

Long-Term Investment Performance

Measuring historical long-term market performance

- Compound annual return (geometric mean)
 - The average performance of an asset that measures the change in wealth over more than one period.
- Arithmetic mean
 - Simple average of returns
- Risk (standard deviation)
 - The fluctuation of returns around the arithmetic average return of the investment. The higher the standard deviation, the greater the variability (and thus risk) of the investment returns.

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Measuring historical long-term market performance

Basic statistical analysis of historical asset returns can reveal the growth rate of wealth invested in an asset class or portfolio and the riskiness or volatility of asset classes.

Compound annual return

The compound annual return is measured by geometric mean. It measures the average performance of an asset or portfolio over a given time period. In other words it is a backward-looking statistic that determines the change in wealth over more than one period.

Arithmetic mean

The arithmetic mean is just the simple average of returns. This measure of average better represents typical performance over single periods.

Risk

Risk is measured by standard deviation. It measures the fluctuation of returns around the arithmetic average return of the investment. The higher the standard deviation, the greater the variability (and thus risk) of the investment returns.

Types of asset classes

→ Stocks

- Large company stocks
- Small company stocks
- International stocks

→ Bonds

- Government bonds
- Corporate bonds
- Municipal bonds
- High yield bonds
- International bonds

→ Cash Equivalents

- Money market funds
- Treasury bills
- Certificates of deposit

→ Real assets

- Real estate
- Commodities
- Gold

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Types of asset classes

The first step in developing an asset allocation policy is learning about investment vehicles and their performance characteristics.

Stocks

Large company stocks are stocks of companies with relatively large market values. Small company stocks are more volatile than large company stocks and, in terms of capitalization, are usually defined as the bottom 20% of the companies listed on the New York Stock Exchange. International stocks represent stocks of foreign companies.

Bonds

The U.S. government is the largest bond issuer in the world. The payment of interest and principal is backed by the U.S. Treasury and, for this reason, government bonds are considered to be one of the safest investments in the world. Corporate bonds usually offer a higher rate of return than government bonds due to the risk of default. High yield bonds exhibit significantly more risk of default than investment grade corporate bonds. Municipal bonds are issued by state and local governments, and the income is exempt from federal income tax. However, the alternative minimum tax (AMT) and state and local taxes could apply, and federal taxes would apply to any capital gains. International bonds are issued by foreign governments or corporations.

Cash equivalents

Cash equivalents represent investments in short-term, high-quality securities such as money market funds, Treasury bills, and certificates of deposit (CDs). These investments are less volatile than stocks or bonds and are highly liquid (easily convertible to cash). CDs are insured by the Federal Deposit Insurance Corporation (FDIC) up to \$100,000 and offer a fixed rate of return. They do not necessarily protect against a rising cost of living. The FDIC insurance on CDs applies in cases of insolvency of the bank but does not protect market value. Other types of cash investments are not insured, and their market value and yield may fluctuate with market conditions.

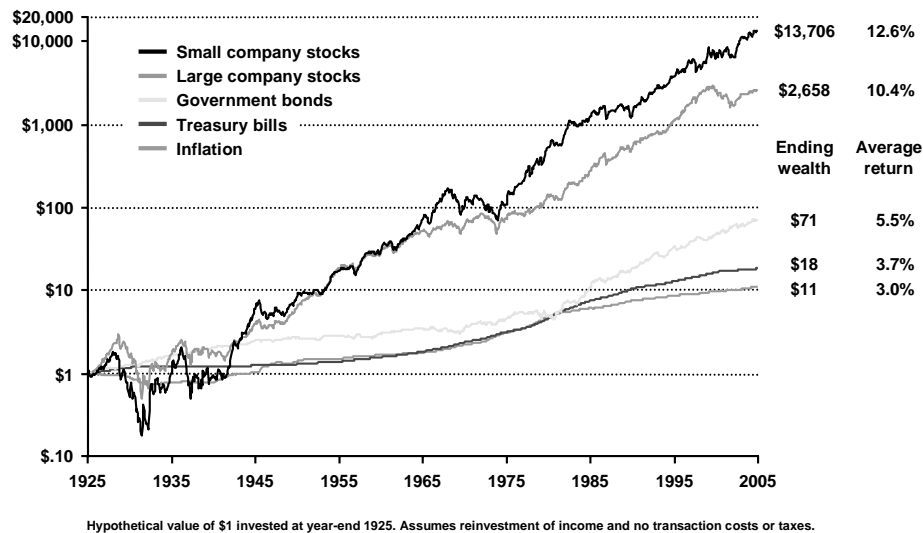
An investment in a money market fund is not insured or guaranteed by the FDIC or any other government agency. Although the funds seek to preserve the value of your investment at \$1 per share, it is possible to lose money by investing in a money market fund.

Real assets

Real assets are those assets falling outside of the traditional classifications of stocks, bonds, and cash equivalents. They have a value independent of the monetary units in which they are denominated and, because of this, can sometimes serve as an effective hedge against inflation.

Stocks, Bonds, Bills, and Inflation

Year-end 1925–2005



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Stocks, Bonds, Bills, and Inflation® 1925–2005

An 80-year examination of past capital market returns provides historical insight into the performance characteristics of various asset classes.

This graph illustrates the hypothetical growth of a \$1 investment in four traditional asset classes, as well as inflation, over the time period December 31, 1925 through December 31, 2005.

Large and small company stocks have provided the largest increase in wealth over the past 80 years. The fixed income investments provided only a fraction of the growth provided by stocks.

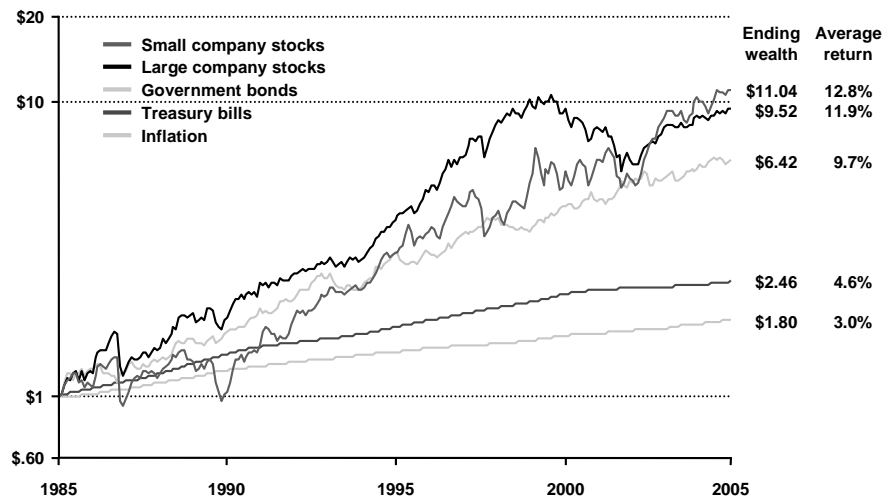
As illustrated in this image, stocks produced greater returns and a higher ending wealth value than fixed income investments. However, these higher returns are associated with much greater volatility (risk). Furthermore, small company stocks may be subject to a higher degree of market risk than large company stocks.

Government bonds and Treasury bills are guaranteed by the full faith and credit of the United States government as to the timely payment of principal and interest, while stocks are not guaranteed and have been more volatile than the other asset classes. Furthermore, small company stocks are more volatile than large company stocks and are subject to significant price fluctuations, business risks, and are thinly traded. The average return represents a compound annual return. Underlying data is from the Stocks, Bonds, Bills, and Inflation® (SBBBI®) Yearbook, by Roger G. Ibbotson and Rex Sinquefeld updated annually.

Source: Small Company Stocks—represented by the fifth capitalization quintile of stocks on the NYSE for 1926–1981 and the performance of the Dimensional Fund Advisors, Inc. (DFA) U.S. Micro Cap Portfolio thereafter; Large Company Stocks—Standard & Poor's 500®, which is an unmanaged group of securities and considered to be representative of the stock market in general; Government Bonds—20-year U.S. Government Bond; Treasury Bills—30-day U.S. Treasury Bill; Inflation—Consumer Price Index.

Stocks, Bonds, Bills, and Inflation

Year-end 1985–2005



Hypothetical value of \$1 invested at year-end 1985. Assumes reinvestment of income and no transaction costs or taxes.

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Stocks, Bonds, Bills, and Inflation 1985–2005

Examining the past 20 years of capital market returns can provide historical insight into the performance characteristics of various asset classes.

This image illustrates the hypothetical growth of a \$1 investment in four traditional asset classes, as well as inflation, over the time period December 31, 1985 through December 31, 2005.

As illustrated in this image, stocks produced greater returns and a higher ending wealth value than fixed income investments. However, the higher returns of stocks are associated with greater volatility (risk). Furthermore, small company stocks may be subject to a higher degree of market risk than large company stocks.

Government bonds and Treasury bills are guaranteed by the full faith and credit of the United States government as to the timely payment of principal and interest, while stocks are not guaranteed and have been more volatile than the other asset classes. Furthermore, small company stocks are more volatile than large company stocks and are subject to significant price fluctuations, business risks, and are thinly traded. The average return represents a compound annual return. Underlying data is from the Stocks, Bonds, Bills, and Inflation® (SBBBI®) Yearbook, by Roger G. Ibbotson and Rex Sinquefeld updated annually.

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Asset class performance

1926–2005

		Small stocks	Large stocks	Government bonds	Treasury bills
Annual	Compound annual return	12.6%	10.4%	5.5%	3.7%
	Standard deviation	32.9%	20.2%	9.2%	3.1%
12-month rolling periods	Highest return	316.4%	162.9%	54.4%	15.2%
	Lowest return	-75.9%	-67.6%	-17.1%	0.0%
	Average positive return	31.9%	22.0%	8.6%	3.8%
	Average negative return	-18.6%	-13.7%	-3.8%	0.0%
	Percent periods positive	72.4%	73.9%	77.8%	98.3%
	Percent periods negative	27.6%	26.1%	22.2%	1.7%

Assumes reinvestment of income and no transaction costs or taxes.

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Historical asset class performance

Understanding the risk and return characteristics of individual asset classes can help determine which investment vehicles are most appropriate for your portfolio.

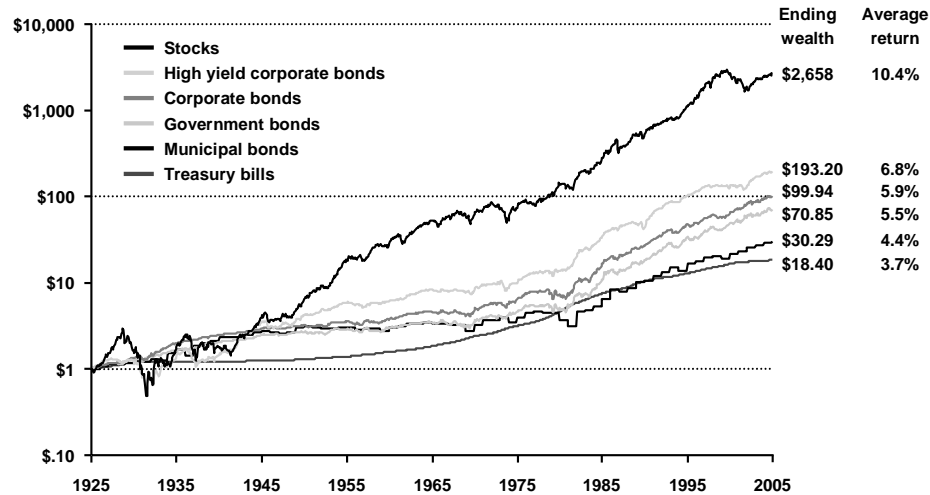
This table shows both annual and 12-month rolling period performance measures for four traditional asset classes from 1926–2005. While small and large stocks have the greatest historical returns, these returns are associated with much greater volatility (risk) as evidenced by a higher standard deviation, the range between the highest and lowest 12-month returns, and the percent of periods that were negative.

The annual statistics are calendar year computations, whereas the rolling period statistics are a series of overlapping, contiguous periods of data. In this case, the first rolling period is January 1926–December 1926; the second rolling period is February 1926–January 1927, etc. The average positive return is the arithmetic average of all periods that experienced a positive return, while the average negative return is the arithmetic average of all periods that experienced a negative return.

Source: Small Company Stocks—represented by the fifth capitalization quintile of stocks on the NYSE for 1926–1981 and the performance of the Dimensional Fund Advisors, Inc. (DFA) U.S. Micro Cap Portfolio thereafter; Large Company Stocks—Standard & Poor's 500®, which is an unmanaged group of securities and considered to be representative of the stock market in general; Government Bonds—20-year U.S. Government Bond; Treasury Bills—30-day U.S. Treasury Bill.

Bond market performance

Year-end 1925–2005



Hypothetical value of \$1 invested at year-end 1925. Assumes reinvestment of income and no transaction costs or taxes.

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Bond market performance 1925–2005

Although bonds have not been the leading asset class for wealth accumulation, they have provided relatively stable returns over the past 80 years.

This image illustrates the hypothetical growth of a \$1 investment in stocks, high yield corporate bonds, corporate bonds, government bonds, municipal bonds, and cash over the period December 31, 1925 through December 31, 2005.

In accordance with their higher risk (due to risk of default), high yield and corporate bonds outperformed government bonds and Treasury bills. When compared to the ending wealth of stocks, however, high yield and corporate bonds fell short. Though municipal bonds underperformed other bonds and stocks, the income they generate is usually exempt from federal income taxes.

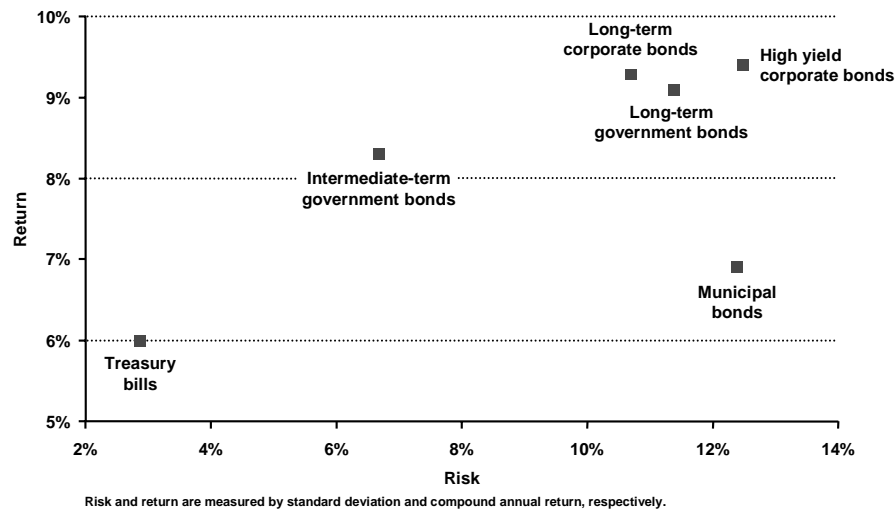
Historically, bonds have not proven to be the best investment vehicle for long-term growth. However, there have been short periods of time when bonds have outperformed stocks, such as the mid-1970s recession and the early 2000s bear market. For this reason, bonds can provide excellent diversification benefits.

The average return represents a compound annual return. Government bonds and Treasury bills are guaranteed by the full faith and credit of the United States government as to the timely payment of principal and interest, while stocks and corporate bonds are not guaranteed. Stocks have been more volatile than the other asset classes. With corporate bonds, an investor is a creditor of the corporation and the bond is subject to default risk. High yield corporate bonds exhibit significantly more risk of default than investment grade corporate bonds. Municipal bonds may be subject to the alternative minimum tax (AMT) and state and local taxes, and federal taxes would apply to any capital gains distributions.

Source: Stocks—Standard & Poor's 500®, which is an unmanaged group of securities and considered to be representative of the stock market in general; High Yield Corporate Bonds—Ibbotson Domestic High Yield Bond Index; Corporate Bonds—Citigroup Long-Term High-Grade Corporate Bond Index; Government Bonds—20-year U.S. Government Bond; Municipal Bonds—1926–1984, 20-year prime issues from Salomon Brothers' Analytical Record of Yields and Yield Spreads and Mergent's Bond Record thereafter; Treasury Bills—30-day U.S. Treasury Bill.

Bonds: risk versus return

1970–2005



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Bonds: risk versus return

When developing an asset allocation policy for the fixed income portion of a portfolio, it is important to understand the risk and return relationship of the bonds being considered.

The image illustrates the risk-and-return relationship of six bond asset classes based on performance over the past 36 years.

The various bonds are plotted according to risk, as defined by standard deviation, along the horizontal axis and compound annual return along the vertical axis. As expected in an efficient market, asset classes exhibiting higher returns are typically associated with higher risk.

High yield corporate bonds have exhibited the highest risk of the asset classes shown. High yield corporate bonds' high volatility, however, has been accompanied by high returns. Municipal bonds had the second highest risk level, but the second lowest return. Note that while municipal bonds underperformed most other bonds examined, the income they generate is usually exempt from federal income taxes. At the low-risk end of the spectrum are cash equivalent investments. These investments have demonstrated very small fluctuations in principal, but have historically offered lower returns as well.

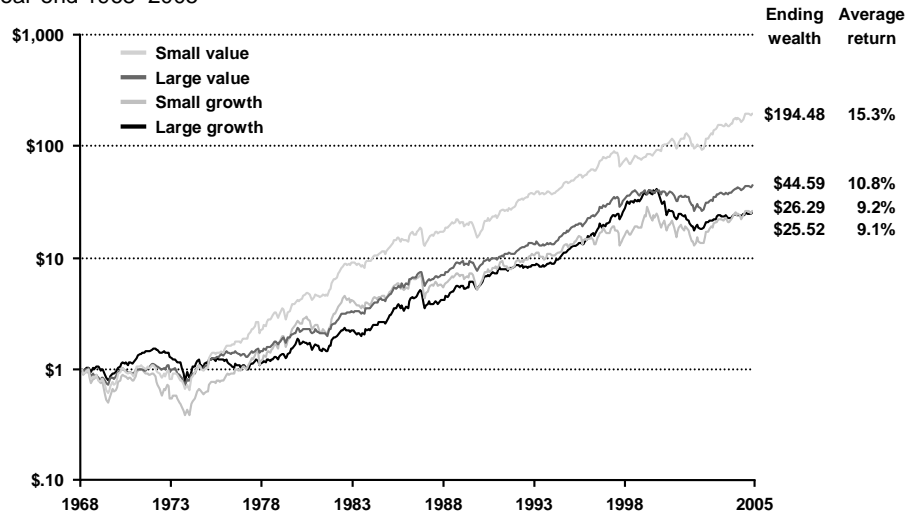
The goal is to select and combine assets in an efficient manner in order to meet your future needs at a risk level with which you feel comfortable.

Government bonds and Treasury bills are guaranteed by the full faith and credit of the United States government as to the timely payment of principal and interest, while corporate bonds are not guaranteed. With corporate bonds, an investor is a creditor of the corporation and the bond is subject to default risk. High yield corporate bonds exhibit significantly more risk of default than investment grade corporate bonds. Municipal bonds may be subject to the alternative minimum tax (AMT) and state or local taxes, and federal taxes would apply to any capital gains distributions. The data assumes reinvestment of all income and does not account for taxes or transaction costs.

Source: High Yield Corporate Bonds—Ibbotson Domestic High Yield Bond Index; Long-Term Corporate Bonds—Citigroup Long-Term High-Grade Corporate Bond Index; Long-Term Government Bonds—20-year U.S. Government Bond; Intermediate-Term Government Bonds—5-year U.S. Government Bond; Municipal Bonds—1926–1984, 20-year prime issues from Salomon Brothers' Analytical Record of Yields and Yield Spreads, and Mergent's Bond Record thereafter; Treasury Bills—30-day U.S. Treasury Bill.

Growth and value investing

Year-end 1968–2005



Hypothetical value of \$1 invested at year-end 1968. Assumes reinvestment of income and no transaction costs or taxes.

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Growth and value investing 1968–2005

Equity investors are faced with several choices of style when selecting stocks or mutual funds. Typically, stock investments are broken down into small and large, in addition to growth and value.

Growth stocks are generally those that have high earnings and/or sales growth. Value stocks, on the other hand, are seen as companies with lower growth potential that could possibly be turned around. Typically value stocks are those that have been on the receiving end of disappointing news, causing the price to be bid down.

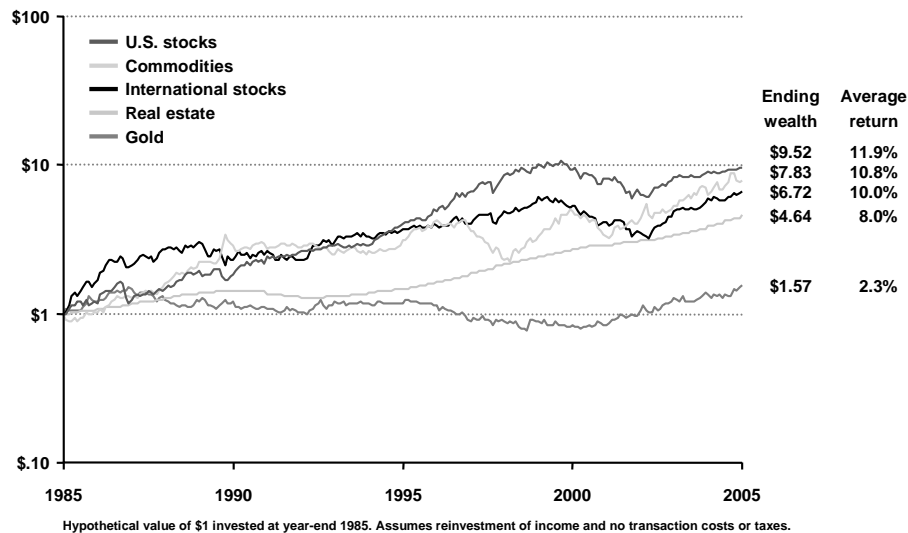
This chart shows the growth of \$1 invested in large growth, large value, small growth, and small value stocks at year-end 1968. Over this long history, value stocks outperformed growth stocks by a large margin, with small value exhibiting the best performance. It is important to note, however, that in some extended periods, growth stocks have outperformed their value counterparts.

Returns and principal invested in stocks are not guaranteed. Furthermore, small company stocks are more volatile than large company stocks, are subject to significant price fluctuations, business risks, and are thinly traded. The average return represents a compound annual return. The image uses monthly data series for large companies traded in the NYSE, AMEX and NASDAQ. Companies in deciles 1-2 are defined as large, deciles 3-5 are midsize, deciles 6-8 are small, and deciles 9-10 are micro company stocks. Growth and value styles for each size grouping are determined by the book-to-price ratio where the total market capitalization of the growth and value indices are equal for that size portfolio. All Ibbotson growth and value indices were constructed with data from CRSP, the Center for Research in Security Prices, Graduate School of Business, The University of Chicago. Index composition is rebalanced annually in June. Stocks are not guaranteed. Furthermore, small company stocks are more volatile than large company stocks and are subject to significant price fluctuations, business risks, and are thinly traded.

Source: Growth and Value Indices—represented by the Ibbotson Associates Growth-Value Indices.

Stocks, commodities, real estate, and gold

Year-end 1985–2005



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Stocks, commodities, real estate, and gold 1985–2005

International stocks, real estate, commodities, and gold have traditionally served to lower the overall risk of a domestic portfolio.

This image illustrates the hypothetical growth of a \$1 investment in domestic stocks, international stocks, commodities, real estate, and gold over the time period December 31, 1985 to December 31, 2005. The best performing asset class over this 20-year period was domestic stocks, with \$1 growing to approximately \$9.52.

International stocks, commodities, real estate, and gold are often overlooked in an investor's asset allocation decision. These assets can be excellent vehicles for diversification purposes, because their returns have demonstrated low or even negative correlation with more traditional assets. In other words, when traditional assets have done poorly, these alternative assets may have done well, thereby reducing the overall volatility (risk) of your portfolio.

Commodities, real estate, and gold can also be an effective hedge against rising inflation rates.

Returns and principal invested in stocks are not guaranteed. International investments involve special risks such as fluctuations in currency, foreign taxation, economic and political risks, and differences in accounting and financial standards. The smooth slope of the real estate index line seems to indicate stable returns. However, these returns are based on appraisal values rather than actual prices. This method of valuing real estate assets tends to smooth price fluctuations that would be more readily apparent if more frequent transaction data were available. The real estate industry is highly cyclical, and the value of securities issued by companies doing business in that sector may fluctuate widely. The commodities index represents a passive unleveraged investment in commodity futures. The risk of loss in trading commodity futures and options can be substantial. Investors could lose the full balance of their account when trading commodities. Gold like any other coin or bullion is subject to investment risks like perceived scarcity of coin, its quality, current demand, market sentiment, and economic factors. The average return represents a compound annual return. Diversification does not eliminate the risk of experiencing investment losses.

Source: U.S. Stocks—Standard & Poor's 500®, which is an unmanaged group of securities and considered to be representative of the stock market in general; International Stocks—Morgan Stanley Capital International Europe, Australasia, and Far East (EAFE®) Index; Commodities—Goldman Sachs Commodity Index; Real Estate—NCREIF Property Index; Gold—1977–1987, Federal Reserve (2nd London fix), Wall Street Journal London P.M. closing price thereafter.