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An investor's guide to the gold market
(US edition)

For thousands of years, gold has been valued as a global currency, a commodity, an investment and simply an object of beauty. As financial markets developed rapidly during the 1980s and 1990s, gold receded into the background and many investors lost touch with the asset. But recent years have seen a striking revival in investor interest in gold. Some investors have bought gold as a tactical asset in order to capitalize on the positive price outlook associated with strong demand and tight supply in the industry. Others have bought gold as a long-term or strategic asset seeking to take advantage of its unique investment characteristics. The 2007-2009 financial crisis has put gold's long standing role as a safe haven asset firmly back in the spotlight. But gold has a role to play in enhancing portfolio performance regardless of the health of the financial sector or broader economy. Gold has proven itself to be an effective portfolio diversifier—returns are generally uncorrelated with those financial assets typically held by US investors. It also has a long history as an inflation and dollar hedge. This book describes the defining characteristics of the gold market from an investor's point of view. It also looks at the various aspects of demand and supply, from important gold-buying religious festivals in India to exciting new uses of gold in the industrial sector to the emergence of China as the world's largest producer of gold. The book also summarises the various ways that investors can buy gold or gain an exposure to movements in the gold price and outlines the tax treatment of the yellow metal in the United States.

Price trends	6
Gold and volatility	10
The investment case for gold	14
Gold as a portfolio diversifier	
Gold as an inflation hedge	
Gold as a dollar hedge	
Gold as a safe haven	
Demand	26
Jewelry	
Industrial	
Investment	
Supply	34
The mining sector	
Gold as a monetary reserve asset	
Recycled gold	
Ways to access the gold market	44
Pension eligibility and taxation	50
Related World Gold Council research	52

Price trends

The gold price reached a new record in 2008, fixing at US\$1011.25/ oz in afternoon trading in London on March 17, driven by safe-haven inflows in the run-up to the worst financial crisis since the Great Depression. The credit crisis, which began in the summer of 2007, developed into a full blown financial and economic crisis over the course of the year, sending the price of real and financial assets spiraling downwards. The US economy suffered its first annual contraction in GDP since 1982, while the benchmark S&P 500 and Dow Jones Industrial Average equity indices fell by 38% and 34%, respectively. The other commonly traded commodities and diversified commodity baskets fell between 6% and 63%; the price of oil, which is often erroneously equated to an investment in gold, fell by 56%. Gold, though softening from its March peak, ended the year at US\$869.75/oz, 4.3% higher than the end of 2007, fulfilling its role as a safe-haven asset during times of financial or geopolitical distress. In the first half of 2009, the gold price rallied by a further 7.4%, ending June at US\$934.50/oz.

Chart 1

Gold price (US\$/oz), London PM fix

Source: Bloomberg

Gold's price performance during the financial crisis put it firmly in the spotlight. Many investors and commentators, hitherto unfamiliar with the yellow metal, attributed its high price solely to safe haven inflows. Safe haven inflows played an important role between H2 2007 – H1 2009, but the increase in price over that period marked the continuation of a well established trend rather than the emergence of a new one. The rally in the gold price started a good six years before the financial crisis began.

Gold's bull run started in April 2001, when the price slowly lifted from its earlier low of US\$255.95/oz, just higher than the

20-year low of US\$252.85/oz set on 25 August 1999. Gold's performance in the first nine months of 2001 was extremely modest, rising just US\$20.55/oz to US\$276.50/oz, a level it had reached and periodically retreated from in the previous few years. This time, however, the rise was to prove a harbinger for a strong and enduring rally. Between the end of 2001 and 2008, the gold price rose from US\$276.50/oz to US\$869.75/oz, a cumulative rise of 215% or an average annual return of 16%. Four of those eight years were marked by gains of 20% or more. In the first half of 2009, the gold price rose by a further 7.5% to US\$934.50/oz.

Chart 2

Annual change in the gold price (end of period, % year-on-year)

Source: Bloomberg

Price trends

Like any freely-traded good or service, the price of gold is determined by the confluence of demand and supply. Many factors influenced the rise in the gold price over this period (these are discussed in more detail in the Demand and Supply chapters). On the supply side, mine production started to fall from 2001, hit by the curtailment of mine expansion plans in previous years, declining ore grades and production disruptions. Widespread producer de-hedging reduced the supply of gold coming from the miners even more. At the same time, rising mining costs put a higher floor underneath the gold price. Metals Economic Group estimates that the total cost of replacing reserves and finding and mining new gold rose to US\$655/oz in 2008 from US\$281/oz in 2001. The period was also marked by a fundamental shift in the behavior of central banks, who switched from being large suppliers of gold to the market in 2001 to net purchasers in Q2 2009.

Meanwhile, on the demand side, strong GDP growth and a growing middle class in key jewelry buying markets like India and China were putting a higher floor underneath the gold price. While new ways to access the gold market were releasing pent-up investment demand, gold exchange-traded funds, pioneered by World Gold Council in 2003, allowed investors to buy gold on stock exchanges for the first time. The development of the ETFs was mirrored by growing interest in gold ownership more generally, as evidenced by the concurrent rise in coin and bars sales. Investors began to increasingly acknowledge gold's diversification benefits. In H2 2008, as concerns about future inflation and dollar weakness grew, investors bought gold as a store of value, encouraged by its long history as an inflation and dollar hedge.

Gold and volatility

Gold's volatility characteristics are often misunderstood. Many people tend to equate the behavior of the price of gold to that of other commodities, which often are very volatile. Oil, copper and soybeans, for example, have had annualized volatilities of 41%, 25% and 23%, respectively, over the past twenty years (based on daily returns from July 1989 to June 2009). The volatility of gold over the same period was just 15.8%. Overall, commodities, as measured by the S&P Goldman Sachs Commodity Index, were over 35% more volatile than gold over the past twenty years.

There are good reasons why gold is less volatile than other commodities. First, the gold market is deep and liquid, and is supported by the availability of large above-ground stocks. Because gold is virtually indestructible, nearly all of the gold that has ever been mined still exists and, unlike base metals or even other precious metals such as silver, much of it is in near-market form. As a result, in the event of a sudden supply-side shock or rapid increase in demand, recycled gold can, and frequently does, come back on to the market, thereby dampening any brewing price spike.

The second reason rests in the geographical diversity of mine production and gold reserves. These are much more diverse globally than other commodities, leaving gold less vulnerable to regional or country-specific shocks. Contrast this with oil, for example, where the price will often be aggressively driven by economic or political events in the Middle East, Eurasia, and Africa—regions where geopolitical risk is usually comparatively high. Similar examples can be found in metals: close to 50% of palladium's production comes from Russia, and 78% of platinum's production comes from South Africa.

Gold has, in fact, been slightly less volatile than major stock market indices such as the S&P 500 over the past 20 years. The average daily volatility from July 1989 to June 2009 for gold was 15.8% per annum compared to 18.4% annual volatility for the S&P 500 over the same period. Even if 2008 and 2009 are excluded from the equation, given the unusually high levels of volatility experienced by most assets during that time (the average daily volatility of the S&P 500 jumped to 41% in 2008, while gold's average daily volatility rose to 31.6%), the S&P 500 was still 10% more volatile than gold on average.

Chart 3

**2008 world gold mining and crude oil production by region
(% of total production)**

Source: GFMS, Energy Information Administration

Chart 4

Gold and S&P 500 22-day average daily volatility (annualized)

Source: Bloomberg, World Gold Council

The investment case for gold

Many investors have bought gold as a tactical asset in recent years in order to capitalize on the positive price outlook associated with strong demand and tight supply in the industry. But gold also has a role to play as a strategic asset, thanks to the diversification benefits it can bring to a portfolio, its effectiveness as a store of value against inflation and dollar depreciation, and its behavior as a safe-haven in times of financial or geopolitical duress.

Gold as a portfolio diversifier

One of the most compelling reasons to invest in gold is to help diversify a portfolio. Portfolio diversification is one of the cornerstones of modern finance theory. Put simply, it argues that investors should hold a range of assets in their portfolio that are diversely correlated to lower the risk while enhancing returns. Different assets perform well under different macroeconomic, financial and geopolitical conditions. For example, a sharp slowdown in world growth is likely to hurt commodity prices and cyclical stocks, but boost returns on government bonds. High inflation years will often coincide with sharp rises in commodities prices, but poor gains in equity and stock indices. Diversification reduces the likelihood of substantial losses arising from a change in macroeconomic conditions that are particularly damaging for one asset class, or a group of asset classes that behave in a similar fashion.

Table 1

Performance of key financial asset classes and macroeconomic indicators

Asset	1H 2009	2008	2007	2006	Average 2001-2005	Average 1991-2000
3-month T-bill	1.1%	4.1%	5.7%	5.2%	2.6%	4.9%
US Treasurys	-4.6%	14.7%	9.7%	3.3%	5.8%	7.4%
US Corporate bonds	8.9%	-5.3%	4.9%	4.6%	7.7%	7.6%
US High yield	35.8%	-29.4%	2.1%	13.6%	10.6%	9.9%
EM Sovereign debt	14.6%	-10.9%	6.3%	9.9%	12.3%	11.7%
S&P 500	3.2%	-37.0%	5.5%	15.8%	0.5%	14.4%
MSCI World ex US	9.8%	-43.2%	12.9%	26.2%	5.3%	7.4%
MSCI Emerging markets	36.2%	-53.2%	39.8%	32.6%	19.4%	3.3%
REITs	-11.7%	-37.7%	-17.9%	33.9%	18.1%	
S&P GS Commodity index	6.6%	-46.5%	32.7%	-15.1%	9.8%	6.1%
Gold (spot)	5.1%	5.8%	31.0%	23.2%	13.7%	-2.6%
Real GDP growth (saar)	-3.8%	-1.9%	2.5%	2.4%	2.4%	3.5%
CPI inflation (saar)	2.7%	-0.1%	4.2%	2.5%	2.6%	2.4%

Note: All returns are based on total indices unless otherwise noted

Source: Bloomberg, Barclays, JP Morgan, World Gold Council

Because changes in the price of gold do not correlate with changes in the price of other mainstream financial assets, the yellow metal fulfils this investment criterion. Importantly, it is a relationship that holds across markets and over time. The correlation coefficients between gold and a range of US assets are shown in the chart below. Over the past ten years, the average correlation of gold with US equities and short term cash bonds has been close to zero, while the correlation of gold to government and corporate bonds, world equities and REITs has ranged between 10% to 30%. Gold price changes do not correlate strongly with most commodities either. For example, the correlation of gold to two major commodity indices: the S&P Goldman Sachs Commodity Index (a production-weighted index) and the Dow Jones AIG Commodity Index (a liquidity and production-weighted index) is 31% and 53% respectively. The difference arises from the fact that the S&P GSCI is skewed towards energy while the DJ AIG commodity index has a more diverse set of weights. Out of the 20 major commodities that generally comprise the indices, all but silver had a correlation with gold lower than 50%, ranging between -10% and 46%.

Chart 5

10-year correlation of monthly returns on key asset classes versus gold (USD); Aug 99 - Jul 09

Source: Bloomberg, Barclays, JP Morgan, World Gold Council

Chart 6

10-year correlation of monthly returns on selected commodities versus gold (USD); Aug '99 - Jul '09

Source: Bloomberg, World Gold Council

It is also worth noting that, contrary to popular belief, there is no stable correlation between gold and oil prices; at times the price of the two commodities move in the same direction, but at other times they do not.

Gold's lack of correlation with other assets is a function of the unique drivers of demand and supply, which, as for any freely traded good, ultimately determine price movements. Demand for gold comes from three sectors: jewelry, industry and investment; while supply comes from newly mined gold, official sector sales and the recycling of above ground stocks. The three sources of demand and three sources of supply are, in turn, affected by a very wide range of factors, discussed in more detail in the Demand and Supply sections. Some factors, such as inflation and currency movements,

Chart 7

**Rolling 2-year correlation between monthly changes in the price of gold (US\$/oz) and oil (WTI, US\$/bbl);
May 85 - Jul 09)**

Source: Bloomberg, World Gold Council

are tied to developments elsewhere in financial markets, but many more are peculiar to the gold market, underpinning the yellow metal's lack of correlation to other assets year after year. These include fashion trends, marketing campaigns, the Indian wedding season, religious festivals, gold mine exploration spending, new discoveries of gold, the cost of finding and mining gold and central banks' strategic reserve decisions.

18

Gold as an inflation hedge

Gold's history as an inflation hedge spans centuries. It was perhaps best chronicled by Roy Jastram in his seminal book *The Golden Constant*, originally published in 1977. Jastram, then professor of Business Administration at the University of California at Berkeley, found that over the centuries and in different countries, gold's purchasing power, while fluctuating, has returned to a broadly constant level. A new edition of the book was published in June 2009, with two additional chapters by Jill Leyland, formerly Economic Adviser to the World Gold Council, to bring it up to date.

More recent data show that gold has continued to hold its value versus the dollar. Between the end of 1973 (at which point the price of gold had been freed in both private and official markets) and June 2009, the gold price increased from US\$106.72/oz to US\$926.60/oz, a rise of 768%. Adjusting for the cumulative rise in US consumer price inflation over the same period, gold rose by 87%, which equates to an annualized real return of 1.8%.

Chart 8

Gold (US\$/oz, end of period) and real gold price (Jan 1974 = 100)

Source: Global Insight, World Gold Council

A cursory glance at changes in the gold price and changes in the US consumer price index shows an intuitive relationship between the two, with peaks in the gold price tending to lead peaks in the CPI.

Observing gold's performance in high inflation years compared with moderate and low inflation years also helps to underline the relationship. Between 1974 and 2008, US consumer price inflation exceeded 5%, which we define as a high inflation year, in 8 years; the CPI ranged between 2% and 4.9% (defined as a moderate inflation year) in 21 years; and inflation was low (below 2%) in 6 years. Whereas in the low and moderate inflation years gold only posted mildly positive real returns, in the high inflation years gold rose by an average of 14.9% in real terms. There are two main reasons why gold acts as an inflation hedge. First, gold has a long history as a monetary asset, but unlike other currencies its value cannot be de-based by governments or central banks. Throughout history, governments have repeatedly switched

Chart 9

Annual change in the gold price (US\$/oz) and US CPI; 2-year moving average, % year-on-year; 1973-2008

Source: Bloomberg, World Gold Council

Chart 10

Real change in the gold price (US\$/oz), during high, moderate and low inflation years (1974-2008)

Source: Bloomberg, World Gold Council

on the printing presses to finance expenditure programs, often leading to rampant inflation. More recently, concern over the amount of money pumped into the economy during the 2007/2008 financial crisis led to a strong increase in investors' interest in gold as a store of value in early 2009 when the world economy started to show signs of recovery. Second, commodities are often the root cause of inflation, with increases in the price of fuels, metals and other raw materials used in the production process passed from producers to consumers, creating what economists term cost-push inflation. Mining gold is a resource intensive business, with many commodities, such as energy, cement and rubber, used in the exploration, extraction and production process. As a result, a rise in commodity prices puts direct pressure on the cost of extracting gold, which in turn puts a higher floor underneath the gold price.

Gold as a dollar hedge

Gold has historically exhibited a strong inverse relationship to the dollar or, further back in history, whatever global currency was dominant at the time. Over the past ten years, the correlation of weekly returns between gold and the trade-weighted dollar has ranged from -0.3 to -0.8. The correlation coefficient in 2008 and in the first half of 2009, on a 52-week rolling basis, was -0.5. This relationship makes gold an effective hedge against dollar weakness and has been a key influence in driving up the gold price in recent years, which have been characterized by a sharp depreciation in the dollar and expectations of further dollar weakness due to the record US budget deficit.

There are strong reasons why gold tends to move in an opposite direction to the US dollar. First, gold is priced in dollars and, everything else being equal, weakness in the currency in which a real asset is denominated tends to lead to an increase in its price, as sellers demand compensation for the currency loss. Second, gold's history as a monetary asset makes it an attractive store of value in periods of high inflation or rising inflation expectations,

Chart 11

Gold and the trade weighted dollar, correlation coefficient

* 52-week rolling average

Source: Bloomberg, World Gold Council

22

The investment case for gold driven by excessive money supply growth, which undermines fiat currencies. Third, the depreciation in the dollar (appreciation in other currencies) reduces gold's price to buyers outside of the dollar bloc, increasing demand and putting upward pressure on the price. Finally, a depreciation in the dollar increases the costs of extracting gold overseas and often the price of other commodities used in the extraction and production process, thus putting a higher floor underneath the gold price.

Gold as a safe-haven asset

Gold has a long history as a safe-haven asset. During periods of geopolitical or financial market uncertainty, investors have tended to increase their purchases of gold and gold-related instruments. The 2008 financial crisis is a good case in point, as gold rose 4.3%, based on the London PM fix, in a year marked by contractions in nearly all financial markets except government bonds. However, gold's history as the asset of last resort goes back far further. In his classic book *The Golden Constant*, Roy Jastram describes what he calls the *Attila Effect*, or the tendency of people of all types to gravitate towards gold in times of social, political and economic distress. Examples are plenty, but given that the price of gold was not free floating until the 1970s, we will focus on modern history.

While gold should not be regarded as a panacea, given that the price performance depends on many factors, one can still find a positive relationship between gold and economic or financial crises. Perhaps the best example of the value of gold in the mind of investors lies in the recent crisis. The gold price rose for the eighth consecutive year in 2008 amid one of the most tumultuous years in financial markets since the Great Depression. The price reached a new record high in the first quarter of the year, of US\$1011.25/oz, on the London PM fix, on March 17, following the safe-haven inflows in the run up to the Bear Stearns crisis and subsequent takeover by JP Morgan with backing of the US Treasury. The gold price subsequently pulled back, but spiked up several times later in the year as it emerged that the Treasury would have to bailout mortgage giants Freddie Mac and Fannie Mae, and come to the rescue, along with the Federal Reserve, of the US financial system as a whole.

Chart 12

Performance of gold (LHS, \$US/oz) and S&P 500 index (RHS, level) during the 2008 financial crisis

Source: Bloomberg, World Gold Council

Lehman Brothers' collapse in the fall of 2008 prompted investors to buy an unprecedented 111 tonnes of gold ETFs in five consecutive days, bringing total inflows in gold ETFs in Q3 to 150 tonnes. However, the impact of strong investor inflows into gold ETFs, coupled with strong buying of physical gold, was offset to a significant extent by disinvestment by institutional investors who, in the absence of having anything else to sell and with money markets essentially shut, used gold as an asset of last resort, selling it to raise much-needed cash in order to meet margin calls on other assets. Nevertheless, gold ended 2008 with a 4.3% return compared with a drop of 43% in commodity markets (as measured by the S&P Goldman Sachs Commodity Index), and a 37%, 43%, and 53% fall, respectively, in US, developed and emerging equity markets.

24

The investment case for gold

There are valid reasons why investors buy gold during such periods. Gold is unique in that it does not carry credit risk. Gold is not one's liability. There is no risk that a coupon or a redemption payment will not be made as for a bond; or that a company will go out of business as for an equity. And unlike a currency, the value of gold cannot be affected by the economic policies of the issuing country or undermined by inflation in that country. At the same time, 24-hour trading, a wide range of buyers from the jewelry sector to financial institutions to manufacturers of industrial products and the wide range of investment channels available, including coins and bars, jewelry, futures and options, exchange-traded funds, certificates and structured products, make liquidity risk very low.

Demand

Gold demand comes from three sources: jewelry, industry (including medical applications), and investment. In the five years to 2008, the annual demand for gold was, on average, 3,599 tonnes. The primary source of demand comes from jewelry, which has accounted for 68% of the total demand over the past five years, followed by investment demand which has accounted for a further 20% and industry which accounts for the remaining 12%. Looking at 2008 in isolation shows a notably different picture, with investment's share of demand increasing to 25%, at the expense of jewelry demand, which declined to 62%. Industrial demand was unchanged at 12%.

Chart 13

Demand flow 5-year average (2004-2008)

Source: GFMS, World Gold Council

27

Jewelry

Jewelry demand is affected by desirability, income levels, price and price volatility, as well as a variety of socio-economic and cultural influences. Over 53% of jewelry demand has come from four countries – China, India, Turkey and the USA – over the past five years. Each market is driven by a different set of socio-economic and cultural factors. India, which typically buys a quarter of the world's gold each year, is a good case in point. Here, demand for gold is firmly embedded in cultural and religious traditions. The country has one of the most deeply religious societies in the world, the most widespread faith being Hinduism, which is practiced by around 80% of the population. Gold is seen as a symbol of wealth and prosperity in the Hindu religion. Hindus consider gold an auspicious metal, offered as a symbolically significant gift during religious festivals. The most important of these is Diwali, which marks the beginning of the Hindu New Year and usually takes place in October or November. Gold also plays an important role in the marriage ceremony, where brides are often adorned from head to toe in gold jewelry. Most of this will be a gift from the bride's parents as a way of providing her with some inheritance, as Hindu tradition dictates that the family's assets are only passed down to sons. Much of this demand takes place during the wedding season, which falls between October and January and April and May, though a good many purchases will be made well in advance of the wedding, often years in advance and perhaps even from birth.

These Indian events are one reason why demand for jewelry is seasonal, but there are other important reasons. Christmas, for instance, and other end-of-year festivals are also significant gold-buying occasions around the globe. The long holidays around 1st May (Labor Day), National Day and Chinese New Year in China are also occasions associated with the purchase of gold jewelry. Q4 is generally the strongest quarter thanks to Diwali, the most important Hindu festival, the main India wedding season and Christmas. Significant events in Q1 are the Chinese New Year, the end of the Indian wedding season and, to a lesser extent, Valentine's Day. The start of the second quarter sees additional wedding seasons in parts of India, while May brings the Akshaya Trithya festival in

Chart 14

5-year average jewelry demand by region (2004-2008)

Source: GFMS, World Gold Council

India. Tourist demand is at its peak in Turkey in the third quarter. In contrast, the third quarter sees the Shradh a fortnight whose religious significance is not propitious for gold buying by Hindus.

Many of gold's key jewelry-buying markets have experienced rapid GDP growth over the past decade, India and China being the best examples. This has led to a sharp increase in households' disposable income levels and has pushed a growing number of households from low-income to middle and high-incomes. The retail sectors in these countries have been revolutionized as a result and gold has been one of the many luxury consumer goods to benefit. In effect, rising income levels have put a higher floor underneath the gold price than in the past.

In 2008 and the first half of 2009, jewelry demand slowed sharply as the world economy experienced its worst recession since the Great Depression. Consumers, facing rising unemployment and falling house and stock prices, concentrated spending on essential

goods, at the expense of non-essentials such as jewelry. At the same time, the gold price reached record levels in key jewelry buying markets, largely due to weakness in their respective currencies. While a rising gold price is not always negative for jewelry demand, as jewelry is often bought with the dual purpose of adornment and investment, in this instance, when combined with a sharp slowdown in growth (and outright contraction in some countries) and unusually high price volatility, it contributed to a notable downturn in the jewelry market.

Consumers and the jewelry trade do not like price volatility. It makes them reluctant to buy gold, for fear that they might find they can purchase it cheaper at a later date. They are therefore inclined to at least wait for prices to stabilize. This is especially true of markets like India and the Middle East, where jewelry is priced according to the prevailing market rate with only a very small mark up (1% to 2%). This makes changes in the market price of gold visible very quickly at the retail level, thereby having a direct impact in the jewelry market.

The triple whammy of the global recession, record local currency gold prices and abnormally high price volatility saw jewelry demand contract by 9% in 2008 and 22% in the first half of 2009.

30

Investment demand

Investment accounted for 20% of total demand over the past five years, or 717 tonnes per annum on average, making it the second largest element of demand. In World Gold Council's Gold Demand Trends, where readers can monitor demand and supply flows on a quarterly basis, investment is divided into identifiable and inferred investment. Identifiable investment is made up of retail investment in coins, bars, medals and imitation coins, and ETFs (exchange traded funds) and related products. Inferred investment is the balancing item between the supply and demand figures. While this category is partly an error term, its more important role is to capture the less visible part of investment demand.

Since the beginning of the decade, total investment demand has soared from only 4% of overall gold demand in 2000 to a record 25% in 2008. From 2003 to 2007, the increase in investment was driven mainly by an increase in demand for ETF and related products, as the launch of these new gold-backed products around the world released pent-up demand. In 2008, as demand

Chart 15**Identifiable investment demand (tonnes)**

Source: GFMS

for safe-haven investments soared as the world's financial markets went into meltdown, both retail demand for coins and bars and ETF demand increased sharply.

Although some of the safe haven inflows may diminish as the global economy recovers and investors' risk appetite improves, there are good reasons to expect investment demand to remain strong. First, if investors have learnt anything from the 2007/08 financial crisis it is an understanding of risk and diversification, which is likely to support the case for gold as a safe haven against future event risks. More broadly, they have come to recognize the importance of gold as a diversifying asset regardless of the state of the financial sector or wider economy. Gold has been one of the few assets to deliver on its diversification promise, in contrast to so many other assets where the correlations with equities tended to 1. Second, gold has a long history as a store of value against inflation and dollar depreciation; many investors are of the view that both are on the cards. Finally, the demand and supply dynamics in the gold industry remain positive, supporting tactical allocations: the strength of investment demand should continue to offset much of the weakness in the jewelry and industrial sectors, where demand should improve as the world economy recovers. On the supply side, mine production remains relatively flat and central banks have turned from being large net sellers of gold to small net buyers, according to preliminary data.

Industrial demand

Industrial and dental uses account for around 12% of gold demand, or an annual average of 441 tonnes from 2004 to 2008, inclusive. Over half of the gold used in technical applications goes into electronic components thanks to gold's high thermal and electrical conductivity and its outstanding resistance to corrosion. The share of electronics in total gold demand has grown over the past decade but it also fluctuates according to global GDP and the fortunes of the electronics industry. Most manufacturing of electronic components containing gold occurs in North America, Western Europe or East Asia.

Gold's medical use has a long history; its bio-compatibility, resistance to bacterial colonization and to corrosion, as well as its malleability mean that it can be used successfully inside the human body. Today's various biomedical applications include the use of gold wires in pacemakers, implants for the eye and inner ear, as well as gold seeds in the treatment of prostate cancer. Its best-known and most widespread use, however, is in dentistry. Dental use currently accounts for about 1.7% of gold demand on average for the past 5 years, a share which is gradually declining.

Gold is also used in a number of other industrial and decorative purposes such as gold plating and coating and in gold thread (used in saris in India). Various techniques are employed to enable gold to be used in decorative finishes. Other applications take advantage of gold's reflectivity of heat and other useful optical properties. Overall these uses of gold account for 2-3% of total demand.

New uses of gold

Research over the last decade has uncovered a number of possible new practical uses for gold, some of which appear to have substantial potential in increasing the industrial use of the metal. This includes the use of gold as a catalyst in fuel cells, chemical processing and controlling pollution. A number of companies are known to be developing industrial catalysts based on gold and this could lead to important new demand for the metal, not least in the automotive industry, which currently consumes large quantities of other precious metals like platinum (but not gold). In the rapidly developing field of nanotechnology there are many possible applications, including the use of gold in solar cells, improved LCD displays using gold nanorods, for example, in mobile phones and laptops, as well as the development of new technologies to store terabytes of data on a single disc or flash memory device.

Supply

The annual supply of gold comes from a combination of newly mined gold, the mobilization of central bank reserves and the recycling of above ground stocks. In the five years to 2008, the annual supply of gold averaged 3,599 tonnes, 59% of which came from newly mined production (net of producer de-hedging), 13% from net official sector sales and 28% from the recycling of fabricated products, principally jewelry.

Chart 16

Supply flows five-year average (2004-2008)

Source: GFMS, World Gold Council

Mine production

Gold is mined on every continent with the exception of Antarctica (where mining is forbidden), in operations ranging from the tiny to the enormous. The dominant producing country for much of the 20th century was South Africa, which in the early 1970s was producing 1,000 tonnes per annum, or over 70% of the world total at that time. This position has been eroded in the past two decades and today mine production is much more geographically diverse. This helps to underpin gold's lower price volatility compared with other commodities, such as oil, as it has reduced the metal's vulnerability

to any economic, political or physical shock in a specific country or region. China is currently the world's largest producer of gold, mining 292 tonnes of the yellow metal in 2008, followed by the United States and South Africa, which produced 234.5 and 233.3 tonnes, respectively.

The supply of gold from the mining sector has been declining since 2001, due partly to the considerable cutbacks in exploration spending that accompanied the low gold price in the late 1990s and the consequent dearth of major new discoveries that followed, and partly to declining ore grades and production disruptions. The supply of gold coming from the mining sector has been reduced even further over the past five years by the widespread practice of de-hedging, with producers closing out hedge positions (forward fixed price arrangements) taken out in earlier years. Although exploration spending started to pick up in earnest from 2003, thanks to the higher gold price, the industry has had only limited success in finding major new deposits of gold. Metals

Chart 17

Top 10 Gold producing countries in 2008 (tonnes)

Source: GFMS

Economics Group cites no major discoveries of gold in their 2008 report, *Strategies for Gold Reserve Replacement*, and only one in 2007. On a three-year average basis, gold contained in major new discoveries declined to 426 tonnes in 2008 compared with 3,948 tonnes ten years ago. In addition, lead times in the industry are typically very long, which means that it can take years for a new discovery to translate into higher gold supply.

Despite these challenges, the major gold producers have been able to replace their reserves through a combination of acquisitions, finding additional resources at existing mines and upgrading resources to reserves thanks to the higher gold price.

Operating costs

Mining gold is an expensive business. Before mining can even begin, the gold must be found using costly exploration techniques, or gold deposits must be acquired from a third party. A mine must then be built, as well as possibly an entire infrastructure, depending on the location of the mine. Gold-bearing ore is then dug from the

Chart 18

Mine production (tonnes)

Source: GFMS

Chart 19

Gold in major discoveries and gold exploration budgets by year

Source: Metal Economic Group's Strategies for Gold Reserve Replacement

surface or extracted from the rock face underground. It is then brought to the surface, where necessary, and crushed or milled, then concentrated in order to separate out the coarser gold and heavy mineral particles from the remaining parts of the ore. Gold is removed from the concentrate by a number of processes and then smelted into gold-rich doré (a mix of gold and silver) and cast into bars. Dore bars are then sent to an external refinery to be refined to bars of pure (999.9 parts per thousand) gold.

On top of all this, the mine facility needs to be maintained and overhead, administrative and marketing costs must be met. The cost of all this varies greatly from mine to mine and depends on a whole host of factors, including: the country of origin, the cost of labor, the nature and distribution of the ore body, the ore grades, and such issues as the need to build infrastructure and local political instability, which can lead to costly delays.

Costs are generally quoted cash or total. Cash costs include all the regular working costs of the mine, while total costs include

38

additional charges such as depreciation. Cash and total costs have escalated sharply in recent years, fuelled by inflationary pressures from rising labor costs, the higher price of energy and other raw materials used in the production process, such as rubber and steel, and the depreciation in the dollar which has increased local currency costs in mines located outside of the dollar bloc. Cash costs rose to US\$467/oz in 2008 from US\$176/oz in 2001, while total costs rose to US\$585/oz from US\$228/oz over the same period.

But even total costs do not fully encompass the cost of finding and mining gold. They do not, for instance, include exploration spending that ultimately proves unsuccessful. Metals Economics Group estimates that, when these costs are included, the all-inclusive cost of replacing and producing an ounce of gold was even higher in 2008, at US\$655/oz. The rise in production costs has contributed to putting a higher floor underneath the gold price in recent years.

Chart 20

**Total cost of replacing and producing an ounce of gold,
1999-2008, (US\$/oz)**

Source: Metals Economics Group

Supply from above ground stocks

Because gold is virtually indestructible, practically all of the gold that has ever been mined still exists. Of the 163,000 tonnes of above ground stocks currently estimated to be in existence, GFMS calculates that 51% is held in the form of jewelry, 18% is in the hands of the official sector, 17% is with investors, 12% is contained within industrial products and 2% is unaccounted for. Some of this gold periodically comes back onto the market, principally from the jewelry and official sectors.

Chart 21

Above ground stock, end 2008 = 163,000 tonnes

Source: GFMS

Official sector

Central banks and supranational organizations have been major holders of gold for more than 100 years. Central banks started building up their stocks of gold from the 1880s, during the period of the classic gold standard, when the amount of money in circulation was linked to the country's gold stock, and paper money was convertible to gold at a fixed price. At their peak in the 1960s, official gold reserves were around 38,000 tonnes and

40

probably accounted for about half of above ground stocks at that time. Gradually, as central banks created more money than was consistent with stable prices and after several years of moderate, but persistent inflation, the maintenance of the official price of gold became unrealistic, and the United States, as the pivot of the system, was faced with the choice of deflating, devaluing or abandoning the system. In August 1971, it abandoned the system, with President Nixon closing the gold window .

In the 1980s and 1990s, central banks began to re-appraise the role of gold in their external reserves. Some central banks decided to reduce their gold holdings and the total of official stocks declined by about 10% between 1980 and 1999. In September 1999, a group of European central banks agreed, in the first Central Bank Gold Agreement (CBGA1) to limit disposals to 400 tonnes a year for five years, and also set a ceiling on the volume of gold lent to the market. They also reaffirmed their confidence in the future of gold as a reserve asset. CBGA1 proved very successful and was renewed (CBGA2) for a further five year term in September 2004, this time setting the annual ceiling at 500 tonnes. Signatories sold the full quota in the first three years of the agreement, but significantly undersold the ceiling in the final two years. In the penultimate year of the agreement, signatories sold 358 tonnes of gold and, with just one month to go at the time of writing, 140 tonnes to date in the final year. A third five-year CBGA agreement was announced on August 7, 2009, reducing the annual ceiling to 400 tonnes, in a clear acknowledgement that central banks' appetite for gold sales had diminished. At the same time, the signatories reiterated the importance of gold as an element of global monetary reserves and said that the planned 403 tonnes of IMF sales could also be accommodated within the agreement.

Many other central banks around the world hold either no gold or a very small percentage of their total reserve in gold. However, this is starting to change. Most noteworthy in 2008 was the announcement by China's State Administration of Foreign Exchange (SAFE) that the country's official reserves had grown to 1,054 tonnes from 600 tonnes. This makes China the world's sixth largest official holder of

Chart 22

Central bank sales under CBGA2 (tonnes)

Source: World Gold Council

gold, after the United States, Germany, the IMF, Italy and France. Yet the yellow metal still accounts for less than 2% of the country's huge reserves, meaning there is ample scope for further growth, as is the case in the rest of Asia. The International Monetary Fund's International Financial Statistics, in which nearly all central banks report their gold holdings, also reported a notable increase in Russia's gold reserves in 2008 and the first half of 2009, taking the country's gold reserves to 536.9 tonnes in June 2009, or 4% of total reserves.

42

Recycled gold

The remaining supply of gold comes from recycled fabricated products, mainly from the jewelry sector. Smaller amounts come from gold recuperated from the electronics sector. The supply of recycled gold depends largely on economic circumstances and the behavior of the gold price. In the five years to 2008, recycled gold fluctuated between 878 tonnes and 1215 tonnes per annum. It is common practice in the Middle East and Asia for gold items to be sold if the owner needs ready cash. Gold owners often also trade in one piece of jewelry for another and the original piece is then melted down (if it is simply resold, it is not included as recycled gold in the statistics). The 2007-2009 financial crisis was an example where the supply of gold from fabricated products reached a record quarterly high of 558 tonnes in Q1 2009, driven by distress selling as the world economy entered its worst recession since the Great Depression.

Chart 23

Recycled gold (tonnes)

Source: GFMS

Ways to access the gold market

The gold market is deep and liquid and there are many ways for investors to buy physical gold or gain an exposure to movements in the gold price.

Gold coins

Investors can choose from a wide range of gold bullion coins issued by governments across the world. These coins are legal tender in their country of issue for their face value rather than for their gold content. For investment purposes, the market value of bullion coins is determined by the value of their fine gold content, plus a premium or mark-up that varies between coins and dealers.

Coins vary in weight and in karatage. Karatage is a measure of gold content. Pure gold (fine gold) is 24 karats, hence 24 karats is theoretically 100% gold. Any karat content lower than 24 is a measure of how much gold there is, for example, 18 karat is 18/24ths of 100% gold = 75.0% gold. The most common coin weights (in troy ounces of fine gold content) are 1/20, 1/10, 1/4, 1/2 and 1 ounce.

It is important not to confuse bullion coins with commemorative or numismatic coins, whose value depends on their rarity, design and finish rather than on their fine gold content. Many mints and dealers sell both.

The US Mint offers a variety of bullion and commemorative coins, listed on their website at www.usmint.gov. The most widely traded coins in the US are American Eagle Coins. American Eagles use 22 karat gold and are produced from gold mined in the United States. Their weight, content and purity are guaranteed by the United States Government. The US Mint does not sell American Eagle, or other bullion coins, direct to the public, but instead uses a network of wholesalers, brokerage companies, precious metals firms, coins dealers and banks; a network known as Authorized Purchasers. A collectible version of the American Eagle Gold Bullion Coin is available directly from the United States Mint. The Mint also offers a 24k bullion coin the American Buffalo via the same Authorized Purchaser channel.

Gold bars

Gold bars can also be bought in a variety of weights and sizes, ranging from as little as one gram to 400 troy ounces (the size of the internationally traded London Good Delivery bar). Small bars are defined as those weighing 1000g or less. Bars are typically marked with the name of the manufacturer or issuer, a serial number, the purity of the bar and, at times, the weight. Bars are manufactured in different purities, usually ranging between 995 and 999.9 parts gold in 1000. The most widely traded small bars are one 1 kilo bars and the most widely traded large bars are London Good Delivery 400 oz bars. These bars must meet stringent conditions set by the London Bullion Market Association (LBMA), including being of a weight between 350 oz and 430oz and being not less than 995 parts gold in 1000. The Gold Bars Worldwide website (www.goldbarsworldwide.com) provides a wealth of additional information regarding the international gold bar market.

A list of coin and bar dealers in the US can be found on the Where to Buy section of the World Gold Council website, at http://www.invest.gold.org/sites/en/where_to_invest.

Gold exchange traded funds

Gold exchange traded funds (ETFs) offer investors the convenience of buying gold on the stock exchange as easily as they would any other share. There are several gold ETFs listed on stock exchanges around the globe. The largest ETF in the United States is SPDR® Gold Shares or GLD (its ticker symbol) as it is often known, a joint initiative between World Gold Council and State Street Global Advisors. GLD was originally listed on the New York Stock Exchange in November of 2004 and has traded on the NYSE's Arca platform since December 13, 2007. GLD shares are 100% backed by physical gold bullion, all of which is held in the form of London Good Delivery 400 oz bars in allocated accounts. Investors in GLD cannot take physical delivery of the gold, rather it is held by a custodian on their behalf. The shares track the spot price of gold, less the administration fees. At the beginning of August 2009, the

Ways to access the gold market

fund held a total of 1,072 tonnes of London Good Delivery Bars, worth around US\$33 billion. The World Gold Council backed ETFs, such as GLD, never engage in derivative transactions. For more information, see www.spdrgoldshares.com.

Gold accounts

Bullion banks offer gold accounts. In an allocated gold account, gold is stored in a vault owned and managed by a recognized bullion dealer or depository. Specific bars (or coins, where appropriate), which are numbered and identified by hallmark, weight and fineness, are allocated to each particular investor, who pays the custodian for storage and insurance. The holder of gold in an allocated account has full ownership of the gold in the account, and the bullion dealer or depository that owns the vault where the gold is stored may not trade, lease or lend the bars except on the specific instructions of the account holder.

In an unallocated account investors do not have specific bars allotted to them (unless they take delivery of their gold, which they can usually do within two working days). Unallocated accounts are cheaper than allocated accounts as the bank reserves the right to lease the gold to a third party. As a general rule, bullion banks do not deal in quantities of below 1000 ounces in either type of account. Their customers are institutional investors, private banks acting on behalf of their clients, central banks and gold market participants wishing to buy or borrow large quantities of gold.

Gold futures and options

Gold futures contracts are firm commitments to make or take delivery of a specified quantity and purity of gold on a prescribed date at an agreed price. The initial margin or cash deposit paid to the broker is only a fraction of the price of the gold underlying the contract. Consequently, investors can achieve notional ownership of a value of gold considerably greater than their initial cash outlay. While this leverage can be the key to significant trading profits, it can give rise to equally significant losses in the event of an adverse movement in the gold price.

Futures contracts are traded on regulated commodity exchanges around the world. In the United States, investors can trade gold in 100 oz or 50 oz (miniFutures) lots on the New York Mercantile Exchange's COMEX division. If the buyer takes physical delivery of the gold, then the seller must deliver 100 ounces of refined gold per contract, assaying not less than 995 parts, cast either in one 100 oz bar or three 1 kilo bars, bearing a serial number and identifying stamp of a refiner approved by the exchange. In practice, however, most contracts are rolled over or settled financially. COMEX also offers investors options on its gold futures. These give the holder the right, but not the obligation, to buy (call option) or sell (put option) a specified quantity of COMEX gold futures at a predetermined price by an agreed date. Like futures contracts, buying gold options can give the holder substantial leverage. COMEX options are American-style , meaning they can be exercised at any time up to expiration.

The over-the-counter market

The OTC market offers investors a further range of gold products, including spot and forward contracts and tailor-made structured products. However, because the entry level is typically high, this market is dominated by institutional players or ultra-high net worth individuals. Investors wishing to use this channel should contact a bullion bank.

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Gold coins and bars are classified as collectibles for tax purposes. In retirement funds, the amount invested in collectibles is usually considered to be distributed to you in the year the investment takes place, meaning investors may have to pay an additional 10% tax. However, there are exceptions. This tax does not apply to precious metal bullion investment products, which are defined as coins or bars meeting minimum exchange purity requirements for contract delivery (i.e. 99.5% purity for gold). All investment grade bullion is eligible for inclusion in 401(K)s and Individual Retirement Accounts (IRAs). The same applies to SPDR Gold Shares, as the Internal Revenue Service treats the purchase of the shares as an investment in the underlying asset, which are solely London Good Delivery gold bars.

For long-term capital gains purposes, investments in the same gold coins and bars are not exempt from the collectibles category, nor are SPDR Gold Shares, and are subject to the maximum capital gain rate of 28%. There is, therefore, an anomaly in the way the IRS treats these gold coins and bars and SPDR Gold Shares for retirement purposes and for capital gains purposes. Legislation seeking to amend this, the Fair Treatment for Precious Metals Investors Act, has been introduced in Congress. If successful, the bill will also exempt these coins and bars and SPDR Gold Shares from the collectibles category for long-term capital gains purposes, meaning they will be taxed at the same rate as investments in stocks and mutual funds, which is currently 15%.

Related World Gold Council research

The following research reports can be downloaded from the World Gold Council's website at:

<http://www.research.gold.org/research/>

Gold Investment Digest, Quarterly, by Natalie Dempster, Juan Carlos Artigas and John Mulligan

Gold Demand Trends, Quarterly, by Rozanna Wozniak and Louise Street

Gold as a Tactical Inflation hedge and Long-term Strategic Asset, by Natalie Dempster and Juan Carlos Artigas.

Investing in Commodities – Benefits, Risks and Implementation: A Case Study on Missouri State Employees

Retirement System, by Natalie Dempster

Is Gold a Volatile Asset? By Rozanna Wozniak

What does a US recession imply for the Gold Price? by Natalie Dempster

Investing in Gold: The Strategic Case, by Natalie Dempster *Gold as a Safe Haven*, by Rhona O'Connell *Commodity*

Prices and the Influence of the US Dollar, by Nikos Kavalis.

Unit Convention

Troy ounce = 31.103 grams

Tonne = 32,151 troy ounces

Kilogram = 32.1507 troy ounces

Karat = gold purity in parts per 24

Glossary

Account allocated An account in which the client's metal is individually identified as his, and physically segregated from all the other gold in the vault; in the event of a default by the holding bank, the investor becomes a secured creditor.

Account unallocated An account in which the client's bars are not specifically ring-fenced, and which may be cheaper than an allocated account as some banks do not charge for storage. The client carries higher counterparty risk, however, as he is an unsecured creditor in the event of a default by the holding bank.

American Option An option that may be exercised on any date up to and including the expiry date.

Bar A typical gold product, either for trading or accumulation. Bars come in a variety of shapes, weights and purities. Different bars are favored in different parts of the world.

Bull run A period of rising prices for a financial asset

Bullion Metal in the mass, usually uncoined gold in bars or ingots (from the Old French *boillion* meaning froth on boiling liquid)

Bullion coin A legal tender coin whose market price depends on its gold content, rather than its rarity or face value.

Certificate Gold certificates are a method of holding gold without taking delivery. Issued by individual banks they confirm and individual's ownership while the bank holds the metal on the client's behalf. The client thus saves on storage and personal security issues, and gains liquidity in terms of being able to sell portions of the holdings (if need be) by simply telephoning the custodian.

COMEX The New York Commodity Exchange, now a division of NYMEX, the New York Mercantile Exchange. The contracts in COMEX gold market consists of 100 ounces each, and the actively traded contracts are the even months of the year.

Delivery The transfer of an asset from the seller to the buyer. This does not necessarily involve physical shipment but can be done on paper with the bullion remaining in the vaults of a specified bank.

Doré A gold-silver alloy, an intermediate product from certain gold mines.

Face Value The nominal value given to a legal tender coin or currency (for example a 1oz Gold American Eagle coin has a face value of \$50, but will always be bought close to the market price for a 1oz of gold).

Related World Gold Council research

Fineness Gold purity, usually expressed in parts per thousand; thus 995 or two nines five is 995/1000 or 99.5% pure. 995 was the highest purity to which gold could be manufactured when good delivery (q.v.) was determined, but for very high technology applications now is possible to produce metal for up to 99.9999% purity.

Fix The London gold fixing (see: www.goldfixing.com) takes place twice daily over the telephone and sets a price at which all known orders to buy or sell gold on a spot basis at the same time of the fix can be settled. The fix is widely used as the benchmark for spot transactions throughout the market. The five members of the fix meet at 10:30am and 3:00pm London time.

Futures contract An agreement to buy or sell a specific amount of a commodity or financial instrument at a particular price on a stipulated future date; the contract can be sold before the settlement date. Futures contracts are standardized and are traded on margin on futures exchanges, such as the COMEX division of NYMEX, or the Tokyo Commodity Exchange (TOCOM).

Gold Standard A monetary system based on convertibility into gold; paper money backed and interchangeable with gold.

Good delivery bar Also referred to as large bars, the ingots that conform the London Good Delivery standard.

Good delivery standard The specification to which a gold bar must conform in order to be acceptable on a certain market or exchange. Good delivery for the London Bullion Market is the internationally accredited good delivery standard. A good delivery bar for London should weight between 350 and 430 ounces (gold content) of a minimum purity of 99.5% (two nines five). Further specifications can be obtained from the LBMA.

Grain One of the earliest weight units used for measuring gold. One grain is equivalent to 0.0648 grams.

Hedging The use of derivative instruments to protect against price risk.

55

Karat Unit of fineness, scaled from 1 to 24, 24-karat gold (or pure gold) has at least 999 parts pure gold per thousand; 18-karat gold has 750 parts pure gold and 250 parts alloy per thousand, etc.

Kilo bar A bar weighing 1 kilogram approximately 32.1507 troy ounces.

LBMA The London Bullion Market Association acts as the coordinator for activities conducted on behalf of its members and other participants of the London Bullion Market, and it is the principal point of contact between the market and its regulators.

Legal tender The coin or currency which the national monetary authority declares to be universally acceptable as a medium of exchange; acceptable for instance in the discharge of debt.

Liquidity The quality possessed by a financial instrument of being readily convertible into cash without significant loss of value.

Margin A deposit required to be put up before opening a derivative contract.

Numismatic Coins valued for their rarity, condition and beauty beyond the intrinsic value of their metal content. Generally, premiums for numismatic coins are higher than for bullion coins.

OTC Over-the-counter, or principal's contract. The OTC gold market trades on a 24-hour per day continuous basis and accounts for the bulk of global gold trading. Most OTC trades are settled using gold stored in London, irrespective of the country where the deal is actually transacted.

Settlement date The date on which a contract is scheduled for delivery and payment. Spot settlement in the bullion market is two days after the bargain has struck.

Spot price The price for spot delivery which, in the gold market, is two days from the trade date.

Troy ounce The standard weight in which gold is quoted in the international market, weighing 31.1035 grams. It was named after the old French city of Troyes, where there was an annual trading fair in mediaeval days and where this was a unit of weight.

SPDR® GOLD TRUST has filed a registration statement (including a prospectus) with the SEC for the offering to which this communication relates. Before you invest, you should read the prospectus in that registration statement and other documents the issuer has filed with the SEC for more complete information about the Trust and this offering. You may get these documents for free by visiting EDGAR on the SEC Web site at www.sec.gov. Alternatively, the Trust or any Authorized Participant will arrange to send you the prospectus if you request it by calling toll free at 1-866-320-4053 or contacting State Street Global Markets, LLC, One Lincoln Street, Attn. SPDR® Gold Shares, 30th Floor, Boston, MA 02111.