SECTION 1: BOND BASICS

1a. BASIC BOND TERMS

Bond Definition

A bond is a debt security which obligates the issuer to pay interest (usually semi-annually) and to repay the principal amount when the debt matures.

Par Value

Stated Interest Rate

Bonds are issued with a stated par value (usually $1000 minimum) and a stated rate of interest on the debt. For example, a $1000 par value bond is issued with a stated rate of interest of 8% by ABC Corporation in 2014. The maturity on the debt is 2034. ABC must pay $80 of interest annually to the bondholder for each of the 20 years the bond is outstanding.

Redemption

At maturity, ABC Corporation must repay the $1000 principal amount to the bondholder. The bond is redeemed by the issuer at par.

Zero-Coupon Bond

Bonds can also be issued with a stated par value (usually $1000 minimum) but without a stated rate of interest. No semi-annual interest payments are made on these "zero-coupon" bonds. Instead the bonds are purchased at a discount from par and are redeemed at maturity at par value.

1b. BOND ISSUE STRUCTURE

Term Bonds

A bond issue where every bond has the same interest rate and maturity is called a term bond issue. Corporate bond issues and U.S. Government bond issues are typically term bonds.

> For example, in 2014, ABC Corporation issues $1,000,000 of 8%, $1000 par bonds, all maturing in 2034. Each and every $1000 bond within the issue is identical - same maturity and interest rate.

Serial Bonds

A bond issue with differing maturities is a serial bond issue. Because of the nature of interest rates, differing maturities require different interest rates. Thus, both the maturities and stated interest rates differ for the bonds in the issue. Most municipal bond issues and corporate equipment trust certificates are serial bonds.

> For example, in 2014, the City of Los Angeles issues $10,000,000 of serial bonds with the following schedule:

Maturity	Interest rate	Amount
2020	5.20%	$1,000,000
2021	5.30%	$1,000,000
2022	5.40%	$1,000,000
2023	5.50%	$1,000,000
2024	5.60%	$1,000,000
2025	6.00%	$5,000,000

Balloon Maturity

Each maturity has a different interest rate on the bond. This is natural because the longer the maturity, the higher the interest rate that investors demand. Note in this example that the majority of the

bonds will mature in 2025 - this is called a balloon maturity.

Series Bonds

A bond issue where the bonds have the same maturity but different dates of issuance is a series bond issue. Series bonds are rarely issued, and are used to finance long-term construction projects where all of the money is not needed at once. Instead of floating a $10,000,000 bond issue today to build a new plant, a corporation could float a series bond issue, selling $5,000,000 of bonds this year, $3,000,000 next year, and $2,000,000 the following year, for a total issue of $10,000,000. By phasing in the bonds, the total interest cost to the issuer is reduced.

1c. BOND PRICE QUOTES

Term bonds are quoted on a percentage of par basis. This is the same as quoting the bonds on a dollar price basis. Because of this, term bonds are also known as dollar bonds.

Corporate Bonds % Of Par In 1/8ths

Corporate bonds are quoted as a percentage of par value; with minimum changes of 1/8th point.

> For example, ABC Corporation debentures are quoted at 101 3/8. The dollar price of a $1000 par bond is 101.375% of $1000 par = $1013.75

Government Bonds % Of Par In 1/32Nds

U.S. Government bonds are quoted as a percentage of par value, with minimum changes of 1/32nd point.

> For example, a U.S. Treasury Bond is quoted at 99.24. The dollar price of a $1000 par bond is 99 and 24/32% of par = 99 and .75 % = 99.75% of $1000 par = $997.50.

Both corporate bonds and government bonds are quotable on a percentage of par basis because they are term bonds. Each and every bond within a term issue is identical and therefore has the same dollar price. The reason why governments are quoted in 32nds whereas corporates are quoted in 1/8ths is because the government trading market is much more active and traders are willing to trade on narrower margins (known as spreads). Some government dealers quote in 1/64ths instead of 32nds.

Note that bond quotes are a throwback to the "good old days." Before the year 2000, stocks and corporate bonds were quoted in minimum increments of 1/8th point - which dates back to silver coins used in the American colonies in the 1700's that were made in Spain that could be fractioned into 1/2s, 1/4s, and 1/8ths. The term used was "pieces of eight." (There's some worthless history for you!)

As stock trading volumes skyrocketed in the 1980s with the introduction of computerized trading, the SEC pressed the stock exchanges to narrow their spreads, which makes the market more "efficient" and lowers costs to end users. Of course, the market makers did not want this, because wider spreads meant that they could earn bigger profits. The resistance of the market makers was finally overcome in the year 2000, when stock prices were first required to be quoted in pennies. However, the bond markets were never in the SEC's crosshairs - the corporate bond market has never had high trading volumes; and the SEC has no authority to regulate the

Treasury bond market (this is covered in a later chapter). Thus, these markets are still quoted in 1/8ths (corporate bonds) or 32nds (Treasury bonds).

Municipal Serial Bonds - Basis Quotes

Municipal bond issues are generally serial bonds. In a serial bond offering, each maturity has a different interest rate. This means that each maturity has a different value, and therefore has a different market price. It would be very cumbersome to quote different market prices for each of the maturities within an issue. Instead, serial bonds are quoted on a "yield basis," also known as a basis quote.

> For example, a municipal dealer quotes the 2023 5.50% bond of Los Angeles (listed in the preceding section) on a 5.50 basis. This means he or she is offering the bond to the purchaser at a price to yield 5.50%. Since the coupon is 5.50%, this bond will be priced at par.

Basis Points

Basis quotes are in "yields." A quote of 5.50% is a bond priced to yield 5.50%. If the quote were 5.60, the bond is priced to yield 5.60%. The difference between the 5.50 and 5.60 quotes is a change of 10 basis points. One basis point equals .01% on a bond. Ten basis points equal .1%. One hundred basis points equal one full point or 1%.

To convert a basis quote into a dollar price requires the use of a bond calculator. The use of such a calculator is not permitted in the exam. Instead, the relationship between the coupon rate and the basis must be known.

When bonds are originally issued, the interest rate placed on the bonds is set at the current market rate, so that the issue will be priced at par. If market interest rates stay the same after the issuance date, the bonds will trade at par.

Price At Par

> Assuming that it is now 2014, a bond maturing in 2023 has nine years to maturity. The coupon rate on the bond is 5 1/2% - this is the rate of interest that is printed on the $1,000 par bond certificate. If the bond is being offered at a price quoted to a 5.50% yield, or "basis," the price will be 100.00% of par.

Since the amount of interest received per $1,000 par bond does not change (the holder receives 5.50% of $1,000 = $55 of annual interest), if market interest rates move up after the bond has been issued, the price of the bond must fall below par, so that the bond gives a competitive yield to the current market.

Price At Discount

> If the 5.50% coupon bond were quoted on a 6.00% basis, then the price would be 96.56% of par value, or $965.60 for every $1000 par bond (this is from a bond calculator). This bond is selling at a discount. In order to increase the yield on the bond, above the stated coupon rate, the dealer had to lower the price below par.

Since the amount of interest received per $1,000 par bond does not change (the holder receives 5.50% of $1,000 = $55 of annual interest), if market interest rates move down after the bond has been issued, the price of the bond must rise above par, so that the bond gives a competitive yield to the current market.

Price At Premium

If the 5.50% bond were quoted on a 5.00% basis, then the price would be 103.59% of par value, or $1035.90 for every $1000 par bond (this is from a bond calculator). This bond is selling at a premium. In order to decrease the yield on the bond below the stated coupon rate, the dealer had to raise the price above par.

To summarize, corporate and government bonds are quoted on a percentage of par basis because they are term bonds. Any municipal issues which are term bonds are also quoted on a percentage of par basis, and are known as dollar bonds.

To Find Approximate Price Of Long Term Bond Quoted On A Yield Basis = Coupon

Basis

Municipal serial bonds are quoted on a yield basis. In order to find the dollar price from a basis quote, a bond calculator must be used. When a municipal serial bond is quoted on a yield basis, a "rough" approximation of the dollar price can be made, but it is only valid for long-term (20 year+ maturity) bonds.

To find the approximate price of a long-term municipal serial bond quoted on a yield basis, just divide the coupon by the basis.

For example, a municipal bond dealer quotes a 30 year 4% General Obligation bond on a 5.00 basis. The approximate price of this bond is:

$$\frac{4\% \text{ Coupon}}{5\% \text{ Basis}} = 80\% \text{ of } \$1{,}000 \text{ Par} = \$800$$

For example, a municipal bond dealer quotes a 30 year 6% General Obligation bond on a 5.00 basis. The approximate price of this bond is:

$$\frac{6\% \text{ Coupon}}{5\% \text{ Basis}} = 120\% \text{ of } \$1{,}000 \text{ Par} = \$1200$$

Thus, if the "basis" is higher than the coupon, the bond is trading at a discount; and if the "basis" is lower than the coupon, the bond is trading at a premium.

1d. THE EFFECT OF INTEREST RATE MOVEMENTS ON BOND PRICES

In the previous section, basis quotes were used to show bonds selling at a discount and bonds selling at a premium.

Discount Bond

By definition, a bond sells at a discount when par value is in excess of the bond's purchase price.

For example, a $1000 par corporate bond quoted at 90 is selling at a discount of 10 points ($100) from par.

Premium Bond

By definition, a bond sells at a premium when the bond's purchase price is in excess of par value.

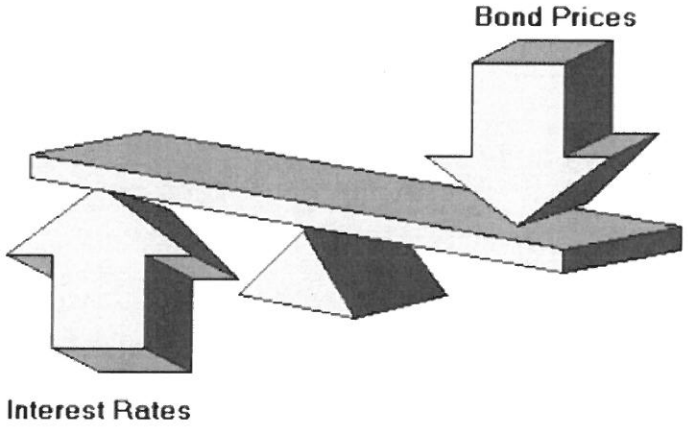
For example, a $1000 par corporate bond quoted at 110 is selling at a

premium of 10 points ($100) over par.

When a bond is issued, the coupon rate on the bond is set at a level that is comparable to the market rate of interest at that time. If the yield that is demanded by the market is the same as the bond's coupon rate, then the bond will sell in the market at par value.

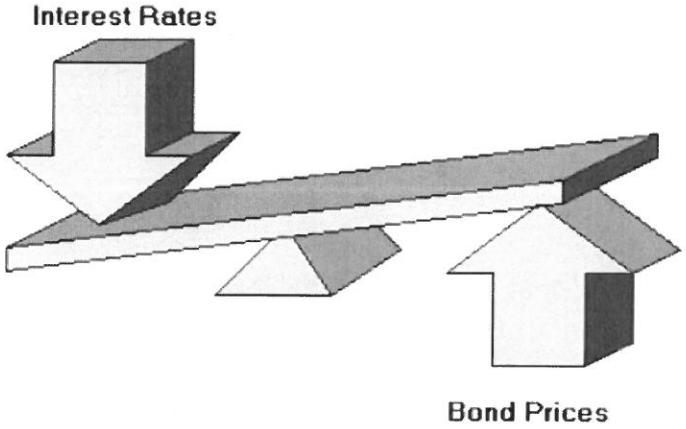
Interest Rates Up - Bond Prices Down

The bond is now trading in the secondary market. Assume that the bond has a 5.50% coupon rate. As long as market yields for this type of bond are at 5.50%, the dollar price will be par. But what happens if interest rates rise in general? Assume that interest rates in general rise to 6%. This bond yields only 5.50% if it is priced at par. To be competitive with the market, the price of the bond must drop to a level where this bond yields 6%. Therefore, when interest rates rise, the prices of bonds trading in the secondary market must drop.



Interest Rates Down - Bond Prices Up

On the other hand, what happens if interest rates fall in general? Assume that interest rates in general fall to 5%. This bond yields 5.50% if it is priced at par. To be competitive with the market, the price of the bond will rise to a level where this bond yields 5%. Therefore, when interest rates fall, the prices of bonds trading in the secondary market must rise.



To summarize:

When interest rates **RISE**, bond prices **FALL**;

When interest rates **FALL**, bond prices **RISE**.

Longer Maturity - Greater Volatility

Another factor to consider is that, as interest rates move, bond prices do not move by equal amounts. The longer a bond's maturity, the faster the bond's price will move in response to interest rate changes. This is due to the compounding effect of interest rates on the bond's value.

A bond can be visualized as having 2 components - these are:

the stream of interest payments over the life of the bond; and

the final principal repayment.

The actual current market price of the bond is the "present value" of the stream of future interest payments and the final principal repayment, discounted by the current market rate of interest (this is essentially the reverse of interest compounding).

Shorter Maturity - Lower Volatility

Most OF Bond's Value Is In Final Principal Repayment

Most of a bond's value is in the big final principal repayment. If the repayment will happen soon (a short maturity), then the price cannot move much from par as market interest rates move. If repayment is far in the future, then the "present value" of that large principal payment is greatly discounted to today's value, compounded over many years. Due to this greater compounding effect, the current price of the bond can move greatly as market interest rates move.

Lower Coupon - Greater Volatility

The lower the coupon rate on a given bond, the greater the price volatility of that bond in response to market interest rate movements. Again, bonds can be visualized as having 2 components:

the stream of interest payments over the life of the bond: and

the final principal repayment.

Bonds with low interest rates have more of the bond's "present value" in the final principal repayment; and less of the bond's value in the interest stream that is received sooner. If most of a bond's value is in the big final principal repayment that is received at the end of a bond's life, then the "present value" of that large principal payment is greatly discounted to today's value, compounded over many years. Due to this greater compounding effect, the current price of the bond can move greatly as market interest rates move.

Higher Coupon - Lower Volatility

Conversely, bonds with high interest rates have more of the bond's "present value" in the interest payment stream that is received sooner; and less of the bond's value in the final principal repayment that happens at the end of a bond's life. Because most of the value is in the high interest payments that are received sooner, the "present value" of these cannot be discounted as greatly since they are received much earlier. Due to this lesser compounding effect, the current price of the bond cannot move greatly as market interest rates move. To summarize, as market interest rates move:

Long Maturity bond prices move more rapidly than do short maturity issues.

Short Maturity bond prices move less rapidly than do long maturity issues.

Low Coupon (Discount) bond prices move more rapidly than do high coupon (premium) bond prices.

High Coupon (Premium) bond prices move less rapidly than do low coupon (discount) bond prices.

As market interest rates move up, the percentage downward price movement of bonds, ranked from greatest percentage movement to lowest, is:

Large Discount Bond (lowest coupon)

Small Discount Bond

Par Bond

Small Premium Bond

Large Premium Bond (highest coupon)

Long Term Zero Coupon Issues Are Most Volatile

Thus, the most volatile bonds are deep discount long-term maturities. Bonds with low coupon rates will tend to trade at discounts - with the most steeply discounted issues being zero-coupon bonds. Such bonds have no interest payments - the entire value is in the final principal repayment at maturity. Long-term zero coupon issues are the most volatile of all bond issues.

1e. BOND YIELDS

Assume that a corporate bond dealer is offering a 10 year, 10% bond at a price of 90. This bond is being offered at a discount, therefore the true yield of the bond is higher than the stated yield. The relevant yields are:

Nominal Yield

Nominal Yield, which is the stated rate of interest on the bond. The bond's stated rate of interest is 10% of $1,000 par.

Current Yield

Current Yield, which takes into account the market price of the bond. The formula for current yield is:

$$\text{Current yield} = \frac{\text{Annual Interest in Dollars}}{\text{Bond's Market Price}} = \frac{\$100}{\$900} = 11.11\%$$

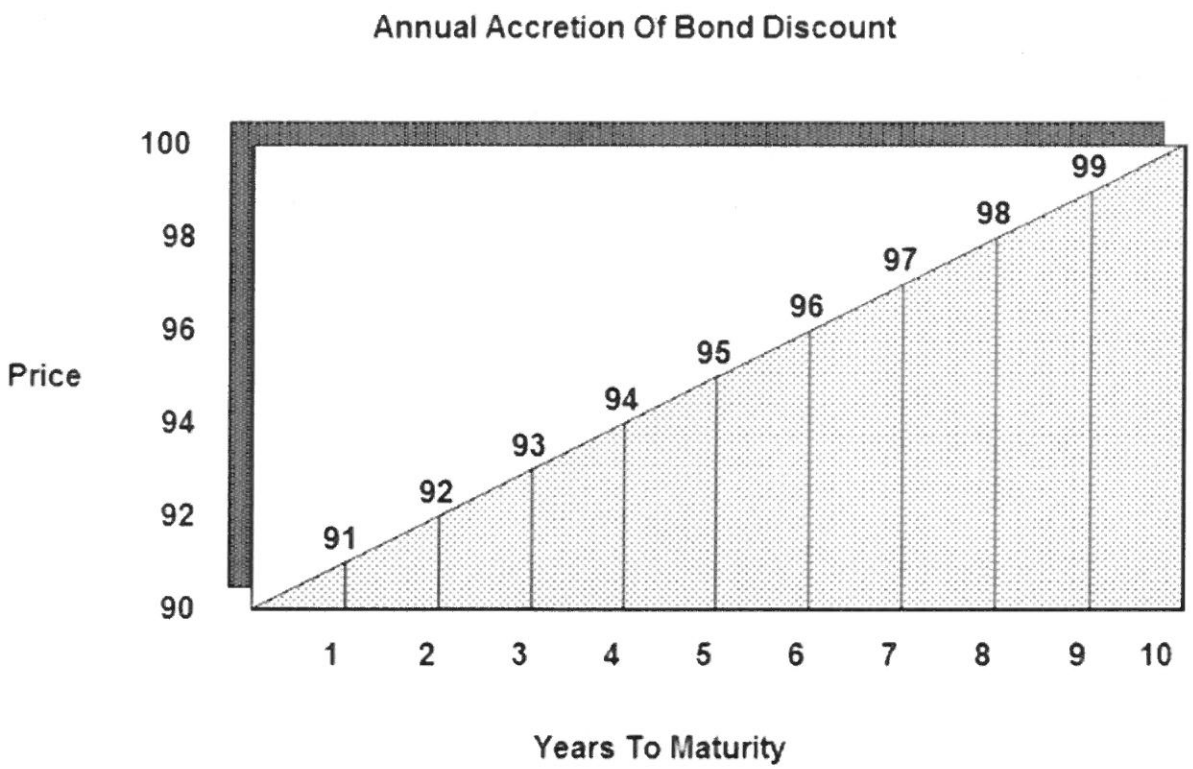
Note that the current yield is higher than the nominal yield, since the discount price is taken into account.

Yield To Maturity

Yield to Maturity, which takes into account both the market price of the

bond as well as any capital gains or losses on the bond if held to maturity.

When a bond is bought at a discount from par, the discount is "earned" over the life of the bond. This capital gain is pro-rated over the bond's life to include the effect of the annual capital gain on the bond's yield. The annual capital gain for this bond can be visualized as follows:



This bond is being purchased at a discount price of 90% of $1,000 par, or $900. The bond will mature at par in 10 years. The discount of $100 is being earned over 10 years, so each year $10 of the discount is earned. This is termed the annual accretion of the bond discount.

The formula for yield to maturity is:

$$\text{Yield to Maturity} = \frac{\text{Annual Income} \quad \begin{matrix}+\text{ Annual Capital Gain (Discount Bond)} \\ \text{or} \\ -\text{ Annual Capital Loss (Premium Bond)}\end{matrix}}{(\text{Purchase Price} + \text{Redemption Price})/2}$$

In this case, the yield to maturity for this discount bond is:

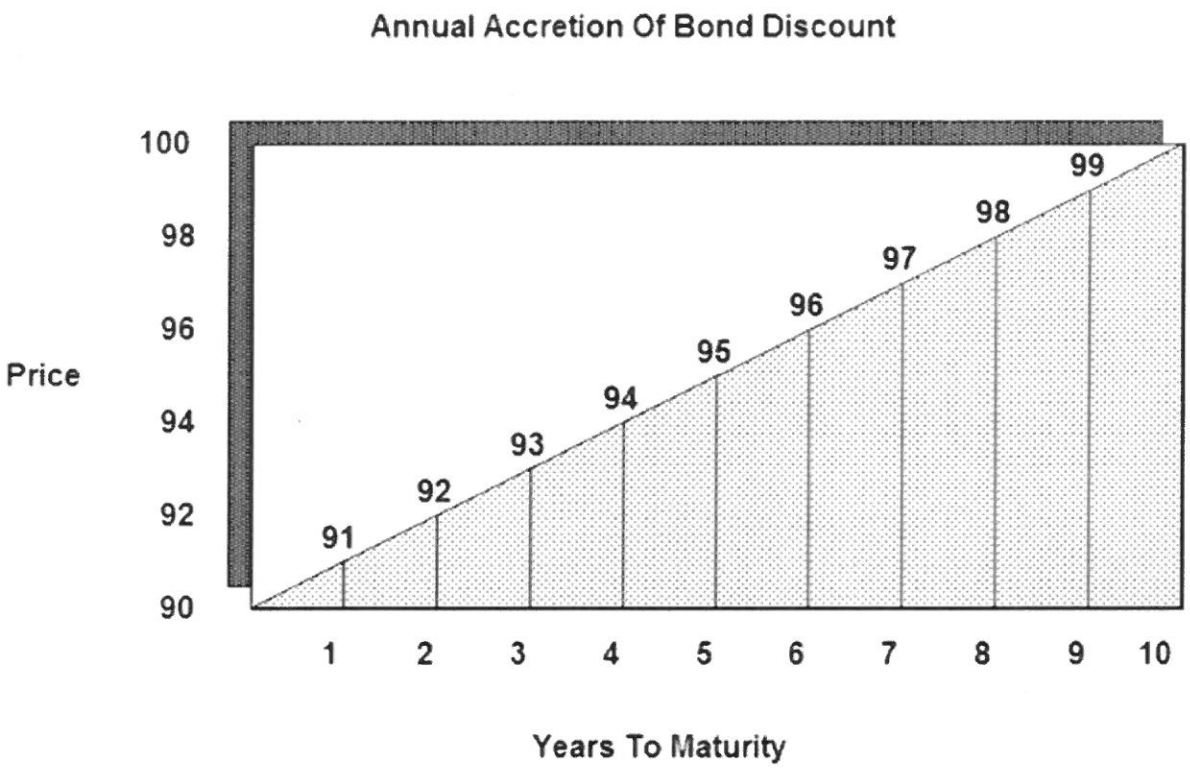
$$\frac{\$100 + 10\ (\$100 \text{ discount over } 10 \text{ years} = \$10 \text{ year})}{(\$900 + \$1000)/2}$$

$$\frac{\$110}{\$950} = 11.58\%$$

Note that the yield to maturity is higher than the current yield. This is due to

bond as well as any capital gains or losses on the bond if held to maturity.

When a bond is bought at a discount from par, the discount is "earned" over the life of the bond. This capital gain is pro-rated over the bond's life to include the effect of the annual capital gain on the bond's yield. The annual capital gain for this bond can be visualized as follows:



This bond is being purchased at a discount price of 90% of $1,000 par, or $900. The bond will mature at par in 10 years. The discount of $100 is being earned over 10 years, so each year $10 of the discount is earned. This is termed the annual accretion of the bond discount.

The formula for yield to maturity is:

$$\text{Yield to Maturity} = \frac{\text{Annual Income} \quad \begin{matrix} + \text{ Annual Capital Gain (Discount Bond)} \\ \text{or} \\ - \text{ Annual Capital Loss (Premium Bond)} \end{matrix}}{(\text{Purchase Price} + \text{Redemption Price})/2}$$

In this case, the yield to maturity for this discount bond is:

$$\frac{\$100 + 10\ (\$100 \text{ discount over } 10 \text{ years} = \$10 \text{ year})}{(\$900 + \$1000)/2}$$

$$\frac{\$110}{\$950} = 11.58\%$$

Note that the yield to maturity is higher than the current yield. This is due to

the inclusion of the capital gain arising from the discount in the YTM formula.

Discount Bond Yield Order

Thus, arranging the yields for discount bonds from lowest to highest shows:

Nominal Yield;

Current Yield;

Yield to Maturity (Basis).

For the examination, you do not need to calculate Yield To Maturity. However, you must understand that the YTM is the highest for a discount bond because it not only reflects the fact that the bond is being purchased for less than par; but it also reflects the annual earning of the bond discount as part of the investment return.

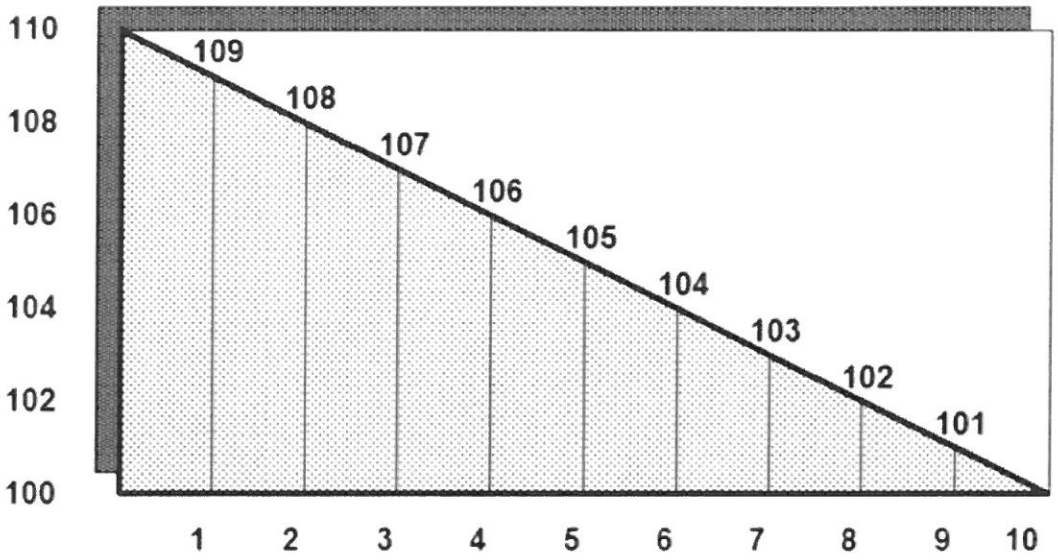
Now, let's compute the nominal yield, current yield and yield to maturity for a premium bond. Assume that a 10-year, 10% corporate bond quoted at 110.

Nominal Yield = 10%

$$\text{Current yield} = \frac{\$100}{\$1100} = 9.09\%$$

This is a premium bond. When a bond is bought at a premium over par, the premium is "lost" over the life of the bond. This capital loss is pro-rated over the bond's life to include the effect of the annual capital loss on the bond's yield. The annual capital loss for this bond can be visualized as follows:

Annual Amortization Of Bond Premium



This bond is being purchased at a premium price of 110% of $1,000 par, or $1,100. The bond will mature at par in 10 years. The premium of $100 is being lost over 10 years, so each year $10 of the premium is lost. This is termed the amortization of the bond premium.

$$\text{Yield to Maturity} = \frac{\$100 - \$10 \text{ annual premium loss}}{(\$1100 + \$1000)/2} = \frac{\$90}{\$1050} = 8.57\%$$

Note that in this example, the yield to maturity is lower than the current yield. This is due to the inclusion of the capital loss arising from the premium in the YTM formula.

Premium Bond Yield Order

Thus, arranging the yields for premium bonds from lowest to highest shows:

Yield to Maturity (Basis).

Current Yield;

Nominal Yield.

For the examination, you do not need to calculate Yield To Maturity. However, you must understand that the YTM is the lowest for a premium bond because it not only reflects the fact that the bond is being purchased for more than par; but it also reflects the annual loss of the bond premium as a reduction of the investment return.

1f. CALL AND PUT FEATURES

Call Definition

An issuer may include features in a bond other than simply paying interest and promising to pay back the principal amount at maturity. The issuer may include "call provisions" in the bond contract. When a bond is callable, the issuer has the right to redeem (to "call in") the bond at a predetermined price at a date prior to maturity. However, the issuer is not obligated to do so.

For example, a 20-year bond is issued in 2014 with the following call schedule:

Call Schedule

Redemption Date	Redemption Price
2024	105
2025	104
2026	103
2027	102
2028	101
2029 and after	100

This issue is first callable in 2024 at a price of 105. The issuer will pay a 5 point call premium if it calls the bonds in 2024. Notice that the later the issuer calls the bonds, the less the call premium that will be paid. After 2028, no call premium will be paid if the issuer redeems.

Calls Occur When Interest Rates Drop

An issuer is likely to call a bond early if interest rates have dropped in the market subsequent to the bonds' issuance. The cost to the issuer for doing this is the call premium. The issuer can then sell new bonds to replace the old at a lower interest rate. From the investor's standpoint, a call is never welcome. The bonds will be called early and the investor will receive the call premium (if any). When the investor reinvests the proceeds, he or she will find that the new interest rate will be lower.

Call Protection

Clearly, investors are not happy when bonds are called. To make these issues marketable to the public, investors are protected from calls for a stated period after the bonds' issuance. In this example, the bonds issued in 2014 are first callable in 2024. An investor has 10 years of "call protection" with this issue.

Call Protection Is Typically 10 Years

The typical call protection period for new issues of bonds is 10 years; investors are reluctant to buy bonds with shorter initial periods of call protection.

Call Price Sets Ceiling On Market Price

If interest rates drop, it is more likely that an issuer will call in bonds. We also know that as interest rates drop, prices in the market will rise. The price will not rise by as much as that for a non-callable issue. For example, in 2024 the price of this issue will not go much above 105, no matter how far interest rates drop. The reason why is obvious; why would someone pay more than 105 for an issue that is likely to be called at that price? If he paid more, he would suffer a capital loss when the bond is called. Therefore, the call price tends to set a ceiling on the market price of the bond during periods of falling interest rates.

Zero-Coupon Bonds Callable At Accreted Value Plus Call Premium

Also note that zero-coupon bonds can be issued that are callable. Unlike conventional bonds which are called at par plus a call premium, zero-coupon bonds are called at their current accreted value (the purchase price plus compounded growth-to-date) plus a call premium.

Put Definition

The issuer may also include "put" provisions in the bond contract. This gives the investor the right to tender the bond (he or she can "put" the bond) to the issuer after a specified date for a price set in the bond contract. The price is usually par.

For example, a 20-year bond is issued in 2014 with a tender option at par. The schedule included with the bond is:

Put Schedule

Tender Date	Tender Price
2024 and after	100

The bondholder has the right to tender the bond to the issuer at any time starting in 2024 and will receive par for the bond.

Put/Tender Option Given To Bondholder When Interest Rates Are Low

During periods when interest rates for long term bonds are very low, any purchaser of a new bond with a low coupon rate is highly susceptible to "interest rate risk," - the risk that a rise in interest rates will cause the bond to fall sharply in value. To eliminate this risk and make the bond more marketable, the issuer might give the bondholder a put option instead of placing a somewhat higher coupon rate on the bond.

Put Exercised When Interest Rates Rise

The bondholder is likely to exercise the tender option if interest rates have risen during the period following the bonds' issuance. As interest rates rise, bond prices fall. If the bond's price were to drop below par, the bondholder can always tender the bond (as of 2024) to the issuer and receive par value. The bondholder is only too happy to exercise the option when interest rates rise because the proceeds of the redemption can be reinvested at higher current interest rates.

Put Price Sets Floor On Market Price

The price set by the tender option puts a floor under the market price of the bond during periods of rising interest rates. The price will never drop much below par once the option is exercisable, because if it did, traders would buy as many of the bonds as possible and "put" them to the issuer at par for a capital gain. This buying action would force the market price back up to par.

1g. YIELD TO CALL - YIELD TO PUT

Yield To Call

Yield To Put

If a bond is called prior to maturity, or a put option is exercised, the yield for that bond will change. Calculating yield to call or yield to put is similar to the yield to maturity formula.

$$\text{Yield to Call Date or Put Option} = \frac{\text{Annual Income} \quad \begin{matrix} + \text{ Annual Capital Gain (Discount Bond)} \\ \text{or} \\ - \text{ Annual Capital Loss (Premium Bond} \end{matrix}}{(\text{Purchase Price} + \text{Call or Put Price})/2}$$

Differences in the computation from YTM arise when the redemption (call or put) price is other than par, and because redemption occurs in a shorter time frame.

For example, a corporation issues a 20 year 10% bond at par. The bond is currently trading at par. The bond is callable in 5 years at 105 and is puttable in 5 years at 100. What are the yield to maturity, yield to call and yield to put for this bond?

$$\text{Yield to Maturity} = \frac{\$100 \text{ annual income} + 0 \text{ annual gain}}{(\$1000 \text{ purchase price} + \$1000 \text{ redemption})/2} = \frac{\$100}{\$1000} = 1($$

$$\text{Yield to 5 Year Call} = \frac{\$100 \text{ annual income} + \$10 \text{ annual gain} *}{(\$1000 \text{ purchase price} + \$1050 \text{ redemption})/2} = \frac{\$110}{\$1025} =$$

* The annual gain of $10 comes from earning the $50 premium over 5 years = $10 per year

$$\text{Yield to 5 Year Put} = \frac{\$100 \text{ annual income} \pm \$0 \text{ annual gain or loss}}{(\$1,000 \text{ purchase price} + \$1,000 \text{ redemption}) \ / \ 2} = \frac{\$100}{\$1,000}$$

Note that the yield to call is higher than the yield to maturity due to the earning of the call premium over a shorter time period. The yield to put is the same as the yield to maturity because the redemption price was set at par.

Discount Bond = YTC > YTM

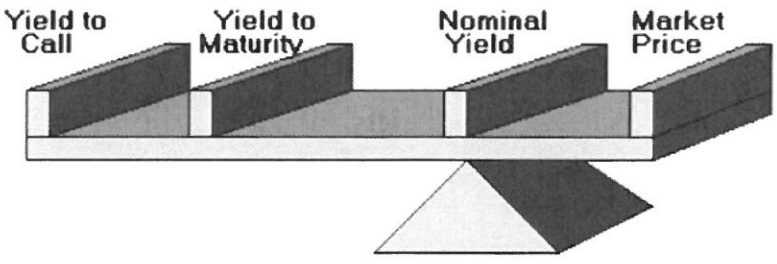
Premium Bond = YTC < YTM

For the examination, you do not have to compute yield to call or yield to put. What you must know is that yield to call is higher than yield to maturity for a discount bond (since the discount is earned faster); and yield to call is lower than yield to maturity for a premium bond (since the premium is lost faster).

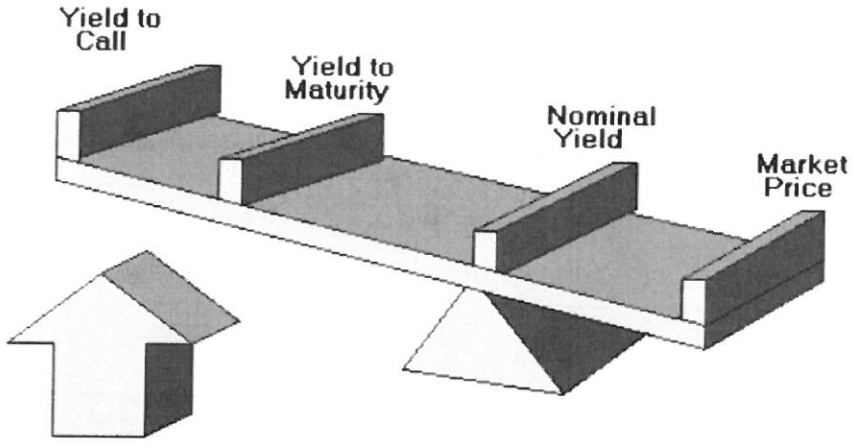
1h. SUMMARY OF YIELDS AND BOND PRICE MOVEMENTS

We already know that there is an inverse relationship between interest rate movements and bond price movements. As interest rates increase in the market, the yield to maturity of outstanding bonds must increase to be competitive. This forces bond prices down. At the same time, the yield to call on the bond also must increase, due to the drop in the bond's price. This can be pictured as follows:

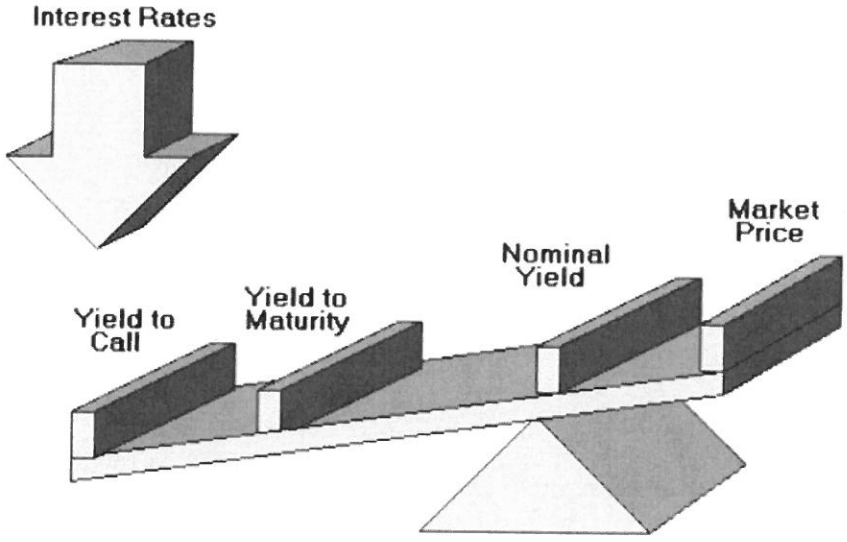
When the bond is issued, market interest rates and the stated interest rate on the bond are the same.



As interest rates rise in the market, yields are pushed up and the bond's market price is pushed down:



Conversely, as interest rates fall in the market, yields are pushed down as the market price of the bond rises.



1i. RISKS ASSOCIATED WITH BONDS

Bondholders are subject to a variety of risks. An evaluation of a bond should take into consideration the risks to which the security is subject. The risks are:

Credit Risk

Credit Risk: The risk that the issuer cannot make interest and principal payments on an issue. The ratings agencies rate bonds only for credit risk, not for any other risks.

Moody's Standard And Poor's

The two main agencies are Moody's and Standard and Poor's. A much smaller third rating's agency is Fitch's.

Treasury Debt - AAA Rated

Treasury bonds are rated AAA (top rating) by Moody's and Fitch's because they are considered to have no credit risk. Note that this is true, even with the Standard and Poor's "questionable" downgrade of U.S. Government debt mid-2011 to a "AA" rating because of the ballooning Federal debt. The other credit ratings agencies maintained their AAA ratings, since the U.S. Government is highly unlikely to ever default on its debt. This is the rating that must be known for the exam.

Long-Term Bond Ratings

Long term corporate and municipal bonds are rated under the "ABC" system.

The ratings used by the two agencies for long-term bonds are:

	Standard and Poor's	Moody's
Investment Grade	AAA	Aaa
	AA	Aa
	A	A
	BBB	Baa
Speculative Grade	BB	Ba
	B	B
	CCC	Caa
	CC	Ca
	C	C

Investment Grade

The top 4 ratings are considered "investment" grade. The highest investment grade is AAA (there is no AAA+), while the lowest is BBB. Generally, institutions will restrict their investments to bonds of these grades.

Speculative Grade ("Junk")

Below this level, (the gray shaded area) the bonds become speculative. BB is the highest speculative rating, while the lowest is C. Speculative bonds are commonly referred to as "junk bonds." Thus, a "BB" rated bond is the highest "junk rating" available.

+ Or - Ratings

Standard and Poor's can adjust a rating slightly without making a letter change by adding a + or - to the rating. For example, A+ is better than A.

1-2-3 Ratings

Moody's adjusts ratings by adding "1, 2, 3" rankings. For example, within an A rating A-1 is higher than A-2; A-2 is higher than A-3.

Short-Term Note Ratings

Moody's also rates short-term corporate and municipal issues for credit risk. The ratings used for short term issues are:

Commercial Paper	Municipal Notes
P 1	MIG 1
P 2	MIG 2
P 3	MIG 3
NP	SG

The P ratings stand for "prime" paper with P 1 being the highest and P 3 the lowest. NP means "not prime," the lowest rating. The MIG ratings stand for "Moody's Investment Grade," with MIG 1 being the highest and SG ("Speculative Grade") the lowest.

Standard and Poor's uses a different rating scale for commercial paper. It rates the paper of companies using a version of the "ABC" ratings.

Standard and Poor's Commercial Paper Ratings		
A Rated	B Rated	C Rated
A - 1	B	C
A - 2		
A - 3		

Only Top 2 Grades Of Paper Are Actively Traded (P1, P2; A1, A2)

Under the Standard and Poor's Ratings, investment grade paper carries an "A" rating. In the commercial paper market, institutional investors generally limit their purchases to the top 2 grades of paper (P1 or P2; and A1 and A2). For example, money market mutual funds will only buy paper of these grades.

Interest Rate Risk

Market Risk

Interest Rate Risk: The risk that rising interest rates will cause bond prices to fall. Long-term maturities, low coupon rate bonds and deep discount bonds are most susceptible to this risk, as discussed previously in this section. Another name for interest rate risk when talking about bonds is "market risk." It is the risk that market interest rates will rise, forcing bond prices lower.

Greater Risk For Longer Maturities And Lower Coupon Issues

Below is a chart that illustrates the price changes that will occur if market interest rates move by 1 percentage point, for bonds of varying maturities and coupon rates. The chart shows that as maturities lengthen, as well as when coupon rates are lower, percentage price changes are greater in response to market interest rate movements.

	8% Coupon		10% Coupon		12% Coupon	
Years to	If Rates		If Rates		If Rates	
maturity	Rise	Fall	Rise	Fall	Rise	Fall
1	-.09	+1.0	-.09	+0.9	-.09	+0.9
2	-1.8	+1.8	-1.8	+1.8	-1.7	+1.8
3	-2.6	+2.7	-2.5	+2.6	-2.4	+2.5
4	-3.3	+3.4	-3.2	+3.3	-3.0	+3.2
5	-4.0	+4.2	-3.8	+4.0	-3.6	+3.8
10	-6.5	+7.1	-6.0	+6.5	-5.5	+6.0
15	-8.1	+9.2	-7.3	+8.1	-6.5	+7.3
20	-9.2	+10.7	-8.0	+9.2	-7.1	+8.0
30	-10.3	+12.5	-8.7	+10.3	-7.5	+8.7

Interest Rate Risk Applies Only To Fixed Rate Securities

Also note that interest rate risk only exists for fixed income securities, which include bonds with fixed coupon rates and preferred stock with fixed dividend rates. As market rates rise, the prices of these securities fall. This direct inverse relationship does not exist between common stock prices and market interest rate movements; nor does it exist for "variable rate" bonds.

Variable Rate Bonds Do Not Have Interest Rate Risk

A "variable rate" bond has an interest rate that is periodically reset to a market index. Thus, as market interest rates move up, so will the interest rate on the bond; and as market interest rates move down, so will the interest rate on the bond. Because the interest rate on these bonds moves with market rates, the price stays very close to par. Thus, variable rate bonds do not have market (interest rate) risk.

Purchasing Power Risk

Purchasing Power Risk: The risk that inflation will lower the value of bond

interest payments and principal repayment, thereby forcing prices to fall. When there is significant inflation, market interest rates rise and this forces bond prices down. This risk is most significant for long term bonds (when market interest rates rise, long term bond prices fall faster). Another name for purchasing power risk is "inflation" risk. The only bond that gives protection against purchasing power risk is a "TIPS" - a Treasury Inflation Protection Security - covered later in this chapter.

Marketability Risk

Marketability Risk: The risk that the security will be difficult to sell. Many factors affect marketability: the issue's size, the number of traders in the market, etc. Marketability risk is virtually non-existent for Treasury bonds because the market is so large and liquid; while it is a major concern in the fragmented, illiquid municipal bond market (this is covered later in this chapter).

Liquidity Risk

Liquidity Risk: The risk that the security can only be sold by incurring large transaction costs. Generally, short-term high quality issues are liquid; the longer the term and lower the quality, the lesser the liquidity.

Legislative Risk

Legislative Risk: The risk that new laws reduce the value of a security, such as a change in the tax laws increasing tax rates on interest received from debt investments.

Call Risk

Call Risk: The risk that the bonds may be redeemed prior to maturity, forcing reinvestment of the proceeds at a lower interest rate. Call risk increases as interest rates fall, since issuers are able to call in existing higher rate issues and can "refund" them at lower current market rates.

The bonds most susceptible to call risk are those that an issuer is likely to call - these are bonds with high coupon rates and low call premiums. Conversely, the bonds that an issuer is least likely to call are those with low coupon rates and high call premiums.

Reinvestment Risk

Reinvestment Risk: The risk for a long-term bond investor that market interest rates are falling over that investment's time horizon. A bond investor receives semi-annual interest payments, which must be "reinvested" in additional bond purchases to maintain the overall return on that bond portfolio. As these semi-annual payments are received, they are reinvested at lower and lower interest rates - hence the term "reinvestment risk."

Zero-Coupon Bond Avoids Reinvestment Risk

The only bond that avoids this risk is a "zero-coupon bond." The rate of return is established by the deep discount price at which the bond is purchased. The bond grows in value towards par at maturity and there are no payments received during the investment's time horizon that must be reinvested

Risks Of International Investing

There are other risks that affect bond investors (and equity investors as well) when investments are made outside the United States. The risks of international investing are:

Exchange Rate Risk

Exchange Rate Risk: The risk that the value of the foreign currency in which the investment is denominated weakens, which is the same as the U.S. dollar strengthening. When the value of the investment is converted into U.S. dollars, it buys "fewer" U.S. dollars, and is now worth less than before. Protection against this risk can be purchased by using foreign

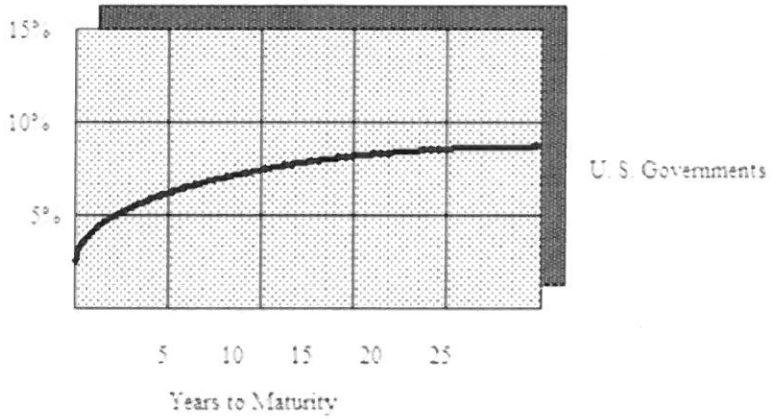
currency options, covered in a later chapter.

Political Risk

Political Risk: Not to be confused with legislative risk, this is the risk of investing in foreign countries that have weak political and legal systems - typically 3rd world countries. If one buys the bonds of, say, Indonesia and, Indonesia declares unilaterally that it is cutting the interest rate it will pay on the bonds from 8% to 4%, those bondholders don't have much in the way of legal recourse.

1j. THE YIELD CURVE

The direction which interest rates are taking determines what will happen to bond prices. To evaluate the interest rate environment, analysts use the yield curve. The curve shows the market rates of interest for bonds of different maturities with similar credit ratings.



Normal Yield Curve (Ascending)

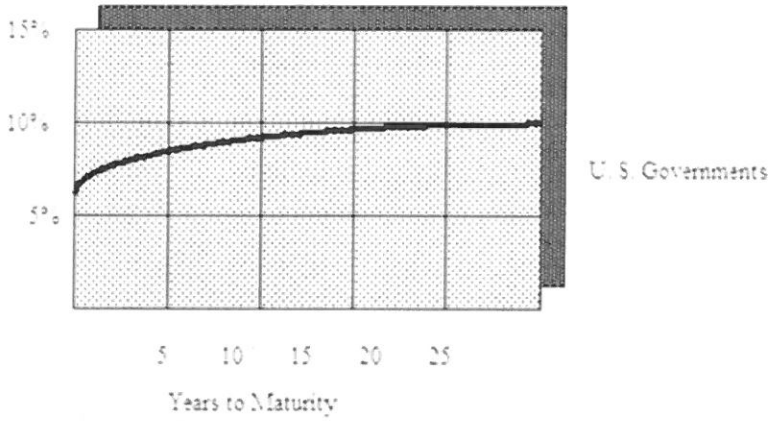
The "normal" shape of the yield curve shows that as maturities lengthen, yields increase. This curve is typical during periods of economic expansion, when monetary policy is loose. Above is an ascending yield curve. As a general statement, yields increase as maturities lengthen because investors demand a premium for the extra risk associated with longer term maturities (both interest rate risk and purchasing power risk).

Short Term Rates Move Faster Than Long Term Rates

During periods when economic expansion is peaking, monetary policy is tightened by the Federal Reserve (this will be covered more fully in the Analysis Chapter). The effect is to increase short-term rates, since the Federal Reserve exerts its influence on short-term rates. This also forces long-term rates up, but they do not rise as much. This occurs because the market for short-term funds is much larger than that for long-term funds, and the greater activity causes rate changes to show rapidly.

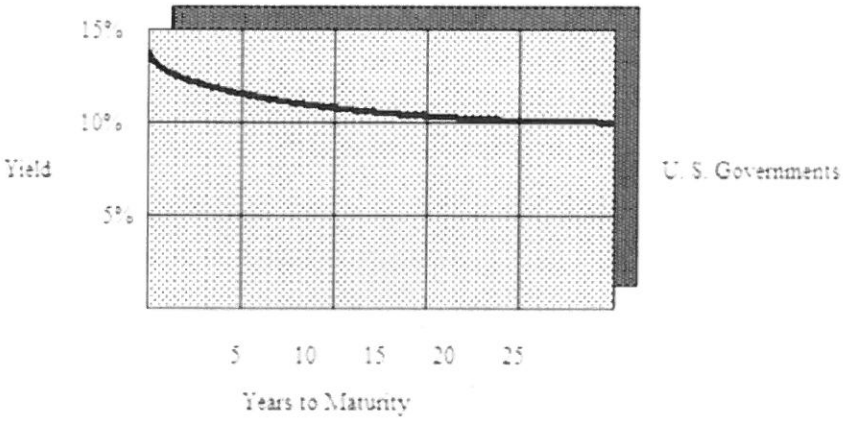
Flat Yield Curve

The yield curve now "flattens out" as short-term rates rise closer to long-term levels.



Inverted Yield Curve (Descending)

If the Federal Reserve really tightens short-term credit to slow the economy, then short-term rates can rise above long-term rates. This is called an "inverted" yield curve, and rarely occurs in the business cycle. It happens when the economy appears to be "overheating," increasing inflation fears. To slow things down, the Fed raises short-term rates to extremely high levels. Below is an inverted curve.



Yield Curve Shape Reflects Economic Cycle

One can see, as the economic cycle progresses, the shape of the yield curve changes.

An ascending curve occurs during periods of normal economic expansion;

A flat curve occurs when the economy is peaking;

An inverted curve occurs when short-term credit is severely tightened if the economy is "overheating."

Yield Curve Theories

There are various theories that attempt to explain yield curve shapes in a more precise manner. These are:

Liquidity Preference

Liquidity Preference: states that investors prefer liquidity; and that because of this, short term issues (which are more liquid) should trade at lower yields than long term issues. Thus, the "normal" curve under this theory is an ascending yield curve.

Market Segmentation

Market Segmentation: states that individual and institutional investors are restricted to making investments in specific maturity sectors. For example, pension funds will tend to buy long term bonds (to fund future pension liabilities); whereas money funds will buy short term maturities only. Under this theory, the yield curve simply shows the relative supply and demand for issues in each maturity range.

Expectations

Expectations: states that the shape of the yield curve shows investor expectations as to the future direction of interest rates.

A positive curve indicates that investors expect interest rates to rise. An ascending yield curve is typical when the economy is growing. When the economy is growing, it is "expected" that the Fed will try to slow down growth by raising interest rates, since an overheating of the economy could lead to inflation. Thus, an ascending yield curve is a predictor that interest rates will rise in the future.

A negative curve indicates that investors expect interest rates to fall. A descending yield curve is typical when the Fed has tightened credit greatly to slow the economy. When the economy is slowing, it is "expected" that the Fed will try to restimulate growth by lowering interest rates. This is also a low inflation type of environment, so the Fed can lower rates without worrying about igniting inflationary pressures. Thus, a descending yield curve is a predictor that interest rates will fall in the future.

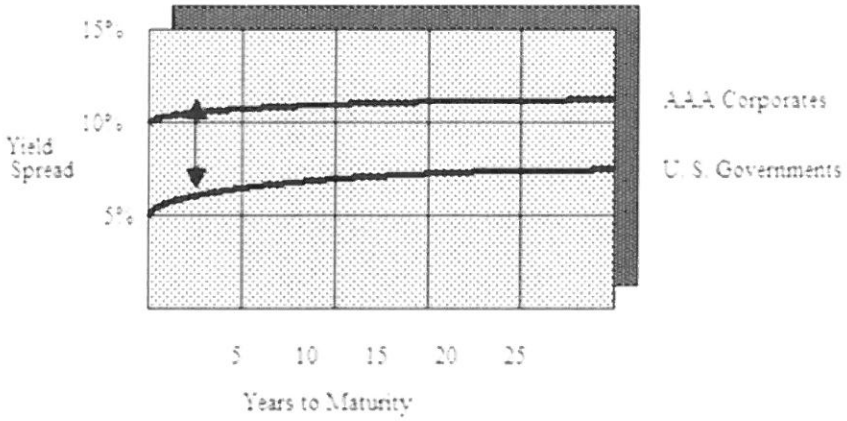
A flat curve would indicate that investors expect no change in interest rate levels.

Yield Curve Shape Is Actually A Combination Of All Theories

In reality, yield curve shapes are driven by a combination of all of these factors. Yield curves, over time, tend to be ascending, showing investors' liquidity preference. If the curve shows unusual dips or humps, it means that the yield and hence the demand for that maturity is unusually low or high, as compared to other bonds. For example, there may be a big demand for 10 year Treasury Bonds by Japanese investors, causing yields for that maturity to drop below those of less popular 15 year bonds. This validates the market segmentation theory. Finally, inflation fears tend to steepen the yield curve, while disinflation would flatten or invert the yield curve, validating the expectations theory.

Comparative Yield Curves

Yield curves can also be compared for issuers in different risk categories. The base for comparison is the risk-free securities of the U.S. Government. These are often compared to the yields of AAA rated corporate bonds. Below is a sample comparative yield curve chart.



Yield Spread

Notice that corporates have a higher yield for all maturities than governments due to the higher default risk. The "spread" between the "risk-free" government yield and corporate yield is about 5% in this example. This is the "risk premium" component of interest rates.

Widening Spread Indicates Coming Recession

The yield spread is an indicator of future economic trends. Assume that the "normal" yield spread is 5%. If investors expect a recession, they will "flee to safety." They will sell corporate bonds (raising yields) and buy government bonds (lowering yields). Thus, when a recession is expected, the yield spread will **WIDEN**.

Narrowing Spread Indicates Coming Expansion

Conversely, when investors expect an economic expansion, they will sell governments (raising yields) and buy corporates (lowering yields). Thus, when an expansion is expected, the yield spread will **NARROW**.