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Portfolio Investment Opportunities in

Precious Metals

by David M. Darst

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PRECIOUS METALS

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David M. Darst, CFA

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About the Author

David M. Darst, CFA, is a managing director and chief investment strategist of Morgan Stanley Wealth Management with responsibility for asset allocation and investment strategy, and was the founding chairman of the Morgan Stanley Wealth Management Asset Allocation Committee and the founding president of the Morgan Stanley Investment Group. He joined Morgan Stanley in 1996 from Goldman Sachs, where he held senior management posts within the Equities Division, and earlier for six years as resident manager of their Private Bank in Zurich.

David is the author of 11 books, including this one: *The Complete Bond Book* (McGraw-Hill, 1975); *The Handbook of the Bond and Money Markets* (McGraw-Hill, 1981); *The Art of Asset Allocation, Second Edition* (McGraw-Hill, 2008); *Mastering the Art of Asset Allocation* (McGraw-Hill, 2007); *Benjamin Graham on Investing* (McGraw-Hill, 2009); *Portfolio Investment Opportunities in China* (John Wiley & Sons, 2013); *Portfolio Investment Opportunities in Precious Metals* (John Wiley & Sons, 2013); *Portfolio Investment Opportunities in Managed Futures* (John Wiley & Sons, 2013); *Portfolio Investment Opportunities in India* (John Wiley & Sons, 2013); and *The Little Book That* Still *Saves Your Assets* (John Wiley & Sons, 2013), which has ranked on the bestseller lists of the *New York Times* and *BusinessWeek*. His financial works have been translated into Chinese, Japanese, Russian, German, Korean, Italian, Indonesian, Norwegian, and Vietnamese. In 2012, Seapoint Books published David's book, *Voyager 3,* which contains his creative writing.

David appears frequently on CNBC, Bloomberg, FOX, PBS, and other television channels, and has contributed numerous articles to *Barron's, Euromoney, The Money Manager*, *Forbes.com, The Yale Economic Review,* and other publications. He broadcasts and writes extensively on asset allocation in the firm's biweekly *Investment Strategy and Asset Allocation Commentary* and in the Morgan Stanley Wealth Management monthly publication, *Asset Allocation and Investment Strategy Digest*, the predecessors of which he launched in 1997.

David attended Father Ryan High School in Nashville, Tennessee, graduated from Phillips Exeter Academy, was awarded a BA degree in Economics from Yale University, and earned his MBA from Harvard Business School. David has lectured extensively at Wharton, Columbia, INSEAD, and New York University business schools, and for nine years he served as a visiting faculty member at Yale College, Yale School of Management, and Harvard Business School. David is a CFA Charterholder and a member of the New York Society of Security Analysts and the CFA Institute.

Introduction

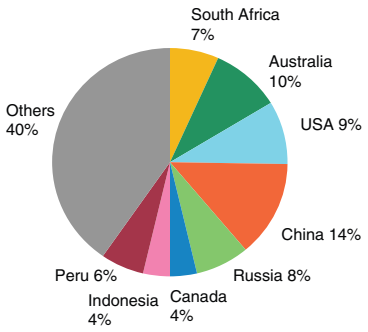
This book seeks to:

- Provide some degree of perspective on the role and positioning of gold (and other precious metals) within an economic, financial, societal, and portfolio context in the Modern Era as well as in earlier time frames.
- Set forth proponents' and opponents' views of the advantages and disadvantages, the rewards and risks, of involvement in precious metals.
- Shed light on key factors affecting precious metals prices, including supply-demand forces, expectations concerning inflation and deflation in the general price level, geopolitical conditions, the level of real interest rates, and the structure and health of sovereign credit and the global monetary system.
- Furnish information about a range of the specific vehicles that provide exposure to precious metals, as well as sources of further learning available in books, in articles, and on Internet web sites.

Figure i.1 presents the supply sources by region for gold, silver, platinum, and palladium.

Figure i.1 Supply by Region: (a) Gold, (b) Silver, (c) Platinum, and (d) Palladium

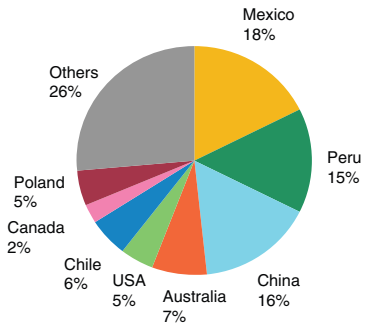
Gold Mine Production by Region (2011)



Source: *U.S. Geological Survey, Mineral Commodities Summaries, January 2013.*

(a)

Silver Mine Production by Region (2011)



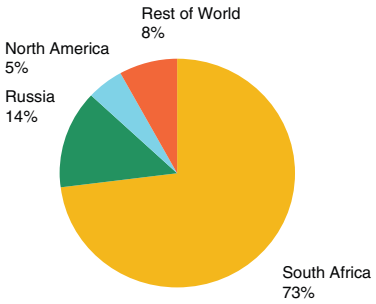
Source: *U.S. Geological Survey, Mineral Commodities Summaries, January 2013.*

(b)

(continued)

Figure i.1 (*continued*)

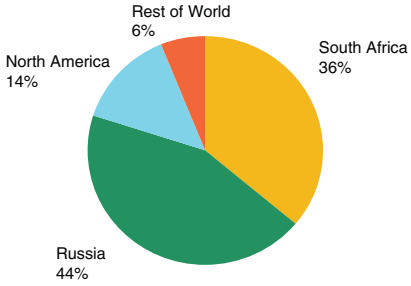
Platinum Supply by Region (2012)



Sources: Johnson Matthey PLC; *www.johnsonmatthey.com.*

(c)

Palladium Supply by Region (2012)



Sources: Johnson Matthey PLC; *www.johnsonmatthey.com.*

(d)

Sources: U.S. Geological Survey, Mineral Commodities Summaries, January 2009–2013 and Johnson Matthey PLC; www.platinum.matthey.com.

Section 1

Advantages and Risks of Precious Metals

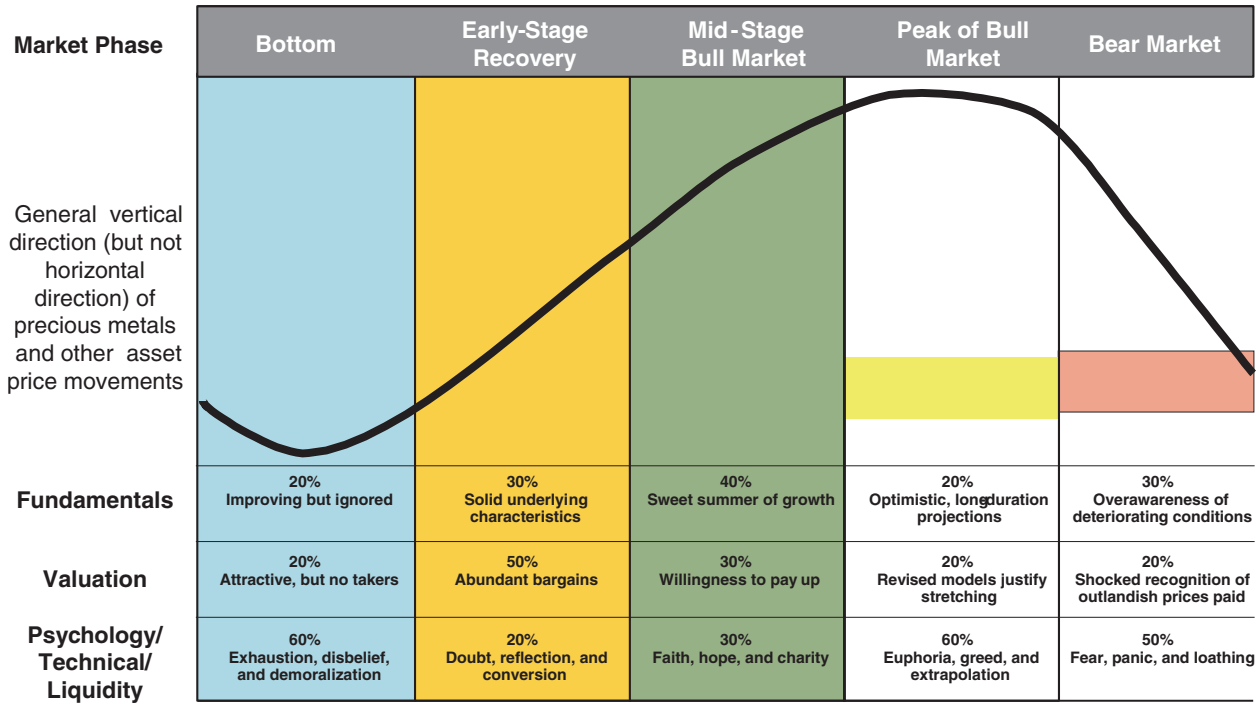
For centuries, gold and certain other precious metals have served as a store of value, as a medium of exchange, and at times as a unit of account. In periods of economic uncertainty or in environments subject to potential crises or financial market dislocations, investors have sometimes increased portfolio exposure to precious metals. When viewed from a long-term perspective, precious metals have generally been considered a hedge against inflation in the general price level.

Global population, income, economic, and monetary growth have tended to exceed the approximately 1.8 percent secular annual growth rate in the physical stock of gold. In the years since 2000, supply-and-demand data show that precious metals demand has tended to be driven by increased net investment and fabrication demand.

Because of their underlying supply-and-demand characteristics and their generally low correlations of returns with many other asset classes, precious metals have tended to be viewed as an asset class with diversification properties that can improve the risk-reward parameters of an investment portfolio. In addition to their responsiveness to classical forces of supply and demand, the price of precious metals may be subject to geopolitical and political factors and expectations concerning the likelihood of significant inflation or deflation in the general price level.

The monetary value of the daily trading volume in precious metals and precious metal–related instruments is relatively small compared to the monetary value of the global daily trading volume in many major currency, equity, and fixed-income securities markets and the derivatives thereof.

Precious metals may be characterized as having a relatively inelastic supply, and for gold, a not insubstantial portion (approximately 20 percent) of all the yellow metal mined in history is in the possession of central banks and official international and regional organizations.



Note: The percentages indicated above are hypothetical only and reflect the personal views of the author.

Figure 1 The Gold Debate: The Varying Importance of Factors Driving Precious Metals and Other Asset Prices across Market Phases

Source: David M. Darst, *The Art of Asset Allocation,* 2nd ed. (McGraw-Hill, 2008), p. 313.

Physical precious metals pay no dividend and may be cumbersome to store, assay, subdivide, insure, or transport in quantity.

The value, demand, supply, and disposition of precious metals may be subject to trends in the exploration, production, lending, financing, and sales strategies of select mining companies and the mining industry overall. As shown in Figure 1, the relative influences of fundamental, valuation, and psychology/technical/liquidity factors on precious metals and other asset prices tends to vary over time, with psychological/technical/liquidity factors by far the most important forces at the *bottom of bear market phases* and at the *top of bull market phases*.

The Gold Debate

Arguments for and against gold fall into three categories:

1. Fundamental forces
2. Valuation forces

3. Psychological, technical, and liquidity

All three are discussed next, for each position in the debate.

Fundamental Forces against Gold

In the 2000 through early 2013 period, the gold market changed from being essentially a market with only a fairly small degree of investment interest to a market where investment interest has tended to play a dominant role. Such investment interest has included individual investors, hedge funds, sovereign wealth funds, and central banks.

Private sector bullion holdings exceed those of the world's central banks. Large outflows from and inflows into gold exchange-traded funds (ETFs) suggest that investors may have been increasingly trading in gold funds in a more aggressive way than before, and it has been shown that private holders of gold ETFs have elected (or been forced, through margin calls) to sell some or all of their gold ETFs during large gold price corrections.

Only 15 percent of gold has in recent years been used as a monetary metal; the rest of it has been used as a commercial metal, and that use, particularly as a corrosion-resistant electrical conductor for semiconductors, appears to be declining. Gold is a soft metal having relatively limited industrial applications at the elevated prices of the Modern Era.

Under conditions in which the world's monetary and fiscal authorities have been able to bring about an economic recovery that is not inflationary, gold prices have tended to come under selling pressure. In such a scenario, government tax revenues could be expected to increase and the sovereign credit quality of governments could be expected to increase.

Valuation Forces against Gold

Gold does not produce earnings or pay dividends that can be compounded through time. The total return from holding gold during long periods may therefore prove unattractive. From 1969 to 2007, to cite one example, gold exhibited a greater degree of volatility than the Standard & Poor's (S&P) 500 index (as measured by the standard deviation of annual returns), and gold generated substantially lower compound annual returns than did the S&P 500.

A significant flaw of gold is that it is very difficult if not impossible to value using conventional valuation methodologies. According to gold consultancy GFMS, during the 2009–2012 time frame, global demand for gold for *investment* purposes surpassed gold *jewelry* demand for the first time since 1980, when the previous gold bubble burst. When jewelry demand (the traditional mainstay of the gold market) declines, gold prices may not be able to sustain upward price movements for a meaningful period of time.

Origin of the "Troy" and "Avoirdupois" Weight Systems

The *troy system* used to weigh many precious metals is named after Troyes, France. Troyes was a commercial center in the Middle Ages, and the city was noted for its annual fairs, during which standard weights and measures were set for all of Europe. The *avoirdupois system* takes its name from the French phrase "avoir du poids," meaning goods of weight.

Source: www.ny.frb.org.

Psychological, Technical, and Liquidity Forces against Gold

One of the key reasons gold is valuable is that at times, investors *believe* it is valuable. Investing in gold represents essentially a form of psychological insurance against actual or threatened monetary, financial, economic, political, and/or geopolitical turbulence; over meaningful periods of time during periods of societal progress and accomplishment, gold has had difficulty competing with human innovation, ingenuity, synthesis, creativity, resourcefulness, integration, originality, enterprise, industriousness, energy, diligence, assiduity, and optimism.

Since gold is considered a safe-haven investment in times of economic, financial, political, and geopolitical crisis, and it tends to be less widely sought for industrial uses (in contrast to copper and oil), it can at times attract emotional, speculative investors who may amplify its price gyrations. If gold is purchased as a hedge against systemic meltdown and/or other quasi-apocalyptic/doomsday scenarios, the actual arrival of such conditions may make it difficult to access, transport, subdivide, protect, and properly value and exchange gold for other resources.

In the early post-2010 years, gold tended to become widely publicized in the media, on blogs and web sites, and among the investing public; once an investment idea permeates the popular consciousness, it may tend to signal the late stages (or the cessation) of rising gold prices.

The risk that gold prices could sink by a few hundred dollars per troy ounce appears to be especially prevalent when fear remains in the air, when gold and other commodities trace bubble-like price patterns, and when late-night TV advertisements and other intermediaries offer to buy gold jewelry sight unseen.

Gold's price rally from 2000 through early 2013 still lags behind its 2,200 percent rise in magnitude in the inflationary 1970s, or its quite rapid five-month 70 percent jump in 1933–1934. But gold bulls rarely give focus to the intervening lean years. For example, presciently buying gold in the early 1930s, just before U.S. President Franklin Delano Roosevelt devalued the U.S. dollar, and holding it through to mid-2010 would have generated a

60-fold nominal price return, compared to a 1,000-fold gain for U.S. equities. Gold therefore may be seen over sufficiently long periods of time to be an excellent competitor versus cash, but not always such an effective competitor versus stocks.

Gold has a mixed history of serving as a reliable inflation hedge; at times, however, gold has functioned as a haven against sudden currency depreciation.

After exhibiting rapid, almost vertical price increases (a "parabolic price rise"), gold prices can drop sharply. In January 1980, the London afternoon gold fix reached above $800 per troy ounce on only two occasions. When gold reached its early 1980 peak of $850 a troy ounce in January 1980, it did not stay there long. Just 10 days after hitting that record, spot bullion prices fell below $700; and less than two months later, gold traded at less than $500 an ounce.

Secular bull markets tend to end in parabolic price blow-offs, and as of early 2013, gold skeptics were pointing out that the metal appeared to be approaching such a phase.

As of early 2013, the market for precious metals appeared overextended following sustained upward price moves during the preceding four years. On the COMEX futures exchange, the *net speculative long positions* in gold had swelled to a record number of contracts of 100 troy ounces each. *Total open interest* had also never been higher (up-to-date data on COMEX futures exchange net speculative long positions and total open interest can be found at www.cmegroup.com/company/comex.html).

Fundamental Forces for Gold

Approximately 60 percent of the world's total available gold is already above the ground, and annual mine production appears to have peaked in 1999–2000.

Fundamentally positive supply-demand factors identified by gold analysts include:

- Strong jewelry buying by rising middle classes in emerging countries, especially India and China.
- Investors' apparent increased long-term interest in gold as a hedge against the risks of persistent currency weakness.
- A relatively inelastic supply curve over the medium term and declining output since the turn of the New Millennium in South Africa, for many decades the world's largest gold producer.
- Recurring bouts of concern about global inflation and the health of the global financial system.

Gold has two interesting properties, according to Roy W. Jastram in his 1977 book, *The Golden Constant:* it is cherished by broad swaths of the

world's population, and it is indestructible. Gold can be melted down, but it does not change its chemical makeup or weight in the process.

Many developed nations appear to face large budget deficits and significant future social welfare expenditures (such as retirement and health care), their debt levels are rising, and their monetary authorities have been creating copious amounts of money. Several developed countries cannot afford higher interest rates and in order to keep downward pressure on government bond yields, it appears that these countries' central banks will have to resort to debt monetization. In other words, the central banks will create new money in order to fund the budget deficits. Throughout much but by no means all of human recorded history, currency debasement has tended to be the norm rather than the exception.

Gold's status as a legitimate monetary asset appears to be increasingly accepted. No longer is gold being broadly dismissed as a refuge primarily for conspiracy theorists who may satisfy their paranoid worries by stockpiling canned foods and ammunition; such conditions have tended to represent a certain portion of the mainstream media's portrayal of those who express deep skepticism about the value of government-issued paper money.

In an effort to bail out their banking systems, central banks in several advanced nations have injected significant monetary sums into their economies and this newly created money then found expression as excess bank reserves. As of mid-2013, these excess bank reserves had not permeated through their respective economies, but if and when they do, general price levels may experience meaningful increases and gold may then likely be sought as a store of value.

Deflation in the general price index has for certain periods of time actually been good for gold, owing to the significant increase that tends to occur in gold prices caused by governments' offsetting reflationary efforts to escape deflation.

If gold prices were expressed not in U.S. dollars per troy ounce but instead in troy ounces per U.S. dollar, since 1971 the value of a U.S. dollar has declined 97.1 percent from one thirty-fifth of a troy ounce (0.0286), to approximately one twelve-hundredth of a troy ounce (0.0008) as of mid-2013. Several of the monetary value characteristics of gold compared to paper money appeared significantly out of balance as of mid-2013:

- Total private investment in gold: approximately $800 billion (approximately 0.05 percent of global household net worth).
- Market value of all gold above ground: approximately $5.0 trillion.
- Global M-3 money supply: $60.2 trillion.
- Value of global financial assets: $200 trillion.

Longer term, as emerging countries' income levels tend to increase, emerging countries' inverse demand *sensitivity* to gold price movements may

be expected to decrease, with respect to both changes in and the level of gold prices.

All the gold mined in history, approximately 170,000 tons, or 5.5 billion troy ounces (as of year-end 2012) could barely fill two Olympic-size swimming pools. More than half of all the gold ever mined has been extracted since 1960. Already exploited are the hundred-mile-long gold reefs in South Africa and the berry-sized gold nuggets in California. A significant portion of known remaining gold ore deposits tends to exist as traces in remote and politically fragile regions of the world.

Despite gold ore exploration spending increasing sevenfold to mid-2013 since its cyclical low in 2002, total gold resource increases from new discoveries have meaningfully declined. Over 90 percent of exploration-derived reserve increases for the major gold producers have represented resource upgrades at existing projects. While the more than fivefold increase in gold prices from 2000 through mid-2013 allowed previously subeconomic resources to be reclassified as reserves, the number and size of new discoveries has remained quite low. Peak production theory holds that after about half of a total resource is extracted, riskier, more remote, and reduced-grade resources cause production to plateau or decline. According to U.S. Geological Survey data, an estimated 170,000 metric tons of gold (5.5 billion troy ounces) have been mined throughout the history of the world. With the remaining global gold ore reserve base reported to be approximately 100,000 metric tons (3.22 billion troy ounces), U.S. Geological Survey estimates thus imply that over 60 percent of the world's known recoverable gold has already been extracted.

Some gold-mining companies have reduced or discontinued the amount of gold they sell forward as a hedge; some gold-mining companies have also bought back their forward sales, a process known as *dehedging*.

As a sign of the shifting landscape for gold, central banks already owning meaningful amounts of gold appear to have significantly reduced or halted altogether their gold sales, and other central banks (in China, India, Russia, Venezuela, Mexico, Sri Lanka, Greece, Kazakhstan, Qatar, Serbia, the Ukraine, and Mauritius, among other countries) have executed purchases of gold to varying degrees. For example, in 2009, central banks and governments purchased a total of 425.4 metric tons (13.7 million troy ounces), the largest increase since 1964 and the first net expansion since 1988.

Central banks appear to have somewhat diminished faith in the creditworthiness of other governments. If central banks have in fact lost some degree of confidence, private investors may be motivated to do the same. Reserves are intended to protect against emergencies. In an emergency, gold at certain times in the past has been perceived as more likely to hold its value than paper money. According to *The Economist* magazine and other observers, at various times in the post-2000 era, the global financial

system contained several elements of unsustainability. Certain large debtor countries were running significant fiscal deficits, but retained at the same time the ability to depreciate their currencies and to offer near-zero interest rates on their short-term debt. Gold price movements may reflect investors' fears of a significant crisis in the global foreign exchange markets.

Valuation Forces for Gold

Economic output in the United States as measured by gross domestic product (GDP) increased slightly more than sixfold between 1980 and mid-2013. When scaling up the gold price peak of 1980 by a similar six times multiple, it is posited that the gold price could theoretically reach a level around $5,300 per troy ounce.

As of mid-2013, the global M-3 money supply measure in dollar terms had reached more than 10 times what it was in 1980. The aggregate total global gold supply amounted to 170,000 metric tons (5.5 billion troy ounces), up from 110,000 metric tons (3.54 billion troy ounces) in 1980. Adjusting for the increased M-3 money supply, as well as the increased gold supply, the 1980 peak price would work out to more than $5,700 per troy ounce as of mid-2013.

Based on the *officially reported* version of consumer price inflation, the peak of $850 per ounce for gold in 1980 was equivalent to about $2,300 per ounce as of mid-2013. For gold to reach its prior all-time high of $850, achieved on January 21, 1980, in *alternate CPI-adjusted* dollars as calculated by Shadow Government Statistics, the price would have to rise to $6,650 per troy ounce.

Compared to other asset classes' secular bull market price behavior, gold did not yet seem to be in a bubble as of mid-2010. From July 1999 to June 2013, the trough-to-peak percentage change in the gold price was 389 percent. Using secular bull market upswings during other periods (of differing lengths of time), the trough-to-peak change for the S&P 500 index was 1,317 percent, for the West Texas Intermediate crude oil price was 882 percent, and for the S&P Homebuilding Index was 954 percent.

As of early 2013, real interest rates were negative in many developed nations. Due to central banks' reflationary efforts, short-term interest rates were well below official inflation rates. Because holding cash under such conditions represented a loss-making proposition after inflation, some proportion of investors were motivated to turn to gold.

Psychological, Technical, and Liquidity Forces for Gold

Gold represents a store of value that has been relatively durable and reliable for significant periods in the past. No fiat currency system in history appears to have outlived gold.

Although a fourfold increase over a small number of years from a $1,000 per troy ounce gold price to more than $5,000 per troy an ounce seems extreme, exactly such a percentage price change trajectory was experienced over the 1978–1980 time frame.

Based on the then-record high prices set by gold in September 2011, the price had risen close to five times in the 2000–2011 time period, similar to the magnitude of the rise in the inflation-plagued years immediately leading up to May 1978. In 1978, the gold price was about to inflate dramatically, as the mania spread from the early-investing contrarians to the later-stage broader public, or expressed another way, from the "boom" stage to the "euphoria" stage.

Gold is regarded as a secure store of value because people believe it is safe. Investors, several respected economists, and investment strategists have expressed concerns that many governments have not taken sufficient steps to restrain budget deficits, leading these governments to resort to the politically expedient route of printing money to inflate away sovereign indebtedness. In these economists' and strategists' opinion, a principal argument for gold has been based on the expectation that all of the money that many major central banks have been printing will be difficult to control, if and when meaningful inflation returns.

The relationship between gold and financial crises has extended through many centuries. Gold prices may be likely to rise, anticipating inflation, further advances in commodity prices, global supply chain shortages, currency debasement, and increased debt monetization (money printing to buy government debt) by major central banks.

During times of economic uncertainty when confidence in financial assets is low, gold has tended to assume the role of a currency.

Gold has been perceived as a defense against: (1) monetary, fiscal, exchange-rate, wage-price and capital controls, social unrest, expropriation, armed conflict, and/or protectionist policy errors by countries' elected and/or appointed officials; (2) counterparty risk within domestic and cross-border financial systems; (3) breakdowns in the physical, behavioral, and/or electronic infrastructure affecting the trading, settlement, and custody of assets; and/or (4) secular deterioration in the quality of and investors' confidence in sovereign debt.

Through excessive credit creation and by allowing a high degree of leverage, several large countries have witnessed successive bubbles formed in equities, residential real estate, commercial real estate, and certain other asset classes; when these asset-price bubbles have begun to burst, in order to forestall appropriate asset price adjustments, some governments have implemented: (1) bailouts, takeovers, rescues, and/or capital injections into weakened financial entities; (2) large-scale deficit spending and other fiscal stimulus measures; and/or (3) monetary policy measures (including

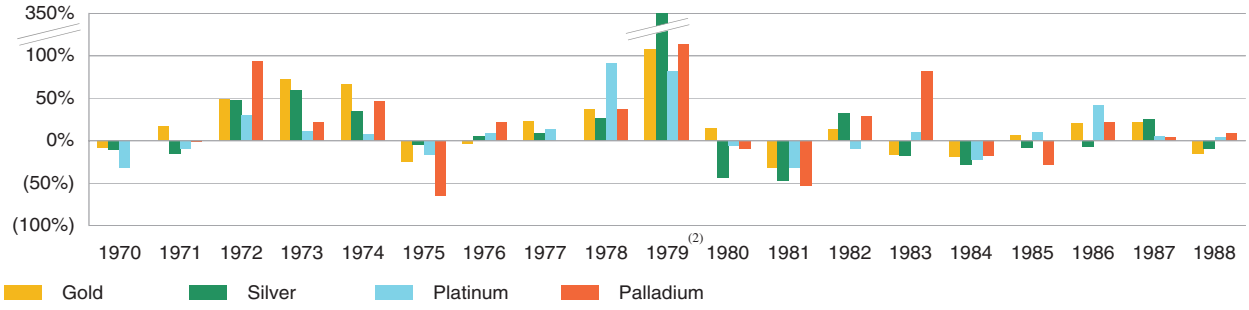
extremely low policy interest rates, accounting forbearance, credit support activities, cross-border swap lines, and/or quantitative easing, also known as debt monetization or "printing money" to purchase sovereign, government agency, and/or corporate securities).

Gold has, at various points in the Modern Era, been perceived as being able to help alleviate major weaknesses in the global monetary system. In the views of certain observers and financial market participants, a primary systemic weakness derives from the fact that the level of reserves in the global economy depends to a not insignificant degree on the United States' running a large balance of payment deficits to supply such reserves, thereby becoming increasingly indebted to the rest of the world. Moreover, the system in place for the past several decades of the twentieth century and the first decade of the twenty-first century has tended to create asset bubbles within countries that generate large balance-of-payments surpluses; such asset bubbles usually severely damage the surplus-generating countries' banking sectors when they collapse.

Section 2

Precious Metals Investment Performance and Correlations

This section of the book provides comparative price performance data for gold, silver, platinum, and palladium from 1970 through 1988 (in Figure 2) and from 1989 through mid-2013 (in Figure 3).



Notes:

1. Gold and silver price data show the year-over-year change for year-end Handy & Harman spot metal prices from Bloomberg LLC; platinum and palladium price data show the year-over-year change for the Johnson Matthey average December spot metal prices.
2. In 1979, a number of factors (including the Hunt Silver Crisis, discussed elsewhere in this document) contributed to a significant rise in precious metals prices. Total returns in 1979 for precious metals were as follows: gold (+126%); silver (+361%); platinum (+82%); and palladium (+139%).

Figure 2 Annual Precious Metals Price Performance Comparison, 1970–1988(1)

Sources: Bloomberg LLC; Handy & Harman.

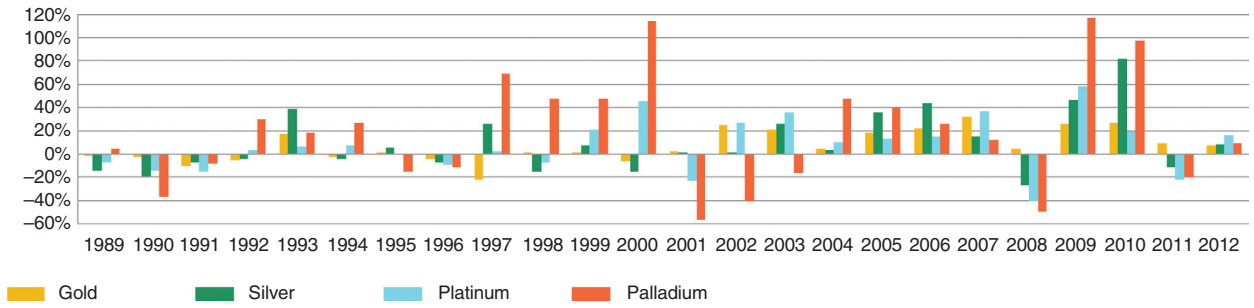


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Figure 3 Annual Precious Metals Price Performance Comparison, 1989–2012[(1)]

Sources: Bloomberg LLC; Handy & Harman.

Correlations of Annual Returns of Precious Metals

Tables 1, 2, 3, and 4 show correlations of annual returns (from 1979 to 2012) across precious metals, selected asset classes, and inflation.

Table 1 Correlations of Gold Annual Returns

Length of Holding Period	Silver	Platinum	Palladium	S&P 500	10-Year U.S. Treasury Bond	USCPI	Cash (U.S. 90-day T-Bill)
5 Years	0.71	0.90	0.64	0.84	–0.61	0.89	0.31
10 Years	0.66	0.43	–0.01	0.32	–0.18	0.26	–0.35
30 Years	0.88	0.69	0.40	0.03	–0.15	0.42	0.00

Sources: Morgan Stanley Wealth Management Investment Strategy; Bloomberg LLC; Handy & Harman.

Table 2 Correlations of Silver Annual Returns

Length of Holding Period	Silver	Platinum	Palladium	S&P 500	10-Year U.S. Treasury Bond	USCPI	Cash (U.S. 90-day T-Bill)
5 Years	0.71	0.84	0.89	0.98	–0.96	0.62	–0.01
10 Years	0.66	0.54	0.39	0.80	–0.75	0.36	–0.28
30 Years	0.88	0.64	0.55	0.12	–0.19	0.44	0.07

Sources: Morgan Stanley Wealth Management Investment Strategy; Bloomberg LLC; Handy & Harman.

Table 3 Correlations of Platinum Annual Returns

Length of Holding Period	Silver	Platinum	Palladium	S&P 500	10-Year U.S. Treasury Bond	USCPI	Cash (U.S. 90-day T-Bill)
5 Years	0.90	0.84	0.90	0.92	–0.85	0.76	–0.10
10 Years	0.43	0.54	0.74	0.63	–0.42	0.66	–0.02
30 Years	0.69	0.64	0.71	0.21	–0.29	0.16	–0.20

Sources: Morgan Stanley Wealth Management Investment Strategy; Bloomberg LLC; Handy & Harman.

Table 4 Correlations of Palladium Annual Returns

Length of Holding Period	Silver	Platinum	Palladium	S&P 500	10-Year U.S. Treasury Bond	USCPI	Cash (U.S. 90-day T-Bill)
5 Years	0.64	0.89	0.90	0.89	–0.98	0.52	–0.40
10 Years	–0.01	0.39	0.74	0.48	–0.44	0.51	0.21
30 Years	0.40	0.55	0.71	0.31	–0.28	0.14	–0.02

Sources: Morgan Stanley Wealth Management Investment Strategy; Bloomberg LLC; Handy & Harman.

Principal Uses of Precious Metals

Principal uses of gold include:

- Jewelry
- Electrical products
- Dentistry
- Financial asset

Principal uses of silver include:

- Jewelry
- Industrial and electronic
- Photography
- Coinage
- Medical
- Financial asset

Principal uses of platinum include:

- Autocatalyst
- Petroleum and plastics
- Jewelry

- Dentistry and medicine
- Financial asset

Figure 4 provides perspective on the average primary sources of China's platinum demand over the 2008–2012 time period.

Principal uses of palladium include:

- Autocatalyst
- Jewelry
- Industrial and electronic
- Photography
- Hydrogen storage and technology
- Financial asset

Figure 5 provides perspective on the average primary sources of China's palladium demand over the 2008–2012 time period.

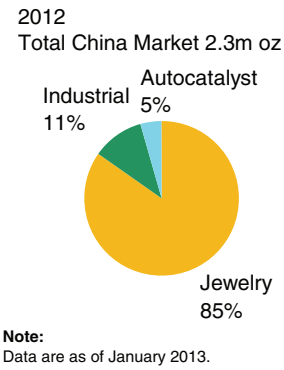


Figure 4 China Platinum Demand

Source: www.matthey.com.

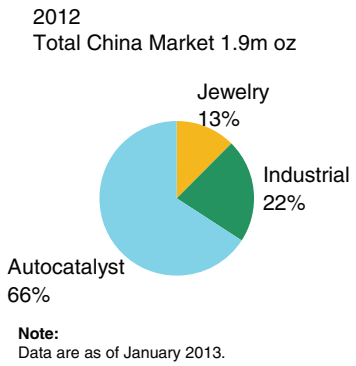


Figure 5 China Palladium Demand

Source: www.matthey.com.

Section 3

Overview of Gold

"Gold is a treasure, and he who possesses it does all he wishes to in this world, and succeeds in helping souls into paradise."
—Christopher Columbus

"Gold can a path through hosts of warders clear. And walls of stone more swiftly can displace than ever lightning could."
—Quintus Horatius Flaccus (Horace)

"Gold is not a perfect standard of value: It is certain that paper has shown itself a still more imperfect one."
—British economist T. S. Gregory

This section of the book provides perspective on gold's role though long periods of history, the supply of and demand for gold, and gold price movements, both on an absolute basis and relative to other asset classes.

History and Background of Gold[1]

For thousands of years, gold has been treasured for its beauty and rarity and embraced as:

- A symbol of wealth, faith, and power.
- A medium of international exchange.

[1] "What's Good for the Goose," *Worth Magazine*, November 2002, World Gold Council.

- A store of value.
- A unit of account during certain periods of time.

From the voyage of Christopher Columbus in 1492, through the eighteenth century, Central and South America were the main suppliers of gold to world commerce. Following the discovery of gold in California in 1848, North America became the world's major gold supplier.

As of 2013, China, the United States, and Australia were the leading producers of newly mined gold. In 2012, the U.S. dollar value of aggregate global gold demand was well above US$100 billion for the second year in succession against a backdrop of uncertainty in financial and commodity markets.

Gold also functions as an important industrial commodity. It is considered an excellent conductor of electricity, is highly resistant to corrosion, and is chemically stable, making gold critically useful in electronics and other high-technology applications.

Why Central Banks Hold Gold[2]

Central banks and international monetary authorities have long held gold in their reserves. Good reasons exist for countries continuing to hold gold as part of their reserves. Several of these motivations are described next, and are recognized by central banks themselves, although different central banks may emphasize different factors at different times.

- *Diversification.* Gold tends to offer good diversification properties within a currency portfolio. These stem from the fact that its value is determined by supply and demand in the world gold markets, whereas currencies and sovereign debt securities depend on governments' promises and variations in central banks' monetary policies. The price of gold may therefore behave in a completely different way from the prices of currencies or the exchange rates between currencies.
- *Economic security.* Gold has maintained its real purchasing power value in the long run and thus may be suited to form part of central banks' reserves and provide economic security.

[2] *Source:* World Gold Council.

- *Physical security.* Countries have in the past imposed various forms of exchange controls and, in some cases, complete asset freezes. Reserves held in the form of another country's securities are vulnerable to such measures. When appropriately located, gold tends to be much less vulnerable. Reserves are for potential use in an emergency. Total and incontrovertible liquidity is therefore essential. Gold is perceived to provide this.
- *Unexpected needs.* Owning gold represents an option against an unknown future. It provides a form of insurance against improbable but, when they occur, highly unsettling and/or damaging events.
- *Confidence.* The public tends to take confidence from knowing that its government holds gold.
- *Income.* A gold-lending market exists, and gold can also be traded on a tactical basis in an attempt to generate profits.
- *Insurance.* The opportunity cost of holding gold may be viewed as comparable to an insurance premium.

Gold Sales under Central Bank Gold Agreements (CBGA)

The first agreement (CBGA 1, also known as the Washington Agreement on Gold, signed on September 26, 1999) lasted from September 27, 1999, to September 26, 2004, and covered the sales of 2,000 tonnes of gold (64.3 million troy ounces) over that period.

The second agreement (CBGA 2) lasted from September 27, 2004, to September 26, 2009, and provided for a maximum of 500 tonnes (16.1 million troy ounces) to be sold in each agreement year. Total sales under CBGA 2 amounted to 1,884 tonnes (60.6 million troy ounces).

The third agreement (CBGA 3) covers sales for a period of five years from September 2009 through September 2014 and provides for a maximum of 400 tonnes (12.9 million troy ounces) to be sold in each agreement year.

Under CBGA 3, as of April 27, 2010, central banks had only sold a total of 7.2 tonnes (231,487 troy ounces) of gold (including International Monetary Fund [IMF] sales of 5.6 tonnes [180,046 troy ounces]).

Figure 6 shows gold sales under CBGA. Announcements of their intentions to sell, but before such sales commenced, a portion of their official gold reserves (in April 1999, by Switzerland, and in May 1999, by the United Kingdom), led central banks in Austria, Australia, Belgium, Canada, Luxembourg, the Czech Republic, and India to sell part of their gold reserves.

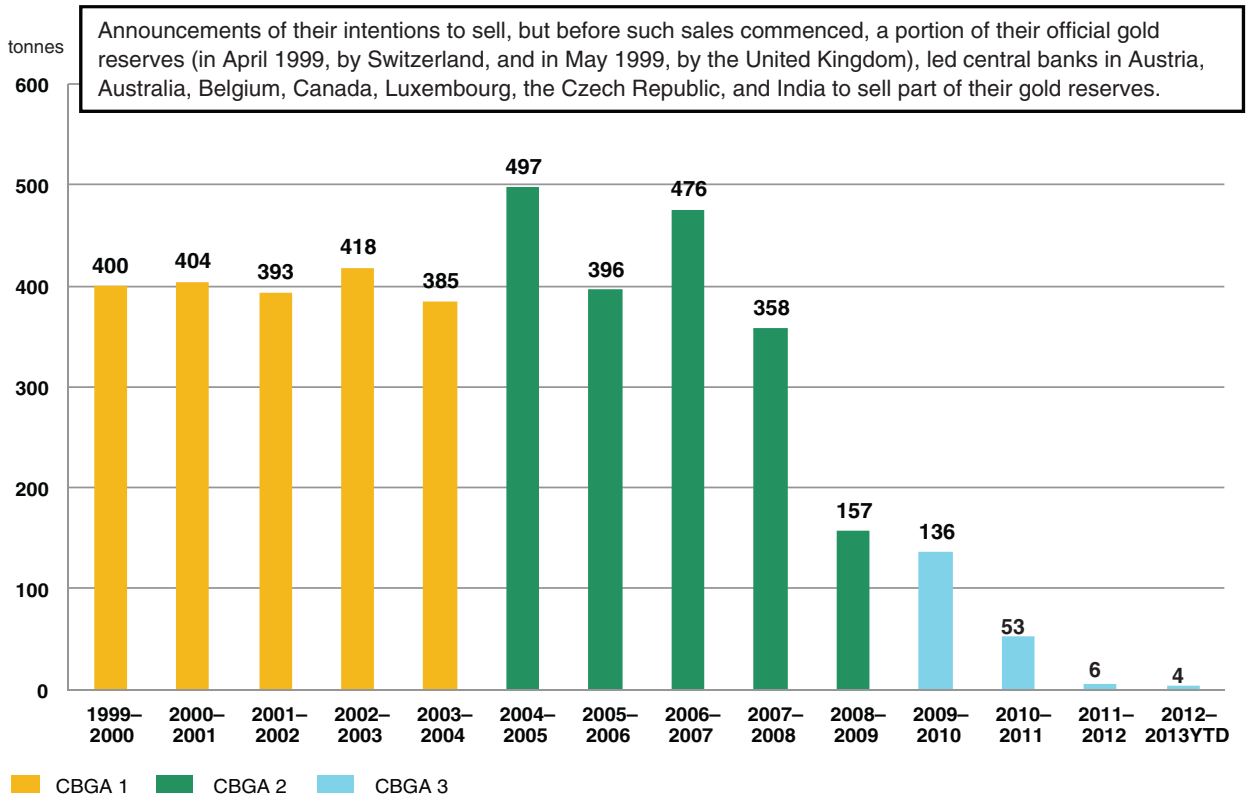


Figure 6 Gold Sales under Central Bank Gold Agreements (CBGA)

Source: World Gold Council.

Major Central Banks' Gold Holdings[3]

Figure 7 shows, as of 2013, the gold holdings of 12 of the world's largest central banks, as well as the percentage change in such holdings since 1991.

To increase its gold holdings as a percentage of total foreign currency reserves to the world's central bank average of 10 percent, China would need to buy US$180 billion of gold, or about 5,400 metric tons, the equivalent of more than two years of global mine production.

As of September 2009, central banks around the world owned a total of 26,297 metric tons (845.5 million troy ounces) of gold, equivalent to 11 years of global production, down from 29,214 tons (939.3 million troy ounces) in 1991, according to the World Gold Council.

If the nine largest foreign exchange reserve–owning countries decided to increase their gold holdings to 10 percent of their total reserves, as of mid-2010, this would imply the additional acquisition of 11,174 metric tons (359.2 million troy ounces); to 25 percent, 33,254 metric tons (1.069 billion troy ounces).

[3] *Source:* Carolyn Cui, "Central Banks Join a New Gold Rush," *Wall Street Journal,* November 11, 2009.

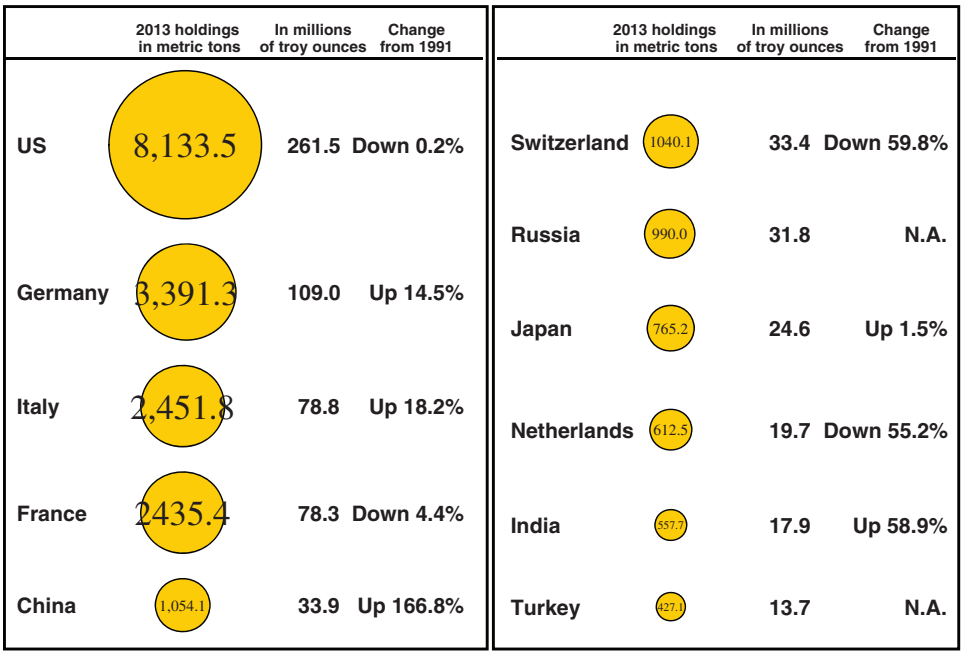


Figure 7 Major Central Banks' Gold Holdings

Source: World Gold Council.

Gold as an Asset Class[4]

Gold is a precious yellow metallic element, not subject to oxidation or corrosion, with 79 protons in its nucleus and an atomic weight of 196.967. Gold occurs in the Earth's crust at the rate of 0.004 parts per million.

The first gold coins are believed to have been minted approximately 2,700 years ago, and since then, gold has for varying lengths of time functioned alongside or instead of various other forms of currency as a medium of exchange, store of value, and unit of account. For example, throughout its 1,100-year history, the Byzantine Empire, with Constantinople as its capital, maintained a monetary economy based on gold.

Its gold coin, weighing approximately 4.5 grams and called the *bezant* (also known as the *solidus*, or *nomisma*) circulated freely within and outside the Byzantine Empire for 645 years, from 324 to 969 A.D.

Gold can be purchased and sold in a variety of forms, including:

- Recently minted legal tender and commemorative coins.
- Previously issued coins and medals of numismatic value.
- Gold bars and bullion.

[4] *Source:* David M. Darst, *The Art of Asset Allocation,* 2nd ed. New York: McGraw-Hill, 2008; Morgan Stanley Wealth Management Investment Strategy Asset Class Review—Gold, February 12, 2013.

- Shares of gold-mining companies.
- Exchange-traded funds, closed-end funds, and open-end funds.
- Gold futures and options.
- Gold trust receipts, structured notes, and gold-backed bonds.
- Gold jewelry and objects of art.
- In a related but different category, other precious metals such as silver, platinum, palladium, and rhodium.

How and where gold is owned is often determined by the investor's motivations, concerns, temperament, amounts to invest, objectives, and personal circumstances.

Advantages of gold include:

- Historically, gold has tended to retain its purchasing power compared to the cost of fundamental human needs such as food, shelter, and clothing.
- For centuries, the intrinsic value of gold has been widely accepted due to its rarity, beauty, durability, malleability, ductility, portability, divisibility, and anonymity.
- Gold has generally tended to exhibit negative or very low correlations of returns with almost all other asset classes.
- During many previous periods of excessive inflation, financial market turmoil, deflationary shock, monetary system failure, and/or geographical instability, gold has been viewed as a form of insurance protection and refuge.
- Unlike many managed-paper currency systems, gold has a slowly changing and relatively inelastic supply; gold is considered to be the only monetary asset that is not the liability of another party.

Disadvantages of gold include:

- Although gold as an asset may be considered a conservative investment, some segments of the gold market may be deemed to include speculative and momentum-based traders, promoters, conspiracy theorists, and dogmatic participants whose views at times may lack objectivity.
- Physical gold has no yield, may trade in relatively low volume and somewhat illiquid markets; is cumbersome to transport in large quantities; may incur costs of assay, custody, taxation, segregation, and insurance; and may be difficult to access in unsettled conditions.
- Due to their effectively embedded option component linked to changes in gold prices, gold-mining shares have substantially leveraged exposure to gold price movements; may at times be inaccurately valued; and may sometimes be difficult to assess by conventional methods employed by issuers, investors, and intermediaries, leading to unforeseen and possibly unfavorable consequences.

- For substantial intervals during eras of financial and geopolitical stability, gold prices may move within a mean-reverting band, influenced by: (1) the level of real interest rates; (2) the demand for jewelry, industrial uses, exchange-traded funds and other investment vehicles, and identified bar and coin hoarding; and (3) sources of supply, including new discoveries, production, forward sales and hedging by gold-mining companies, gold scrap recycling, and central bank purchases, sales, and gold-lending activity.
- Gold may potentially be subject to governmental influence and/or confiscation through taxation, the sealing of safety deposit boxes and other measures, the declaration of gold payment clauses as unenforceable, and the arbitrary fixing of gold prices.

Table 5 shows monthly and annual price returns for spot prices of physical gold from 1990 through mid-2013.

Table 5 Handy & Harman Gold Bullion Spot Price Index Monthly and Annual Total Returns (%), 1993–2013 YTD

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Full Year
2013	0.17	–4.58	0.62	–8.09	–5.07	–1.99	10.28	6.10	N/A	N/A	N/A	N/A	**–20.40**
2012	11.08	1.49	–6.07	–0.68	–5.65	2.60	1.47	1.63	7.73	–3.21	0.41	–3.71	**5.86**
2011	–5.59	6.33	1.98	6.71	0.07	–2.02	8.17	11.36	–10.67	6.30	1.39	–10.08	**11.70**
2010	–1.95	2.75	0.65	5.71	2.39	3.02	–6.03	6.59	4.90	3.04	2.73	1.59	**27.77**
2009	5.72	3.53	–3.73	–3.63	10.44	–4.20	0.48	1.01	4.98	4.44	13.05	–6.44	**26.47**
2008	10.73	5.23	–3.91	–6.70	1.69	5.02	–1.32	–9.26	6.18	–17.38	11.19	7.05	**4.32**
2007	2.93	2.11	–0.37	2.30	–2.64	–1.30	2.31	0.98	10.57	6.26	–0.76	6.41	**31.92**
2006	10.22	–2.24	4.68	10.65	1.40	–6.05	3.10	–1.42	–3.89	0.75	7.11	–2.27	**22.48**
2005	–3.09	3.15	–1.83	1.92	–4.88	5.47	–1.85	0.99	9.23	–0.53	5.29	4.11	**18.46**
2004	–4.07	–0.98	7.04	–8.31	1.22	0.65	–1.11	4.05	2.06	2.38	6.54	–3.93	**4.54**
2003	6.58	–5.46	–3.63	0.57	7.32	–4.26	2.53	5.88	3.30	–0.45	2.52	5.23	**20.85**
2002	2.10	5.15	1.53	2.26	5.97	–2.48	–4.35	2.68	3.48	–2.10	0.30	8.48	**24.70**
2001	–2.33	0.83	–3.37	2.11	1.65	1.16	–1.74	2.67	7.36	–4.90	–1.17	0.36	**2.10**
2000	–2.39	3.65	–5.76	–0.61	–1.02	5.84	–3.96	0.09	–1.21	–3.34	1.74	0.63	**–6.70**
1999	–1.14	0.58	–2.65	2.56	–6.28	–2.83	–2.07	–0.31	17.35	0.03	–2.59	–0.38	**0.54**
1998	6.20	–2.44	1.21	3.22	–5.50	0.92	–2.51	–4.17	6.16	–0.53	0.82	–2.04	**0.57**
1997	–6.37	3.79	–2.65	–2.56	1.60	–3.20	–2.45	–0.31	2.07	–6.23	–4.62	–3.35	**–22.21**
1996	4.81	–1.21	–1.07	–1.27	–0.19	–2.19	0.86	0.30	–1.93	0.13	–1.71	–1.07	**–4.64**
1995	–1.96	0.40	4.14	1.72	–3.62	0.72	–0.96	–0.26	0.43	–0.35	1.35	–0.22	**1.19**
1994	–3.54	0.97	2.00	–3.28	–2.35	5.62	–1.09	0.46	2.36	–2.79	–0.20	–0.18	**–2.39**
1993	–0.86	–0.86	3.11	4.88	6.53	0.26	6.16	–7.52	–4.32	3.94	0.38	5.62	**17.54**

Handy & Harman Gold Bullion Spot Price Index tracks the price of gold in U.S. dollars per troy ounce and is reported on a daily basis since January 1970. Data are as of September 23, 2013.

Source: Bloomberg.

Demand, Supply, and Global Gold Holdings

For 2009, Table 6 sets forth the major sources of demand for gold, Table 7 shows the major sources of supply of gold, and Table 8 lists the 20 largest official gold holdings of countries and international monetary organizations.

Table 6 Demand for Gold

Classification	2012 Metric Tons[a]
Jewelry	1,908
Identifiable Investment	1,535
Central Bank Net Purchases	535
Industrial and Dental	428
Total	**4,406**

[a] Conversion ratios: one metric ton equals 32,150 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Source: World Gold Council.

Table 7 Supply of Gold

Classification	2012 Metric Tons[a]
Mining Output	2,848
Net Producer Hedging	(20)
Total Mine Supply	2,828
Recycled Gold	1,626
Total	**4,453**

[a] Conversion ratios: one metric ton equals 32,150 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Source: World Gold Council.

Table 8 Official Gold Holdings (as of June 2013)

Rank	Entity	Gold Holdings (metric tons)	Gold Holdings (million troy ounces)[a]
1	United States	8,133.5	261.5
2	Germany	3,391.3	109.0
3	IMF	2,814.0	90.5
4	Italy	2,451.8	78.8
5	France	2,435.4	78.3
6	China	1,054.1	33.9
7	Switzerland	1,040.1	33.4
8	Russia	990.0	31.8
9	Japan	765.2	24.6
10	Netherlands	612.5	19.7
11	India	557.7	17.9
12	ECB	502.1	16.1
13	Turkey	427.1	13.7

Table 8 (*continued*)

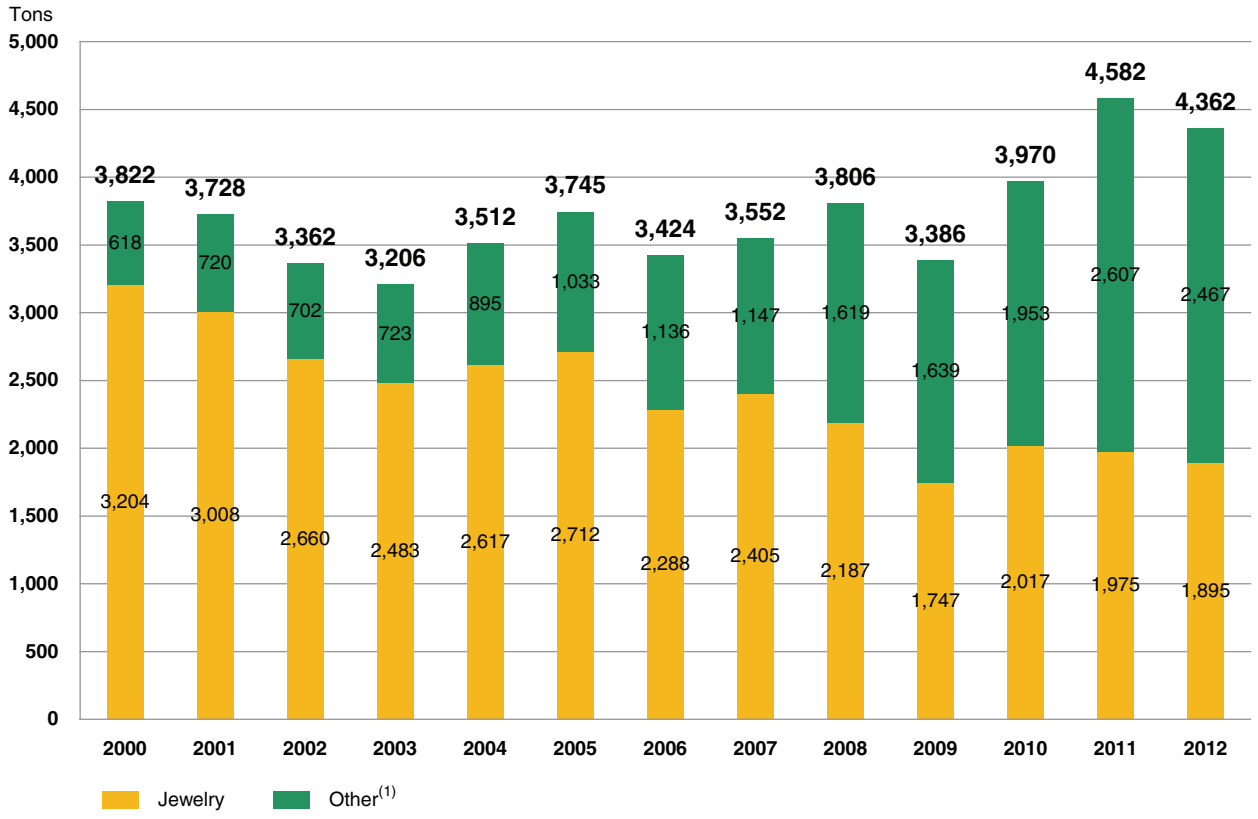
Rank	Entity	Gold Holdings (metric tons)	Gold Holdings (million troy ounces)[a]
14	Taiwan	423.6	13.6
15	Portugal	382.5	12.3
16	Venezuela	365.8	11.8
17	Saudi Arabia	322.9	10.4
18	United Kingdom	310.3	10.0
19	Lebanon	286.8	9.2
20	Spain	281.6	9.1

[a] Conversion ratios: one metric ton equals 32,150 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Source: World Gold Council.

Jewelry and Net Retail Investment in Gold

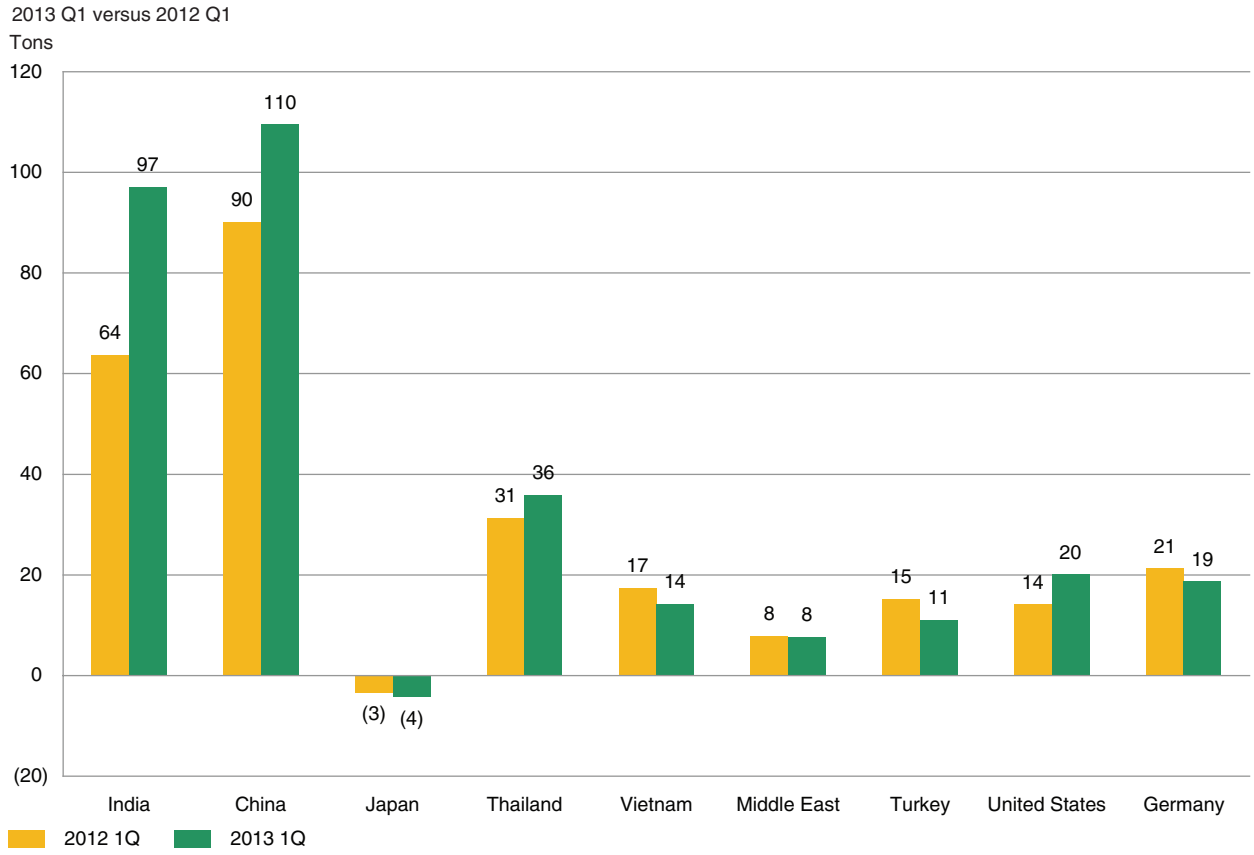
Figure 8 shows the major sources of identifiable gold demand since 2000, and Figure 9 sets forth the net retail investment in gold in 2012 Q1 versus 2013 Q1.



Note:
(1) Other includes net retail investment, ETFs and similar products, industrial, and dental.

Figure 8 Historical Identifiable Gold Demand since 2000

Source: "*Gold Demand Trends*," World Gold Council, May 26, 2013.



Note:

(1) Retail Investment. For the three bar, coin, and medallions categories, the Retail Investment category comprises individuals' purchases of coins and bars defined according to the standard adopted by the European Union for investment gold. Medallions of at least 99% purity, wires, and lumps sold in small quantities are also included. In practice, this category includes the initial sale of many coins destined ultimately to be considered as numismatic holdings rather than bullion. It excludes second hand coins and is measured as net purchases.

Figure 9 Net Retail Investment(1)

Source: "Gold Demand Trends," World Gold Council, August 2013.

In 2012 on a global basis, India accounted for 25 percent of gold jewelry consumption, 19 percent of total net retail investment demand (coins and bars), and 17 percent of other industrial and decorative demand.

India was the strongest-performing market in 2010 Q1 compared to 2009 Q1, as total consumer demand surged 698 percent to 194 tons.[5]

Above-Ground Stocks of Gold, Demand and Supply Flows

Figure 10 shows the above-ground stocks of gold as of 2012.

Figure 11 shows the major sources of annual demand for gold during the 2008–2012 time frame. East Asia, the Indian subcontinent, and the Middle

[5] *Source:* "*Gold Demand Trends*," World Gold Council, May 26, 2010.

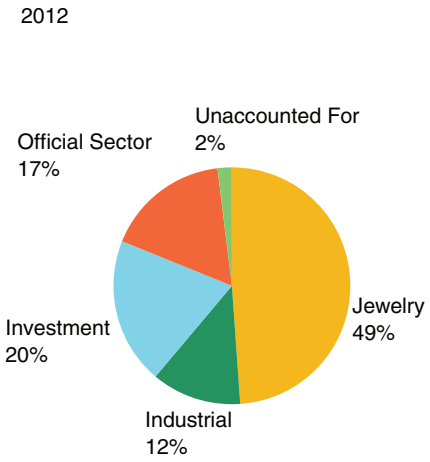
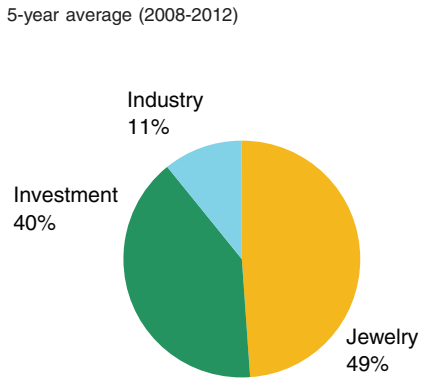


Figure 10 Above-Ground Stocks (~170,000 tons)

Source: "Gold Demand Trends," World Gold Council, August 2013.

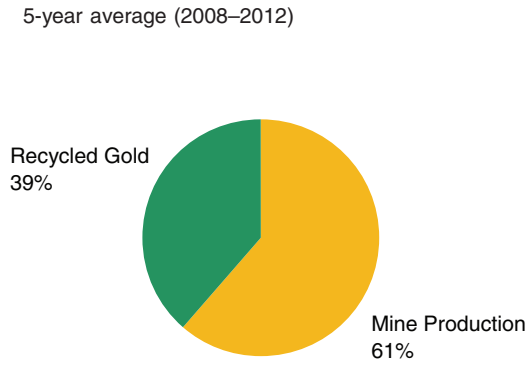
East have accounted for an average of 70 percent of world demand in the five years from 2008 through 2012. Fully 55 percent of demand has been attributable to five countries: India, Italy, Turkey, the United States, and China, with each country's market driven by a separate set of socioeconomic and cultural factors.



East Asia, the Indian subcontinent, and the Middle East accounted for 70% of world demand over the 2008–2012 period. Fully 55% of demand is attributable to just five countries: India, Italy, Turkey, the United States, and China, with each market driven by a different set of socioeconomic and cultural factors.

Figure 11 Demand Flows

Source: "Gold Demand Trends," World Gold Council, August 2013.



The comparatively long lead times in gold production, with new mines often taking up to 10 years to come on stream, mean that mining output is relatively inelastic and unable to react quickly to changes in the price outlook. The incentives promised by a sustained price rally, as experienced by gold over the 2002–2010 period, were not therefore easily or rapidly translated into increased production.

Figure 12 Supply Flows

Source: "Gold Demand Trends," World Gold Council, August 2013.

Figure 12 shows the major sources of annual supply of gold over the 2008–2012 time frame.

The comparatively long lead times in gold production, with new mines often taking up to 10 years to come on stream, mean that mining output is relatively inelastic and unable to react quickly to changes in the price outlook. The incentives promised by a sustained price rally, as experienced by gold over the 2002–2010 period, were not therefore easily or rapidly translated into increased production.

The Price of Gold

The purchasing power of gold is asserted to have remained relatively constant since biblical times. Figure 13 shows the annual price of gold from 1850 to 2012.

Key price drivers for gold include:

- Supply-demand
- Inflation/deflation outlook
- Real (after inflation) interest rates
- Geopolitics
- Structure of the monetary system

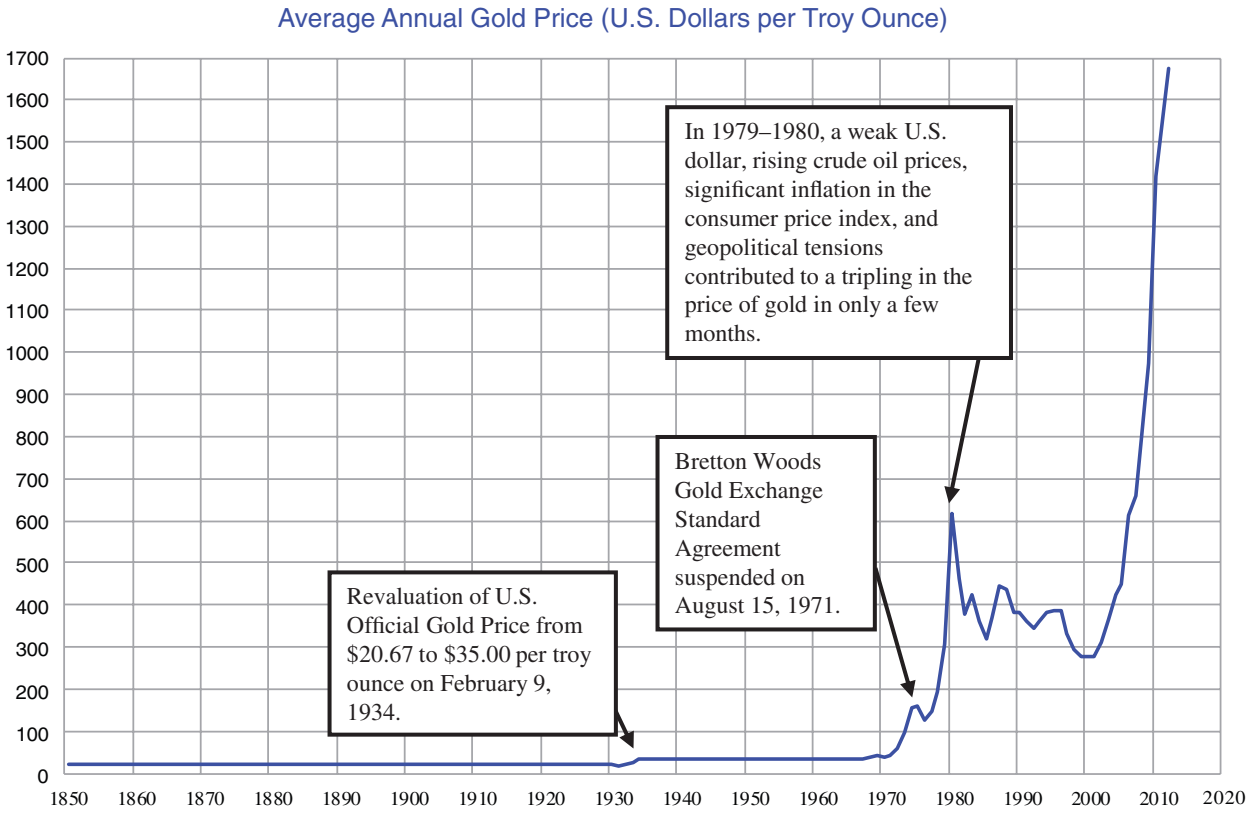


Figure 13 The Price of Gold: 1850–2012

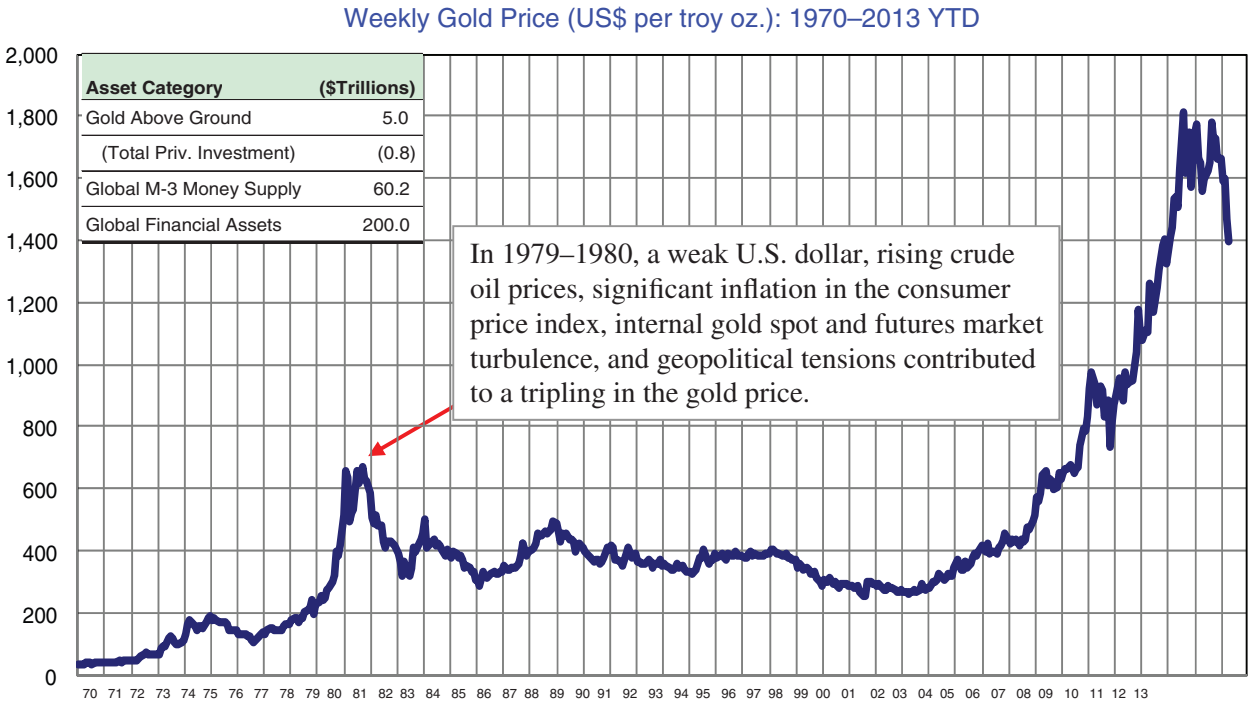
Sources: The Gold Institute; Bloomberg LLC.

Figure 14 shows weekly gold prices from 1970 through 2012. In 1979–1980, a weak U.S. dollar, rising crude oil prices, significant inflation in the consumer price index, internal gold spot and futures market turbulence, and geopolitical tensions contributed to a tripling in the gold price.

Gold Demand Outlook

The structure of the global demand for gold is very diverse. During the five years up to 2012, 68 percent of average annual demand came from jewelry, with more than 50 percent of this demand stemming from India, China, Turkey, and the Middle East. Investment demand, on average, accounts for 20 percent where India, Europe, and the United States play an important role. Finally, the remaining 12 percent average represents industrial demand, especially from Japan.

Consequently, looking at the impact that variables such as the money supply, inflation, or the velocity of money have on the price of gold, while



Note:
Data are as of June 19, 2013.

Figure 14 The Price of Gold: 1970 through mid-2013

Source: Bloomberg LLC.

focusing primarily on the United States, provides only part of the whole picture. It is important to study the behavior of gold prices in the context of global economies and to take into account the many forces and countries that shape its performance.

China and Gold Ore Reserves

As of 2012, China was the world's largest producer and either the largest or the second-largest consumer of gold, but it had only 4 percent of total world's ore reserves, with total basic reserves amounting to 1,900 tons, according to the U.S. Geological Survey (USGS).[6]

Assuming that the 2012 USGS mine production and reserves figures are correct (Figure 15), China may exhaust existing gold mines in six years or less if Chinese demand continues to grow strongly.

[6] *Source:* U.S. Geological Survey, Mineral Commodity Summaries Report, January 2010.

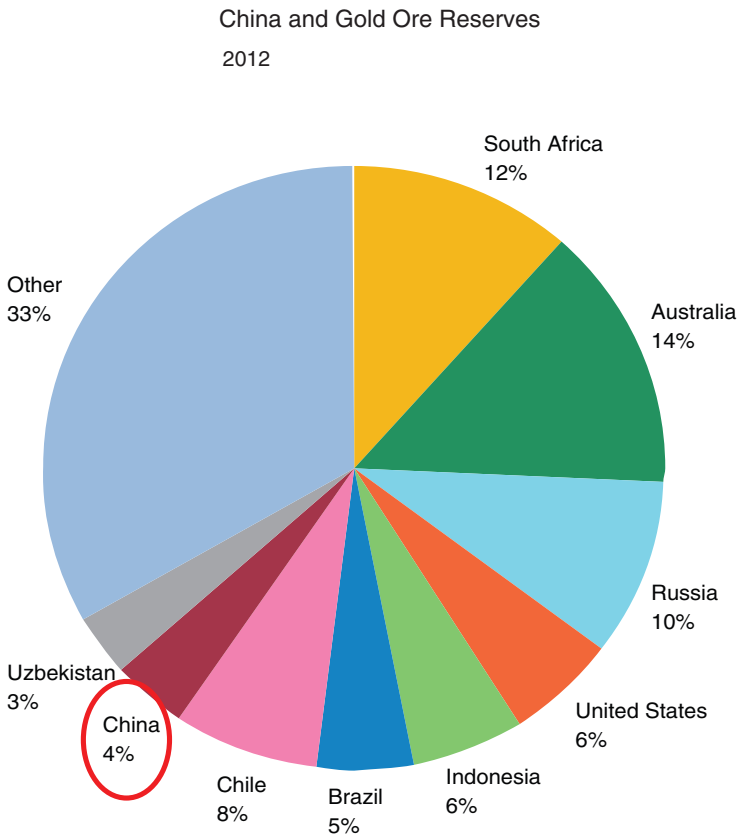


Figure 15 Gold Ore Reserves by Country

Source: World Gold Council, U.S. Geological Survey, January 2013.

Origins of Gold Demand in China[7]

Gold is a symbol of wealth in Chinese culture. In the Chinese tradition, gold is given as a gift on birthdays, Mother's Day, for births, and at the Chinese New Year. Gold also serves as part of matrimonial jewelry, which forms a major part of total jewelry demand in China.

According to Timothy Green, the author of *Ages of Gold,* the Chinese have long been fascinated by gold. In 23 A.D., Emperor Wang Mang, founder of the Xin Dynasty, held in his treasury the world's largest reserve of gold, approximately 155 tons.

After the collapse of the Han Dynasty, the tradition of minting gold coins did not develop for many centuries during the reigns of the Tang, Ming, and Qing. The currency of the time was copper, with silk also used to settle

[7] *Sources:* World Gold Council; U.S. Geological Survey.

transactions. Gold was used among the nobility, for settlements among different factions in China, and for hoarding wealth.

Prior to 2002, the gold market in China was tightly regulated from production through retail distribution. Gold prices and quotas were dictated by the People's Bank of China (PBoC) jointly with other central authorities. Permission was required from the PBoC to export gold, and imports of gold jewelry were subject to a 60 percent import tariff (a 40 percent reduction from 100 percent in 1996).

From 1996, China hastened the reform and liberalization process. In October 2002, the Shanghai Gold Exchange was established to replace the PBoC's gold purchase and allocation system.

The China Gold Association (CGA) was established in November 2001 and plays an active role in China's gold industry. The CGA acts as a bridge between the Chinese government and gold producers in protecting business interests and providing information, consultancy, coordination, and intermediary services.

Long-Term Outlook for the Chinese Gold Market[8]

Chinese gold demand has increased by nearly 400 percent from 2002 to an estimated 817 tons in 2012, an average of more than 8 percent per annum during the same period.

Over time, significant potential for growth exists in Chinese gold jewelry demand, representing the vast majority (78 percent) of the domestic gold market.

Net retail gold investment continues to develop in China. Investors seeking to protect their wealth, and institutional and retail investors looking to manage portfolio risk, have sought gold ownership.

The PBoC has also played a supportive role on the demand side. The motivations of the PBoC for owning gold are the same as the reasons why individuals want to own gold—namely, its diversification properties, as insurance against unexpected events, and due to gold's past ability to outperform during periods of heightened financial, economic, political, or geological uncertainty.

In 2007, China overtook South Africa to become the world's leading gold producer. China has continued to increase production, increasing output for 10 straight years and reaching a new record in 2009 of 300 tons (9.65 million troy ounces), according to the U.S. Geological Survey.

Assuming that long-term gold demand growth is in line with China's supply growth target of 5 percent per annum (as set out in the country's 11th

[8] *Sources:* World Gold Council; U.S. Geological Survey.

Five-Year Plan), China could experience total demand in 2025 at double 2010 levels.

China and Gold

China is the world's largest producer of gold and the second-largest consumer (behind India), based on data from the World Gold Council. Its annual gold output is about 300 metric tons (9.6 million troy ounces), and it consumes about 800 metric tons (25.7 million troy ounces) on an annual basis. Private holdings of gold by Chinese individuals have been estimated at more than 3,000 metric tons (96.5 million troy ounces).

In April 2009, gold prices rallied when China suddenly acknowledged that its gold reserves had risen by 454 metric tons (14.6 million troy ounces) since 2003, to 1,054 tons (33.9 million troy ounces).

"Gold is not a bad asset, but currently a few factors limit our ability to increase foreign-exchange investment in gold," said Yi Gang, director of China's State Administration of Foreign Exchange (SAFE) and a vice governor of the People's Republic of China.

In April 2010, the World Gold Council signed a letter of understanding to cooperate with the Industrial and Commercial Bank of China to expand awareness of and investment in the gold market within China. The Industrial and Commercial Bank of China has over 200 million individual clients, over 3.5 million corporate customers, and more than 16,000 offices.

In December 2009, Ji Xiaonan, head of China's Assets Supervision and Administration Commission, recommended that China increase its gold reserves to 6,000 metric tons (192.9 million troy ounces) within 3 to 5 years, and possibly to 10,000 metric tons (321.5 million troy ounces) in 8 to 10 years.

Unless new discoveries are located, U.S. Geological Survey data indicate that China's reserves of economically recoverable gold will be virtually exhausted by approximately 2015.

India and Gold

Lacking easy or efficient access to modern financial services, many rural private citizens in India favor gold over securities or bank deposits. Indian individuals are estimated to own 20,000 metric tons (643 million troy ounces) of gold, approximately two thirds of the gold holdings of the world's central banks, and approximately one eighth of all the gold mined thus far in history.

India's post office sells 24-carat gold coins, in sizes as small as 0.5 grams, to savers wary of fiat currencies or mutual funds.

On November 3, 2009, the Reserve Bank of India announced that it had bought 200 metric tons (6.4 million troy ounces) of gold from the IMF.

Gold Price Relative to the S&P 500

Some number of analysts and other financial market participants track the per-ounce gold price relative to the absolute level of the S&P 500 index of U.S. common stocks. Figure 16 shows this relationship from 1926 through mid-2013, during which time the gold-to-S&P 500 ratio has ranged from a low of 0.4 in the mid-1960s to a high of 6.0 in early 1980. As of mid-2013, the gold-to-S&P 500 ratio stood at about 1.0.

Gold Prices during Periods of Uncertainty

Some investors have turned to gold during actual or feared periods of acute inflation, deflation, geopolitical instability, or severe turbulence in capital markets.

In the late 1920s, the Dow Jones Industrial Average (DJIA) had increased by 6 times relative to the increase in the price of gold; by the mid-1960s, the DJIA had increased by almost 10 times relative to the increase in the price of gold; in the late 1990s, the DJIA had increased by 14 times relative to the increase in the price of gold; as of December 2009, the ratio of the increase in

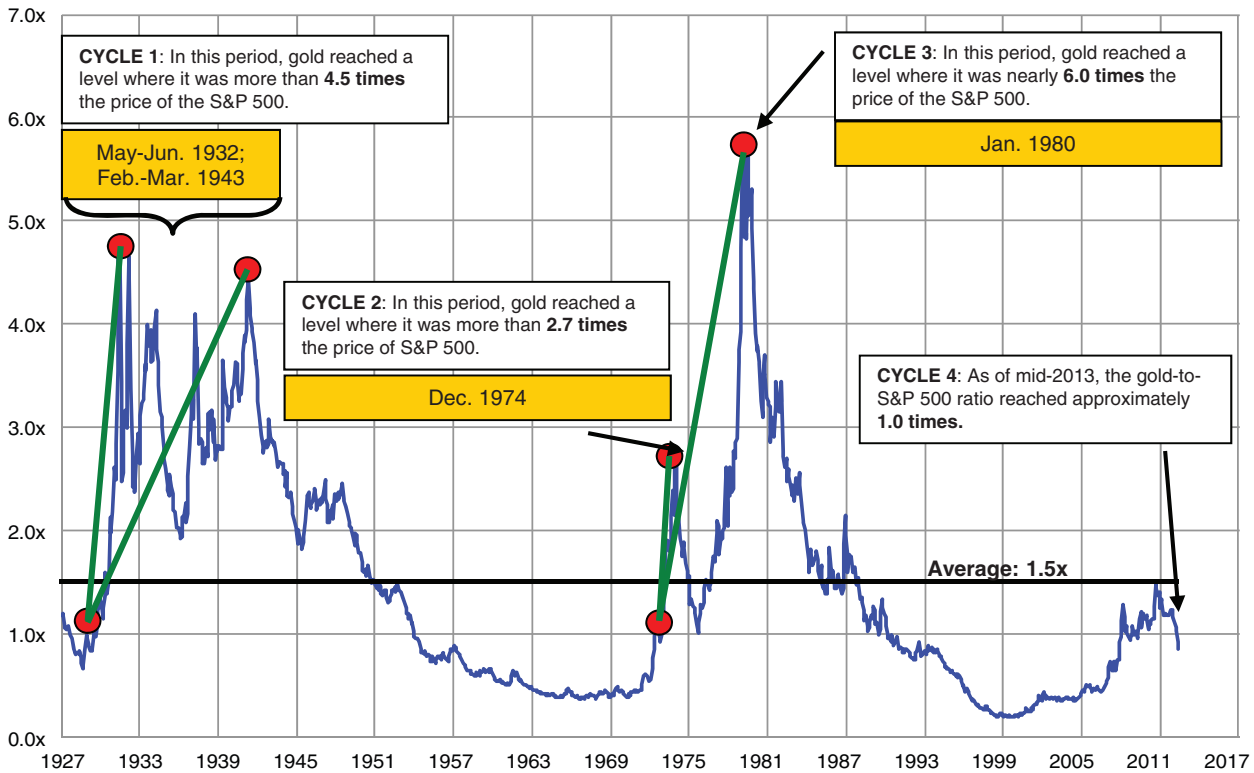


Figure 16 Gold Price Relative to the S&P 500

Sources: Bloomberg LLC; wjbcapital.com.

Fort Knox Bullion Depository

The Fort Knox Bullion Depository, located 30 miles from Louisville, Kentucky, is the storage facility for a large portion of the United States' gold reserves. The Depository was completed in 1936, at a cost of $560,000.

Within the building is a two-level steel and concrete vault. The vault door weighs more than 20 tons and no one person is entrusted with the combination to the vault door lock.

The gold stored in the Depository is in the form of standard mint gold bars and coin gold bars fabricated from the melting of gold coins.

As of 2012, the gold holdings at the Fort Knox Depository equaled approximately 147 million troy ounces. The peak level of gold holdings at the Fort Knox Depository was 649.6 million troy ounces, on December 31, 1941.

Sources: www.ustreasury.gov; www.usmint.gov; www.globalsecurity.org.

the DJIA relative to the increase in the price of gold was 3.3 times. Figure 17 shows the historical path of the DJIA-to-gold ratio.

Gold Prices during Periods of Uncertainty

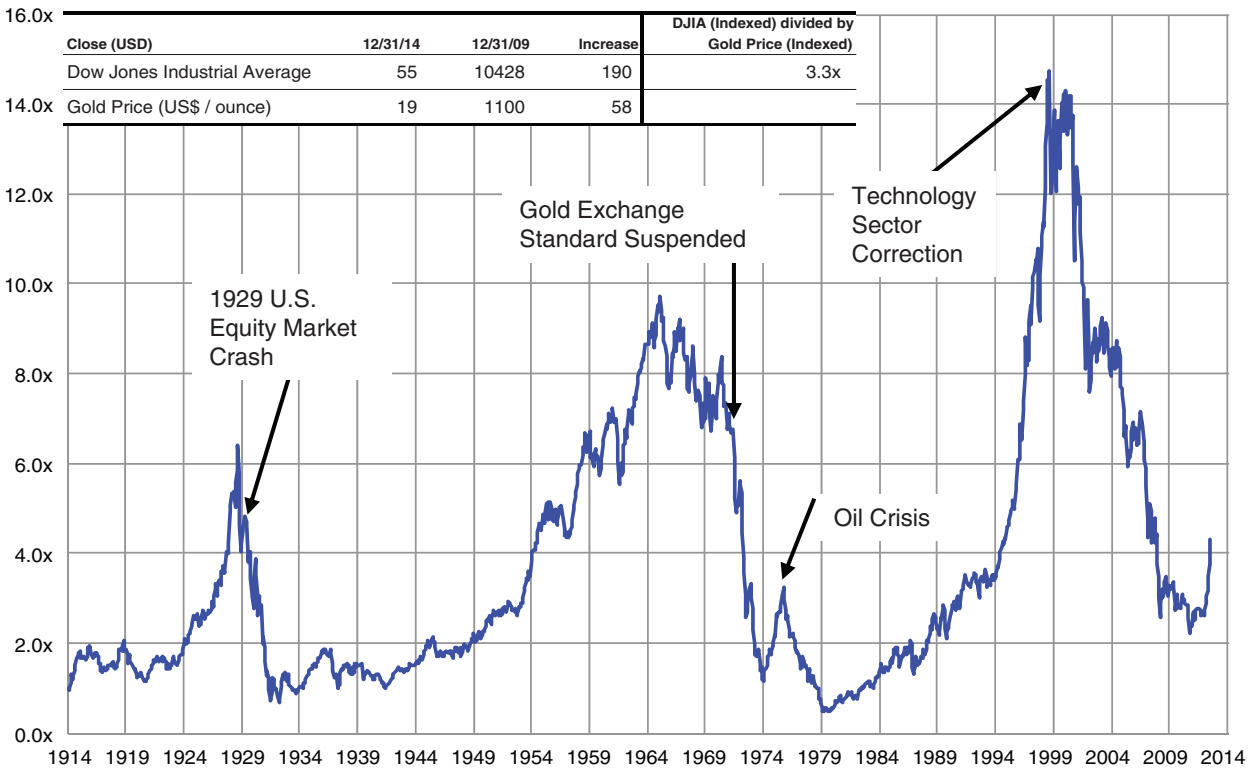


Figure 17 DJIA (Indexed) Divided by Gold Price per Ounce (Indexed)

Sources: Bloomberg; FactSet.

Gold Price versus the DJIA and the S&P 500

Figure 18 displays the indexed performance of the Handy & Harman spot gold price relative to the price performance of the Dow Jones Industrial Average and the S&P 500.

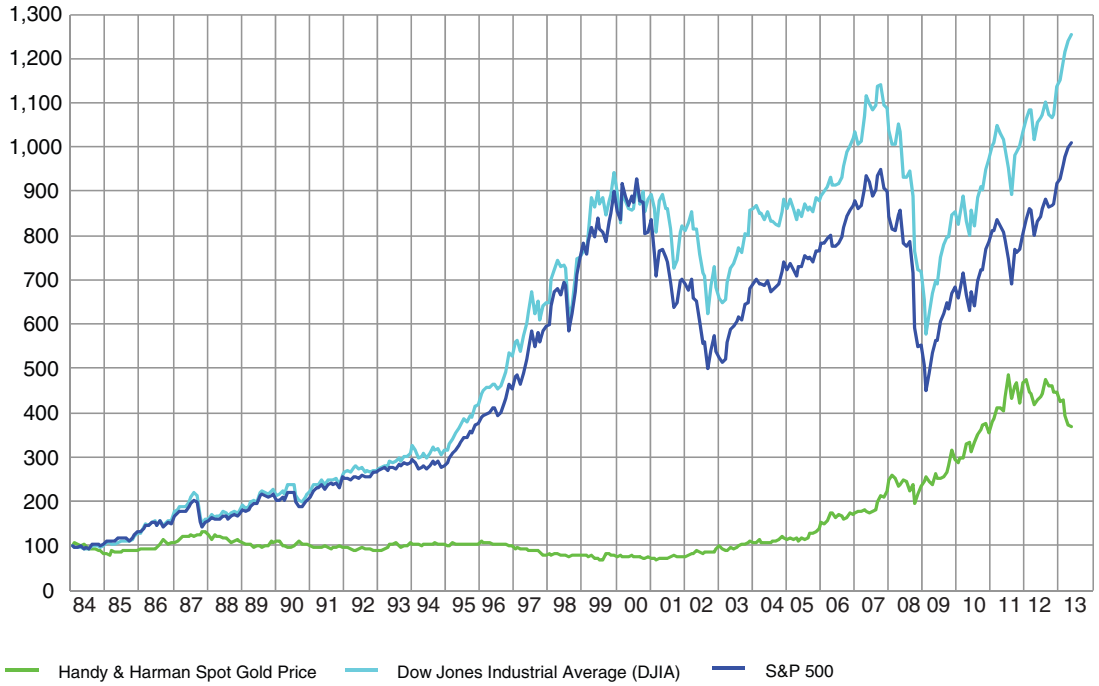
Ratio of the Price of Gold to the Price of Silver

Figure 19 shows the ratio of the per-ounce price of gold to the per-ounce price of silver, from 1950 through 2012.

Annual World Production of Gold since 1900

Figure 20 shows the annual world production of gold from 1900 through 2012, and Table 9 sets forth the amounts in 2011 and in 2012 by the eight largest gold-producing countries.

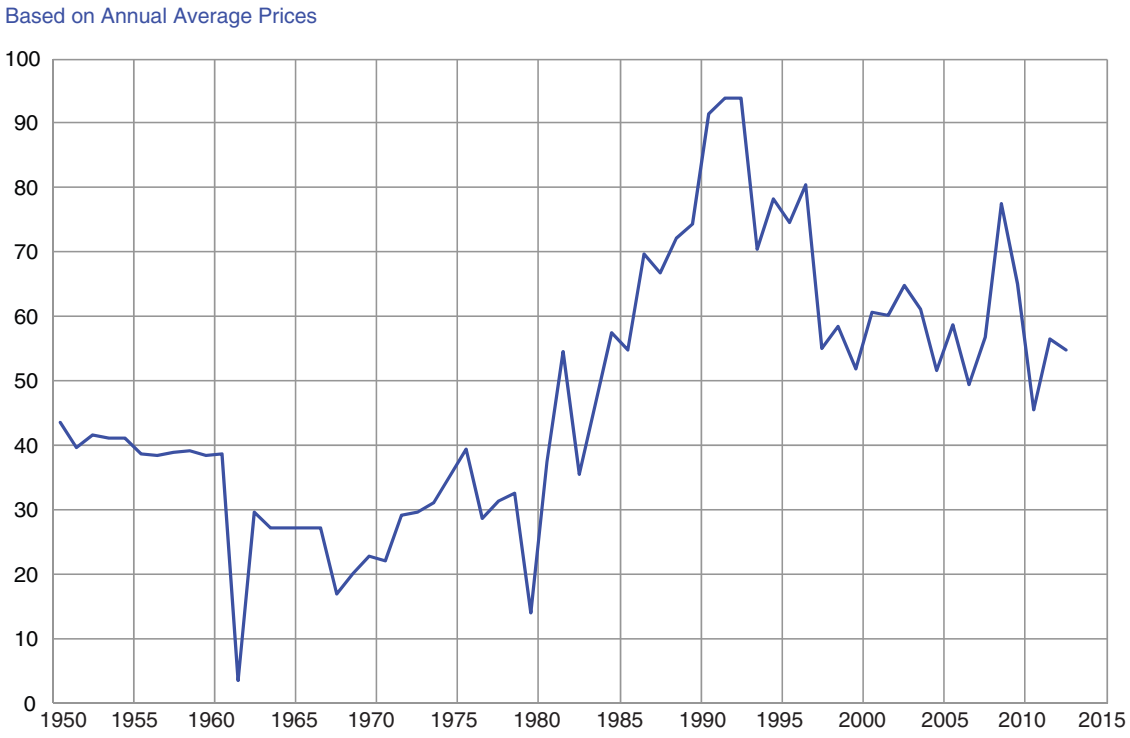
Gold Price versus the DJIA and the S&P 500
1984 to mid-2013(1)



Note:
1. Data are as of June 1, 2013.

Figure 18 Index Performance 1984 through mid-2013 YTD (January 1, 1984 = 100)

Source: FactSet.



Note:

(1) Data are as of December 31, 2012.

Figure 19 Ratio of the Spot Price of Gold to the Spot Price of Silver (1950–2012)[1]

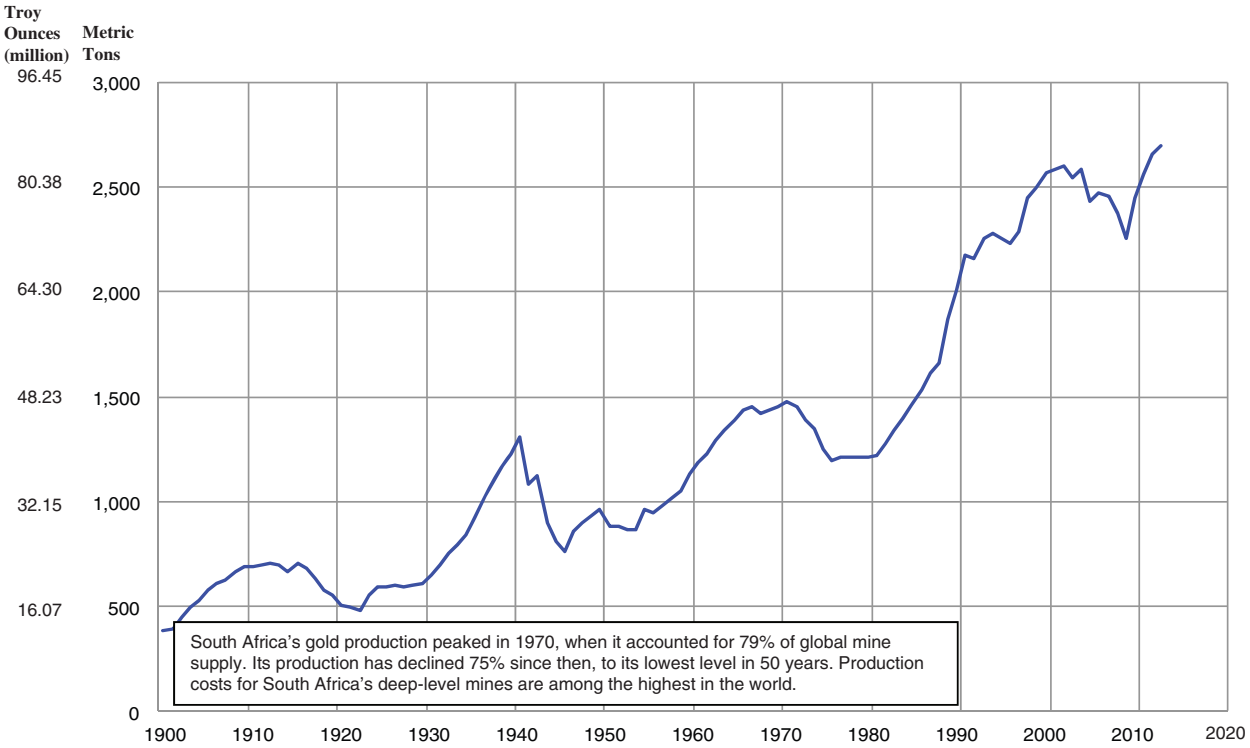
Sources: The Gold Institute; The Silver Institute; Handy & Harman.

Table 9 Gold Mine Production in 2011 and 2012

	2011		2012	
Country	Metric Tons Produced	Troy Ounces Produced	Metric Tons Produced	Troy Ounces Produced
South Africa	181	5,819,285	170	5,465,627
Australia	258	8,294,893	250	8,037,687
United States	234	7,523,275	230	7,394,671
China	362	11,638,570	370	11,895,776
Russia	200	6,430,149	205	6,590,903
Indonesia	96	3,086,472	95	3,054,321
Canada	97	3,118,622	102	3,279,376
Peru	164	5,272,722	165	5,304,873
Other countries	1,068	34,336,997	1,072	34,465,600
Total	**2,660**	**85,520,986**	**2,659**	**85,488,835**

Conversion ratios: one metric ton equals 32,151 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Source: U.S. Geological Survey, Mineral Commodities Summaries, January 2013.



Note:
(1) Conversion ratios: one metric ton equals 32,151 troy o unces; one troy ounce equals 1.0971 avoirdupois ounces.

Figure 20 Annual World Production of Gold since 1900

Source: U.S. Geological Survey.

South Africa's gold production peaked in 1970, when it accounted for 79 percent of global mine supply. Its production has declined 75 percent since then, to its lowest level in 50 years. Production costs for South Africa's deep-level mines are among the highest in the world.

Global Supply of and Fabrication Demand for Gold

The Federal Reserve Bank of New York is one of 12 regional reserve banks in the Federal Reserve System. It houses significant gold reserves, which are located 80 feet underground. The Federal Reserve Bank of New York began storing gold during the major twentieth-century periods of armed conflict (in 1914–1918 and in 1939–1945) when many countries wanted their gold reserves held away from military action.

Only a small percentage of the gold in Federal Reserve Bank of New York stores belongs to the United States. The approximately 60 account holders include countries, monetary authorities, and regional organizations.

Table 10 World Gold Supply and Demand (metric tons)

Supply	2005	2006	2007	2008	2009	2010	2011	2012	2013e	2014e	2015e	2016e	2017e
Mine Production	2,445	2,430	2,417	2,343	2,428	2,739	2,838	2,861	2,884	2,936	2,946	2,980	3,023
Scrap Supply	900	1,129	960	1,220	1,400	1,723	1,669	1,616	1,410	1,320	1,180	1,100	1,100
Net Official Sales	593	365	495	174	–470	–77	–457	–532	–400	–230	–125	–90	–30
Net Producer Hedging	–142	–395	–444	–250	–264	–106	11	–40	–35	50	70	75	90
Total Supply	***3,796***	***3,529***	***3,428***	***3,487***	***3,094***	***4,279***	***4,061***	***3,905***	***3,859***	***4,076***	***4,071***	***4,065***	***4,183***
Fabrication Demand													
Jewelry	2,700	2,285	2,401	2,180	1,650	2,020	1,975	1,893	1,860	1,953	2,054	2,100	2,178
Electronics	285	308	311	280	255	326	320	285	300	310	315	325	340
Dental	61	58	54	53	51	50	53	53	53	55	55	55	55
Official Coins, Medals and Imitation Coins	241	281	297	342	342	302	333	397	389	375	357	340	325
Total Fabrication Demand	***3,287***	***2,932***	***3,063***	***2,855***	***2,298***	***2,698***	***2,681***	***2,627***	***2,601***	***2,693***	***2,781***	***2,820***	***2,897***

Source: Precious Metals Market Outlook, Quarterly—2013 Q1, CRU Analysis.

Table 10 shows the global supply of and fabrication demand for gold from 2005 through 2017 (estimated).

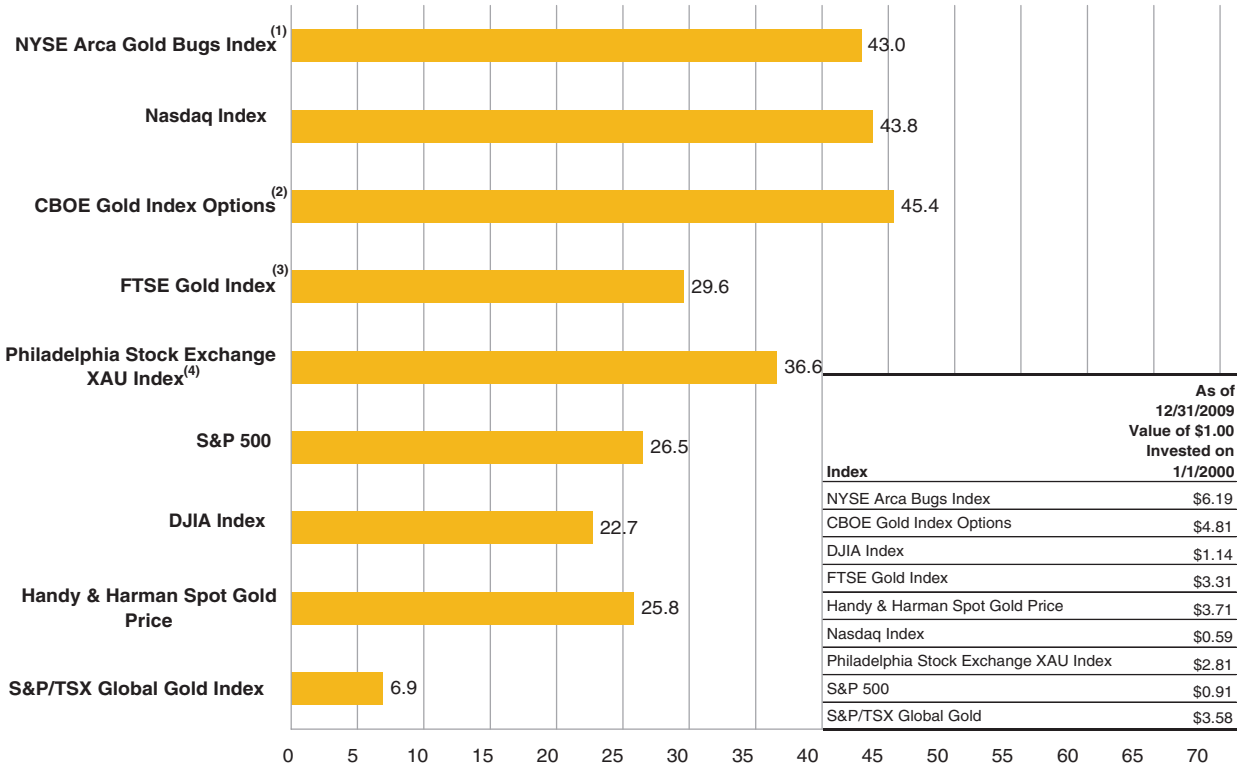
In 1933, U.S. President Franklin D. Roosevelt imposed a ban on U.S. citizens' buying, selling, or owning gold. A series of executive orders prohibited the private ownership of gold, ending its use as a form of tender. One of these executive orders, signed on April 5, 1933, established policing powers, which ultimately led to the confiscation of gold owned by private citizens. This ban was later repealed on December 31, 1974. Further details are contained in Section 7 of this book.

Investment Performance of Gold Share Indices

Gold share prices may perform differently from each other and from the price of gold itself.

Gold shares have tended to exhibit greater volatility than the price of the underlying metal because of the companies' inherent operating leverage. Using calendar year 2009 as a representative example, Figure 21 shows the wide divergence in performance between several kinds of gold share indices, the spot gold price, and leading U.S. equity indices.

Representative Divergent Price Performance of Select Indices of Gold Mining Shares in 2009



Notes:
1. A modified equal -dollar weighted index composed of 16 companies; for information on the constituents of this index, please see www.amex.com.
2. An equal -dollar weighted options index composed of 10 companies; for information on the constituents of this index, please see www.cboe.com.
3. A market capitalization weighted index of primarily South African gold shares; for information on the constituents of this index, please see www.ftse.com.
4. The Philadelphia Stock Exchange Gold and Silver Index is a market capitalization weighted index of 12 companies; for information on the constituents of this index, please see www.phlx.com.

Figure 21 Investment Performance of Gold Share Indices

Sources: Bloomberg LLC; Morgan Stanley Wealth Management Investment Strategy.

Physical Gold

Investors may purchase physical gold in the form of bars or coins. The value of *gold coins* tends to be affected by two main factors:

- The amount and purity of the gold content.
- Details concerning the specific minting.

The value of *gold bars* tends to be determined primarily by weight. Gold coins are usually purchased from specialized dealers, while gold bars are usually purchased in public trading markets. For more information, see:

- www.austrian-mint.com
- www.gold.org

- www.gold-eagle.com
- www.goldinfo.net
- www.goldinstitute.com
- www.handyharman.com
- www.perthmint.com
- www.royalmint.com
- www.thebulliondesk.com
- www.the-privateer.com
- www.usmint.gov

Table 11 lists several popular types of gold coins and gold bars.

Table 11 Selected Types of Gold Coins and Gold Bars

Name	Description
Coins	
American Eagle	A 22-carat gold coin carrying an eagle's head issued by the United States Mint in sizes of 1 ounce, ½ ounce, ¼ ounce, and 1/10 ounce, with face values of $50, $25, $10, and $5, respectively.
Australian Nugget	A 24-carat gold coin issued by GoldCorp of Australia in sizes of 1 kilogram, 10 ounces, 2 ounces, 1 ounce, ½ ounce, ¼ ounce, 1/10 ounce, and 1/20 ounce.
Britannia	A 22-carat legal tender gold coin issued by the Royal Mint in Great Britain in sizes of 1 ounce, ½ ounce, ¼ ounce, and 1/10 ounce.
Maple Leaf	A 24-carat gold coin issued by the Royal Canadian Mint issued in sizes of 1 ounce, ½ ounce, ¼ ounce, and 1/10 ounce.
Philharmoniker	A 1-ounce legal tender 24-carat gold coin produced by the Austrian mint. The coin bears a number of musical instruments to honor the Vienna Philharmonic Orchestra, after which it is named.
Krugerrand	A 22-carat gold bullion coin produced and distributed by Rand Refinery Limited, and minted by the South African Mint. Available in sizes of 1 ounce, ½ ounce, ¼ ounce, and 1/10 ounce.
Chinese Panda	Panda gold coins are struck at the Shenzhen Guobao Mint in sizes of 1 ounce, ½ ounce, ¼ ounce, and 1/10 ounce, and 1/20 ounce.
Bars and Bullion	
Kilobar	The world's most widely traded small gold bar, weighing 1 kilogram. This bar is popular among investors and fabricators as it is normally traded at an extremely low premium to the prevailing value of its gold content.
400-Ounce Bar	A bar that weighs between 350 ounces and 430 ounces with minimum gold purity of 99.5%. Central banks normally hold gold in the form of these bars and are believed to hold 2.5 million of them.
Gold Bullion Bars by Refinery	Gold bullion bars in fineness from 0.9950 to 0.9999 gold are available in sizes of 1 troy ounce, 10 ounces, 1 kilogram, 100 ounces, and 400 ounces from U.S. refineries such as PAMP (Produits Artistiques de Métaux Précieux S.A.), Credit Suisse, and Johnson Matthey.

Source: World Gold Council.

Section 4

Overview of Silver

Silver is a very ductile, malleable chemical element with atomic number 47 denoted by the chemical symbol Ag (from the Latin word *argentum*, meaning "silver"). Soft, white, and lustrous in appearance, silver has the highest electrical conductivity of any element and the highest thermal conductivity of any metal. Silver has long been valued as a precious metal, used in coins, art, jewelry, photographic film, and industry.

History and Background of Silver[9]

For centuries, silver has attracted human interest, and the remains of several ancient civilizations include plentiful amounts of silver jewelry, sacred religious items, and other artifacts shaped from the metal.

Significant improvements in technology and the discovery of the New World in 1492 led to a large increase in mined silver, particularly in Latin America in the sixteenth, seventeenth, and eighteenth centuries. From 1500 through 1800, Bolivia, Peru, and Mexico accounted for over 85 percent of the world's silver production and trade. The remaining production in the period was derived largely from Germany, Hungary, and Russia, with lesser amounts from other European countries, Chile, and Japan. After 1850, several other countries increased production, particularly the United States after the discovery of the 1858–1859 Comstock Lode in Nevada. Global silver production continued to grow, increasing from 40 to 80 million troy ounces annually by the 1870s.

The period from 1876 to 1920 witnessed an upsurge in technological innovation and the exploitation of new ore-bearing regions. Total annual production in the 1875–1900 quarter-century quadrupled over the average of the first 75 years, to nearly 120 million troy ounces per annum. Several

[9] *Source:* The Silver Institute.

mining advances in the twentieth century have led to increased global silver production. These new extraction techniques have been of critical importance to the silver supply, since many of the high-grade ore bodies throughout the world were largely depleted by the end of the nineteenth century.

Silver is sought as a valuable and practical industrial commodity; the largest users of silver are the jewelry, electronics, and photography industries.

The Price of Silver

Figure 22 shows the per-ounce price history of silver from 1970 through mid-2013, and Table 12 shows the year-over-year percentage price change for silver from 1970 through 2012.

In 1980, the price of an average new home in the United States was equivalent to approximately 4,000 ounces of silver. As of 2003, the price of an average new home in the United States was equivalent to approximately 50,000 ounces of silver.[10]

Figure 22 Weekly Price of Silver ($U.S. per Troy Ounce), 1970 through mid-2013

Source: Bloomberg LLC.

[10] *Sources:* Bloomberg; U.S. Census Bureau.

Table 12 Annual Change in the Price of Silver, 1970–2012

% Change in Price		% Change in Price	
Year	Y-o-Y	Year	Y-o-Y
1970	–10.9%	1992	–4.8%
1971	–15.9%	1993	38.4%
1972	47.8%	1994	–4.1%
1973	59.8%	1995	4.9%
1974	34.0%	1996	–7.4%
1975	–4.6%	1997	25.7%
1976	5.0%	1998	–15.1%
1977	9.1%	1999	6.8%
1978	27.0%	2000	–14.8%
1979	361.3%	2001	1.2%
1980	–44.1%	2002	1.6%
1981	–47.3%	2003	25.7%
1982	32.1%	2004	14.8%
1983	–17.9%	2005	29.2%
1984	–28.9%	2006	46.4%
1985	–8.3%	2007	14.7%
1986	–7.9%	2008	–23.0%
1987	24.8%	2009	48.2%
1988	–10.1%	2010	83.2%
1989	–14.0%	2011	–9.94%
1990	–19.4%	2012	9.02%
1991	–7.7%		

Source: Bloomberg LLC.

The Hunt Silver Crisis (1979–1980)

In the 1970s, Nelson Bunker Hunt and William Herbert Hunt, the sons of Texas oil billionaire Haroldson Lafayette Hunt, Jr., decided to buy precious metals as a hedge against inflation. Since gold could not legally be held by U.S. private citizens at that time, the Hunt siblings elected to invest heavily in silver.

In 1979, Nelson Bunker Hunt and William Herbert Hunt, together with a small group of investors, formed a silver pool. In a short period of time, they had amassed nearly 200 million ounces of silver (over 130 million ounces of physical silver and over 50 million ounces in silver futures) and, in the process, contributed to a significant rise in the price of silver. From $5 per ounce in early 1979, the price of silver rose to over $50 per ounce in January 1980. On March 27, 1980, "Silver Thursday," in response to increased margin requirements imposed by certain silver futures exchanges, the resulting margin calls, and other factors, silver plummeted 50 percent and the market price of silver continued to move downward.

Sources: www.encyclopedia.com; www.bloomberg.com.

Annual World Production of Silver since 1900

Table 13 shows the annual world production of silver by country in 2011 and 2012.

Global Supply and Demand Data for Silver

Table 14 sets forth global supply and demand data for silver, from 2003 through 2012.

Physical Silver

Investors may purchase physical silver in the form of bars or coins. The value of silver coins tends to be affected by two main factors:

- The amount and purity of the silver content.
- Details concerning the specific minting.

The value of silver bars tends to be determined primarily by weight. Silver coins and bars (see Table 15) may be purchased from specialized dealers. For more information, see:

- www.austrian-mint.com
- www.handyharman.com

Table 13 Silver Mine Production in 2011 and 2012

	2011		2012E	
Country	Metric Tons Produced	Troy Ounces Produced	Metric Tons Produced	Troy Ounces Produced
United States	1,120	36,008,836	1,050	33,758,284
Australia	1,730	55,620,792	1,900	61,086,419
Bolivia	1,210	38,902,403	1,300	41,795,971
Canada	572	18,390,227	530	17,039,896
Chile	1,290	41,474,463	1,130	36,330,344
China	3,700	118,957,762	3,800	122,172,837
Mexico	4,150	133,425,598	4,250	136,640,673
Peru	3,410	109,634,046	3,450	110,920,076
Poland	1,170	37,616,374	1,170	37,616,374
Russia	1,350	43,403,508	1,500	48,226,120
Other Countries	3,600	115,742,688	3,900	125,387,912
Total	**23,300**	**749,112,395**	**24,000**	**771,617,918**

Conversion ratios: one metric ton equals 32,151 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Source: U.S. Geological Survey, Mineral Commodities Summaries, January 2013.

Table 14 Global Silver Supply-and-Demand Data

(in millions of ounces)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Supply										
Mine Production	597.2	613.6	637.2	641.3	666.1	683	713.6	752.7	757	787
Net Government Sales	88.7	61.9	65.9	78.5	42.5	30.5	15.6	44.2	12	7.4
Old Silver Scrap	196	198.7	202.7	206.2	203	200.8	199.8	228.8	258.1	253.9
Producer Hedging	—	—	45.9	—	—	—	—	50.4	12.2	—
Implied Net Disinvestment	7.8	—	—	—	1.4	—	—	—	—	—
Total Supply	***889.8***	***874.1***	***951.7***	***926***	***913***	***914.3***	***929.1***	***1,076.20***	***1,039.40***	***1,048.30***
Demand										
Fabrication										
Industrial Applications	368.4	389.7	430.3	453	486.2	490.9	403.6	500.7	487.8	465.9
Photography	192.9	178.8	160.3	142.2	117.6	101.3	79.3	72.1	66.1	57.8
Jewelry	186.8	187.6	188.4	176.5	183.8	179.1	178.7	192.8	186.5	185.6
Silverware	85.1	68.3	69.6	63.4	61.5	59.8	55	52.8	48.3	44.9
Coins and Medals	35.7	42.4	40	39.8	39.7	65.3	78.8	99.4	118.3	92.7
Total Fabrication	***868.8***	***866.7***	***888.6***	***874.9***	***888.9***	***896.4***	***795.4***	***917.9***	***907.1***	***846.8***
Producer Dehedging	21	2	—	11.6	24.1	8.7	17.4	—	—	41.5
Implied Net Investment	–	5.4	63.1	39.5	–	9.3	116.3	158.3	132.3	160
Total Demand	**889.8**	**874.1**	**951.7**	**926**	**913**	**914.3**	**929.1**	**1,076.20**	**1,039.40**	**1,048.30**

Sources: U.S. Geological Survey; The Silver Institute.

Table 15 Selected Types of Silver Coins and Silver Bars

Name	Description
Coins	
American Eagle Silver Dollar	A 1-ounce silver coin minted in 0.999 pure silver displaying an American eagle on one side and Lady Liberty on the other, issued by the United States Mint.
Australian Silver Coin Series	A 1-ounce silver coin minted in 0.999 pure silver issued by the Perth Mint of Australia. The 2004 edition displays a kookaburra, a well-known Australian bird.
Britannia	Legal tender silver coins minted in 0.958 pure silver issued by the British Royal Mint in weights of 32 grams, 16 grams, 8 grams, and 3 grams.
Brilliant Silver Canadian Dollar	A 25-gram, 0.999 pure silver coin issued by the Royal Canadian Mint. The 2004 edition commemorates the 400th anniversary of the first French settlement in North America.
Austria and Her People Silver Coins	A 25-gram, silver coin series produced by the Austrian mint. The coins feature several Austrian regions, traditions, and castles in honor of the country and its history.
South African Silver Crown Series	A series of 1-ounce silver coins minted by the South African Mint.
Chinese Silver Panda	A series of silver bullion coins issued by the People's Republic of China. The design of the panda is changed every year, and the coins are minted in different sizes and denominations, ranging from 0.5 troy ounce to 1 kilogram.

(*continued*)

Table 15 (*continued*)

Name	Description
Bars	
Silver Bars	Several weights of silver bars are available; the 1,000-ounce and 100-ounce bars have tended to be the most popular among investors and fabricators.
Silver Bars by Refinery	Silver bars available in various sizes from selected U.S. refineries such as ASARCO and Johnson Matthey, ranging in fineness from 0.9990 to 0.9995 silver.

Source: The Silver Institute.

- www.perthmint.com
- www.royalmint.com
- www.silverinstitute.org
- www.usmint.gov

Section 5

Overview of Platinum and Palladium

History and Background of Platinum and Palladium[11]

Unlike gold and silver, which have been known since the earliest civilizations, platinum and palladium have a more recent history. Platinum was categorized as a precious metal in 1751, and palladium was isolated as a separate metal in 1803.

Platinum

- When platinum was discovered by Spanish conquistadors in sixteenth-century Ecuador, they thought it was silver that had not "ripened." They called it little silver, *platina,* and tossed it back into the rivers to age.
- In 1790, a French goldsmith created platinum jewelry for King Louis XVI, and the king later declared platinum "a metal fit only for kings."
- In 1801, English physician William Hyde Wollaston obtained the first pure sample of platinum.
- In 1924, South Africa became a rich source of platinum when German geologist Hans Merensky discovered the largest platinum deposits ever found.
- As of the early twenty-first century, approximately 90 percent of all platinum supply originates from South Africa and Russia.

Palladium

- Just two years after obtaining the first pure sample of platinum, William Hyde Wollaston discovered palladium in 1803. It was named after the asteroid "Pallas," which was discovered in the same year and which in turn took its name from the Greek "Pallas," goddess of wisdom.
- The use of palladium increased significantly beginning in the 1970s for the development of automobile catalytic converters. Palladium is a

[11] *Sources:* wikipedia.com; webelements.com; platinuminfo.net.

primary component in catalytic converters, which are used to reduce vehicle exhaust emissions.
- Palladium is also used extensively in the electronics, dental, jewelry, and chemical sectors.

At the end of the nineteenth century, and in the first half of the twentieth, platinum became popular for making fine jewelry. At the outset of World War II, platinum was declared a strategic metal by the U.S. military, and its use was prohibited for all nonmilitary purposes. By the end of the twentieth century, and the beginning of the twenty-first century, platinum had reemerged as a popular jewelry component.[12]

The Price of Platinum and Palladium

Figure 23 shows the average monthly price of platinum from 1960 through mid-2013, and Table 16 sets forth the annual changes in the price of platinum over the same time period.

Note:
(1) Pricing data are Johnson Matthey spot platinum price levels from 1960 through 1992 and Handy & Harman price levels from 1993 through 2010.

Figure 23 Average Monthly Price[(1)] of Platinum (U.S. Dollars per Ounce) from 1960 through mid-2013

Sources: Bloomberg LLC; Johnson Matthey PLC.

[12] *Source:* Platinum Guild International.

Table 16 Annual Changes in the Price of Platinum

Year	1960–2012 % Change in Price Y-o-Y	Year	1960–2012 % Change in Price Y-o-Y
1960	4.4%	1987	5.3%
1961	–0.2%	1988	4.6%
1962	0.2%	1989	–7.5%
1963	0.0%	1990	–14.3%
1964	6.0%	1991	–15.7%
1965	11.3%	1992	2.9%
1966	1.5%	1993	5.8%
1967	15.0%	1994	6.8%
1968	136.5%	1995	0.0%
1969	–34.2%	1996	–9.1%
1970	–32.4%	1997	2.7%
1971	–9.9%	1998	–7.9%
1972	30.3%	1999	20.7%
1973	11.6%	2000	45.1%
1974	7.9%	2001	–23.4%
1975	–16.4%	2002	27.1%
1976	9.1%	2003	35.8%
1977	13.5%	2004	5.8%
1978	91.5%	2005	12.9%
1979	82.0%	2006	15.3%
1980	–6.2%	2007	36.9%
1981	–31.6%	2008	–41.3%
1982	–9.6%	2009	63.3%
1983	9.5%	2010	21.0%
1984	–22.7%	2011	–21.2%
1985	10.2%	2012	10.4%
1986	41.9%		

Data are as of December 31, 2012.

Source: Bloomberg LLC.

Figure 24 shows the average monthly price of palladium from 1970 through mid-2013, and Table 17 sets forth the annual changes in the price of palladium over the same time period.

Note:
(1) Pricing data are Johnson Matthey spot palladium price levels from 1970 through 1994 and Handy & Harman price levels from 1994 through 2013.

Figure 24 Average Monthly Price[(1)] of Palladium (U.S. Dollars per Ounce) from 1970 through mid-2013

Source: Bloomberg LLC.

Table 17 Annual Changes in the Price of Palladium

Year	1970–2012 % Change in Price Y-o-Y	Year	1970–2012 % Change in Price Y-o-Y
1970	0.0%	1985	–29.1%
1971	–1.4%	1986	22.1%
1972	94.2%	1987	3.4%
1973	21.6%	1988	9.2%
1974	46.0%	1989	4.6%
1975	–64.7%	1990	–36.5%
1976	21.4%	1991	–8.0%
1977	0.0%	1992	30.0%
1978	37.3%	1993	18.3%
1979	138.6%	1994	26.6%
1980	–9.6%	1995	–15.6%
1981	–53.6%	1996	–11.0%
1982	28.6%	1997	69.1%
1983	82.2%	1998	47.6%
1984	–18.3%	1999	47.7%

Table 17 (*continued*)

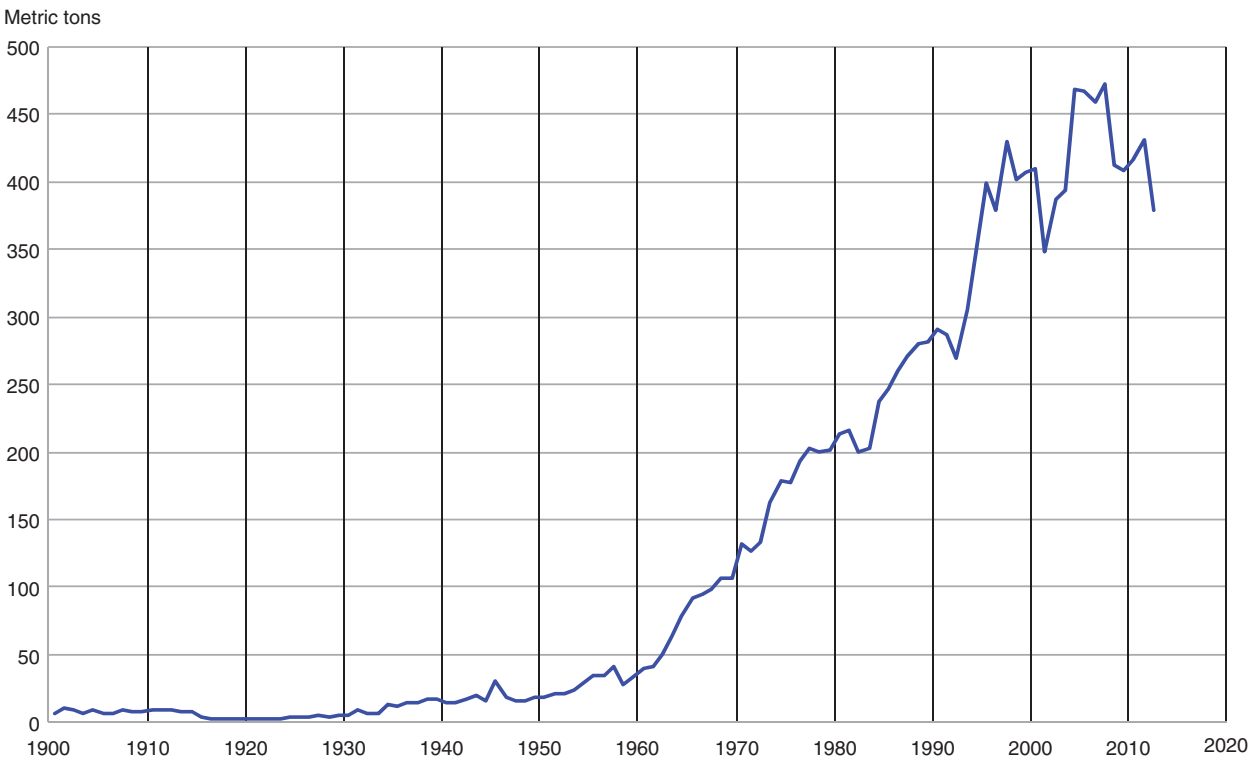
Year	1970–2012 % Change in Price Y-o-Y	Year	1970–2012 % Change in Price Y-o-Y
2000	114.4%	2007	12.7%
2001	–56.6%	2008	–49.7%
2002	–40.5%	2009	119.7%
2003	–15.8%	2010	96.7%
2004	–8.3%	2011	–18.5%
2005	38.6%	2012	7.7%
2006	26.7%		

Data are as of December 31, 2012.

Source: Bloomberg LLC.

World Production of Platinum and Palladium

Figure 25 displays the world production of platinum and palladium (and small amounts of other platinum-group metals including iridium, osmium,



Note:
(1) Includes world production for platinum, palladium, and small amounts of other platinum-group metals including iridium, osmium, rhodium, and ruthenium.

Figure 25 World Production(1) of Platinum and Palladium from 1900 through 2012

Source: matthey.com.

Table 18 Platinum Mine Supply[a]

Country	2011 Metric Tons Produced	2011 Troy Ounces Produced (000)	2012 Metric Tons Produced	2012 Troy Ounces Produced (000)
South Africa	151.2	4,860	127.4	4,095
Russia	26.0	835	24.9	800
Other countries	24.6	790	23.2	745
Total	**201.7**	**6,485**	**175.4**	**5,640**

[a] Conversion ratios: one metric ton equals 32,150 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Sources: Johnson Matthey PLC; www.platinum.matthey.com.

Table 19 Palladium Mine Supply[a]

Country	2011 Metric Tons Produced	2011 Troy Ounces Produced (000)	2012 Metric Tons Produced	2012 Troy Ounces Produced (000)
South Africa	79.6	2,560	72.5	2,330
Russia	108.2	3,480	89.6	2,880
Other countries	41.1	1,320	41.5	1,335
Total	**228.9**	**7,360**	**203.6**	**6,545**

[a] Conversion ratios: one metric ton equals 32,150 troy ounces; one troy ounce equals 1.0971 avoirdupois ounces.

Sources: Johnson Matthey PLC; www.platinum.matthey.com.

rhodium, and ruthenium) from 1990 through mid-2013, and Tables 18 and 19 show the principal countries' supply of platinum and palladium in 2011 and 2012.

Global Supply and Demand Data

Table 20 presents platinum's supply and demand data for the 2003–2012 time frame. Table 21 presents palladium's supply-and-demand data for the 2003–2012 time frame.

Table 20 Global Supply of and Demand for Platinum, 2000–2009

(In thousands of troy ounces)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Supply by Region										
South Africa	4,630	5,010	5,115	5,295	5,070	4,515	4,635	4,635	4,860	4,095
Russia	1,050	845	890	920	915	805	785	825	835	800
North America	295	385	365	345	325	325	260	200	350	295
Rest of World	225	250	270	270	290	295	345	390	440	450
Total Supply	***6,200***	***6,490***	***6,640***	***6,830***	***6,600***	***5,940***	***6,025***	***6,050***	***6,485***	***5,640***

Table 20 (*continued*)

(In thousands of troy ounces)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Demand										
Autocatalyst:										
Gross	3,270	3,490	3,795	3,905	4,145	3,655	2,185	3,075	3,185	3,240
Recovery	(645)	(690)	(770)	(860)	(935)	(1,130)	(830)	(1,085)	(1,240)	(1,130)
Jewelry	2,510	2,160	1,965	1,640	1,455	1,365	2,245	1,685	1,665	1,890
Glass	210	290	360	405	470	315	10	385	515	180
Chemical	320	325	325	395	420	400	290	440	470	450
Electrical	260	300	360	360	255	225	180	220	220	155
Petroleum	120	150	170	180	205	240	210	170	210	200
Investment	15	45	15	(40)	170	555	660	655	460	455
Other	470	470	475	490	495	535	440	530	550	575
Total Demand	***6,530***	***6,540***	***6,695***	***6,475***	***6,680***	***6,160***	***5,390***	***6,075***	***6,035***	***6,015***

Source: *Platinum 2013*, published by Johnson Matthey PLC, May 2013.

Table 21 Global Supply of and Demand for Palladium, 2000–2009

(In thousands of troy ounces)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Supply by Region										
South Africa	2,320	2,480	2,605	2,775	2,765	2,430	2,370	2,640	2,560	2,330
Russia	2,950	4,800	4,620	3,920	4,540	3,660	3,635	3,720	3,480	2,880
North America	935	1,035	910	985	990	910	755	590	900	905
Rest of World	245	265	270	270	285	310	340	405	420	430
Total Supply	***6,450***	***8,580***	***8,405***	***7,950***	***8,580***	***7,310***	***7,100***	***7,355***	***7,360***	***6,545***
Demand										
Autocatalyst:										
Gross	3,450	3,790	3,865	4,015	4,545	4,465	4,050	5,580	6,155	6,615
Recovery	(410)	(530)	(625)	(805)	(1,015)	(1,140)	(965)	(1,310)	(1,695)	(1,660)
Jewelry	260	930	1,430	995	715	855	705	495	295	255
Chemical	265	310	415	440	375	350	325	370	440	530
Electronics	900	920	970	1,205	1,240	1,025	975	970	895	770
Dental	825	850	815	620	630	625	635	595	540	530
Investment	30	200	220	50	260	420	625	1,095	(565)	470
Other	110	90	265	85	85	75	70	90	110	105
Total Demand	***5,430***	***6,560***	***7,355***	***6,605***	***6,835***	***6,675***	***6,420***	***7,885***	***6,175***	***7,615***

Source: *Platinum 2013*, published by Johnson Matthey PLC, May 2013.

As of mid-2013, five palladium ETFs had total holdings amounting to more than one third of annual global consumption. While the popularity of palladium ETFs has increased the convenience of investing in the white

metal, when profit taking, asset reallocation, or other ETF liquidations occur, ETFs' holdings of palladium may add to the supply of the metal and exert downward pressure on prices.

Autocatalysts are by far the largest user of palladium; autocatalysts convert over 90 percent of hydrocarbons, carbon monoxide, and oxides of nitrogen produced in the exhaust from gasoline engines into carbon dioxide, nitrogen, and water vapor.[13]

Physical Platinum and Palladium

Investors may purchase physical platinum and palladium in the form of bars or coins. The value of platinum and palladium coins tends to be affected by two main factors:

- The amount and purity of the platinum and palladium content.
- Details concerning the specific minting.

The value of platinum and palladium bars tends to be determined primarily by weight. Table 22 shows several popular platinum and palladium coins and bars as of mid-2013. Platinum and palladium coins and bars may be purchased from specialized dealers. For more information, see:

- www.austrian-mint.com
- www.handyharman.com
- www.perthmint.com
- www.preciousplatinum.com
- www.royalmint.com
- www.usmint.gov

Table 22 Select Types of Platinum Coins and Platinum Bars

Name	Description
Platinum Coins	
Platinum American Eagle	Platinum American Eagle coins are U.S legal tender. They are offered in sizes of 1, ½, ¼, and 1/10 ounces with face values of $100, $50, $25, and $10, respectively.
Australian Koala	Australian Koala coins are issued by the Perth Mint and are available in weights of 2, 1, ½, ¼, 1/10, and 1/20 ounces. The prices reflect the value of their 0.9995 platinum content.
Isle of Man Noble	With its first minting in 1983, the Isle of Man Noble became the first world's first platinum investment coin. Nobles come in weights of 1, ½, ¼, 1/10, and 1/20 ounces.

[13] *Source:* www.stillwaterpalldium.com.

Table 22 (*continued*)

Name	Description
Canadian Maple Leaf	Issued by the Canadian Mint, Canadian Platinum Maple Leafs are available in five sizes: 1, ½, ¼, 1/10, and 1/20 ounces. The 1-ounce coin is the most popular.
Chinese Panda	Chinese Panda coins are made from 0.9995 platinum and are available in sizes of 1, ½, ¼, 1/10, and 1/20 ounces.
Platinum Bars	
Platinum Bars	Investment-grade bars are most common in the 10-ounce size; smaller sizes are also available from various refiners.
Palladium Coins	
Australian Emu	In 1994, the Perth Mint began producing 1-ounce palladium coins as part of the Emu series. In 1998, the mint suspended production due to a worldwide shortage of palladium.
Russian Ballerina	In 1990, the former Soviet Union produced a single issue of 15,000 palladium coins, featuring a ballerina. The coins were not circulated and are very rare.
Palladium Bars	The most common palladium investment bar is the 0.9995 palladium Produits Artistiques de Métaux Précieux (PAMP) Suisse 1-ounce bar.

Sources: Platinum Guild; certifiedmint.com.

Section 6

Overview of Precious Metals Companies

Investors may gain exposure to gold, silver, platinum, and palladium price movements through investment in the shares of precious metals mining companies.

Select Factors Leading to Price Divergence between Precious Metals and Precious Metals Mining Shares

The price movements of precious metals mining shares may (and often do) diverge from the price movements of the underlying metals, due to the following factors, among others:

- Quality and execution ability of management
- Acquisitions and divestitures
- Capital structure
- Issuance/retirement of equity and debt
- Returns on capital
- Governmental policies
- Taxation
- Input costs (e.g., labor and energy)
- Forward sales and hedging activity
- Contractual relationships
- General equity market conditions

Select Precious Metals Mining Shares Indexes

NYSE Arca Gold BUGS Index

The NYSE Arca Gold BUGS Index is a modified weighted index of companies involved in gold mining. The index is designed to give investors significant

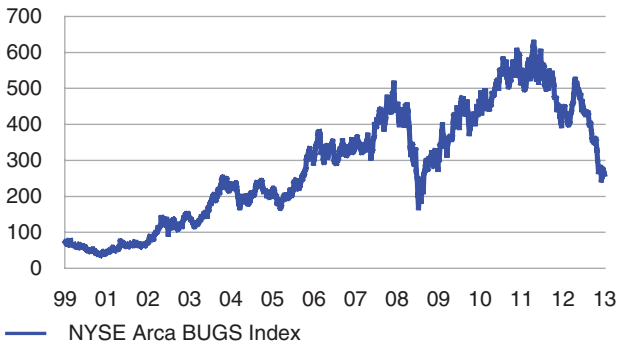


Figure 26 NYSE Arca Gold BUGS Index Performance, 2000 through mid-2013

Source: Bloomberg LLC.

exposure to near-term movements in gold prices by including companies that do not hedge their gold production beyond 1.5 years. The index was developed with a base value of 200 as of March 15, 1996. Figure 26 shows its performance from 2000 through mid-2013, and Table 23 lists its constituents as of December 1, 2011.

Philadelphia Stock Exchange Index

The Philadelphia Stock Exchange Gold and Silver Index is a capitalization-weighted index, which includes the leading companies involved in the mining of gold and silver. The index was developed with a base value of 100

Table 23 AMEX Gold BUGS Index Constituents

Company Name	Symbol	Weight (%)
Goldcorp	GG	16.20
Barrick Gold	ABX	15.37
Newmont Mining	NEM	10.88
Harmony Gold Mining	HMY	5.21
Coeur d'Alene Mines	CDE	5.11
Yamana Gold	AUY	5.00
Anglogold Ashanti	AU	4.88
Gold Fields	GFI	4.80
Randgold Resources	GOLD	4.71
IAMGOLD	IAG	4.43
Eldorado Gold	EGO	4.34
Hecla Mining	HL	4.14
Cia de Minas Buenaventura	BVN	4.08
New Gold	NGD	3.90
Kinross Gold	KGC	3.85
Agnico-Eagle Mines	AEM	3.11

Source: Bloomberg LLC.

Figure 27 Philadelphia Stock Exchange Index Performance, 1999 through mid-2013
Source: Bloomberg LLC.

as of January 1979. Figure 27 shows the performance of the Philadelphia Exchange Gold and Silver Index from 1999 through mid-2013, and Table 24 lists the components of the index as of July 2, 2013.

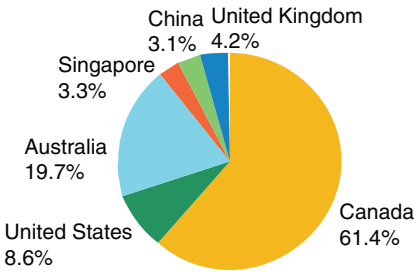
Market Vectors Junior Gold Miners Index

The Market Vectors Junior Gold Miners Index provides exposure to a global universe of publicly traded small- and medium-capitalization companies that generate at least 50 percent of their revenues from gold and/or silver mining, hold real property that has the potential to produce at least 50 percent of the company's revenue from gold or silver mining when developed, or primarily

Table 24 Philadelphia Gold & Silver Constituents

Company Name	Symbol	Weight (%)
Freeport-McMoRan Inc.	FCX	8.57
Newmont Mining Corp.	NEM	8.20
Goldcorp Inc.	GG	8.00
Yamana Gold Inc.	AUY	7.79
Barrick Gold Corp.	ABX	6.60
New Gold Inc.	NGD	4.38
Agnico Eagle Mines Ltd.	AEM	4.06
Cia de Minas Buenaventura	BVN	4.00
Silver Wheaton Corp	SLW	3.90
AngloGold Ashanti Ltd.	AU	3.85
Randgold Resources Ltd.	GOLD	3.79
Royal Gold Inc.	RGLD	3.68
Kinross Gold Corp.	KGC	3.65
Eldorado Gold Corp.	EGO	3.61
Pan American Silver Corp.	PAAS	3.39
IAMGOLD Corp.	IAG	3.03

Source: Bloomberg LLC.



Note:
Data are as of May 31, 2013.

Figure 28 Market Vectors Junior Gold Miners Index: Country Breakdown

Source: Van Eck Global (vaneck.com).

invest in gold or silver. Figure 28 shows the country breakdown of the mining companies in the Market Vectors Junior Gold Miners Index as of May 31, 2013. Table 25 shows the index constituents as of July 1, 2013.

At times, some degree of investor attention has been focused on the junior gold miners. These are small gold-mining firms that often own some land and have conducted geology studies. Junior miners that have not reached

Table 25 Market Vectors Junior Gold Miners Index Constituents

Company Name	Symbol	Weight (%)
Torex Gold Resources	TXG	4.58
Argonaut Gold	AR	4.53
LionGold	LIGO	4.04
China Gold Intl Resources	CGG	3.91
China Precious Metal	1194	3.24
Sandstorm Gold	SSL	2.90
Silvercorp Metals	SVM	2.82
McEwen Mining	MUX	2.76
Dundee Precious Metals	DPM	2.55
Seabridge Gold	SA	2.55
Fortuna Silver Mines	FVI	2.49
Beadell Resources	BDR	2.23
Rubicon Minerals	RMX	2.21
OceanaGold	OGC	2.17
Resolute Mining	RSG	2.11
Primero Mining	P	2.10
Rainy River Resources	RR	2.02
Endeavor Silver	EXK	1.96
Rio Alto Mining	RIO	1.95

Sources: Bloomberg LLC; Van Eck Global (vaneck.com).

production stage do not really represent direct exposure to gold. They are more like a deep-out-of-the money call option that a specific company will be able to overcome numerous regulatory and operational hurdles to produce gold-bearing ore. Among the junior miners, it may be more appropriate for investors to focus on companies within a year of commencing production. Such firms usually have gold in the ground and, in most cases, have passed regulatory and financial hurdles.

FTSE Gold Mines Index

The FTSE Gold Mines index series encompasses all gold-mining companies that have a sustainable and attributable gold production of at least 300,000 ounces a year, and that derive 51 percent or more of their revenue from mined gold. It was launched in 1992 with a base value of 1000. Figure 29 shows the FTSE Gold Mines Index Performance from 1999 through mid-2013, and Table 26 lists the constituents of the index as of June 28, 2013.

Figure 29 FTSE Gold Mines Index Performance, 1999 through mid-2013

Source: Bloomberg LLC.

Table 26 FTSE Gold Mines Index Constituents

Company Name	Symbol	Weight (%)
Goldcorp Inc.	GG	17.83
Barrick Gold Corp.	ABX	14.01
Newmont Mining Corp.	NEM	13.09
Yamana Gold Inc.	AUY	6.37
Newcrest Mining Ltd.	NCM	6.14
Kinross Gold Corp.	KGC	5.15
Randgold Resources Ltd.	GOLD	5.07
AngloGold Ashanti Ltd.	AU	4.79
Agnico-Eagle Mines Ltd.	AEM	4.23
Eldorado Gold Corp.	EGO	3.91

Source: Bloomberg LLC.

For investors seeking region-specific exposure to gold-mining activity, the FTSE Gold Mines Index has the following subcomponents[14]:

- EMEA Index
- Americas Index
- Asia Pacific Index

S&P/TSX Global Gold Index

The S&P/TSX Global Gold Index offers investors a real-time, investable global gold index. As a broadly representative and investable index, the S&P/TSX Global Gold Index can be used as a benchmark of global gold portfolios and as a basis for index-linked investment vehicles. Figure 30 shows the performance of the S&P/TSX Global Gold Index from 2000 through mid-2013, and Table 27 lists the constituents of the index as of July 2, 2013.

Figure 30 S&P/TSX Global Gold Index Performance, 2000 through mid-2013

Source: Bloomberg LLC.

Table 27 S&P/TSX Global Gold Index Constituents

Company Name	Symbol	Weight (%)
Goldcorp Inc.	GG	16.52
Newmont Mining Corp.	NEM	12.18
Barrick Gold Corp.	ABX	12.18
Yamana Gold Inc.	YRI	5.88
Randgold Resources Ltd.	GOLD	4.76
Kinross Gold Corp.	K	4.67
AngloGold Ashanti Ltd.	AU	4.64
Franco-Nevada Corp.	FNV	4.25
Agnico Eagle Mines Ltd.	AEM	3.91
Eldorado Gold Corp.	ELD	3.56

Source: Bloomberg LLC.

[14] *Source:* FTSE, www.ftse.com.

Examples of Precious Metals Companies

Table 28 includes examples of select precious metals mining companies with market capitalization greater than $1 billion (as of June 28, 2013).

Investors may invest in a variety of U.S., Canadian, South African, Australian, and Asian gold-related companies.

Table 28 Performance Data (Expressed in U.S. Dollars)

Name	Symbol	6/28/2013 Price (US $)	6/28/2013 Market Cap. (US $MM)
Examples of gold-producing companies with market capitalization greater than $1 billion			
North America			
Newmont Mining Corp.	NEM	29.95	14745
Barrick Gold Corp.	ABX	15.74	15758
Freeport McMoran Copper & Gold	FCX	27.30	28236
Goldcorp Inc.	GG	24.73	20081
Iamgold Corp.	IAG	4.33	1631
South Africa			
Anglogold Ashanti	656565	14.30	5488
Anglo American Platinum	676100	29.70	8010
Gold Fields	628021	5.25	3884
Impala Platinum	645780	9.33	5898
Harmony Gold Mining	641056	3.81	1658
Australia			
Newcrest Mining	663710	9.00	6899
Asia			
Zhongjin Gold Co.	667682	1.51	4444
Fujian Zijin Mining	672529	0.18	1063
Examples of Silver Producing Companies with market capitalization greater than $1 billion			
BHP Billiton Ltd.	BHP	57.66	185187
Compania de Minas Buenventura	BVN	14.76	4058
Grupo Mexico	264367	2.88	22403
KGHM Polska Miedz	526325	36.33	7266
Coeur d'Alene Mining Corp.	CDE	13.30	1350
Pan American Silver Corp.	PAAS	11.64	1762
Examples of platinum-producing companies with market capitalization greater than $1 billion			
Anglo American Platinum	676100	29.70	8010
Impala Platinum Holdings	645780	9.33	5898
Lonmin PLC	LNMIY	3.88	2206
Examples of palladium-producing companies with market capitalization greater than $1 billion			
Norilsk Nickel Mining Co.	713143	146.40	25210
Stillwater Mining Co.	SWC	10.74	1268

Sources: FactSet; Bloomberg LLC.

Gold Exchange-Traded Funds (ETFs)

The idea of a gold ETF was first officially conceptualized by *Benchmark Asset Management Company Private Ltd.* in India when they filed a proposal with the Securities and Exchange Board of India in May 2002. It did not initially receive regulatory approval and was launched later, in March 2007.

The world's first listing of an exchange-traded commodity backed by physical bullion was issued on the Australian Securities Exchange in 2003.

Sources: SMC Global Securities Ltd.; www.asx.com.au.

Precious Metals Futures and Options Contracts

The New York Mercantile Exchange (www.nymex.com) is the world's largest physical commodity futures exchange. Precious metals trading on the NYMEX is conducted through two divisions: (1) the COMEX Division, which lists futures and options contracts on gold and silver; and (2) the NYMEX Division, which lists futures and options contracts for platinum and options contracts for palladium. In August 2008, Chicago-based CME Group acquired NYMEX Holdings, Inc. for $11.2 billion. The NYMEX platinum contract began trading in 1956 and is the oldest continuously traded precious metals futures contract in the world. The COMEX Division gold futures began trading in 1974, with the repeal of the ban on private ownership of gold in the United States.

Futures and options on futures are regulated by the U.S. Commodity Futures Trading Commission.

Gold and silver futures are also traded on the Chicago Board of Trade (CBOT). Contract unit sizes for gold are available in smaller sizes—33.2 troy ounces on the CBOT versus 100 troy ounces on the COMEX; and contract unit sizes for silver on the CBOT are 1,000 troy ounces for silver versus 5,000 troy ounces on the COMEX. In May 2004, the CBOT announced plans to offer electronically traded standard-size gold and silver contracts.[15]

- *Futures contracts*. Precious metals futures contracts are standardized commitments to make or accept delivery of a specified type and quantity of a precious metal at the end of a specified future month. The price of the futures contract is agreed upon at the time the commitment is made.

[15] *Sources:* Chicago Board of Trade; Jeremy Grant, "Gold Move is CBOT's Third Metal Attempt," *Financial Times,* May 21, 2004.

- *Options contracts*. A *call option* gives the buyer the right, but not the obligation, to buy the underlying asset at a fixed price before a specified date in the future. A *put option* gives the buyer the right, but not the obligation, to sell the underlying asset at a fixed price before a specified date in the future.

Following are some of the more common precious metals futures[16]:

COMEX Gold Futures

Trading symbol	GC
Trading unit	100 troy ounces
Price quotations	U.S. dollars per troy ounce
Grade and quality specifications	For each contract, the seller must deliver 100 troy ounces of gold of not less than 0.995 fineness.
Margin requirements	Margins are required for all open futures positions.

COMEX Silver Futures

Trading symbol	SI
Trading unit	5,000 troy ounces
Price quotations	U.S. dollars per troy ounce
Grade and quality specifications	For each contract, the seller must deliver 5,000 troy ounces of silver of not less than 0.999 fineness.
Margin requirements	Margins are required for all open futures positions.

NYMEX Platinum Futures

Trading symbol	PL
Trading unit	50 troy ounces
Price quotations	U.S. dollars per troy ounce
Grade and quality specifications	For each contract, the seller must deliver 50 troy ounces of platinum of not less than 0.9995 fineness.
Margin requirements	Margins are required for all open futures positions.

NYMEX Palladium Futures

Trading symbol	PA
Trading unit	100 troy ounces
Price quotations	U.S. dollars per troy ounce
Grade and quality specifications	For each contract, the seller must deliver 100 troy ounces of palladium of not less than 0.9995 fineness.
Margin requirements	Margins are required for all open futures positions.

[16] *Source:* New York Mercantile Exchange.

Section 7

Select U.S. Legislation Affecting Gold

In 1966, Alan Greenspan wrote an essay about the relationship between gold and economic freedom. The essay was published in Ayn Rand's *Objectivist* newsletter in 1966 and reprinted in her book, *Capitalism: The Unknown Ideal*, in 1967.

The Gold Confiscation Executive Order of April 5, 1933

From: President of the United States Franklin Delano Roosevelt

To: The United States Congress

Dated: April 5, 1933

Presidential Executive Order 6102, Forbidding the Hoarding of Gold Coin, Gold Bullion, and Gold Certificates

By virtue of the authority vested in me by Section 5(b) of the Act of October 6, 1917, as amended by Section 2 of the Act of March 9, 1933, entitled.

An Act to provide relief in the existing national emergency in banking, and for other purposes, in which amendatory Act Congress declared that a serious emergency exists,

I, Franklin D. Roosevelt, President of the United States of America, do declare that said national emergency still continues to exist and pursuant to said section do hereby prohibit the hoarding of gold coin, gold bullion, and gold certificates within the continental United States by individuals, partnerships, associations, and corporations and hereby

prescribe the following regulations for carrying out the purposes of the order:

Section 1: For the purpose of this regulation, the term "hoarding" means the withdrawal and withholding of gold coin, gold bullion, and gold certificates from the recognized and customary channels of trade. The term "person" means any individual, partnership, association, or corporation.

Section 2: All persons are hereby required to deliver on or before May 1, 1933, to a Federal Reserve bank or a branch or agency thereof or to any member bank of the Federal Reserve System all gold coin, gold bullion, and gold certificates now owned by them or coming into their ownership on or before April 28, 1933, except the following:

(a) Such amount of gold as may be required for legitimate and customary use in industry, profession, or art within a reasonable time, including gold prior to refining and stocks of gold in reasonable amounts for the usual trade requirements of owners mining and refining such gold.

(b) Gold coin and gold certificates in an amount not exceeding in the aggregate $100.00 belonging to any one person; and gold coins having recognized special value to collectors of rare and unusual coins.

(c) Gold coin and bullion earmarked or held in trust for a recognized foreign government or foreign central bank or the Bank for International Settlements.

(d) Gold coin and bullion licensed for other proper transactions (not involving hoarding) including gold coin and gold bullion imported for reexport or held pending action on applications for export license.

Section 3: Until otherwise ordered any person becoming the owner of any gold coin, gold bullion, and gold certificates after April 28, 1933, shall within three days after receipt thereof, deliver the same in the manner prescribed in Section 2; unless such gold coin or gold bullion, and gold certificates are held for any of the purposes specified in paragraphs (a), (b), or (c) of Section 2; or unless such gold coin or gold bullion is held for purposes specified in paragraph (d) of Section 2 and the person holding it is, with respect to such gold coin or bullion, a licensee or applicant for license pending action thereon.

Section 4: Upon receipt of gold coin, gold bullion, or gold certificates delivered to it in accordance with Section 2 or 3, the Federal Reserve bank or member bank will pay thereof an equivalent amount of any other form of coin or currency coined or issued under the laws of the United States.

Section 5: Member banks shall deliver all gold coin, gold bullion, and gold certificates owned or received by them (other than as exempted under the provisions of Section 2) to the Federal Reserve banks of their respective districts and receive credit or payment thereof.

Section 6: The Secretary of the Treasury, out of the sum made available to the President by Section 501 of the Act of March 9, 1933, will in all proper cases pay the reasonable costs of transportation of gold coin, gold bullion, and gold certificates delivered to a member bank or Federal Reserve bank in accordance with Sections 2, 3, or 5 hereof, including the cost of insurance, protection, and such other incidental costs as may be necessary, upon production of satisfactory evidence of such costs. Voucher forms for this purpose may be procured from Federal Reserve banks.

Section 7: In cases where the delivery of gold coin, gold bullion, or gold certificates by the owners thereof within the time set forth above will involve extraordinary hardship or difficulty, the Secretary of the Treasury may, in his discretion, extend the time within which such delivery must be made. Applications for such extensions must be made in writing under oath, addressed to the Secretary of the Treasury and filed with a Federal Reserve bank. Each application must state the date to which the extension is desired, the amount and location of the gold coin, gold bullion, and gold certificates in respect of which such application is made, and the facts showing extension to be necessary to avoid extraordinary hardship or difficulty.

Section 8: The Secretary of the Treasury is hereby authorized and empowered to issue such further regulations as he may deem necessary to carry out the purposes of this order and to issue licenses thereunder, through such officers or agencies as he may designate, including licenses permitting the Federal Reserve banks and member banks of the Federal Reserve System, in return for an equivalent amount of other coin, currency, or credit, to deliver, earmark or hold in trust gold coin or bullion to or for persons showing the need for same for any of the purposes specified in paragraphs (a), (c), and (d) of Section 2 of these regulations.

Section 9: Whoever willfully violates any provision of this Executive Order or these regulations or of any rule, regulation or license issued thereunder may be fined not more than $10,000, or, if a natural person, may be imprisoned for not more than ten years, or both; and any officer, director, or agent of any corporation who knowingly participates in any such violation may be punished by a like fine, imprisonment, or both.

This order and these regulations may be modified or revoked at any time.

/s/

Franklin D. Roosevelt

President of the United States of America

April 5, 1933

The Trading with the Enemy Act of October 6, 1917

Section 5: (**a**) That the President, if he shall find it compatible with the safety of the United States and with the successful prosecution of the war, may by proclamation, suspend the provisions of this Act so far as they apply to an ally of the enemy, and he may revoke or renew such suspension from time to time; and the President may grant licenses, special or general, temporary or otherwise, and for such period of time and containing such provisions and conditions as he shall prescribe, to any person or class of persons to do business as provided in subsection (a) of Section Four hereof, and to perform any act made unlawful without such license in Section Three hereof, and to file and prosecute applications under Subsection (b) of Section Ten hereof; and he may revoke or renew such licenses from time to time, if he shall be of the opinion that such grant or revocation or renewal shall be compatible with the safety of the United States and with the successful prosecution of the war; and he may make such rules and regulations, not inconsistent with the law, as may be necessary and proper to carry out the provisions of this Act; and the President may exercise any power or authority conferred by this Act through such officer or officers as he shall direct.

If the President shall have reasonable cause to believe that any act is about to be performed in violation of Section Three hereof, he shall have authority to order the postponement of the performance of such act for a period not exceeding ninety days, pending investigation of the facts by him.

Section 5: (**b**) That the President may investigate, regulate, or prohibit, under such rules and regulations as he may prescribe, by means of licenses or otherwise, any transactions in foreign exchange, export or earmarkings of gold or silver coin or bullion or currency, transfers of credit in any form (other than credits relating solely to transactions to be executed wholly within the United States), and transfers of evidences of indebtedness or of the ownership of property between the United States and any foreign country, whether enemy, ally of enemy or otherwise, or between residents of one or more foreign countries, by any person within the United States; and he may require any such person engaged in any such transaction to furnish, under oath, complete information relative thereto, including the production of any books of account, contracts, letters, or other papers, in connection therewith in the custody or control of such person, either before or after such transaction is completed.

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Section 5 of the Trading with the Enemy Act (also known as "The Act of October 6th, 1917) was amended by the Emergency Banking Act of March 9, 1933, to include within its definition of the term "enemy of the United States" United States Citizens, thereby putting the Alien Property Custodian in equitable possession of the peoples' property.

Executive Order 6102 of April 5, 1933: Forbidding the Hoarding of Gold Coin, Gold Bullion, and Gold Certificates

On March 9, 1933, the U.S. Congress passed the Emergency Banking Act, which empowered the president to call all gold into the Treasury, with heavy penalties for those who disobeyed the order. At that time, $1.4 billion in gold (approximately 67.7 million troy ounces) was estimated to be in circulation, most of it hoarded. In the next 30 days, more than one third of this was turned in to the U.S. Treasury. On April 5, President Roosevelt issued an executive order requiring holders of gold to turn it in to the U.S. Treasury in exchange for paper currency under penalty of 10 years' imprisonment and/or a $10,000 fine. U.S. Department of Justice agents began visiting known hoarders, who surrendered $38,901,009 in gold. During the same period, unknown hoarders turned in more than $300 million in gold. Attorney General Homer Stille Cummings issued a threat of prosecution against recalcitrants, who still held $560,201,000. On August 28, President Roosevelt issued another order requiring every possessor of gold to register his or her holdings with the U.S. Treasury before September 18. Those who failed to do so were also to be punished by 10 years' imprisonment and/or a $10,000 fine.

One prosecution took place under the order, and in that case, the order was ruled invalid by Federal Judge John M. Woolsey, on the technical grounds that the executive order was signed by the president, not the secretary of the Treasury as required.

The circumstances of the case were that a New York attorney, Frederick Barber Campbell, held on deposit at the Chase National Bank over 5,000 ounces of gold. When Campbell attempted to withdraw the gold, Chase refused, and Campbell sued Chase. A federal prosecutor then indicted Campbell on the following day (September 27, 1933) for failing to register his gold. Ultimately, the prosecution of Campbell failed, but the authority of the federal government to seize gold was upheld.

The case forced the Roosevelt administration to issue a new executive order under the signature of the secretary of the Treasury, Henry Morgenthau, which was in force for a few months until the passage of the Gold Reserve Act on January 30, 1934.

Reports of Safe Deposit Box Seizure

Reports arose that Executive Order 6102 led to the seizure or freezing of safe deposit boxes in 1933. Inaccurate versions of the text of the order also implied that U.S. Internal Revenue Service agents oversaw the supposed freezing of safe deposit boxes. The actual text of the order contains no reference to IRS agents or to safe deposit boxes.

In practice, despite the threat of criminal prosecution, no safe deposit boxes were forcibly searched under the order, and the few prosecutions that occurred in the 1930s for gold hoarding were carried out under different statutes. One of the few such cases occurred in 1936 when the safe deposit box of an individual who was not a U.S. citizen, containing over 10,000 ounces of gold, was seized with a search warrant as part of a tax evasion prosecution. In 1933, approximately 500 tonnes of gold (16.1 million troy ounces) were turned in to the Treasury "voluntarily" at an exchange rate of $20.67 per troy ounce.

Although the U.S. Treasury did not seize safe deposit box contents, it nevertheless came into possession of a large number of them due to bank failures. During the 1930s over 3,000 banks failed, and the contents of their safe deposit boxes were remanded to the custody of the U.S. Treasury. If no one claimed his or her safe deposit box, it remained in the possession of the U.S. Treasury. As of October 1981, 1,605 cardboard cartons remained in the basement of the U.S. Treasury Building in Washington, D.C., each containing the contents of an unclaimed safe deposit box.

The Gold Reserve Act of 1934 made gold clauses unenforceable, and changed the value of the dollar in gold from $20.67 to $35.00 per ounce. This price remained in effect until August 15, 1971, when President Richard M. Nixon announced that the United States would no longer convert dollars to gold at a fixed value, thus abandoning the gold standard for foreign exchange.

The limitation on gold ownership in the United States was repealed after President Gerald R. Ford, Jr. signed a bill legalizing private ownership of gold coins, bars, and certificates by an act of Congress codified in Public Law 93-373, which went into effect December 31, 1974. Public Law 93-373 does not repeal the Gold Repeal Joint Resolution, which makes unlawful any contracts that specify payment in a fixed amount of money or a fixed amount of gold. That is, contracts are unenforceable if they use gold monetarily rather than as a commodity of trade. However, Act of Oct. 28, 1977, Public Law. No. 95-147, § 4(c), 91 Stat. 1227, 1229 (originally codified at 31 U.S.C. § 463 note, recodified as amended at 31 U.S.C. § 5118(d)(2)) amended the 1933 Joint Resolution and made it clear that parties could again include so-called gold clauses in contracts formed after 1977.

> "Gold is mentioned 391 times in the Old Testament, Silver 117 times, and paper currency zero times."
>
> *—David A. Rosenberg*
> *Chief Economist & Strategist*
> *Gluskin Sheff & Associates Inc.*
> *Toronto, Canada*
> *May 31, 2010*

Section 8

Additional Information on Gold

Background Information on Gold[17]

Gold is a chemical element with the symbol Au (from Latin *aurum,* "shining dawn") and an atomic number of 79. It has been a highly sought after precious metal for coinage, jewelry, and other arts since the beginning of recorded history. The metal occurs as nuggets or grains in rocks, in veins, and in alluvial deposits. Gold is dense, soft, shiny, and the most malleable and ductile pure metal known. Pure gold has a bright yellow color and luster traditionally considered attractive, which it maintains without oxidizing in air or water. Gold is one of the coinage metals and has served as a symbol of wealth and a store of value throughout history. Gold standards have provided a basis for monetary policies. Gold has also been linked to a variety of symbolisms and ideologies.

As of 2012, a total of 161,000 tonnes (5,176,150,000 troy ounces) of gold have been mined in human history. Gold dissolves in mercury, forming amalgam alloys, but does not react with it. Gold is insoluble in nitric acid, which dissolves silver and base metals. This property is exploited in the gold-refining technique known as "inquartation and parting." Nitric acid has long been used to confirm the presence of gold in various substances, and this is the origin of the colloquial term *acid test.*

[17] Adapted from Brook Larmer, "The Real Price of Gold," *National Geographic*, January 2009; Lloyd Mallan, "Suiting Up for Space: The Evolution of the Space Suit," utilisegold.com, September 1971; and Jules Pulouze and Edmond Ferry, "General Notions of Chemistry," goldnews.bullionvault.com, December 2005.

Characteristics

A single gram of gold can be beaten into a sheet of one square meter, or an ounce into 300 square feet. Gold leaf can be beaten thin enough to become translucent. The transmitted light appears greenish blue, because gold strongly reflects yellow and red. Such semitransparent sheets also strongly reflect infrared light, making them useful as infrared (radiant heat) shields in visors of heat-resistant suits, and in sun visors for spacesuits.

Gold readily creates alloys with many other metals. These alloys can be produced to modify hardness and other metallurgical properties, to control melting points, or to create exotic colors (see below). Gold is a good conductor of heat and electricity and reflects infrared radiation strongly. Chemically, it is unaffected by air, moisture, and most corrosive reagents, and is therefore well suited for use in coins and jewelry and as a protective coating on other, more reactive, metals. However, it is not chemically inert.

Common colored gold alloys such as rose gold can be created by the addition of various amounts of copper and silver. Alloys containing palladium or nickel are also important in commercial jewelry as these produce white gold alloys. Less commonly, the addition of manganese, aluminum, iron, indium, and other elements can produce more unusual colors of gold for various applications.

Monetary Exchange

Gold has been widely used throughout the world as a vehicle for monetary exchange, either by issuance and recognition of gold coins or other bare metal quantities, or through gold-convertible paper instruments by establishing gold standards in which the total value of issued money is represented in a store of gold reserves.

However, the amount of gold in the world is finite and production has not grown relative to the growth rate of the world's economies. As of 2013, gold-mining output had been declining for several years. With the sharp growth of economies in the twentieth century, and the increasing buildup of foreign exchange balances, the world's gold reserves and gold-trading markets have become a small fraction of the monetary value of trading in global asset markets and fixed exchange rates of currencies to gold became unsustainable. At the beginning of World War I, the warring nations moved to a fractional gold standard, inflating their currencies to finance the war effort. After World War II, gold was replaced by a system of convertible currency according to the Bretton Woods system. Gold standards and the direct convertibility of currencies to gold have been abandoned by world governments, being replaced by fiat currency in their stead. Switzerland was the last country to tie its currency to gold; Switzerland backed 40 percent of the Swiss franc's value until 1999.

History[18]

Egyptian hieroglyphs from as early as 2600 B.C. describe gold, which King Tushratta of the Mitanni claimed was "more plentiful than dirt" in Egypt. Egypt and especially Nubia had the resources to make them major gold-producing areas for much of history. The legend of the golden fleece may refer to the use of fleeces to trap gold dust from placer deposits in the ancient world. Gold is mentioned frequently in the Old Testament, starting with Genesis 2:11 (at Havilah) and is included with the gifts of the magi in the first chapters of Matthew in the New Testament. Revelation 21:21 describes the city of New Jerusalem as having streets "made of pure gold, clear as crystal." The southeast corner of the Black Sea was famed for its gold. Exploitation is said to date from the time of Midas, and this gold was important in the establishment of what is probably the world's earliest coinage in Lydia around 610 B.C. In Asia, from the sixth or fifth century B.C., the Chu (state) circulated the Ying Yuan, one kind of square gold coin.

The Romans developed new methods for extracting gold on a large scale using hydraulic mining methods, especially in Spain from 25 B.C. onward and in Romania from 150 A.D. onward. One of their largest mines was at Las Medulas in León (Spain), where seven long aqueducts enabled them to sluice most of a large alluvial deposit. The mines at Roşia Montană in Transylvania were also very large and, until very recently, were still mined by opencast methods.

The Mali Empire in Africa was famed throughout the Old World for its large amounts of gold. Mansa Musa, ruler of the empire (1312–1337) became famous throughout the Old World for his great hajj to Mecca in 1324. When he passed through Cairo in July 1324, he was reportedly accompanied by a camel train that included thousands of people and nearly 100 camels. He gave away so much gold that it depressed the gold price in Egypt for over a decade.

The European exploration of the Americas was fueled in no small part by reports of the gold ornaments displayed in great profusion by Native American peoples, especially in Central America, Peru, Ecuador, and Colombia. The Aztecs regarded gold as literally the product of the gods.

Gold has been used as a symbol for purity, value, royalty, and particularly roles that combine these properties. Gold as a sign of wealth and prestige was made fun of by Thomas More in his treatise *Utopia*. On that imaginary island, gold is so abundant that it is used to make chains for slaves, tableware, and lavatory seats. When ambassadors from other countries arrive,

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[18] *Sources:* Nicholas Reeves, *Akhenaten: Egypt's False Prophet*. London: Thames & Hudson, 2005; Reid Goldsborough, "A Case for the World's First Coin: The Lydian Lion," World Gold Council.

dressed in ostentatious gold jewels and badges, the Utopians mistake them for menial servants, paying homage instead to the most modestly dressed of their party. It is estimated that 75 percent of all the gold ever produced in human recorded history has been extracted since 1910.

During the nineteenth century, gold rushes occurred whenever large gold deposits were discovered. The first documented discovery of gold in the United States was at the Reed Gold Mine near Georgeville, North Carolina, in 1803. The first major gold strike in the United States occurred in a small north Georgia town called Dahlonega. Further gold rushes occurred in California, Colorado, the Black Hills, Otago, Australia, the Witwatersrand, and the Klondike region of Alaska.

Occurrence

Gold's atomic number of 79 makes it one of the higher atomic number elements that occur naturally. Similar to all elements with atomic numbers larger than iron, gold is thought to have been formed from a supernova nucleosynthesis process. These explosions scattered metal-containing dusts (including heavy elements such as gold) into the region of space from which they later condensed into our solar system and the Earth.

Production[19]

Since the 1880s, South Africa has accounted for a large proportion of the world's gold supply, with about 50 percent of all the gold ever produced having come from South Africa. Production in 1970 accounted for 79 percent of the world supply, reaching close to 1,000 tons (32,150,000 troy ounces). By 2007, however, production amounted to just 272 tons (8,744,800 troy ounces). This sharp decline was due to the increasing difficulty of extraction, changing economic factors affecting the industry, and tightened safety measures. In 2007, China with 276 tons (8,873,400 troy ounces) overtook South Africa as the world's largest gold producer, the first time since 1905 that South Africa had not been the largest.

Other major producers include the United States, Australia, Russia, and Peru. Mines in South Dakota and Nevada produce approximately two thirds of the gold mined in the United States. Gold is so stable and so valuable that it tends to be practically always recovered and recycled. There is no true consumption of gold in the economic sense; the global stock of gold grows at a fairly slow annual rate, while ownership shifts from one party to another.

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[19] Adapted from Laura Mandaro, "China Pushes to Top as World's Largest Gold Miners," MarketWatch.com, January 2008; and Christian Beinhoff, "Removal of Barriers to the Abatement of Global Mercury Pollution from Artisanal Gold Mining," United Nations Industrial Development Organization, January 1998.

Consumption[20]

India and China are the world's largest consumers of gold, with each country consuming about 25 percent of the world's annual output of gold, purchasing approximately 800 tonnes of gold (25,720,000 troy ounces) every year.

Symbolism

Gold has been highly valued in many societies throughout the ages. In keeping with this, gold has often had a strongly positive symbolic meaning closely connected to the values held in high esteem within a given society. Gold may symbolize power, strength, wealth, warmth, happiness, love, hope, optimism, intelligence, justice, balance, perfection, summer, harvest, and the sun.

Great human achievements are frequently rewarded with gold, in the form of gold medals, golden trophies, and other decorations. Winners of athletic events and other graded competitions are usually awarded a gold medal (e.g., in the Olympic Games). Many awards such as the Nobel Prize are also made of gold. Other award statues and prizes are depicted in gold or are gold plated (such as the Academy Awards, the Golden Globe Awards, the Emmy Awards, the Palme d'Or at the Cannes Film Festival, and the British Academy Film Awards).

Medieval kings were inaugurated under the signs of sacred oil and a golden crown, the latter symbolizing the eternal shining light of heaven, and thus Christian kings were perceived to possess divinely inspired authority. Wedding rings have long been made of gold. Gold is long lasting and unaffected by the passage of time and contributes to the ring symbolism of eternal vows before God and/or the sun and moon and the perfection the marriage signifies. In Orthodox Christianity, the wedded couple is adorned with a golden crown during the marriage ceremony, an amalgamation of symbolic rites.

State Emblem and State Mineral

In 1965, the California Legislature designated gold "the State Mineral and mineralogical emblem." In 1968, the Alaska Legislature named gold "the official state mineral."[21]

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[20] Adapted from "India's Love Affair with Gold Tarnishing," *Financial Times*, March 2008; and Nandita Jain, "Gold: Why China Outbeats India in Gold Reserves." CommodityOnline .com, April 2009.

[21] *Sources:* Jain, "Gold: Why China Outbeats India in Gold Reserves"; "Alaska Statutes," www.legis.state.ak.us; California Government Code selection.

The California Gold Rush and the Panic of 1857[22]

In 1847, the United States produced only 43,000 ounces of gold, primarily as a by-product of base-metal mining. By 1853, California alone produced more than 3 million ounces, then worth some $65 million. The total revenue of the U.S. federal government in 1853 amounted to $61.5 million.

The California gold rush moved the country's political center of gravity sharply westward. About 180,000 people, representing approximately 1 percent of the country's population, left the East Coast for California in 1849 and 1850.

The gold rush produced a national economic boom. Thanks to the new gold supply, the government and private mints greatly increased the amount of gold coinage. As California gold flowed into bank reserves, the banks increased the number of banknotes in circulation. Credit became easy. Railroad mileage tripled in the 1850s; pig iron production increased 14-fold.

Because the United States had no central bank, it was difficult to control the national exuberance. By 1857, as the amount of gold coming out of California began to wane, so did the boom. As the summer progressed, prices on Wall Street began to tumble, and some of the weaker banks and brokerage houses collapsed. But the retreat was orderly until mid-September, when a massive shipment of California gold failed to show up in New York. The steamship *Central America* had been on the New York–Panama run ever since it was built in 1852. The ship had carried prodigious quantities of gold on many voyages.

On September 3, 1857, the *SS Central America* left Panama headed for New York, a trip that usually took about 10 days. On September 11, however, 200 miles off Charleston, South Carolina, the *Central America* was hit by a hurricane and sank. More than 400 people lost their lives. Of far more concern to Wall Street, however, were the four tonnes (128,604 troy ounces) of California gold, then worth more than $2.6 million, in the vessel's hold. When news of the loss of this gold—and the badly needed liquidity it would have provided—reached the Street, the Panic of 1857 ensued and quickly spread to Europe in what may have been one of the first genuinely international financial crises. The banks that survived suspended specie payments, and the economy plunged into a depression that lasted until the outbreak of the Civil War.

In the 1980s, a revolution in underwater technology made search and recovery from deep-sea shipwrecks possible. Using a remotely operated vehicle, and sophisticated statistical analysis, a group of engineers and investors found the ship on September 11, 1987, 130 years after its sinking. Most of

[22] Adapted from John Steele Gordon, "The Immortal Metal," *Barron's*, January 28, 2008.

the gold was recovered. The 39 successors to the original insurance companies that had paid losses claimed ownership and sued. The recovery group argued that it was abandoned property. Nine years later, the courts awarded the recovery group 92 percent of the gold; the insurers received 8 percent.

In 1857, gold was worth $20.67 an ounce. Many of the coins and bars recovered from the *SS Central America* have a numismatic value far above their gold content. A gold bar from the *SS Central America* weighing about 80 pounds was sold at auction in 2001 for $8 million, 10 times its pure gold value.

When Wall Street Rescued the U.S. Treasury[23]

In the 1890s, the U.S. Congress was trying to have it both ways with regard to monetary policy, mandating the gold standard, which makes inflation impossible, and the free coinage silver standard, which guaranteed inflation.

Britain had been on the gold standard since 1821, with the Bank of England willing to buy or sell unlimited quantities of pounds sterling at the rate of three pounds, 17 shillings, $10^1/_2$ pence for an ounce of gold, a rate established in 1694 by Sir Isaac Newton, master of the Mint.

In 1873, the United States set the dollar at $20.67 per ounce of gold.

The Civil War forced the United States off reliance on gold when the government issued $450 million in so-called greenbacks. How, when, and whether to return to the gold standard was one of the big political issues of the post–Civil War era. The Northeast, where most of the country's industrial and financial establishment was located, wanted to return to the gold standard as soon as possible. Farmers in the South and West hated the gold standard, as farmers tend to be chronic debtors and thus benefit from inflation.

Congress passed the law requiring a return to the gold standard by 1879, but in 1878 it passed the Bland-Allison Act, requiring the Treasury to purchase $2 million to $4 million worth of silver every month and turn it into coins at the ratio of 16-to-1.

Congress mandated in 1879 that the Treasury keep at least $100 million in gold on hand to meet any demand for it, and thus maintain the gold standard.

By 1890, the ratio of silver-to-gold market prices had reached 22-to-1. But the Sherman Silver Act of 1890 required the Treasury to buy 4.5 million ounces of silver a month and turn it into coins at the same 16-to-1 ratio.

People began spending silver, the perceived bad money, and hoarding gold, the perceived good money, which they could obtain by withdrawing it

[23] Adapted from John Steele Gordon, "When Wall Street Rescued the Treasury," *Barron's*, October 20, 2008, 1–3.

from the U.S. Treasury. After the stock market crash of 1893, which marked the beginning of a major depression, the trickle of gold out of the U.S. Treasury turned into a flood. Congress quickly repealed the Sherman Silver Act, but people had lost faith in the dollar and the Treasury's ability to maintain the gold standard. Bonds were issued to buy more gold at $100 million, but the metal continued to flow out as people increasingly turned in dollars for gold.

By January 1895, the U.S. gold reserve was down to $64 million and falling fast. The U.S. Congress, dominated by opponents of the gold standard, refused to allow another bond issue to replenish the reserve.

As the months progressed, the amount of gold remaining in the New York sub-Treasury fell to $9 million.

Selling more bonds in the domestic market to buy gold would not do any good, J. P. Morgan said, as the gold would just recycle back out of the Treasury. Instead, he and the Rothschilds, the two most powerful forces in international banking, would buy for the government's account 3.5 million ounces of gold in Europe. To pay for it, Morgan had uncovered an obscure Civil War–era law allowing the government to issue bonds to buy coin with congressional action.

By June 1895, the U.S. Treasury had $107.5 million in gold on hand. Confidence in the U.S. Treasury was restored, and economic recovery had begun.

Britain's 1999–2002 Sale of Gold Reserves[24]

In 1999, U.K. Chancellor of the Exchequer Gordon Brown was accused of trying to take Britain into the European single currency (the euro) by stealth after surprising London's financial sector with the announcement that he was planning to sell more than half of Great Britain's gold reserves.

The 415 tonnes (13.3 million troy ounces) of gold reserves were to be converted into euros, dollars, and yen in the post-1999 period. The sale led to the proportion of the United Kingdom's foreign currency reserves held in gold falling from 17 percent to 7 percent. The chancellor's announcement triggered a fall in the price of gold and provoked the Tories and euro skeptic observers to claim that the decision may have been politically motivated to secretly prepare for Britain's possible entry into the Euro.

Their suspicions were fueled by the timing of the announcement on a Friday afternoon, when most members of Parliament were away from Westminster and news coverage was dominated by the outcome of the elections of the Scottish parliament, Welsh Assembly, and English local councils.

[24] Adapted from *The Daily Telegraph*, May 8,1999.

The U.K. Treasury issued a bland, three-paragraph statement, saying that the sale was intended to achieve "better balance" in Britain's reserves by increasing the percentage held in currency rather than gold, but gave no suggestion that the move might be linked to preparations for joining the euro. Sources in the gold market claimed that Mr. Brown had acted against the advice of Eddie George, the governor of the Bank of England, but this could not be confirmed.

Financiers in the City of London greeted the news with dismay. Haruko Fukuda, chief executive of the World Gold Council, said: "This is a political decision, probably in preparation for joining the euro. This move appears to be preempting the promised referendum. Gold has special characteristics. It has been held as a reserve for thousands of years. Its value does not rely on anybody else's promise to pay, unlike cash, and it builds public confidence."

Francis Maude, the shadow chancellor, said: "Gordon Brown is trying to drag Britain into the single currency by stealth by making it appear inevitable. This could be another step along that road. It is time Gordon Brown started running the Britain economy in the interests of Britain and not in the interests of Europe."

After the sale, Britain's gold holdings amounted to 300 tonnes (9.6 million troy ounces) of bullion. Around 40 percent of the gold sale proceeds was earmarked to be converted in euros, 40 percent into U.S. dollars, and the remaining 20 percent into yen.

The sale of the reserves was seen in Parliament as a further attempt by the U.K. Treasury to bring Britain's economy into line with those countries already signed up to participate in the euro. At the time, Chancellor Brown made no secret of his desire to put Britain into a position where it could join the single currency, possibly by 2002, with a minimum of financial upheaval.

The European Central Bank, which administers the euro, encouraged countries joining the single currency to sell more of their large gold reserves, seeing gold as a bad investment. Having peaked at $835 an ounce in 1980, but by 1999, the gold price had been struggling along at around $300 for approximately 10 years.

A spokesperson for the U.K. Treasury said: "This has nothing whatsoever to do with joining the Euro. It is about efficient asset allocation with our country's foreign exchange reserves." The sale curtailed to some degree the Bank of England's 300-year-old practice of holding gold as a significant part of Britain's foreign exchange reserves.

Britain's gold sales took place via a series of auctions that started in July 1999 and concluded in March 2002, in which 395 metric tons (12.7 million troy ounces) were sold at an average price of slightly less than $275 per troy ounce.

Switzerland and Gold[25]

As of April 1999, Switzerland had 2,590 tons of gold (83.3 million troy ounces) in its official reserves, making it the world's fourth-biggest individual official holder of bullion, after the Eurosystem, the United States, and the IMF. As of April 1999, gold represented 38.3 percent of the reserves of the Swiss National Bank (SNB). Many financial market participants inside and outside of Switzerland had long assumed that the strength of the country's currency and its economy owed much to its considerable reserves of gold. The link between gold and the Swiss currency had been enshrined in the country's constitution for more than a century. The media outside Switzerland were therefore taken aback when, on October 24, 1997, a joint group of the Swiss Finance Ministry and the SNB produced a report about reforming the country's currency laws, which, among other matters, recommended that some 1,400 metric tons (45.0 million troy ounces) of the gold reserves should be sold.

The Federal Ministry of Finance and the SNB, in June 1996, formed a joint Working Party. This Working Party recommended the passage of temporary legislation—pending a necessary revision to the constitution—lowering the Swiss gold-currency ratio from 40 percent to 25 percent. This legislation came into effect on November 1, 1997.

With the end of Article 39, section 7, it became clear that the link between the Swiss franc and gold would be severed. However, within Switzerland itself little importance was attached to the move. The reason was because this link had not been in effect for many years, as Switzerland's Society for the Promotion of the Swiss Economy (a body representing the country's employers) pointed out:

> In reality, this linkage to gold ceased a long time ago. The last time the SNB's redemption obligation was actually honoured was in 1936. Gold has for a long time been a normal commodity and the Swiss franc the legal means of payment.
>
> As part of the review of the Constitution, therefore, the Swiss franc's linkage to gold is also to be abolished in law. This will allow for a more realistic market valuation of the SNB's gold reserves and greater flexibility in their use.

When Switzerland joined the IMF in 1992 (following a national referendum), it promised to bring its laws into compliance with the IMF's Articles,

[25] Adapted from *"Switzerland's Gold,"* World Gold Council, June 2000.

including those which allow a country to set the exchange value of its currency through any means other than tying it to gold. It was not clear that the partial gold backing of the Swiss franc was a breach of the IMF's Articles forbidding countries to peg their currencies to gold, but it was seen as contrary to their spirit.

The proposed amendments to the monetary Articles of the Swiss constitution were designed partly to fulfill this pledge.

The new legislation was a direct consequence of the Swiss referendum and represented "housekeeping" legislation, ratifying in law what had been approved for the new constitution. The Bill contained the following salient points:

- It ratified the Swiss franc as the country's official means of payment.
- It set out the areas of competence of the Federal Council, the Department of Finance, and the Swiss National Bank.
- It contained a number of details concerning the issuing and withdrawal of bank notes.
- It did away with Article 19 of the law concerning the Swiss National Bank, which had stipulated that 25 percent of money in circulation had to be backed by gold.
- It did away with Articles 20–22 of the law concerning the Swiss National Bank, which had regulated the exchange of bank notes and coins with gold. The new legislation concerning currency and means of payment made no mention of gold at all.

Swiss voters approved a new Constitution in April 1999 that eliminated the traditional requirement for the country's currency to be backed by gold. The modernization of Switzerland's 125-year-old Constitution, which was backed by all the major Swiss political parties and was expected to pass easily, produced a closer-than-expected vote.

Some 59 percent of voters casting ballots, 969,400 people, approved the new document. In addition to abolishing the gold standard for the Swiss franc, the Constitution enshrined new rights in law, including the right to strike and the principle of equal opportunities for the handicapped.

But 12 of Switzerland's 26 states, known as cantons, voted against the proposal, which needed a majority of both voters and states to pass. About 669,200 people—41 percent—rejected it.[26]

The Swiss federal Constitution was last overhauled in 1874, although it had been modified 140 times since then.

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[26] *Source:* "Swiss Narrowly Vote to Drop Gold Standard," *New York Times,* April 18, 1999.

Gold Performance Relative to Real Interest Rates

According to the Summers-Barsky Gold Thesis, gold prices tend to exhibit strength during periods when real interest rates (e.g., the three-month T-Bill yield minus the consumer price index inflation rate) are zero or negative, and to exhibit weakness during periods when real interest rates are meaningfully positive. This relationship is graphically represented by Figure 31, which displays the spot gold price relative to real interest rates from 1966 through mid-2013.

Gold Investment Flows

Figure 32 presents gold investment flows by categories from 2005 through 2012.

Money Supply and Gold Price vs. Inflation

Figure 33 compares money supply (M2), U.S. consumer price inflation, and gold price for the years 1971 through 1974. It shows a positive (direct) relationship between the gold price and U.S. consumer price inflation, and a negative (inverse) relationship between gold price and money supply (M2).

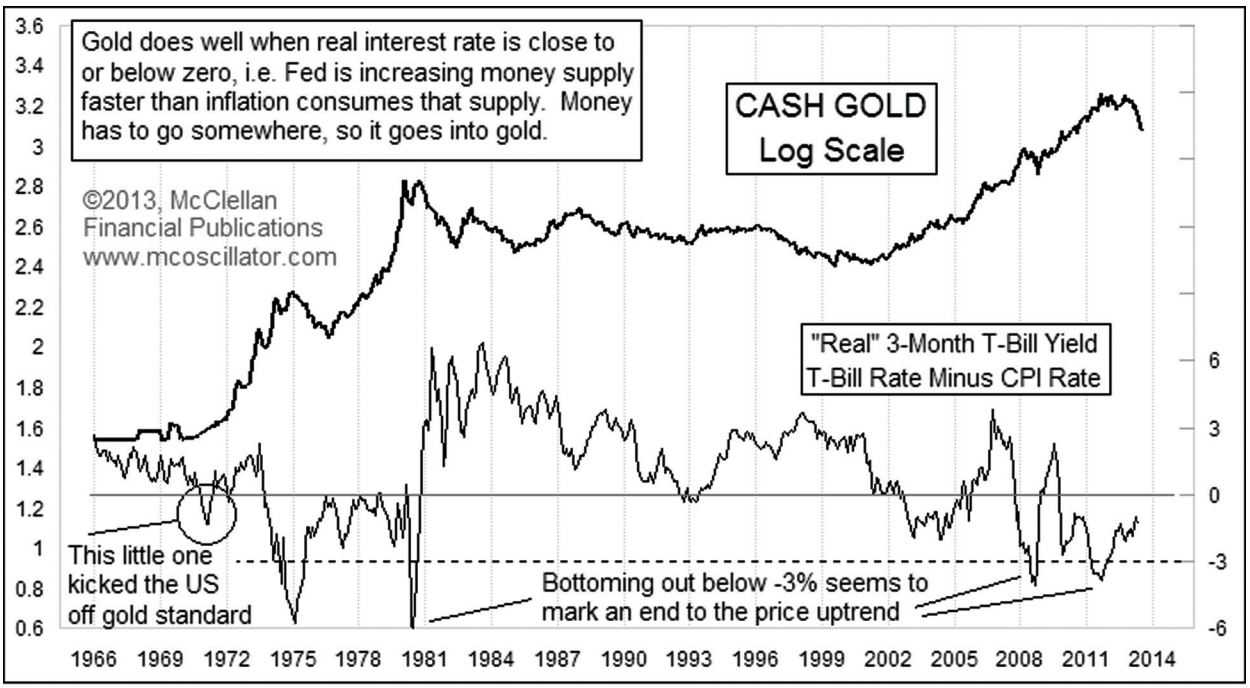

Figure 31 Gold Performance Relative to Real Interest Rates

Source: Copyright © 2013, McClellan Financial Publications, www.mcoscillator.com.

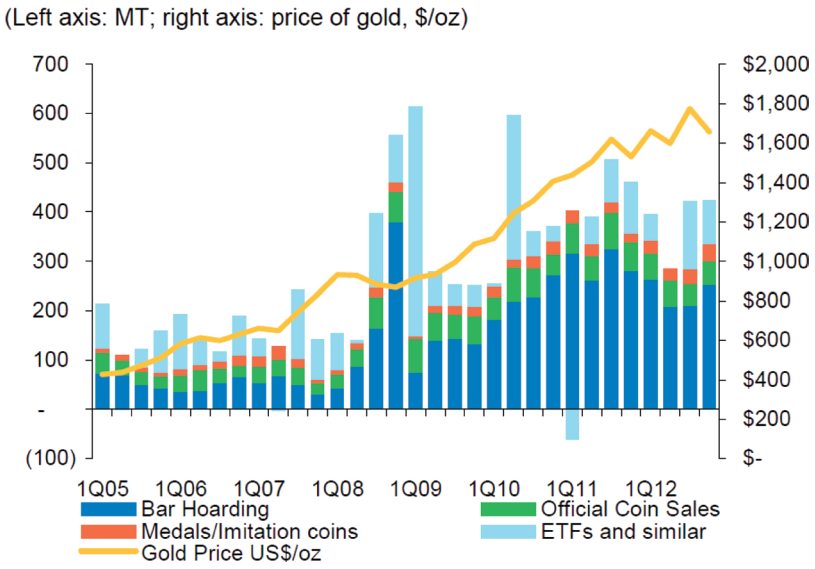

Figure 32 Gold Investment Demand

Source: WGC, GFMS, Morgan Stanley Commodity Research.

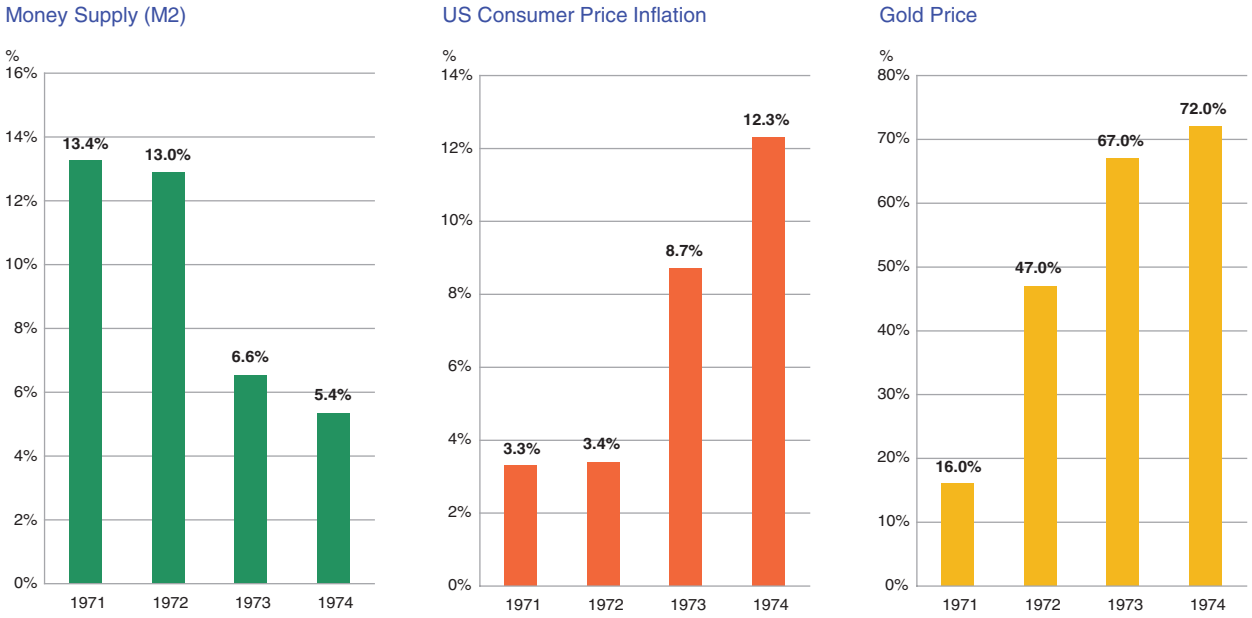

Figure 33 Money Supply and Gold Price vs. Inflation, 1971–1974

Source: Bloomberg LLC.

Operation of the Gold Market[27]

The operation of the gold market is achieved through four primary entities, including the over-the-counter market, the London Bullion Market, futures exchanges, and market regulation.

Over-the-Counter Market

The OTC gold market includes spot, forward, and options and other derivative transactions conducted on a principal-to-principal basis.

While this is a global 24-hour-per-day market, its main centers are London, New York, and Zurich.

Ten members of the London Bullion Market Association (LBMA), the London-based trade association that acts as the coordinator for activities conducted on behalf of its members and other participants in the London bullion market, act as OTC market makers, and most OTC market trades are cleared through London.

London Bullion Market

A primary function of the LBMA is its promotion of refining standards by maintenance of the "London Good Delivery Lists," which are the lists of LBMA accredited smelters and assayers of gold.

Twice daily during London trading hours, a "fix" takes place that provides reference gold prices for that day's trading.

These are referred to as the morning (A.M.) London fix and afternoon (P.M.) London fix. Many long-term contracts are priced based on the London gold fix.

Futures Exchanges

The most significant gold futures exchanges are the COMEX, operated by Commodities Exchange, Inc., a subsidiary of New York Mercantile Exchange, Inc., and the Tokyo Commodity Exchange, also known as TOCOM.

The COMEX is the largest exchange in the world for trading metals futures and options and has been trading gold futures since 1974, while the TOCOM has been trading gold futures since 1982.

Market Regulation

In the United Kingdom, responsibility for the regulation of the financial market participants falls under the authority of the United Kingdom's Financial Services Authority.

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[27] Adapted from Sprott Physical Gold Trust, Form F-1, December 2012.

In the United States, Congress created the Commodity Futures Trading Commission (CFTC) in 1974 as an independent agency with the mandate to regulate commodity futures and options markets in the United States.

Market integrity on the TOCOM is preserved by the TOCOM's authority to perform financial and operational surveillance.

To act as a Futures Commission Merchant Broker, a license must be obtained from Japan's Ministry of Economy, Trade, and Industry (METI).

Section 9

Additional Sources and Disclosures

The sources listed here may offer additional information about precious metals.

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Transactions in commodity futures contracts and options on commodity futures contracts carry a high degree of risk. Futures and options transactions are not appropriate for many investors. Prior to investing (or hedging) in futures or options on futures investors should carefully consider whether such trading is appropriate in light of the investor's experience, objectives, and financial resources. Investors should also fully understand the nature of these investments and any related contractual relationships and the extent of exposure to risk. The risks involved in futures and options on futures include, but are not limited to: (1) investors may sustain a total loss of the funds deposited with the investor's broker to establish or maintain a position in a commodity futures contract and investors may incur losses beyond these amounts; (2) if the market moves against the investor's position, the investor may be called upon by his or her broker to deposit a substantial amount of additional margin funds, on short notice, in order to maintain the position and if the investor does not provide the required funds within the time required by the investor's broker, the position may be liquidated at a loss, with the investor liable for any resulting deficit in his or her account; (3) because of the effect of leverage, a relatively small market movement will have a proportionately larger impact on the funds deposited; (4) investors may find it difficult or impossible to liquidate a position; (5) even if a cash market position is properly hedged,

investors may have to post additional "variation" payments to the investor's broker; (6) futures positions may not effectively track the underlying cash commodity resulting in a hedged position that does not perform as expected; (7) options clients should be fully aware of the standardized terms, special vocabulary (e.g., delta, vega, and other terms) and other potential high-risk characteristics of option transactions; (8) depending on whether the investor is a purchaser or seller of a put or call option the investor should be aware that he or she may suffer a total loss of any option premium and transaction costs paid or be subject to losses in excess of any premium amount received and liability for additional margin; and (9) expected pricing relationships between an option and its underlying futures contract may not exist. Please note these risk factors are illustrative and do not include all of the risks and significant aspects of trading in futures and options on futures.

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Because of their narrow focus, sector investments tend to be more volatile than investments that diversify across many sectors and companies.

Value investing does not guarantee a profit or eliminate risk. Not all companies whose stocks are considered to be value stocks are able to turn their businesses around or successfully employ corrective strategies that would result in stock prices that do not rise as initially expected.

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