June 2022

Treasury Inflation-Protected Securities: How they function and the headwinds they face

Key takeaways

TIPS can help investors maintain their purchasing power in inflationary periods, because their principal value adjusts with changes in the Consumer Price Index for All Urban Consumers, providing a real rate of return that exceeds that of nominal Treasury securities.

The disadvantage of owning TIPS is the price also adjusts downward in lockstep with negative CPI-U results, and the real rate of return can become negative in low real interest-rate environments.

We believe the headwinds of higher real interest rates and a peak in inflation can reduce the attractiveness of TIPS.

The U.S. Treasury introduced Treasury Inflation-Protected Securities (TIPS) as assets to protect against inflation, which is one of the greatest risks to Treasury bonds. When consumer prices rise, the value of the fixed-rate coupon of a Treasury security deteriorates — it loses purchasing power. TIPS include an inflation-adjusting mechanism so they reflect both increases and decreases in inflation.

TIPS, like familiar nominal Treasury securities (T-bills, notes, and bonds), are backed by the full faith and credit of the U.S. government, but they are a more recent innovation. While nominal Treasuries trace their origins to the first T-bill issuance in 1929, the first TIPS 10-year note auction was held in January 1997. The TIPS market has grown significantly, reaching $1.8 trillion[1] as of December 31, 2021, which accounts for approximately 10% of the outstanding issuance from the Treasury Department (including nominal Treasury securities and TIPS).

Many investors assume TIPS are a good hedge against inflation. While it's true TIPS provide several benefits as inflation rises, certain risks come with owning the asset class. We believe both their construction mechanics and their risks are not always well understood by potential investors. Below, we explain how TIPS operate, their potential advantages and disadvantages, and our outlook for TIPS in the market environment before us.

1 Bloomberg U.S. Government Inflation-Linked All Maturities Total Return Index, as of 12/31/21.

The mechanics of TIPS

TIPS are constructed similarly to nominal Treasury securities, but they possess components that make them unique and potentially more beneficial for investors during periods of increasing inflation. Nominal Treasuries have a fixed principal and fixed semiannual coupon payments over the life of the investment. When consumer prices increase, the value of the fixed coupon and principal deteriorates. TIPS have fixed semiannual coupon payments, similar to nominal Treasuries, but the principal value of TIPS is not fixed. The principal of TIPS adjusts as inflation is realized, as measured by the Consumer Price Index for All Urban Consumers (CPI-U). CPI-U measures the change in the price of a basket of goods and services consumed by urban households, including volatile items such as food and energy.

The U.S. Treasury produces daily index ratios to calculate the current principal value for each TIPS issue applicable to the original issue date and based off the value of CPI-U. The index ratio incorporates a three-month lag, meaning the index ratio for any particular issue is based off the CPI-U published for three months prior. For example, the index ratio for January 1 references the CPI-U published for October, which is released in November. For all days after the first of the month, the index ratio is derived using a linear interpolation of the current month's reference CPI-U and the next month's reference CPI-U. The current principal value of a specific TIPS can be calculated by multiplying the par value, which is the principal value at issuance, by the corresponding index ratio.

EXAMPLE 1

TIPS principal adjusts with CPI changes

Current principal value = (Par value) x (Index ratio)

Index ratio = (Reference number CPI-U for calculation day) ÷ (Reference CPI-U number as of issuance date)

Reference CPI-U number = CPI-U published for three months prior

Par value	Coupon	Index ratio for 1/31/22	Principal value on 1/31/22
$1,000	0.125%	1.03687	$1,000 x 1.03687 = $1,036.87

Source: Treasury Direct. For illustrative purposes only.

Meanwhile, the coupon rate of TIPS remains fixed as a percentage of the principal payment. As a result, the coupon amount can increase or decrease marginally as the principal of the TIPS adjusts with inflation.

EXAMPLE 2

Coupon adjusts higher when principal increases, lower when principal decreases

Coupon payment = (Current principal value) x (Coupon rate ÷ 2)

Par value	Coupon	Semiannual coupon	Semiannual coupon before adjustment	Semiannual coupon after adjustment
$1,000	0.125%	0.125% ÷ 2 = 0.0625%	$1,000 x 0.0625% = $0.625	$1,036.87 x 0.0625% = $0.648

Source: Treasury Direct. For illustrative purposes only.

In the event of deflation, the principal value will adjust lower during the life of the bond. However, at maturity, the investor will receive the greater of the par value or the inflation-adjusted principal value of the bond. Therefore, at maturity, the investor will never receive a value below par. The principal can move below par value during the life of the bond, so the coupon can move continuously lower, although the move will be marginal.

The fixed semiannual coupon payment on TIPS also has a floor. In 2011, the Department of the Treasury established a minimum coupon at 1/8% (or 0.125%)[2] for all marketable Treasury securities. The department did so believing it was preferable for investors to receive a semiannual payment even in environments where interest rates may be zero or lower.

While the coupon will always be positive — implying the investor will always receive semiannual interest payments — the real yield on TIPS can be negative. The real yield is the total return an investor can expect to receive if they hold the bond until maturity, after adjusting for inflation. Because the principal of TIPS adjusts for inflation, the yield received for holding TIPS is automatically adjusted for inflation and referred to as the real rate. The real rate is adjusted lower than that of a nominal Treasury security. TIPS yields remove the rate premium nominal Treasuries have for inflation uncertainty.

TIPS yield = Real rate = Nominal rate – Inflation expectations

The difference in the nominal Treasury rate and the TIPS rate is called the breakeven inflation rate. The breakeven inflation rate is a measure of inflation expectations. If realized inflation over the life of the investment exceeds the breakeven inflation rate at issuance, then TIPS will outperform the equivalent nominal Treasury.

In general, TIPS tend to outperform nominal Treasuries in environments when realized inflation is higher than expected inflation and real rates remain steady. Conversely, in markets when realized inflation is lower than expected inflation and real rates rise, TIPS tend to underperform.

Investing in TIPS

Like any investment, TIPS present potential advantages and disadvantages. During periods of rising inflation, TIPS may benefit an investor's portfolio to a greater extent than other fixed income sectors that may come under pressure. However, TIPS can also expose an investor to a negative real rate of return, especially in low real interest-rate environments.

Advantages — Protects purchasing power, diversifies away from risk assets

First, it is important to understand the driving factors of TIPS. As previously mentioned, TIPS adjust as inflation is realized, which is measured by changes in CPI-U. Therefore, investing in TIPS can provide a real rate of return that exceeds that of nominal Treasury securities, helping an investor to maintain purchasing power. If an investor holds the security until maturity, they can receive a value above par that accounts for the realized inflation adjustment. There is also downside protection. At maturity, if the principal value falls below the par value due to deflation, the investor receives the greater of the two.

In addition to adjusting for inflation, TIPS also tend to have a low correlation to equities and other risky assets. Over the last 10 years, TIPS have a 0.16 correlation with the S&P 500 Index and have lower correlations to riskier fixed income sectors like high-yield corporates (0.39) and emerging market debt (0.55) relative to other fixed income market segments. However, nominal Treasuries and other fixed income securities have a negative correlation to risky assets over this same period, implying other investments are likely a better hedge to risky assets than TIPS.

2 U.S. Department of the Treasury.

FIGURE 1

Low correlation of TIPS to risky assets

10-year correlation	U.S. TIPS	U.S. Treasury	Aggregate Bond	U.S. IG Corp	U.S. HY Corp	EM Debt	U.S. MBS	S&P 500
U.S. TIPS	—							
U.S. Treasury	0.67	—						
Aggregate Bond	0.83	0.89	—					
U.S. IG Corp	0.77	0.51	0.83	—				
U.S. HY Corp	0.39	–0.17	0.26	0.66	—			
EM Debt	0.55	0.11	0.50	0.78	0.82	—		
U.S. MBS	0.67	0.82	0.85	0.53	0.01	0.28	—	
S&P 500	0.16	–0.33	–0.02	0.36	0.74	0.55	–0.16	—

Sources: Bloomberg, JPMorgan, as of 12/31/21. U.S. TIPS represents the Bloomberg U.S. Treasury Inflation Notes Index; U.S. Treasury represents the Bloomberg U.S. Treasury Index; Aggregate Bond represents the Bloomberg U.S. Aggregate Bond Index; U.S. IG Corp represents the Bloomberg U.S. Corporate Bond Index; U.S. HY Corp represents the Bloomberg U.S. Corporate High Yield Index; EM Debt represents the JPMorgan Emerging Markets Bond Index Global Diversified; U.S. MBS represents the Bloomberg U.S. MBS Index. For illustrative purposes only. Past performance is not a guarantee of future results. Indexes are unmanaged and used as a broad measure of market performance. It is not possible to invest directly in an index. Diversification does not assure a profit or protect against loss. It is possible to lose money in a diversified portfolio.

Disadvantages — Impact of deflation and tax treatment

On the other hand, there are some inherent disadvantages to owning TIPS. First and foremost, the economic environment is not always inflationary. In deflationary environments, the price of TIPS adjusts downward in lockstep with negative CPI-U results. This does not affect the value the investor receives at maturity because TIPS are structured so the investor receives the greater of the par value or realized price. However, the semiannual coupon payments will decrease as the current principal value of the security falls.

EXAMPLE 3

Negative CPI effects on coupon payments

Coupon payment = (Current principal value) x (Coupon rate ÷ 2)

Par value	Coupon	Index ratio	Semiannual coupon before adjustment	Semiannual coupon after adjustment
$1,000	0.125%	0.9631	$1,000 x 0.0625% = $0.625	$963.1 x 0.0625% = $0.6019

Source: Treasury Direct. For illustrative purposes only.

The semiannual coupon payments can move up and down frequently or change quickly because the CPI-U is a headline inflation number. Headline inflation includes food and energy prices, which tend to be very volatile and together account for approximately 20%[3] of the index. Therefore, an investor may not be able to rely on consistent payments.

While the investor will never receive a value below par at maturity and the principal adjusts for inflation, TIPS can still yield a negative real rate of return. As detailed above, a real rate of return, or real yield, is the total return an investor can expect to receive if they hold a bond until maturity after adjusting for inflation. This disadvantage was heightened in 2021, as all TIPS issued were negative-yielding bonds. This is because TIPS were being issued at a premium to par, a price greater than $1,000, due to coupons being floored at 1/8%, while real rates were negative. Therefore, to adjust for the difference, TIPS must be issued at a premium. If an investor holds the investment until maturity, they will have a negative total return, even if realized inflation is in line with inflation expectations.

Another disadvantage is the tax treatment of TIPS. Because the adjustment to principal is treated as a gain, taxes on gains are incurred each year that inflation results in an upward adjustment (in addition to any tax on interest payments). The taxable gain (including interest payments and increase in principal) is subject to federal tax but exempt from state and local taxes. For example, a 2% annual inflation adjustment at a 25% marginal tax rate will owe 0.5% tax (2% x 25%) due to the principal gain, but the interest income is only ~0.125%. In effect, at low yields, TIPS become negative carry bonds (0.125% income – 0.5% tax = –0.375%).

Another consideration when thinking about inflation-indexed investments relates to the Bloomberg U.S. Treasury Inflation Notes Index. TIPS-based ETFs, which track the index, can still expose an investor to negative real rates. Additionally, there are unique risks when it comes to investing in TIPS-based ETFs. The duration of the index tends to be highly variable because the index has no maturity. The TIPS market is a much smaller market than that of nominal Treasuries, and the duration of the index can be quite volatile based on the composition of maturities. This is important because this index is the underlying index for TIP and SCHP, the two largest TIPS-based ETFs in the market (and two of the twelve largest U.S. fixed income ETFs). People investing in these funds might not fully grasp the risk profile at any given time. In rising interest-rate environments, these funds can fluctuate in price significantly, as TIPS are very sensitive to changes in interest rates. The fluctuations can be fairly large, depending on the mix of maturities in these funds when interest rates change. For example, in October 2008, the 10-year nominal Treasury yield rose 0.16% and the TIP ETF returned –8.72%. Additionally, TIPS-based ETFs are more liquid than individual TIPS. In deflationary environments, investors in TIPS-based ETFs may sell their shares because they no longer need them for inflation protection. This can drive down the price of TIPS-based ETFs fairly significantly, and in turn drive down the price of the TIPS market.

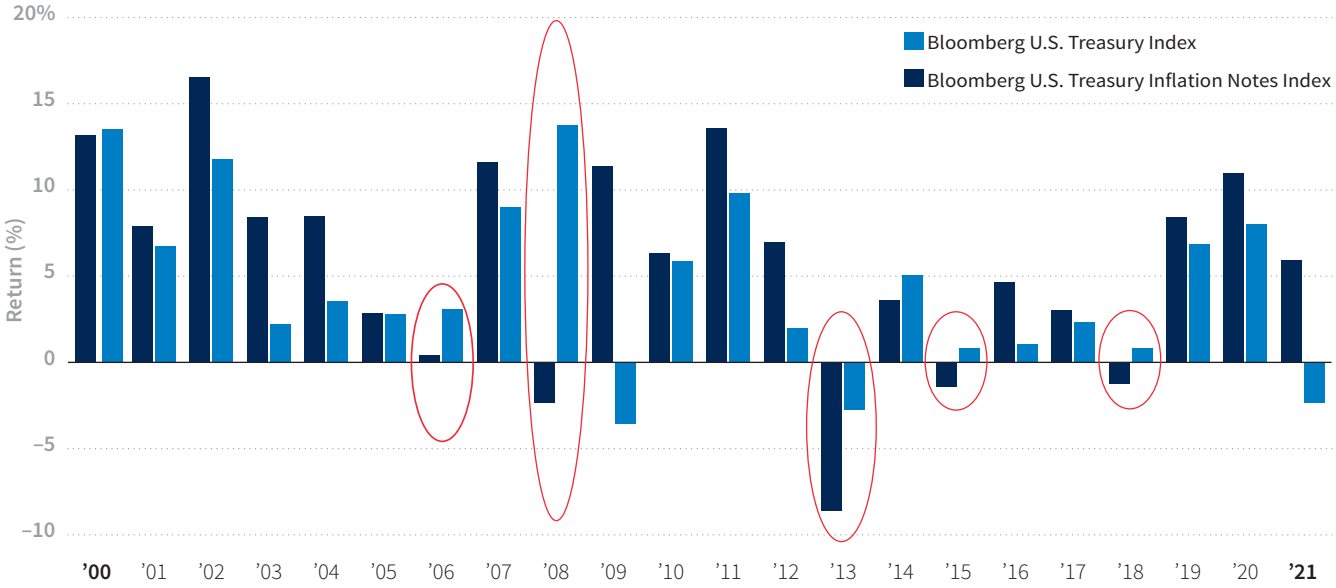
Historical performance

In general, TIPS outperform when realized inflation exceeds expected inflation and real rates remain at low levels. Since the start of the century, the Bloomberg U.S. Treasury Inflation Notes Index has outperformed the Bloomberg U.S. Treasury Index 15 out of 22 years — just over 65% of the time. However, in the 2008 financial crisis, the 2013 taper tantrum, and the 2015 decline in inflation expectations that was driven by lower oil prices, TIPS underperformed significantly (Figure 2).

3 U.S. Bureau of Labor Statistics, as of 1/12/22.

FIGURE 2

Annual returns show TIPS have outperformed nominal Treasuries in 15 out of 22 years



Source: Bloomberg, as of 12/31/21. For illustrative purposes only. Past performance is not a guarantee of future results. More recent returns may be more or less than those shown.

In 2008 and 2013, real yields moved sharply higher and market liquidity was scarce, while in 2015, lower inflation expectations drove underperformance. As you can see in Figure 3, TIPS are affected by both lower inflation expectations and higher real yields. Importantly, the decline in real yields since 2018, and more recently high inflation, has been supportive of TIPS.

Inflation and real yields in 2022

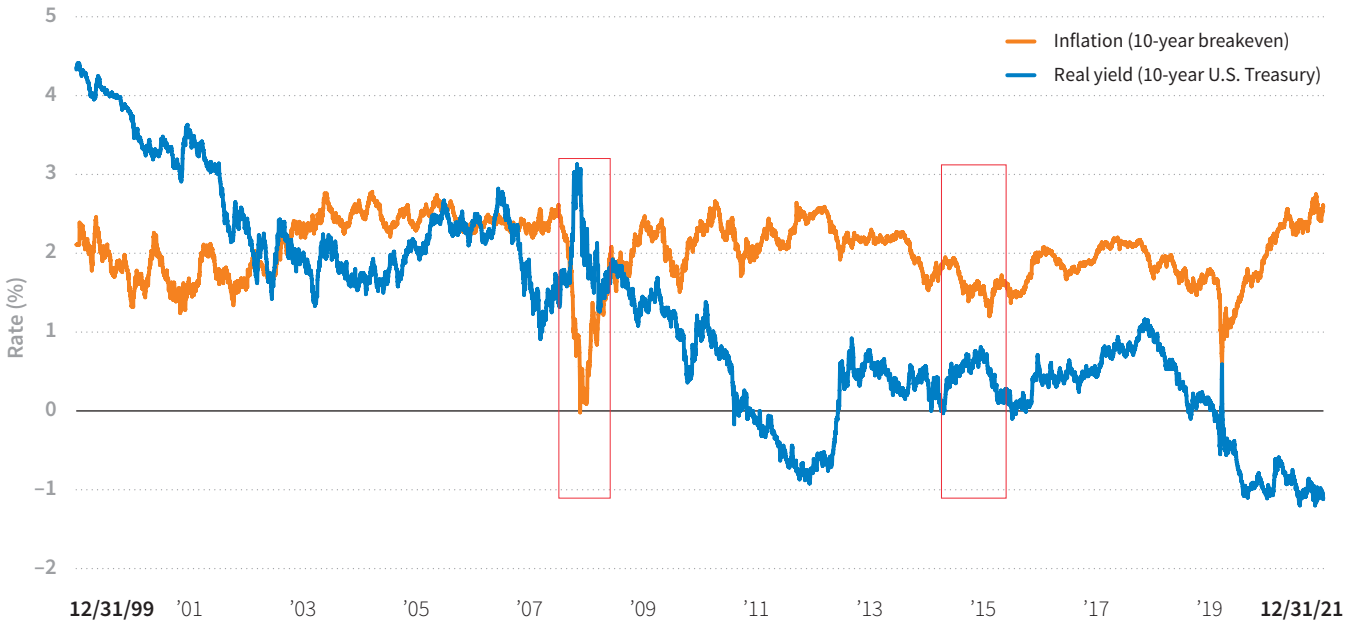
The headline CPI release through March 2022 was 8.5%,[4] as supply-side bottlenecks, labor shortages, and large amounts of fiscal and monetary policy have fueled inflation, while Russia's invasion of Ukraine disrupted commodity markets. The Fed has been behind the curve in fighting inflation, which was supportive of TIPS in the second half of 2021, as inflation continuously surged past expectations. The Fed's focus is clearly on inflation now, and the Fed's hawkish stance is a significant headwind to TIPS.

As the market has priced in consecutive 50-basis-point (bp) hikes at coming meetings, the total return on TIPS has eroded despite inflation continuing to beat expectations because real interest rates have moved significantly higher across the curve. The Bloomberg U.S. Treasury Inflation Notes Index has returned –3.02% YTD as of 3/31/22. With that said, the Bloomberg U.S. Treasury Index delivered –5.58% over the same period, so TIPS have outperformed nominal Treasuries. Although higher real rates might be the trend, real rates rose too quickly for the economy to absorb. We expect periods of stabilization or a rally in real rates as growth concerns become dominant.

4 U.S. Bureau of Labor Statistics, as of 4/12/22.

FIGURE 3

Yields and inflation show TIPS underperform when inflation expectations fall and real rates rise



Source: Bloomberg, as of 12/31/21. For illustrative purposes only. Past performance is not a guarantee of future results. More recent returns may be more or less than those shown.

In our view, after a couple of 50-bp rate hikes, the Fed's pace will slow to 25 bps. At the same time, we are likely to see more signs of a peak in inflation and a slowdown in activity. If, on the other hand, inflation stays high and continues to surprise to the upside, the Fed might continue with 50-bp rate hikes longer. The probability of a 75-bp hike remains very low. The Fed will also be reducing its balance sheet starting on June 1, which will likely add to overall tightening.

Although the probability of a recession in 2022 is low, tightening in current financial conditions has raised the risk of a recession in 2023. When the Fed raises rates into a slowing economy, recessions become more likely. If recession risks rise over the course of 2022 and 2023, real rates are likely to come down, supporting TIPS. However, recessions come with low inflation, so inflation compensation is likely to contribute less, and perhaps negatively, to total returns.

This material is prepared for use by institutional investors and investment professionals and is provided for limited purposes. This material is a general communication being provided for informational and educational purposes only. It is not designed to be investment advice or a recommendation of any specific investment product, strategy, or decision, and is not intended to suggest taking or refraining from any course of action. The opinions expressed in this material represent the current, good-faith views of the author(s) at the time of publication. The views are provided for informational purposes only and are subject to change. The views and strategies described herein may not be suitable for all investors. Prior to making any investment or financial decisions, any recipients of this material should seek individualized advice from their personal financial, legal, tax, and other professional advisors that takes into account all of the particular facts and circumstances of their situation. Putnam Investments cannot guarantee the accuracy or completeness of any statements or data contained in the material. Predictions, opinions, and other information contained in this material are subject to change. Any forward-looking statements speak only as of the date they are made, and Putnam assumes no duty to update them. Forward-looking statements are subject to numerous assumptions, risks, and uncertainties. Actual results could differ materially from those anticipated. Past performance is not a guarantee of future results. As with any investment, there is a potential for profit as well as the possibility of loss.

Issued in the United Kingdom by Putnam Investments Limited®. Putnam Investments Limited is authorized and regulated by the Financial Conduct Authority (FCA). For the activities carried out in Germany, the German branch of Putnam Investments Limited holds a permit as a financial investment broker in accordance with Sec. 34f para. 1 sentence no. 1 of the German Trade Ordinance and is registered under the registration number D-F-16077N8-19 in the publicly available broker register. Putnam Investments Limited is also permitted to provide cross border investment services to certain EEA member states. In Europe, this material is directed exclusively at professional clients and eligible counterparties (as defined under the FCA Rules, or the German Securities Trading Act (Wertpapierhandelsgesetz) or other applicable law) who are knowledgeable and experienced in investment matters. Any investments to which this material relates are available only to or will be engaged in only with such persons, and any other persons (including retail clients) should not act or rely on this material. Furthermore this material is only intended for the recipient receiving it directly from Putnam Investments Limited and should not be forwarded to, or relied upon by, the recipient's underlying clients.

Prepared for use with wholesale investors in Australia by Putnam Investments Australia Pty Limited, ABN, 50 105 178 916, AFSL No. 247032. This material has been prepared without taking account of an investor's objectives, financial situation and needs. Before deciding to invest, investors should consider whether the investment is appropriate for them.

Prepared for use in Canada by Putnam Investments Canada ULC (o/a Putnam Management in Manitoba). Where permitted, advisory services are provided in Canada by Putnam Investments Canada ULC (o/a Putnam Management in Manitoba) and its affiliate, The Putnam Advisory Company, LLC.

This material is prepared by Putnam Investments for use in Japan by Putnam Investments Japan Co., Ltd. ("Putnam Japan"), and is for Professional Investors defined in Article 2, Paragraph 31 of the Financial Instruments and Exchange Act of Japan ("Tokutei-toshika") (including financial instruments business operators or registered financial institutions engaged in the investment management business provided for in Article 61, Paragraphs 1 and 2 of the said Act). Putnam Japan is registered with Kanto Local Finance Bureau in Japan as a financial instruments business operator conducting the investment advisory and agency business, and is a member of Japan Investment Advisers Association. This material is prepared for informational purposes only, and is not intended as a solicitation to invest in any securities or other financial product in Japan, or to enter into with Putnam Japan an investment advisory contract or a discretionary investment management contract in Japan.

Treasury Inflation-Protected Securities: U.S. Treasury Inflation Protected Securities ("U.S. TIPS") pay interest on a semiannual basis, equal to a fixed percentage of the inflation-adjusted principal amount. The interest rate on these securities is fixed at issuance, but over the life of the security, this interest may be paid on an increasing or decreasing principal value that has been adjusted for inflation. U.S. TIPS currently are issued with maturities of five, ten, or thirty years, although it is possible that securities with other maturities will be issued in the future. Repayment of the original principal upon maturity (as adjusted for inflation) is guaranteed for U.S. TIPS, even during a period of deflation. However, because the principal amount of U.S. TIPS would be adjusted downward during a period of deflation, U.S. TIPS will be subject to deflation risk with respect to its investments in these securities. In addition, the current market value of U.S. TIPS is not guaranteed, and will fluctuate. If a portfolio purchases U.S. TIPS in the secondary market whose principal values have been adjusted upward due to inflation since issuance, the portfolio may experience a loss if there is a subsequent period of deflation. A portfolio may also invest in other inflation-related securities which may or may not provide a guarantee of principal. If a guarantee of principal is not provided, the adjusted principal value of the security repaid at maturity may be less than the original principal amount.

A world of investing.®

Putnam INVESTMENTS