

Inflation Protected U.S. Bonds: What's the Interest?

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Toward the end of October 2022 there was a mad dash by many to purchase I-bonds in order to lock in 9.62% interest for the next six months. In fact, interest in these bonds was so high that [treasurydirect.gov](https://www.treasurydirect.gov) was only intermittently available the last few days of the month. So, what is going on here?

The annual I-bond purchase limit for individuals is \$10,000 plus an additional amount up to \$5,000 can be purchased with tax refund dollars. This would mean that a couple could purchase up to \$30,000 per year of I-bonds. Living trusts and certain business entities can also purchase I-bonds (subject to the \$10k annual limit), so if someone wanted to go through the trouble of setting up and funding multiple qualifying entities, one could effectively purchase more than the \$15k annual limit for individuals.

I-bond Interest Calculation

Of course, before jumping in with a knee jerk reaction to the 9.62% headline interest number, we should first understand what that actually meant. The interest rate on I-bonds is determined twice a year (and is credited monthly) using the equation:

$$[\text{fixed rate} + (2 \times \text{semiannual inflation rate}) + (\text{fixed rate} \times \text{semiannual inflation rate})]$$

The “fixed rate” was ZERO from May 1, 2020 through October 31, 2022 and will remain at zero for the life of those bonds. *This means that both the first and last parts of the credited interest rate equation (see above) will be zero for the life of those bonds*, thereby leaving only the semiannual inflation rate as the credited interest amount. In other words, the bonds will grow only at the rate of inflation, but remember that when the bonds are cashed any interest on them is generally taxed as ordinary income, so the likely net rate of return on those bonds is very likely less than the general inflation rate by the amount of tax paid.

Losing out on the first and last parts of the interest rate equation changed with bonds issued on and after November 1, 2022 (at least for the 6 subsequent months) as **the fixed rate is now a positive 0.40%**. The “semiannual inflation rate” on the post 10/31/22 bonds (those issued during the six months following 10/31/22) will initially be lower at 6.48%, but after April 2023 the “semiannual inflation rate” on the two bonds will essentially synchronize. This means that there will be a crossover point where the post-10/31/2022 bond proves to be the better investment.

After running the figures, I found the crossover point will be in the latter half of 2026. That is, with a 4+ year time horizon, the post 10/31/22 I-bonds will more than likely outperform on a pre-tax basis.

What's all this about anyway?

Like most things, it's probably best to start at the beginning. On and off, the issuance of inflation adjusted bonds has been around for quite some time, but their modern use began with British government issuance starting in the early 1980s. This was followed by the U.S. in 1997 with the issuance of Treasury Inflation Adjusted Securities (TIPS) and then in 1998 with the issuance of I-bonds; each of which are still issued today. Though both are issued by the U.S. government, TIPS and I-bonds are a bit different from one another.

TIPS Interest Calculation

TIPS have a different interest calculation scheme than I-bonds and are also taxed differently. I-bonds are only taxed when redeemed while TIPS are taxed as interest is either paid or credited. That is, if TIPS are held in a taxable account.

TIPS, like most bonds, have a Face Value. Unlike most bonds, however, the Face Value is adjusted up or down each month for inflation (or deflation) in addition to paying a fixed interest rate that stays with the bond for its life. The fixed interest amount is paid twice a year with the equation for the interest amount stated as:

$$(\text{Adjusted Face Value} \times \frac{1}{2} \text{ of the fixed rate})$$

Again, this semiannual interest amount will be taxable as ordinary income and while the rate won't change, the interest amount earned will vary with changes in the Adjusted Face Value. This brings us to the second component of TIPS returns: the inflation adjustment.

The inflation adjustment for TIPS functions so that the original face value of a bond maintains its same purchasing power up to the maturity of the bond (note that the Face Value is most often different from its market value). For example, a \$10,000 face value TIPS bond will mature at an amount which provides the same amount of purchasing power plus the amount of interest earned for the prior six months (TIPS pay interest every six months). The catch here is that all of the inflation adjustments along the way are taxable even though they weren't actually paid, which is why holding them within a deferred or even a Roth account is likely superior to owning them outright. Also, although quite unlikely, even if deflation is experienced over the life of a TIPS bond, at maturity the principal received will never be less than the face amount.

Of course, the more traditional straight Treasuries without the inflation protection component can also be purchased, but what's the difference in yield?

The point of market indifference between straight Treasuries and TIPS is the Market's anticipated inflation rate minus a bit of "insurance" that TIPS provide against *unanticipated* inflationary spikes. For instance, if a 10-year Treasury is paying 4.5% and the Market anticipates inflation of 3%, a 10-year TIPS yield would probably be a bit lower than 1.5% so that the anticipated long-term return of the TIPS is equal to that of the straight Treasury minus the "inflation insurance expense" provided by the TIPS. In other words, the anticipated return of TIPS should naturally be less than the anticipated return of their straight Treasury equivalent.

So why buy TIPS (or even I-bonds) if the anticipated return is naturally less than that of their straight Treasury equivalent? The main reason is that **TIPS provide protection against inflation which is actually higher than anticipated**. In other words, TIPS provide protection against *unanticipated* inflationary spikes.

Of course, there's always a catch and with TIPS (as well as with other bonds) the catch is **duration**. I won't get into the actual formula for duration, but it's good enough to understand that the longer the term of an existing bond, the higher its sensitivity to changes in prevailing interest rates so that a upward shift in rates can more than overwhelm the benefit of inflation protection. This sensitivity to interest rates becomes more pronounced the longer the duration of a bond or a collection thereof.

For example, the iShares TIPS Bond ETF (TIP) and Vanguard Inflation-Protected Secs Adm (VAIPX) are two very similar older and more traditional TIPS funds that simply follow TIPS indices. As such, the duration of these

funds follows the overall market duration of outstanding TIPS which is currently just under 7 years. Now, it's no secret that inflation rates skyrocketed in 2022, which in turn led to relatively large upward crediting rates for both I-bonds and TIPS, but this relatively large positive adjustment was overwhelmed by increases in the prevailing interest rates so that the YTD return of TIP and VAIPX were losses of **-12.89%** and **-12.49%**, respectively (source: Ycharts). In other words, the inflation protection provided by these funds was overwhelmed by the negative effect of duration as prevailing interest rates rose. This is why keeping duration limited is important. (Note that two bond portfolios can have the same overall duration while the bond constituents of each might have wildly differing ranges of duration. All things equal, the fund with the constituent bonds having more tightly packed and limited durations will react less to changes in prevailing rates than the fund with more dispersed constituent bond durations).

I-bonds or TIPS?

The inclusion of inflation protected U.S. bonds in a portfolio is meant to provide inflation protection while at the same time avoiding the risk of default. As such, the anticipated long-term rate of return of these investments are lower than any of the other major asset classes due to the general risk/return relationship and, more specifically, due to the added implied cost of inflation protection itself.

Since the fixed rate is now above zero, I-bonds are more attractive than they've been in quite some time. As discussed earlier, a positive fixed allows for more of the I-bond interest crediting equation to come into play. The dollar value of I-bonds also never goes down and associated income taxes aren't owed until the bonds are redeemed or upon final maturity, whichever comes first. If used for qualified education expenses, the proceeds could even be tax-free. The major downsides include the limited amount which can be purchased each year as well as the fact an equal gross return in stocks would be taxed at a lower rate at the federal level (with bonds, exposure is generally better suited within deferred accounts, when possible). Again, until fairly recently, another major downside was a fixed rate of zero but that has now changed.

Unlike I-bonds, TIPS can either be purchased individually or within funds; and either within taxable or deferred or even Roth-type accounts. Given the attributes of TIPS (both low anticipated return and highly tax inefficient) they are probably best suited for deferred accounts, when possible.

When individual TIPS are purchased, they are usually purchased on the secondary market, but can also be purchased at Treasury auction. Whatever the case, immediately after issue the principal value of TIPS begins to fluctuate [mainly] in relation to changes in prevailing interest rates. However, if held until maturity, a TIPS will be worth the inflation adjusted amount of its original face value (or simply the face value, whichever is more). For instance, someone could hypothetically purchase a series of I-bonds which mature each year into the future. That investor would essentially be assured to have his purchasing power (minus applicable taxes) maintained as the bonds mature. This is in addition to the interest received along the way. This said, TIPS will only outperform similar straight U.S. bonds when actual inflation comes in higher than the Market had anticipated, something which I believe is unlikely over long periods of time.

In Summary

For those that place a high value on simply maintaining purchasing power, a ladder portfolio of individual TIPS which mature in a sequence to meet fund future spending might make sense. Though TIPS held in a taxable account can be horribly inefficient, individual TIPS can also be purchased within deferred or Roth-type accounts. Other than potentially missing superior returns, a big drawback might be having to sell a bond before it matures, which could dash the goal of maintaining purchasing power.

For those with a relatively high level of wealth, I believe a short-term TIPS fund provides is a prudent inflation protection option. A good TIPS fund will maintain a shorter duration and do so at a reasonable cost. Such funds can be held within deferred or Roth-type accounts. Unlike owning individual TIPS, having TIPS exposure through ETFs or mutual funds allows for trading and rebalancing in smaller amounts.

For those with children or grandchildren heading toward the expense of higher education and/or for those that would like a stable investment which now finally has a positive non-zero fixed rate, I-bonds might be a good option. Taxes are deferred until they're cashed and even remain tax-free if used by the owner for qualified education expenses. The annual purchase limit is relatively low for those having higher levels of wealth. Over the long term they're likely going to underperform most all of the major asset classes, but they I-bonds do hold value and maintain purchasing power.

As with anything, there are tradeoffs with investing in either I-bonds or TIPS. The main thing is to understand how they work, the major pros/cons, and what role they would play in your portfolio. Remember, the only four things we can at least attempt control:

- Asset allocation – this includes an understanding of why the addition of an asset class target is anticipated to improve the risk/reward characteristics of a portfolio, which is why TIPS are a recommended as part of a well-diversified, inflation-hedged portfolio
- Expenses
- Taxes
- Remain disciplined

With both I-bonds and TIPS, the anticipated long-term return is perhaps the lowest across all major asset classes. This said, from time-to-time they will have superior performance, but it's important not to chase that outperformance after it happens. Instead, an allocation target of I-bonds and/or TIPS should be adopted and then exposure obtained in as tax-efficient and lowest-cost manner as possible.

This is far from an extensive review of TIPS, TIPS funds, and I-bonds, but I hope it helps you to better understand these investment vehicles as well as what role they might play in your portfolio.