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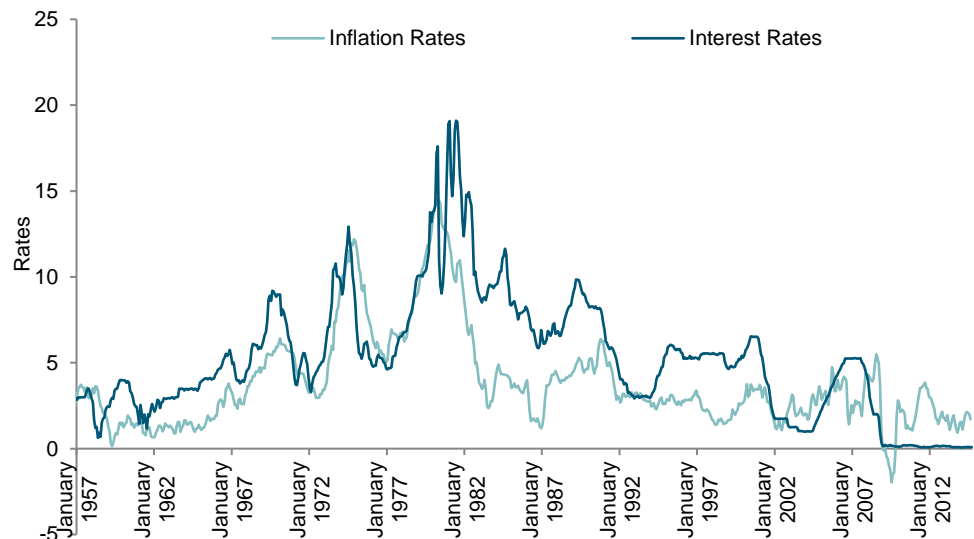
Where Inflation and Interest Rates Intersect

WHAT IS INFLATION?

Inflation is the rate at which prices for goods and services increase. At first, this sounds like a simple concept, but in actuality it is rather complex. Inflation affects numerous aspects of the market and many factors influence it. If prices go up, the current value of the currency is eroded. What could have been purchased a year prior for USD 1.00 might now cost USD 1.03, and if salaries had not risen in tandem with this inflation, the public would have lost purchasing power. From this vantage point, some may see inflation as a bad thing. However, the right balance of inflation and economic growth is important for a healthy economy. An economy that grows too fast can cause high rates of inflation and an economy with slow or no growth can cause low levels of inflation or even deflation (when prices decline). Inflation is one of several key factors that are considered when interest rates are set by the U.S. Federal Reserve. Interest rates determine the cost of borrowing and dictate savings, mortgage, and car loan rates, among others (see Exhibit 1).

The right balance of inflation and economic growth is important for a healthy economy.

Exhibit 1: U.S. Inflation and Interest Rates



Source: St. Louis Federal Reserve. Data as of October 2014. Charts and tables are provided for illustrative purposes.

“Demand-Pull” Inflation

In general, economies are expected to grow—not stay the same or slow down. A growing economy (possibly caused by low interest rates) can cause inflation, as consumers in these economies typically feel confident about the future and spend more money. Sellers anticipate this demand and raise prices, creating inflation. This is also known as “demand-pull” inflation. When supply is not keeping up with demand, prices can become even higher. If consumers expect further inflation in the future, they may make purchases sooner in order to avoid higher prices down the road, which in turn benefits economic growth.

“Cost-Push” Inflation

In contrast, inflation can occur even without economic growth. An increase in the cost of business can cause inflation as well. If manufacturers slow output while demand remains the same, then prices will go up as a result of basic supply and demand principles. Manufacturers could slow down due to higher wages, new taxes or an increase in the cost of exports (foreign exchange or FX cost). This is known as “cost-push” inflation.

Money Supply Expansion

Expansion in the money supply is another major cause of inflation. This occurs when the government or central bank introduces additional money into the economy to spur spending and growth, but the level of production of goods and services remains constant. More money in the economy generally causes increased demand, and this demand chases the same amount of goods. Therefore, prices go up in order to avoid a shortage of supply. In this scenario, inflation erodes the value of money and purchasing power decreases.

The U.S. government can also add money into the economy through the purchase of bonds in the marketplace, which is commonly called quantitative easing (QE). The goal of QE is to inflate prices of bonds so that yields decline, consequently keeping rates low to spur easy lending and growth in the economy.

Inflation, Interest Rates and FX

The rate of inflation influences the direction of interest rates and, conversely, interest rates influence the direction of inflation. If inflation is high, interest rates will typically be raised by the U.S. Federal Reserve to slow economic growth. If inflation is low, economic growth is generally low, and a decrease in rates is enacted in order to lower the cost of borrowing and to spur economic growth. More borrowing power can lead to spending, a stronger economy and, ultimately, inflation. The U.S. Federal Reserve has the task of finding the right balance of tweaking interest rates to

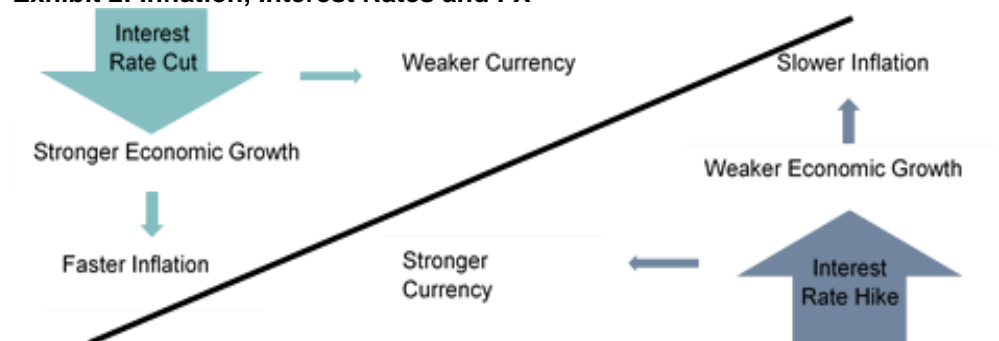
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manage growth and keeping unemployment low and wages high. The Federal Reserve also has to avoid promoting too much growth, which could lead to high inflation. The Fed generally tries to keep inflation within the 2%-3% range.

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When interest rates are increased to tame inflation, foreign capital is usually attracted to the higher rates compared with other countries, and there is more investment in the higher rate environment. This causes the exchange rate to rise. However, if inflation is high (diminishing the purchasing power of that currency), the rise of the currency could be limited. If rates go lower, the opposite is generally true and the currency is likely to suffer (see Exhibit 2).

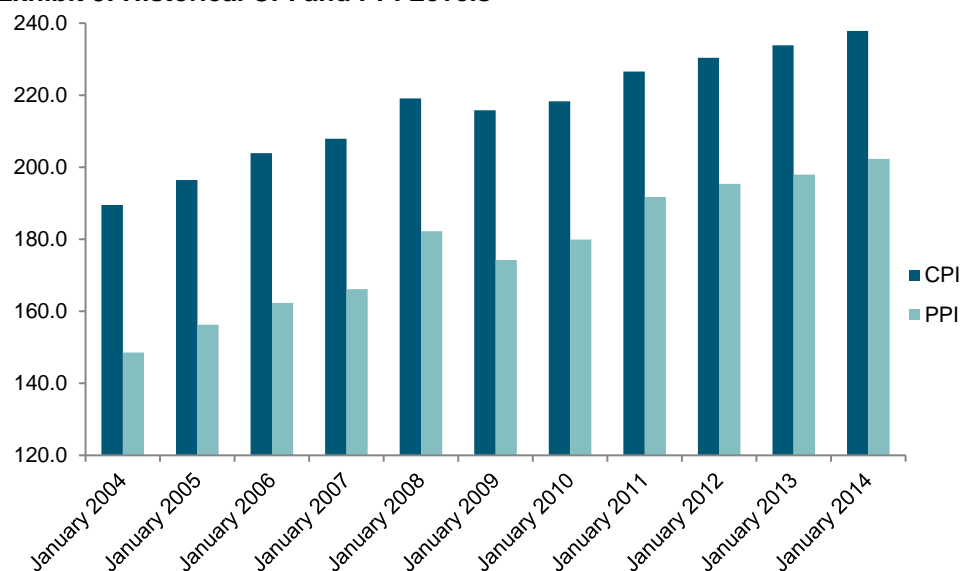
Exhibit 2: Inflation, Interest Rates and FX



Source: S&P Dow Jones Indices LLC. Charts and tables are provided for illustrative purposes.

How is Inflation Measured?

Inflation is measured using several different price sources, with the U.S. Consumer Price Index (CPI) and the Producer Price Index (PPI) being two of the core metrics. The CPI measures the price changes in consumer goods and services. Prices on goods like cars, clothing and food are measured from the purchaser’s point of view. The PPI measures the price changes in goods and services by domestic producers from the seller’s viewpoint. Both indices are calculated monthly and data are produced by the U.S. Bureau of Labor Statistics (see Exhibit 3).

Exhibit 3: Historical CPI and PPI Levels

Source: U.S. Bureau of Labor Statistics. Data as of January 2014. Charts and tables are provided for illustrative purposes.

There are fixed income products that are linked to inflation, and they may offer investors an opportunity to potentially protect the performance of an asset against higher inflation and higher rates.

Inflation-Linked Investment Products

Fixed income products linked to inflation may offer investors a potential opportunity to protect the performance of an asset against higher inflation and higher rates. The U.S. Treasury issues Treasury inflation-protected securities (TIPS). Other countries offer inflation-linked securities and often refer to them as “real bonds” or “linkers.” The advantage of U.S. TIPS is that the purchasing power of future cash flows is protected from inflation. U.S. TIPS are exempt from state and local tax, and they represent a generally liquid market. TIPS pay interest twice per year based on a fixed rate, but the principal value is adjusted based on the CPI in order to account for inflation. The TIPS index ratio is set at 1.0 at issuance and is adjusted on a daily basis according to the CPI, with a three-month lag. The index ratio will therefore increase along with inflation and decrease along with deflation. As the index ratio changes, the principal on the bond adjusts with it on a percentage basis, either up (with inflation) or down (with deflation). At any given time, the number of bonds multiplied by the TIPS index ratio equals the adjusted principal amount. For example, a TIPS index ratio of 1.03 would indicate that the CPI had grown a total of 3% since the corresponding TIPS bond was issued. The principal would be adjusted according to this number, and therefore it would have increased by 3% for this period. An investor who owns USD 100 million par value would receive USD 103,000 in adjusted principal, and the coupon would be paid off of this new principal amount. U.S. TIPS are also protected from deflation if prices go down. The redemption value of the principal cannot go below 100% even if the TIPS index goes below 1.00 (indicating deflation). However, not all “linkers” are protected from deflation.

Characteristics of Inflation-Linked Bond Coupons and Yields

Yield on inflation-linked bonds is calculated on a real rate of return and known as “real yield,” which does not include the performance of the inflation index. At times, the real yield on inflation-linked bonds can be negative. This is due to their relationship with comparable Treasury bonds. To understand this relationship, one has to understand the breakeven rate.

If the inflation rate averages more than the breakeven rate, the inflation-linked bond will outperform the conventional Treasury bond.

The breakeven rate is the difference between the yield on a conventional Treasury bond and the real yield on an inflation-linked bond of similar maturity and credit quality. The breakeven rate reflects the market’s expectation for inflation, and helps to determine which asset will outperform the other. If the inflation rate averages more than the breakeven rate, the inflation-linked bond will outperform the conventional Treasury bond. Conversely, if inflation performs lower than the breakeven rate, the conventional Treasury bond will outperform the inflation-linked bond. Theoretically, if the inflation rate stays at the breakeven rate, neither security will outperform the other.

The real yield on an inflation-linked bond will go below zero if Treasury bonds are trading at yields below the inflation rate. Inflation adjustments to the principal value offset negative yields. The total expected return on an inflation-linked bond is the real yield plus the expected principal adjustments.

Example

A TIPS with a coupon of 0.125% and a maturity of 4/15/19, offered at a price of 101.453125, has a real yield of -.197%, with the last index ratio measuring 1.016462. Compare this to a standard U.S. Treasury bond with a comparable maturity: a Treasury bond with a coupon of 1.625% and a maturity of 4/30/19 has a yield of 1.332% at a price of 101.28125.

The market estimates where inflation will be and prices TIPS accordingly. The above TIPS bond has a real yield of -.197%, a negative yield because currently U.S. Treasuries are yielding 1.332%, which is lower than the expected inflation rate or breakeven rate of 1.529%.

Breakeven rate or expected inflation rate equals comparable U.S. Treasury yield minus TIPS real yield.

$$= 1.332\% - -.197\%$$

$$1.529\% = 1.332\% - -.197\%$$

Real yield on TIPS equals comparable U.S. Treasury yield minus breakeven or expected inflation rate.

$$= 1.332\% - 1.529\%$$

$$-.197\% = 1.332\% - 1.529\%$$

In this example, the breakeven inflation rate equals 1.529% (1.332% - -.197%). If inflation stayed at 1.529% for next four years to the maturity of the TIPS, neither security would be more attractive than the other. But if an investor believed that inflation would average more than 1.529% over the next four years, then the investor would prefer the TIPS issue, as the TIPS issue would outperform the conventional Treasury issue. If the investor believed that inflation would be lower than 1.529%, then they would prefer to buy the U.S. Treasury issue, as the U.S. Treasury would earn a higher yield.

The S&P US Treasury TIPS Index tracks the performance of the U.S. TIPS market.

Indices Based on TIPS

The S&P U.S. TIPS Index is a broad, comprehensive, market value-weighted index that seeks to measure the performance of the U.S. Treasury inflation-linked market. It tracks the entire TIPS market with maturities ranging from 2015 to 2044. Below is the one-year real yield measure or the yield-to-worst (YTW) equivalent in the index. As seen below, the real yield has gone negative at times in the past year.

Exhibit 4: Performance of the S&P U.S. Treasury TIPS Index



Source: S&P Dow Jones Indices LLC, www.spdji.com. Data as of Oct. 20, 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

For more information on this index, including performance data and characteristics, please visit [our website](#).

S&P DJI TIPS and Inflation-Linked Index Offerings			
U.S. INFLATION-LINKED INDICES	COUNTRY	GLOBAL DEVELOPED SOVEREIGN INFLATION-LINKED BOND INDICES	COUNTRY
S&P U.S. TIPS Index	U.S.	S&P Global Developed Sovereign Inflation-Linked Bond Index	Multi
S&P 0-1 Year US Treasury TIPS Index	U.S.	S&P Global Developed Sovereign Inflation-Linked (USD) Bond Index	Multi
S&P 1-3 Year US Treasury TIPS Index	U.S.	S&P/ASX Government Inflation-Linked Bond 0+ Index	Australia
S&P 3-5 Year US Treasury TIPS Index	U.S.	S&P/ASX Government Inflation-Linked Bond 0-10 Year Index	Australia
S&P 5-7 Year US Treasury TIPS Index	U.S.	S&P/ASX Government Inflation-Linked Bond 1-10 Year Index	Australia
S&P 7-10 Year US Treasury TIPS Index	U.S.	S&P/ASX Government Inflation-Linked Bond 10+ Year Index	Australia
S&P 10-15 Year US Treasury TIPS Index	U.S.	S&P/ASX Government Inflation-Linked Bond Index	Australia
S&P 10+ Year US Treasury TIPS Index	U.S.	S&P Canada Sovereign Inflation-Linked Bond Index	Canada
S&P 15+ Year US Treasury TIPS Index	U.S.	S&P Denmark Sovereign Inflation-Linked Bond Index	Denmark
S&P 0-3 Year US Treasury TIPS Index	U.S.	S&P Eurozone Sovereign Inflation-Linked Bond Index	Multi
S&P 0-5 Year US Treasury TIPS Index	U.S.	S&P Eurozone Sovereign (USD) Inflation-Linked Bond Index	Multi
S&P 0-10 Year US Treasury TIPS Index	U.S.	S&P France Sovereign Inflation-Linked Bond Index	France
S&P 0-15 Year US Treasury TIPS Index	U.S.	S&P Germany Sovereign Inflation-Linked Bond Index	Germany
S&P 1-5 Year US Treasury TIPS Index	U.S.	S&P Israel Sovereign Inflation-Linked Bond Index	Israel
S&P 1-10 Year US Treasury TIPS Index	U.S.	S&P Italy Sovereign Inflation-Linked Bond Index	Italy
S&P 1-15 Year US Treasury TIPS Index	U.S.	S&P Japan Sovereign Inflation-Linked Bond Index	Japan
S&P 5+ Year US Treasury TIPS Index	U.S.	S&P New Zealand Sovereign Inflation-Linked Bond Index	New Zealand
S&P 5-10 Year US Treasury TIPS Index	U.S.	S&P Spain Sovereign Inflation-Linked Bond Index	Spain
S&P 5-15 Year US Treasury TIPS Index	U.S.	S&P South Korea Sovereign Inflation-Linked Bond Index	South Korea
S&P 10 Year U.S. TIPS	U.S.	S&P Sweden Sovereign Inflation-Linked Bond Index	Sweden
S&P 30 Year U.S. TIPS	U.S.	S&P U.K. Gilt Inflation-Linked Bond Index	UK

Source: S&P Dow Jones Indices LLC. Charts and tables are provided for illustrative purposes.

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