another way, **the addition of about a 5% holding of gold mine equities generates a smaller diversification advantage.**

## Do Gold and Gold Equities Offer Protection Against Financial Market Crises?

It is often stated that gold provides protection against crises on the financial markets. As an example of such a crisis, we selected the crash of October 19, 1987, and examined the yields of our four investment instruments in the last quarter of 1987.

**Development during crash (indexed)**
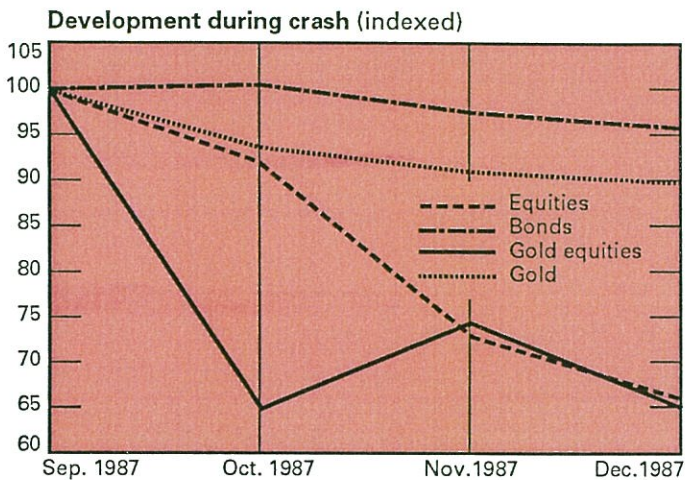


The biggest losers were gold mine equities, which plummeted by more than 35%, followed by shares in general, which dropped by 34%. The reaction of gold mine shares tended to be analogous to that of equities rather than that of gold. Faring considerably better was the investor in gold who chalked up a loss of "only" 10%. Bonds, however, gave the best performance, losing only 4%. During this crisis gold held its value better than shares in general and gold mine shares in particular, but it was unable to hedge portfolio losses.

Although we came to the conclusion in the previous section that gold had not provided any diversification advantages since 1979, it appears that under special circumstances, such as those prevailing in the final quarter of 1987, advantages could be achieved by diversifying into gold. To obtain a clear picture, we must again calculate the yields and standard deviations of our three portfolios. However, due to the small amount of data, the calculation of the standard deviation is not particularly meaningful. Therefore we shall compute only the yields for our portfolios and not bother with adjustment for risks.

| In percent | Portfolio | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Monthly yield | − 3.92 | − 3.77 | − 3.62 |
| Annualized yield | −38.14 | −36.95 | −35.73 |

During the crash (October–December 1987), portfolio 3 displayed the top monthly performance. It thus follows that **owning gold paid off during the crash**, providing at least that the risk factor was left out of consideration.

If a Swiss investor had purchased gold mine shares instead of gold, the following results would have been attained:

| In percent | Portfolio | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Monthly yield | − 3.92 | − 4.45 | − 4.97 |
| Annualized yield | −38.14 | −42.07 | −45.77 |

In contrast to physical gold, no improvement in yield was achieved through gold mine shares – and in this case, too, we made no adjustment for risk. **In this situation at least, gold equities did not provide any crisis protection.**
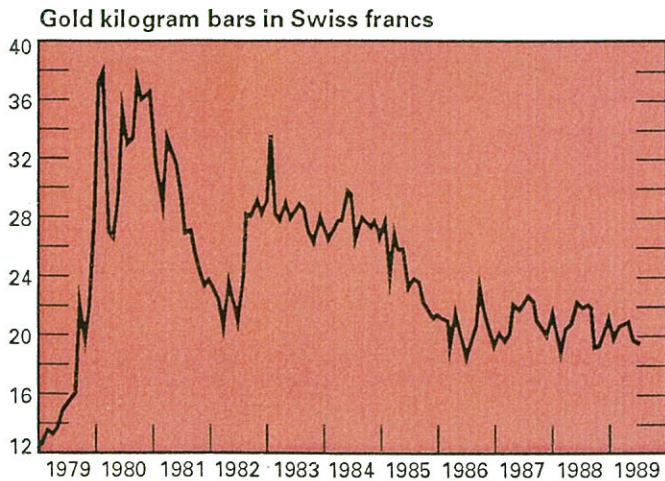
## Do Gold and Gold Equities Protect Against Inflation?

It is possible to determine whether gold and gold equities protect against inflation by means of a simple regression between the yields for gold and gold mine shares and the rates of change in the Swiss consumer price index. Such a regression does not, however, provide any statistically significant results, that is, there is neither a connection between gold and inflation nor between gold equities and inflation. **In other words, gold and gold mine shares do not offer any protection against inflation.**

The fact that gold does not provide protection against inflation in Switzerland is of no great importance to the investor, as interest rates are pushed up when inflation increases and the yield in real on money market paper remains unchanged in real terms. Gold therefore does not offer protection against inflation as such but against **unexpected inflation**. Unexpected inflation is the difference between the inflation rate and money market interest rates. We proceed implicitly from the hypothesis that, in the final analysis, the money market shows nothing other than "liquidity" and so the real yield to be anticipated for the money market is zero. Analogous to the preceding calculation, gold and gold equities can be subjected to regression with expected inflation, with the 3-month Euro Swiss-franc rate being used for the money market rate. This regression provides statistically significant results, whereby only 5.2% of the gold price in Swiss francs ($r2 = 0.052$) and 4% of the price of gold equities ($r2 = 0.04$) can be explained by the unexpected inflation. The conclusion to be drawn from this is that **although the unanticipated inflation does have an effect on gold and gold equities, these investment instruments cannot be viewed as a good means of hedging.**

## Conclusion for the Swiss Investor

On the whole, we see that during the period examined it did not pay for the Swiss investor to hold gold or gold mine shares. However, it would be dangerous to assume on the basis of these data that such investments should not be a part of well-diversified portfolios in the future. It would be particularly wrong to extrapolate the overall negative performance of gold and thus fail to benefit from the **advantages of diversification** that gold offers. Apart from the standard deviations of the investments, the most important

**Gold kilogram bars in Swiss francs**



Although gold did not provide a hedge during the crash, we believe it is quite probable that in a **crisis of catastrophic proportions**, such as a depression with bankruptcies, gold would show a strong increase in value. The crash of October 19, 1987, cannot be interpreted as an exceptional situation in view of the fact that the Fed's effective action helped to prevent a serious crisis. We therefore come to the conclusion that gold can be interesting for the investor who wants to hedge against the type of catastrophe cited above. Gold can be termed a life insurance policy against risk, whereby the opportunity costs (no steady yield) are equivalent to the premiums and the potential yield (payment of the policy amount) comes only with the advent of the catastrophe (death).

factor for the investor in answering the question of whether diversification opportunities are present in gold is his yield expectations for gold in relation to other investments.

We also consider the non-existent connection between **inflation and gold** (gold as a hedge against inflation) as being applicable in the future, especially as an American study [4] covering the period from 1560 to 1976 came to the same conclusion. We therefore believe that even a two-digit inflation rate – provided it is expected – would not help gold to produce a positive yield in real terms. Rather, we anticipate a decline in the significance of gold – and consequently the demand for it – to cover this need. Today, there are other instruments, such as interest rate futures and futures based on the CRB index that better meet this requirement.

[1] The following global indexes were used: Salomon World Bond Performance Index, Morgan Stanley Capital Index (MSCI) and Morgan Stanley Gold Share Index. The kilo price was applied in the case of physical gold. Since gold equities make up only 0.4% of the MSCI, no adjustment of the MSCI for the performance of gold mine shares was made.

[2] For a detailed definition and explanation, see "Begriffserklärung zur Modernen Portfolio-Theorie" (Definition of Terms in Modern Portfolio Theory), UBS Investment Research, January 1989.

[3] The yields are adjusted for the risk by the formula $(rp-rf)/std\ rp$, whereby $rp$ = monthly portfolio yield, $rf$ = interest rate without risk and $std\ rp$ = standard deviation of the portfolio yields. We thus obtain the additional income per unit of standard deviation. The 3-month Euro Swiss-franc rate was used as an interest rate without risk and average 4.74% or 0.3877% per month.

[4] JASTRAM, ROY W. (1977): "The golden constant: The English and American experience 1560 to 1976", John Wiley & Sons, New York.