

### Promised vs. expected return

In words:

The promised return on a bond (or yield) is the return in case the bond does not default.

By the above definition, the promised yield on a bond solves this identity:

$$I(1 + r_{promised})^T \equiv Cashflow_T^{Solvent} \quad (1)$$

The expected return on a bond is the return taking into account the probability of default.

The expected return is equal to the promised return if the probability of default is zero.

The expected return is less than the promised return if the probability of default is positive.

The expected return can be derived by solving:

$$I(1 + r_{expected})^T = (1 - p) * Cashflow_T^{Solvent} + p * Cashflow_T^{Default}$$

Where  $p$  is the probability of default.

#### Example (from page 1 lecture 9):

The bond has a face value of 1000. It sells at par and has a coupon rate of 10%.

Where  $I$  = initial investment  $Cashflow_T^{Solvent}$  is the cashflow if the bond does not default.

Example:

Suppose that you buy a bond with face value of 1000 and one year maturity. The bond sell at par.

The coupon rate is 10%. The promised rate on this bond is

$$1000(1 + r_{promised}) = 1100$$

$$r_{promised} = \frac{1100}{1000} - 1 = .1$$

Example (cont.)

Assume that the probability of default of the bond is 20%. In default the market will return its principal but no interest.

The expected return on this bond is:

$$1000(1 + r_{expected}) = .80 * 100 + 1000 = 1080$$

$$r_{expected} = \frac{1080}{1000} - 1 = .08$$