Interest Rates and Bond Prices

Suppose that a bond exists that pays $1 at time $t+1$. It sells for price $P$ at time $t$. What is the nominal interest rate on the bond?

We can solve for the interest rate by recognizing that we can think of the bond as taking $P$ dollars at time $t$ and paying $(1+i)P$ dollars at time $t+1$. Further, we know that the bond by assumption pays $1$. Therefore the nominal interest rate is implicitly defined by

$$(1+i)P = 1$$
This equation may be rearranged, i.e.

\[1 + i = \frac{1}{P}\] so that

\[i = \frac{1}{P} - 1 = \frac{1}{P} - \frac{P}{P} = \frac{1 - P}{P}\]

This makes intuitive sense; $1 - P$ is what one receives beyond the price of the bond at $t+1$.

Notice that the price of bonds is inversely related to the interest rate.

This type of reasoning may be applied to more complicated assets.