

## RISK IN BOND VALUATION

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**Annotation.** *Businesses obtain long-term external financial capital either by borrowing or by obtaining equity funds. This article describes the risks in bond valuation for businesses, like credit risk, interest rate risks which applies the time-value-of-money techniques to see how to value bonds. Also in this article, we'll discuss the risk of nondomestic bonds used to identify them.*

**Key words:** *credit risk, interest rate risks, reinvestment rate risk of bonds, risk of nondomestic bonds*

Investors in domestic bonds face three types of risk: credit risk, interest rate risk, and reinvestment rate risk. Investors in foreign bonds are subject to two additional risks: political risk and exchange rate risk.

**Credit Risk** The cash flows to be received by bond market investors are uncertain; like individuals, corporate debtors may make interest payments late or not at all. They may fail to repay principal at maturity. To compensate investors for this credit risk or default risk, rates of return on corporate bonds are higher than those on government securities with the same terms to maturity. Government securities are presumed to be free of credit risk. In general, as investors perceive a higher likelihood of default, they demand higher default risk premiums (DRPs). Since perceptions of a bond's default risk may change over its term, the bond's yield to maturity (YTM) may also change even if all else remains constant. Firms, such as Moody's, Standard & Poor's, and Fitch, provide information on the riskiness of individual bond issues through their bond ratings. The bond rating is a measure of a bond's default risk. The DRP is measured by the difference in the YTM, or spread, of two bonds of equal time to maturity. If a ten-year Treasury note has a yield of 5.4 percent and a ten-year Baa-rated corporate bond has a yield of 7.4 percent, the Baa-Treasury spread of 2.0 percentage points represents the DRP earned by investors who are willing to carry the extra risk of a Baa-rated bond. Credit risk spreads fluctuate, based upon credit conditions and investors' willingness to take on risk. In good economic times when investors are optimistic, spreads generally narrow; in uncertain times or in a recession, there is a "flight to quality" as investors prefer safer securities and credit spreads widen. As we introduced in the discussion of premium and discount bonds, bond prices change in response to changes in interest rates.

**Interest rate risk** fluctuating interest rates lead to varying asset prices; in the context of bonds, rising (falling) interest rates result in falling (rising) bond prices. We know the general level of interest rates in an economy fluctuates. For example, interest rates will change in response to changes in investors' expectations about future inflation rates. A longer term to maturity, all else equal, increases the sensitivity of a bond's price to a

given change in interest rates as the discount rate change compounds over a longer time period. Similarly, a lower coupon rate increases the sensitivity of the bond's price to market interest rate changes. This occurs because lower coupon bonds have most of their cash flow occurring further into the future when the par value is paid. Because of interest rate risk, investors will demand a larger risk premium for bonds whose price is especially sensitive to market interest rate changes. Hence, we would expect higher yields to maturity (YTM's) for long-term bonds with low coupon rates rather than for short-term bonds with high coupon rates. The horizon risk premium, or horizon spread, is the difference in return earned by investing in a longer-term bond that has the same credit risk as a shorter-term bond. For example, suppose a five-year Treasury note has a yield of 4.7 percent and a ten-year Treasury note has a yield of 5.4 percent. The difference of 0.7 percentage points is the horizon spread, representing the extra return expected to be earned by investors in the longer-term notes for their exposure to higher levels of interest rate risk.

**Reinvestment Rate Risk** The return an investor receives from a bond investment equals the bond's yield to maturity only if the coupon payments can be reinvested at a rate equal to the bond's yield to maturity. Recall the form of the interest factor in bond price (equation 10-2):  $(1 + r_b)^n$ . This assumes that all the cash flows are reinvested at the periodic rate  $r_b$ . If the coupons are reinvested at a lower rate, the investor's actual yield over time will be less than the bond's yield to maturity. Thus, reinvestment rate risk, or rollover risk, occurs when fluctuating interest rates cause coupon payments to be reinvested at different interest rates. Another illustration of reinvestment rate risk occurs when maturing bank CDs are rolled over into new CDs. The risk benefits the investor when the new CD rate is higher than the maturing CD rate; it works against the investor when the new CD rate is lower. Reinvestment rate risk is eliminated in zero-coupon securities, as they have no intermediate cash flows requiring reinvestment.

**Risks of Nondomestic Bonds** Investors in nondomestic securities face a number of risks beyond those of domestic securities. Among these are political risk and exchange rate risk. Political risk can affect a bond investor in a number of ways. A foreign government may block currency exchanges, preventing the investor from repatriating coupon income. Social unrest may lead a foreign corporation to default on its bonds. Of course, exchange rate changes will cause fluctuations in the values of cash flows in terms of U.S. dollars, and this is called exchange rate risk

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