Bond indenture

Purpose of a Bond Indenture

A bond [indenture](http://www.investopedia.com/terms/i/indenture.asp) is the contract between a bondholder and the issuer. It is a legal document that states what the issuer can and cannot do, and states the bondholders rights. Since there tends to be a ton of legalese involved, the contract is managed by the corporate trustee who polices the actions of the issuer to ensure the rights of the bondholder are upheld.   
Within the indenture, there are affirmative and negative covenants: 

1. Affirmative Covenants   
   Affirmative covenants are what the issuer promises to do for the investor. These promises include things such as paying interest and principle in a    timely manner; paying taxes and other expenses when due; maintaining the assets backing the bond and issuing reports to the trustee to ensure compliance.

They set forth certain actions that the borrowers must take, such as:

* + Paying interest and principal on a timely basis;
  + Paying taxes and other claims when due;
  + Keeping assets in good conditions and in working order;
  + Submitting periodic reports to a trustee so the trustee can evaluate the issuer's compliance with the indenture.

1. Negative Covenants  
   Negative convents are the restraints put on a borrower. These restraints include issuing additional securities or taking on additional debt that may    harm the current bondholders. This is generally done without meeting certain tests and/or ratios or receiving permission from the current bondholders.

They set forth certain limitations and restrictions on the borrower's activities, such as:

* + Limitations on the borrower's ability to incur additional debt unless certain tests are met;
  + Limitations on dividend payments and stock repurchases;
  + Limitations on sale of assets.

**Bond yields**

The general definition of yield is the return an investor will receive by holding a bond to maturity. So if you want to know what your bond investment will earn, you should know how to calculate yield. Required yield, on the other hand, is the yield or return a bond must offer in order for it to be worthwhile for the investor. The required yield of a bond is usually the yield offered by other plain vanilla bonds that are currently offered in the market and have similar [credit quality](http://www.investopedia.com/terms/c/creditrating.asp) and [maturity](http://www.investopedia.com/terms/m/maturity.asp).   
  
Once an investor has decided on the required yield, he or she must calculate the yield of a bond he or she wants to buy. Let's proceed and examine these calculations.   
  
**Calculating Current Yield**   
A simple yield calculation that is often used to calculate the yield on both bonds and the dividend yield for stocks is the [current yield](http://www.investopedia.com/terms/c/currentyield.asp). The current yield calculates the percentage return that the annual coupon payment provides the investor. In other words, this yield calculates what percentage the actual dollar coupon payment is of the price the investor pays for the bond. The multiplication by 100 in the formulas below converts the decimal into a percentage, allowing us to see the percentage return:

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| http://i.investopedia.com/inv/tutorials/site/advancedbond/yield1.GIF |

So, if you purchased a bond with a par value of $100 for $95.92 and it paid a coupon rate of 5%, this is how you'd calculate its current yield:

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Notice how this calculation does not include any [capital gains](http://www.investopedia.com/terms/c/capitalgain.asp) or losses the investor would make if the bond were bought at a discount or premium. Because the comparison of the bond price to its par value is a factor that affects the actual current yield, the above formula would give a slightly inaccurate answer - unless of course the investor pays par value for the bond. To correct this, investors can modify the current yield formula by adding the result of the current yield to the gain or loss the price gives the investor: [(Par Value – Bond Price)/Years to Maturity]. The modified current yield formula then takes into account the discount or premium at which the investor bought the bond. This is the full calculation:

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Let's re-calculate the yield of the bond in our first example, which matures in 30 months and has a coupon payment of $5:

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The adjusted current yield of 6.84% is higher than the current yield of 5.21% because the bond's discounted price ($95.92 instead of $100) gives the investor more of a gain on the investment.   
  
One thing to note, however, is whether you buy the bond between coupon payments. If you do, remember to use the dirty price in place of the market price in the above equation. The dirty price is what you will actually pay for the bond, but usually the figure quoted in U.S. markets is the clean price.   
  
Now we must also account for other factors such as the coupon payment for a zero-coupon bond, which has only one coupon payment. For such a bond, the yield calculation would be as follows:

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| http://i.investopedia.com/inv/tutorials/site/advancedbond/yield5.GIF  n = years left until maturity |

If we were considering a zero-coupon bond that has a [future value](http://www.investopedia.com/terms/f/futurevalue.asp) of $1,000 that matures in two years and can be currently purchased for $925, we would calculate its current yield with the following formula:

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**Calculating Yield to Maturity**   
The current yield calculation we learned above shows us the return the annual coupon payment gives the investor, but this percentage does not take into account the [time value of money](http://www.investopedia.com/terms/t/timevalueofmoney.asp) or, more specifically, the present value of the coupon payments the investor will receive in the future. For this reason, when investors and analysts refer to yield, they are most often referring to the [yield to maturity](http://www.investopedia.com/terms/y/yieldtomaturity.asp) (YTM), which is the interest rate by which the present values of all the future cash flows are equal to the bond's price.   
  
An easy way to think of YTM is to consider it the resulting interest rate the investor receives if he or she invests all of his or her cash flows (coupons payments) at a constant interest rate until the bond matures. YTM is the return the investor will receive from his or her entire investment. It is the return that an investor gains by receiving the present values of the coupon payments, the par value and capital gains in relation to the price that is paid.   
  
The yield to maturity, however, is an interest rate that must be calculated through trial and error. Such a method of valuation is complicated and can be time consuming, so investors (whether professional or private) will typically use a financial calculator or program that is quickly able to run through the process of trial and error. If you don't have such a program, you can use an approximation method that does not require any serious mathematics.   
  
To demonstrate this method, we first need to review the relationship between a bond's price and its yield. In general, as a bond's price increases, yield decreases. This relationship is measured using the [price value of a basis point](http://www.investopedia.com/terms/p/pvbp.asp) (PVBP). By taking into account factors such as the bond's coupon rate and credit rating, the PVBP measures the degree to which a bond's price will change when there is a 0.01% change in interest rates.   
  
The charted relationship between bond price and required yield appears as a negative curve:

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This is due to the fact that a bond's price will be higher when it pays a coupon that is higher than prevailing interest rates. As market interest rates increase, bond prices decrease.   
  
The second concept we need to review is the basic price-yield properties of bonds:

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| ***Premium bond: Coupon rate is greater than market interest rates.  Discount bond: Coupon rate is less than market interest rates.*** |

Thirdly, remember to think of YTM as the yield a bondholder receives if he or she reinvested all coupons received at a constant interest rate, which is the interest rate that we are solving for. If we were to add the present values of all future cash flows, we would end up with the market value or purchase price of the bond.   
  
The calculation can be presented as:

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**OR**

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| http://i.investopedia.com/inv/tutorials/site/advancedbond/yield9.GIF |

***Example 1:*** You hold a bond whose par value is $100 but has a current yield of 5.21% because the bond is priced at $95.92. The bond matures in 30 months and pays a semi-annual coupon of 5%.   
  
***1. Determine the Cash Flows:*** Every six months you would receive a coupon payment of $2.50 (0.025\*100). In total, you would receive five payments of $2.50, plus the future value of $100.   
  
***2. Plug the Known Amounts into the YTM Formula:***

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| http://i.investopedia.com/inv/tutorials/site/advancedbond/yield10.GIF |

Remember that we are trying to find the semi-annual interest rate, as the bond pays the coupon semi-annually.   
  
***3. Guess and Check:*** Now for the tough part: solving for “i,” or the interest rate. Rather than pick random numbers, we can start by considering the relationship between bond price and yield. When a bond is priced at par, the interest rate is equal to the coupon rate. If the bond is priced above par (at a premium), the coupon rate is greater than the interest rate. In our case, the bond is priced at a discount from par, so the annual interest rate we are seeking (like the current yield) must be greater than the coupon rate of 5%.   
  
Now that we know this, we can calculate a number of bond prices by plugging various annual interest rates that are higher than 5% into the above formula. Here is a table of the bond prices that result from a few different interest rates:

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Because our bond price is $95.92, our list shows that the interest rate we are solving for is between 6%, which gives a price of $95, and 7%, which gives a price of $98. Now that we have found a range between which the interest rate lies, we can make another table showing the prices that result from a series of interest rates that go up in increments of 0.1% instead of 1.0%. Below we see the bond prices that result from various interest rates that are between 6.0% and 7.0%:

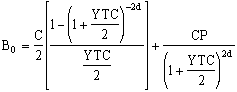
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We see then that the present value of our bond (the price) is equal to $95.92 when we have an interest rate of 6.8%. If at this point we did not find that 6.8% gives us the exact price that we are paying for the bond, we would have to make another table that shows the interest rates in 0.01% increments. You can see why investors prefer to use special programs to narrow down the interest rates - the calculations required to find YTM can be quite numerous!

**YIELD TO CALL**

Many bonds, especially those issued by corporations, are *callable*. This means that the issuer of the bond can redeem the bond prior to maturity by paying the *call price*, which is greater than the face value of the bond, to the bondholder. Often, callable bonds cannot be called until 5 or 10 years after they were issued. When this is the case, the bonds are said to be *call protected*. The date when the bonds can be called is refered to as the *call date*.

The yield to call is the rate of return that an investor would earn if he bought a callable bond at its current market price and held it until the call date given that the bond was called on the call date. It represents the discount rate which equates the discounted value of a bond's future cash flows to its current market price given that the bond is called on the call date. This is illustrated by the following equation:



where

* B0 = the bond price,
* C = the annual coupon payment,
* CP = the call price,
* YTC = the yield to call on the bond, and
* CD = the number of years remaining until the call date.

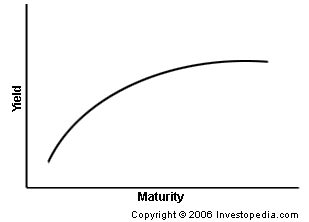
Like the yield to maturity, the yield to call usually cannot be solved for directly. It generally must be determined using trial and error or an iterative technique. Fortunately, financial calculators make the task of solving for the yield to maturity quite simple.

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| **Yield to Call Example** |
| Find the yield to call on a semiannual coupon bond with a face value of $1000, a 10% coupon rate, 15 years remaining until maturity given that the bond price is $1175 and it can be called 5 years from now at a call price of $1100.  **Solution:**  http://www.zenwealth.com/BusinessFinanceOnline/BV/images/YTCEx.gif |

YIELD CURVES (term structure of interest rates)

A yield curve is a representation of the relationship between market remuneration rates and the remaining time to maturity of debt securities, also known as the term structure of interest rates.

A line that plots the interest rates, at a set point in time, of bonds having equal credit quality, but differing maturity dates. The most frequently reported yield curve compares the three-month, two-year, five-year and 30-year U.S. Treasury debt. This yield curve is used as a benchmark for other debt in the market, such as mortgage rates or bank lending rates. The curve is also used to predict changes in economic output and growth.



***Yield Curve***  
The shape of the yield curve is closely scrutinized because it helps to give an idea of future interest rate change and economic activity. There are three main types of yield curve shapes: normal, inverted and flat (or humped). A normal yield curve (pictured here) is one in which longer maturity bonds have a higher yield compared to shorter-term bonds due to the risks associated with time. An inverted yield curve is one in which the shorter-term yields are higher than the longer-term yields, which can be a sign of upcoming recession. A flat (or humped) yield curve is one in which the shorter- and longer-term yields are very close to each other, which is also a predictor of an economic transition. The slope of the yield curve is also seen as important: the greater the slope, the greater the gap between short- and long-term rates.