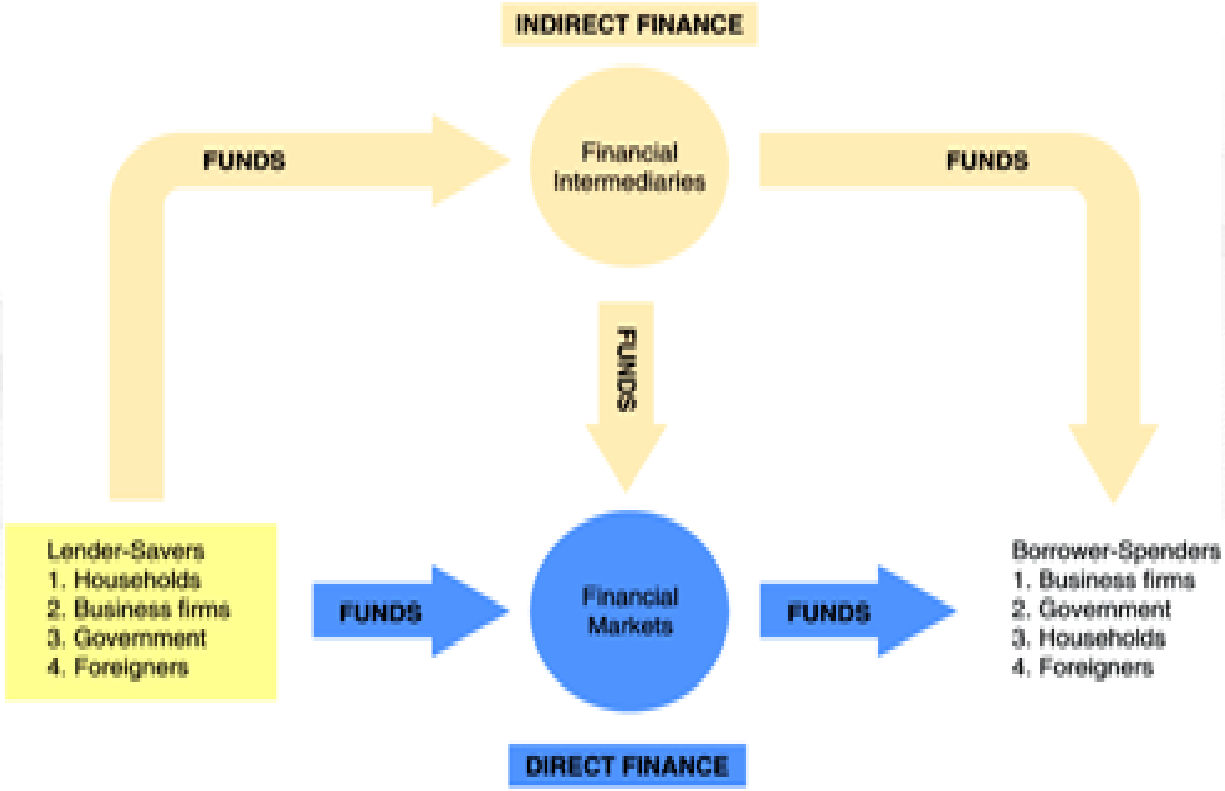
equaliFI ACADEMY

CMIS

CERTIFICATE IN MULTI-ASSET INVESTMENT STRATEGY

THE BOND MARKET


INDIRECT FINANCE
FUNDS
Financial Intermediaries
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Lender-Savers
1. Households
2. Business firms
3. Government
4. Foreigners
FUNDS
Financial Markets
FUNDS
Borrower-Spenders
1. Business firms
2. Government
3. Households
4. Foreigners
DIRECT FINANCE

Bonds are like money market instruments, but they have maturities that exceed one year. These include Treasury bonds, corporate bonds, mortgages, and the like.

We examine how capital markets operate, and then focus our attention on the bonds and the bond market. Topics include:

- Purpose of the Capital Market
- Capital Market Participants
- Capital Market Trading
- Types of Bonds
- Treasury Notes and Bonds
- Municipal Bonds

- Corporate Bonds
- Financial Guarantees for Bonds
- Current Yield Calculation
- Finding the Value of Coupon Bonds
- Investing in Bonds

Purpose of the Capital Market

Original maturity is greater than one year, typically for long term financing or investments.

Best known capital market securities:

- Stocks and bonds

Capital Market Participants

Primary issuers of securities:

- Federal and local governments: debt issuers
- Corporations: equity and debt issuers

Largest purchasers of securities:

- You and me

Capital Market Trading

1. Primary market for initial sale (IPO)
2. Secondary market
    - Over-the-counter
    - Organized exchanges (i.e., NYSE)

Types of Bonds

Bonds are securities that represent debt owed by the issuer to the investor, and typically have specified payments on specific dates.

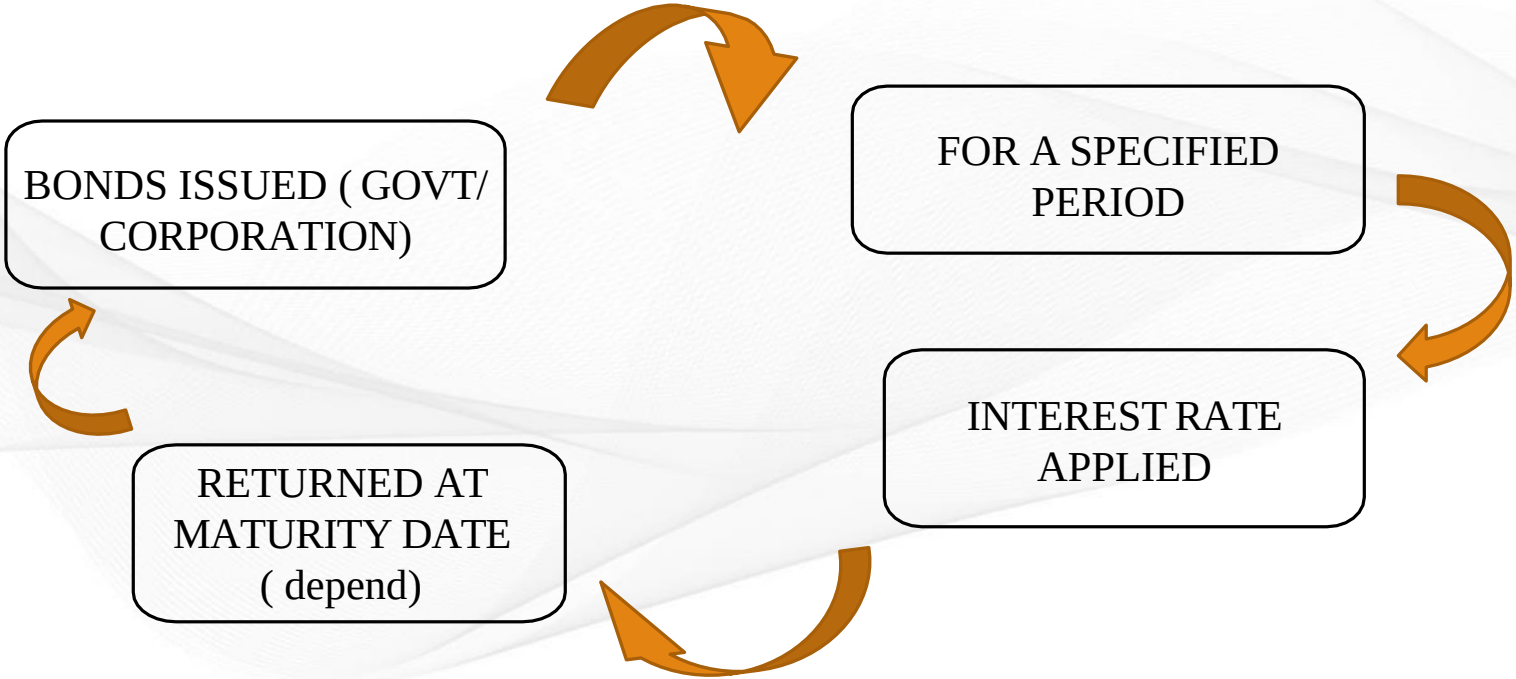
Types of bonds we will examine include long-term government bonds (T-bonds), municipal bonds, and corporate bonds.

Summary of Bond Features

Bond features are outlined in a contract between the issuer and investors (called the indenture):

- Term to maturity
- Principal amount
- Coupon rate
- Amortization features
- Embedded options.

How bonds work?



Feature 1: Term to Maturity

Term to maturity: # of years until the bond expires.

- Usually just called “term” or “maturity.

Bond terms:

- Short term: 1 to 5 years.
- Intermediate term: 5 to 12 years.
- Long term: > 12 years.

Features 2 and 3: Principal & Coupon Rate

Principal: The amount the issuer agrees to repay to bondholders at the maturity date.

- Also commonly called: face value, par value, maturity value.

Coupon Rate: the annual interest rate the issuer agrees to pay on the face value (principal).

- The coupon is the annual amount the issuer promises to pay (in $):
- coupon = coupon rate *principal
- The coupon is paid semiannually on most bonds.

Coupon Rate

Some bonds pay no coupons (zero-coupon bonds).

Zeros are sold at a substantial discount to face value and redeemed at face value at expiration.

All interest is therefore received at expiration.

Some bonds have floating coupons

The coupon resets periodically, according to some formula

Floating Rate Bonds

The coupon for a floater is determined by the following general formula:

- Floater coupon = floating reference rate + fixed margin

Feature 4: Amortization

The principal on a bond can be paid two ways:

- Paid all at once at expiration (“bullet” maturity).
- Paid little-by-little over the life of the bond according to a schedule (amortizing).

One advantage of a bond that amortizes principal is that the issuer won’t have to fund a big “balloon payment” at expiration.

Feature 5: Embedded Options

Options are actions that can be taken by either the issuer or the investor.

The most common is a call provision: Grants issuer the right to retire bonds (fully or partially) prior to maturity.

Put provision: Enables the bondholder to sell the issue back to issuer at par value prior to expiration.

Cont….

Convertible bond – gives bondholders the right to exchange the bond for a specified number of shares of common stock.

- This is advantageous to investors if firm's stock price goes up.

Exchangeable bond – allows bondholders to exchange the bond for a specified number of shares of common stock of another firm.

DEBT INSTRUMENTS

- Government Securities
- Corporate Bonds
- Certificate of Deposit
- Commercial Papers

Government Securities

It is the Reserve Bank of India that issues Government Securities or G-Secs on behalf of the Government of India.

These securities have a maturity period of 1 to 30 years. G-Secs offer fixed interest rate, where interests are payable semi-annually.

For shorter term, there are Treasury Bills or T-Bills, which are issued by the RBI for 91 days, 182 days and 364 days

Corporate Bonds

These bonds come from PSUs and private corporations and are offered for an extensive range of tenures up to 15 years.

Comparing to G-Secs, corporate bonds carry higher risks, which depend upon the corporation, the industry where the corporation is currently operating, the current market conditions, and the rating of the corporation

Certificate of Deposit

Certificate of Deposits (CDs), which usually offer higher returns than Bank term deposits, are issued in demat form
Banks can offer CDs which have maturity between 7 days and 1 year.

CDs from financial institutions have maturity between 1 and 3 years

Commercial Papers

There are short term securities with maturity of 7 to 365 days.

Structured Debt

Structured debt is some type of debt instrument that the lender has created and adapted to fit the needs and circumstances of the borrower

A debt package of this type usually includes one or more incentives that encourage the debtor to do business with the lender, rather than seeking to develop a working relationship with other lenders.

While the overall structure of the debt is adapted to the needs of the borrower, the terms also benefit the lender in the long term.

The main goal of structured debt is to create a debt situation that provides the debtor with as many benefits as possible, while also keeping the overall debt load as low as possible

At the same time, the lender receives an equitable return for the structured debt arrangement

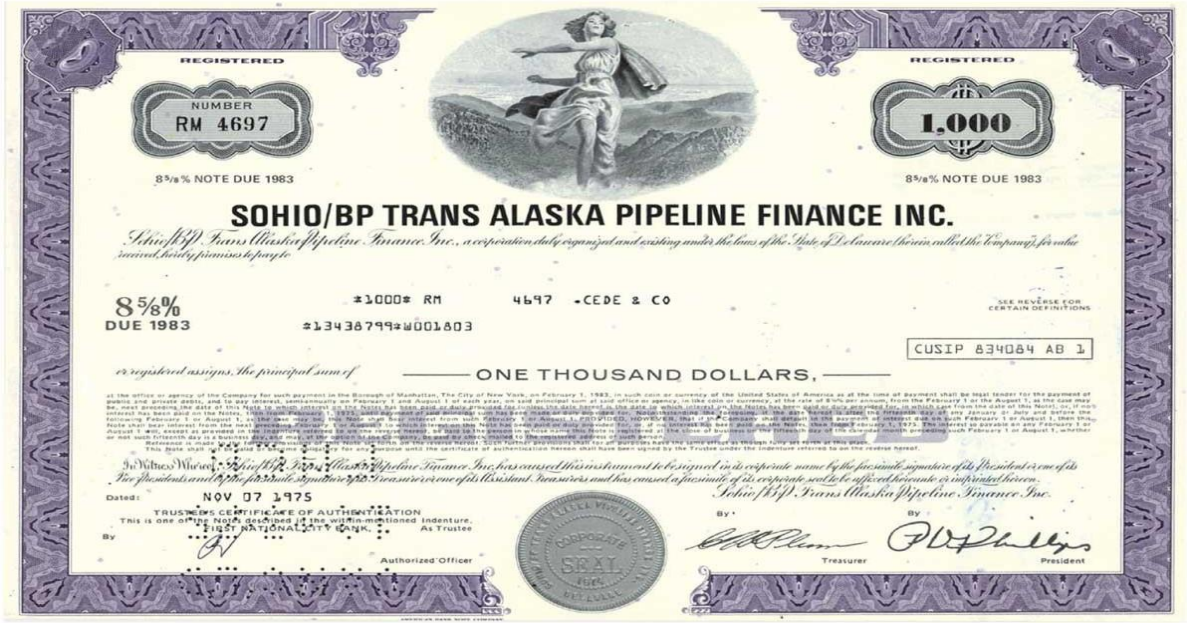
Bond Market Sectors

Asset-backed Sector – issuer pools loans and receivables as collateral for the issuance of securities.

Mortgage-backed Sector – debt backed by pool of mortgage loans:

- Subsectors: Residential mortgage sector and Commercial mortgage sector.

Types of Bonds: Sample Corporate Bond


REGISTERED

NUMBER RM 4697

8⅝% NOTE DUE 1983

REGISTERED

1,000

8⅝% NOTE DUE 1983

SOHIO/BP TRANS ALASKA PIPELINE FINANCE INC.

Sohio/BP Trans Alaska Pipeline Finance Inc., a corporation duly organized and existing under the laws of the State of Delaware (herein called the Company), for value received, hereby promises to pay to

8⅝% DUE 1983

1000 RM 4697 -CEDE & CO

*134387994W001803

SEE REVERSE FOR CERTAIN DEFINITIONS

CUSIP 834084 AB 1

or registered assigns, the principal sum of ——— ONE THOUSAND DOLLARS, ———

at the office or agency of the Company for such payment in the Borough of Manhattan, The City of New York, on February 1, 1983, in such coin or currency of the United States of America as at the time of payment shall be legal tender for the payment of public and private debts, and to pay interest, semiannually on February 1 and August 1 of each year, on said principal sum at said office or agency, in like coin or currency, at the rate of 8⅝% per annum, from the February 1 or the August 1, as the case may be, next preceding the date of this Note to which interest on the Notes has been paid or duly provided for, unless the date hereof is a date to which interest has been paid or duly provided for, in which case from the date of this Note, or unless no interest has been paid or duly provided for on the Notes, in which case from August 1, 1975, until payment of said principal sum has been made or duly provided for. Interest on any overdue principal and (to the extent that payment of such interest is enforceable under applicable law) on any overdue installment of interest shall bear interest at the rate of 8⅝% per annum (computed on the basis of a 360-day year of twelve 30-day months), payable at the same office or agency on demand. As provided in the Indenture hereinafter referred to, this Note is one of a duly authorized issue of Notes of the Company, designated as its 8⅝% Notes due 1983, limited in aggregate principal amount to $1,000,000,000, all issued or to be issued under an Indenture dated as of August 1, 1975, duly executed by the Company to First National City Bank, as Trustee, to which Indenture and all indentures supplemental thereto reference is hereby made for a statement of the respective rights, limitations of rights, duties and immunities thereunder of the Company, the Trustee and the holders of the Notes and of the terms upon which the Notes are, and are to be, authenticated and delivered. This Note shall not be entitled to any benefit under the Indenture or be valid or obligatory for any purpose until the certificate of authentication hereon shall have been signed by the Trustee under the Indenture referred to on the reverse hereof.

Reference is made to the further provisions of this Note set forth on the reverse hereof. Such further provisions shall for all purposes have the same effect as though fully set forth at this place.

In Witness Whereof, Sohio/BP Trans Alaska Pipeline Finance Inc. has caused this instrument to be signed in its corporate name by the facsimile signature of its President or one of its Vice Presidents and by the facsimile signature of its Treasurer or one of its Assistant Treasurers and has caused a facsimile of its corporate seal to be affixed hereunto or imprinted hereon.

Dated: NOV 07 1975

Sohio/BP Trans Alaska Pipeline Finance Inc.

By: Treasurer

By: President

TRUSTEE'S CERTIFICATE OF AUTHENTICATION

This is one of the Notes described in the within-mentioned Indenture.

FIRST NATIONAL CITY BANK, As Trustee

By: Authorized Officer

CORPORATE SEAL 1975 DELAWARE

Figure 10.1 Sohio/BP Corporate Bond

Source: Eakins, *Finance: Investments, Institutions, & Management,* p. 39.

Treasury Notes and Bonds

The U.S. Treasury issues notes and bonds to finance its operations.

The following table summarizes the maturity differences among the various Treasury securities.

Type	Maturity
Treasury bill	Less than 1 year
Treasury note	1 to 10 years
Treasury bond	10 to 30 years

Treasury Bond Interest Rates

No default risk since the Treasury can print money to payoff the debt

Very low interest rates, often considered the risk-free rate (although inflation risk is still present)

Treasury Bond Interest Rates

The next two figures show historical
rates on Treasury bills, bonds, and the inflation rate.

Treasury Bond Interest Rates

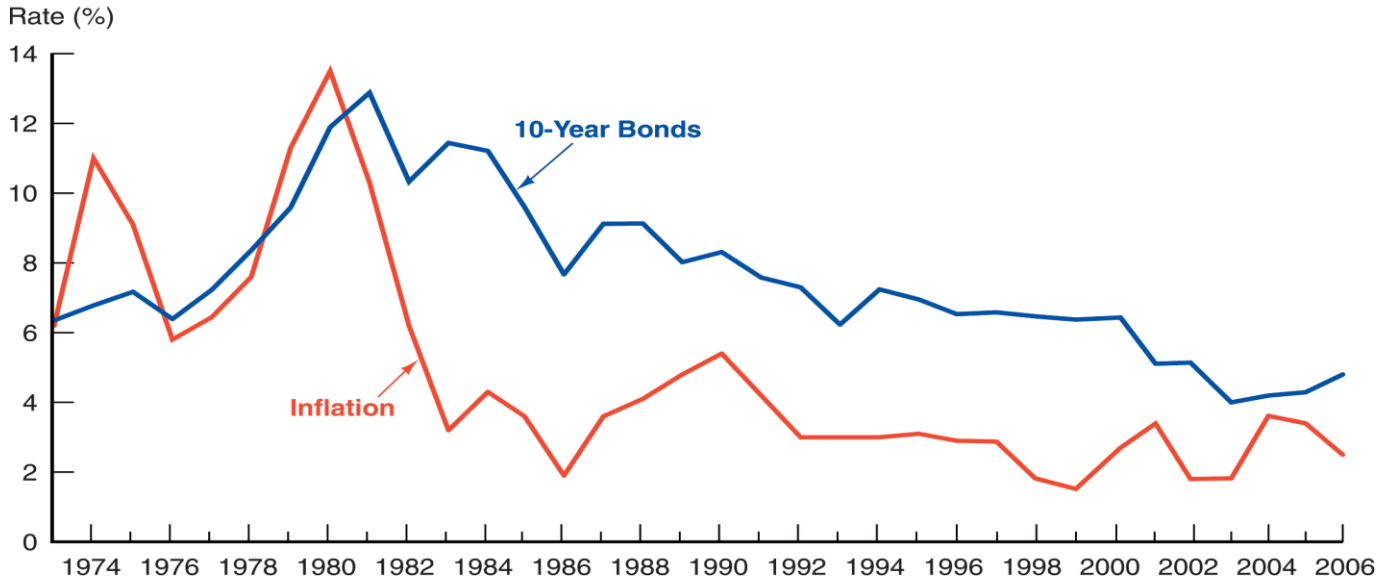


Figure 10.2 Interest Rate on Treasury Bonds and the Inflation Rate, 1973–2006

Sources: http://www.federalreserve.gov/releases and ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

Treasury Bond Interest Rates: Bills vs. Bonds

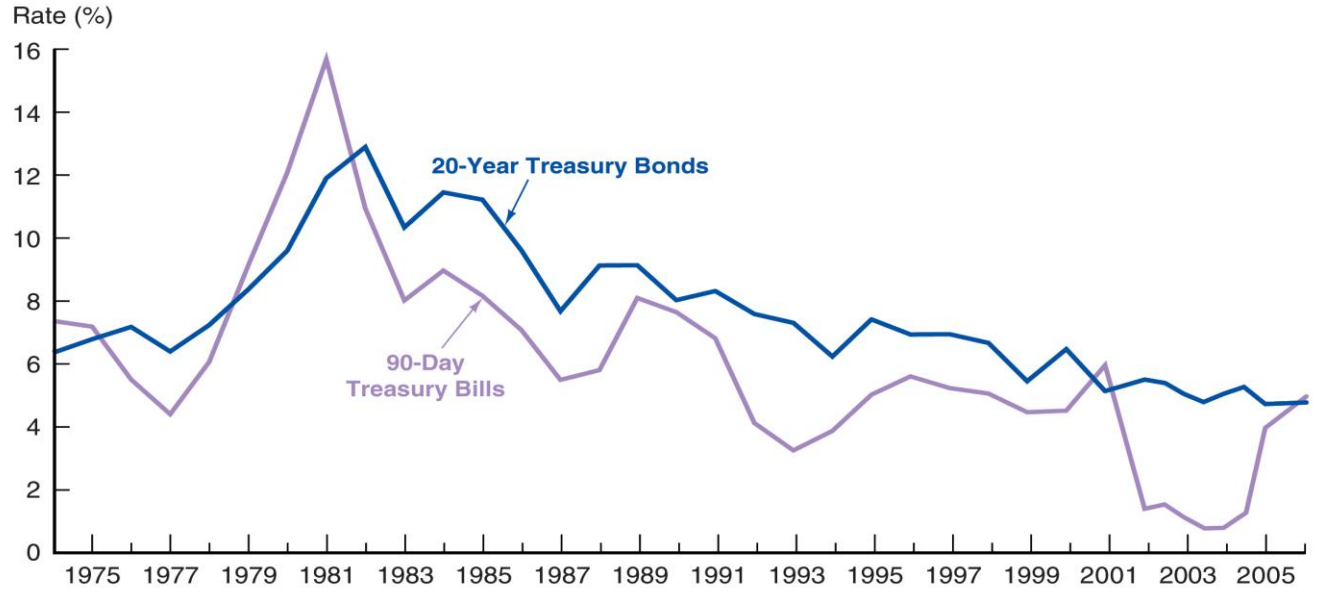


Figure 10.3 Interest Rate on Treasury Bills and Treasury Bonds, 1974–2006 (January of each year)

Source: http://www.federalreserve.gov/releases.

Treasury Bonds: Recent Innovation

Treasury Inflation-Indexed Securities:
the principal amount is tied to the current rate of inflation to protect investor purchasing power

Treasury STRIPS: the coupon and principal payments are “stripped” from a T-Bond and sold as individual zero-coupon bonds.

Treasury Bonds: Agency Debt

Although not technically Treasury securities, agency bonds are issued by government-sponsored entities, such as GNMA, FNMA, and FHLMC.

The debt has an “implicit” guarantee that the U.S. government will not let the debt default.

Municipal Bonds

Issued by local, county, and state governments

Used to finance public interest projects

Tax-free municipal interest rate = taxable interest rate □ (1□ marginal tax rate)

Municipal Bonds: Example

Suppose the rate on a corporate bond is 9% and the rate on a municipal bond is 6.75%.Which should you choose?

Municipal Bonds: Example

Answer: Find the marginal tax rate: $6.75\% = 9\% \times (1 - MTR)$, or $MTR = 25\%$

If you are in a marginal tax rate above 25%, the municipal bond offers a higher after-tax cash flow.

Municipal Bonds

Two types

- General obligation bonds
- Revenue bonds

NOT default-free (e.g., Orange County California)

- Defaults in 1990 amounted to $1.4 billion in this market

Municipal Bonds

The next slide shows the volume of general obligation bonds and revenue bonds issued from 1984 through 2006.

Municipal Bonds: Comparing Revenue and General Obligation Bonds

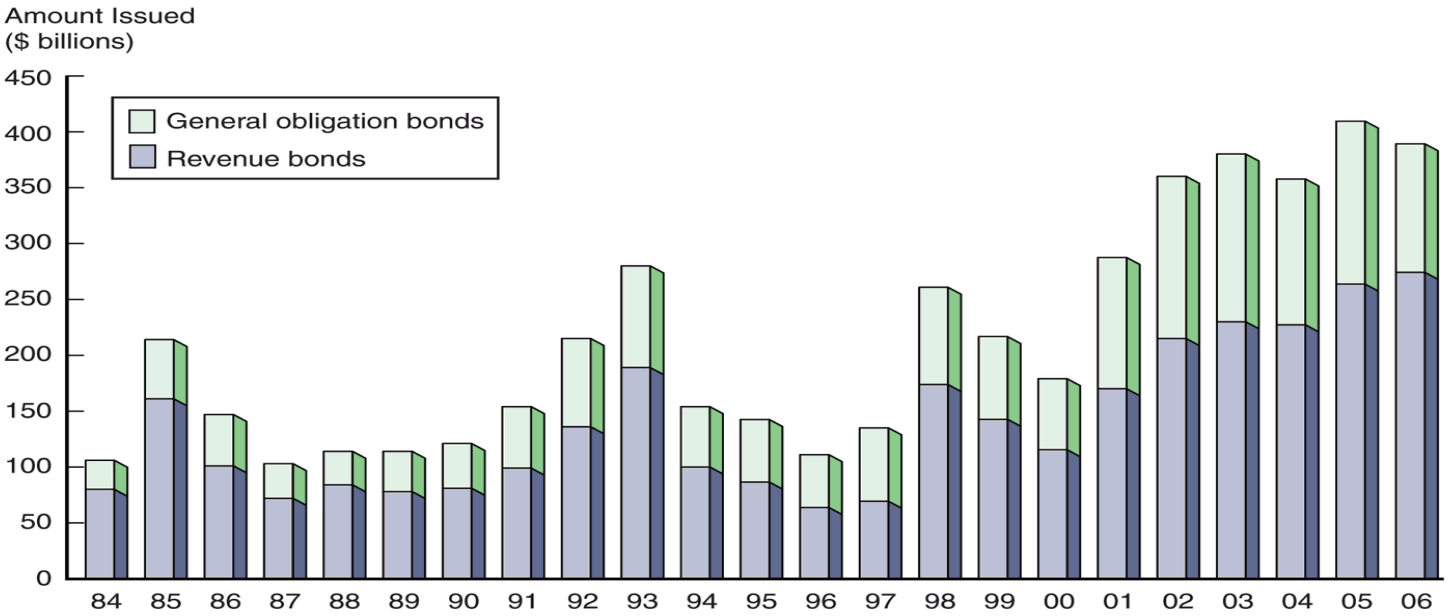


Figure 10.4 Issuance of Revenue and General Obligation Bonds, 1984–2006 (End of year)

Source: Federal Reserve Bulletin, various issues, Table 1.45.

Corporate Bonds

Typically have a face value of $1,000, although some have a face value of $5,000 or $10,000

Pay interest semi-annually

Corporate Bonds

Cannot be redeemed anytime the issuer wishes, unless a specific clause states this (call option).

Degree of risk varies with each bond, even from the same issuer. Following suite, the required interest rate varies with level of risk.

Corporate Bonds

The next slide shows the interest rate on various bonds from 1973- 2007.

The degree of risk ranges from low-risk (AAA) to higher risk (BBB). Any bonds rated below BBB are considered sub-investment grade debt.

Corporate Bonds: Interest Rates

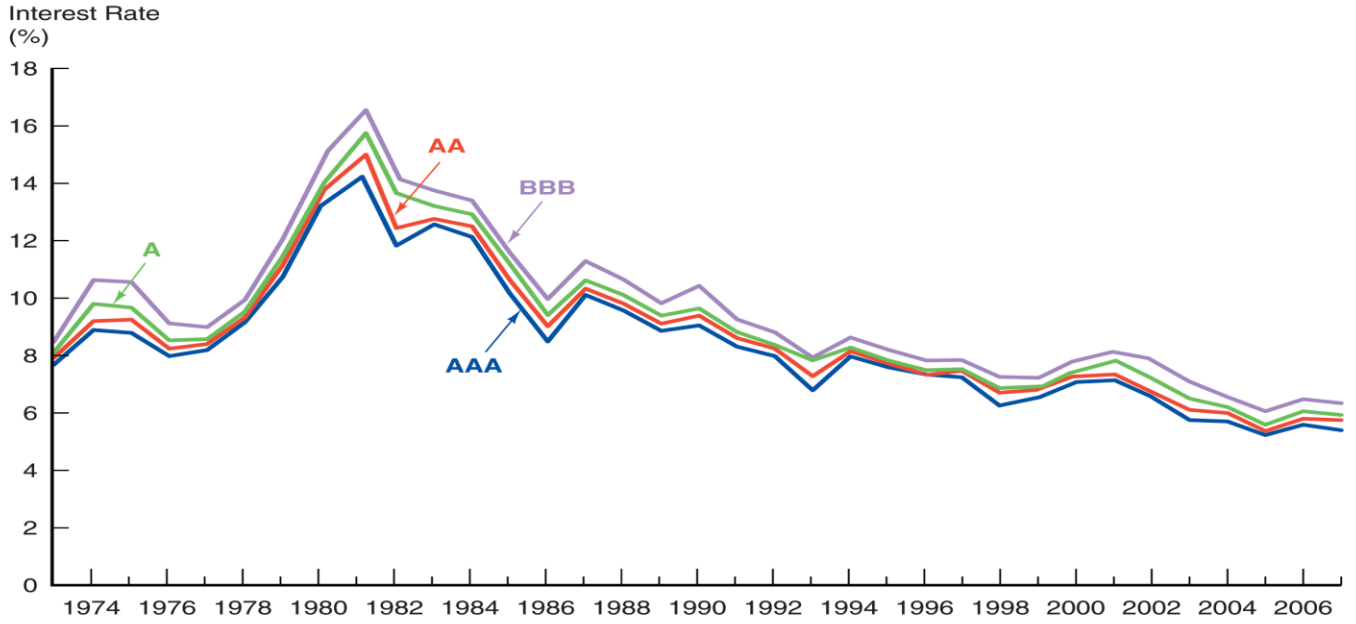


Figure 10.5 Corporate Bond Interest Rates, 1973–2006 (End of year)

Source: Federal Reserve Bulletin, Table 1.35, various issues.

Corporate Bonds: Characteristics of Corporate Bonds

Registered Bonds

- Replaced “bearer” bonds
- IRS can track interest income this way

Restrictive Covenants

- Mitigates conflicts with shareholder interests
- May limit dividends, new debt, ratios, etc.
- Usually includes a cross-default clause

Corporate Bonds: Characteristics of Corporate Bonds

Call Provisions

- Higher yield
- Sinking fund
- Interest of the stockholders
- Alternative opportunities

Conversion

- Some debt may be converted to equity
- Similar to a stock option, but usually more limited

Corporate Bonds: Characteristics of Corporate Bonds

Secured Bonds

- Mortgage bonds
- Equipment trust certificates

Unsecured Bonds

- Debentures
- Subordinated debentures
- Variable-rate bonds

Corporate Bonds: Characteristics of Corporate Bonds

Junk Bonds

- Debt that is rated below BBB
- Often, trusts and insurance companies are not permitted to invest in junk debt

Corporate Bonds: Debt Ratings

The next slide explains in further details the rating scale for corporate debt. The rating scale is for Moody's. Both Standard and Poor's and Fitch have similar debt rating scales.

TABLE 10.2 Debt Ratings

Standard and Poor's	Moody's	Average Interest Rate* (%)	Definition
AAA	Aaa	5.47	Best quality and highest rating. Capacity to pay interest and repay principal is extremely strong. Smallest degree of investment risk.
AA	Aa	5.81	High quality. Very strong capacity to pay interest and repay principal and differs from AAA/Aaa in a small degree.
A	A	5.99	Strong capacity to pay interest and repay principal. Possess many favorable investment attributes and are considered upper-medium-grade obligations. Somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions.
BBB	Baa	6.39	Medium-grade obligations. Neither highly protected nor poorly secured. Adequate capacity to pay interest and repay principal. May lack long-term reliability and protective elements to secure interest and principal payments.
BB	Ba		Moderate ability to pay interest and repay principal. Have speculative elements and future cannot be considered well assured. Adverse business, economic, and financial conditions could lead to inability to meet financial obligations.
B	B		Lack characteristics of desirable investment. Assurance of interest and principal payments over long period of time may be small. Adverse conditions likely to impair ability to meet financial obligations.
CCC	Caa		Poor standing. Identifiable vulnerability to default and dependent on favorable business, economic, and financial conditions to meet timely payment of interest and repayment of principal.
CC	Ca		Represent obligations that are speculative to a high degree. Issues often default and have other marked shortcomings.
C	C		Lowest-rated class of bonds. Have extremely poor prospects of attaining any real investment standard. May be used to cover a situation where bankruptcy petition has been filed, but debt service payments are continued.
CI			Reserved for income bonds on which no interest is being paid.
D			Payment default.
NR			No public rating has been requested.
(+) or (−)			Ratings from AA to CCC may be modified by the addition of a plus or minus sign to show relative standing within the major rating categories.

*Average interest rates are reported in the *Bulletin* only for the top four risk categories.
Source: Federal Reserve Bulletin, Table 1.35, Lines 27–30. March 2007.

Financial Guarantees for Bonds

Some debt issuers purchase *financial guarantees* to lower the risk of their debt.

The guarantee provides for timely payment of interest and principal, and are usually backed by large insurance companies.

Bond Yield Calculations

Bond yields are quoted using a variety of conventions, depending on both the type of issue and the market.

We will examine the current yield calculation that is commonly used for long-term debt.

Bond Current Yield Calculation

What is the current yield for a bond with a face value of $1,000, a current price of $921.01, and a coupon rate of 10.95%?

Answer:

i_c = C / P = $109.50 / $921.01 = 11.89%

Note: C (coupon) = 10.95% x $1,000 = $109.50

$$\text{Current Yield} = \frac{\text{Annual coupon pyt.}}{\text{Current price}}$$

$$\text{Capital Gains yield} = \frac{\text{Change in price}}{\text{Beginning price}}$$

$$\text{Exp. Total Return} = \text{YTM} = \text{Expected Current Yield} + \text{Expected Capital gains yield}$$

Find current yield and capital gains yield for a 9%, 10- year bond (F.V. Rs. 1000) when the bond sells for Rs.887 and YTM = 10.91%.

$$\textbf{Current yield} = \frac{\text{Rs.90}}{\text{Rs.887}} = \mathbf{0.1015} = \mathbf{10.15\%.}$$

Yield to Maturity

The **yield-to-maturity (YTM)** is the measure of a bond's rate of return that considers both the interest income and any capital gain or loss.

What is the YTM on a 10-year, 9% annual coupon, Rs.1,000 par value bond, selling for Rs.887?

Must find the k_d that solves this model:

$$B_0 = \frac{INT}{(1+k_d)^1} + \ldots + \frac{INT}{(1+k_d)^n} + \frac{B_n}{(1+k_d)^n}$$

$$Rs.887 = \frac{90}{(1+k_d)^1} + \ldots + \frac{90}{(1+k_d)^{10}} + \frac{1,000}{(1+k_d)^{10}}$$

$$YTM = K_d = 10.91$$

YTM = Current yield + Capital Gains yield.

Cap Gains yield = YTM - Current yield

= 10.91% - 10.15%

= 0.76%.

Coupon Rate, YTM, MP, and Par Value

If MP = Par(Red.) Value, then **YTM = Coupon Rate**

If MP > Par (Red.) Value, then **YTM < Coupon Rate**

If MP < Par (Red.) Value, then **YTM > Coupon Rate**

Finding the Value of Coupon Bonds

Bond pricing is, in theory, no different than pricing any set of known cash flows. Once the cash flows have been identified, they should be discounted to time zero at an appropriate discount rate.

The table on the next slide outlines some of the terminology unique to debt, which may be necessary to understand to determine the cash flows.

Finding the Value of Coupon Bonds

TABLE 10.3 Bond Terminology

Coupon interest rate	The stated annual interest rate on the bond. It is usually fixed for the life of the bond.
Current yield	The coupon interest payment divided by the current market price of the bond.
Face amount	The maturity value of the bond. The holder of the bond will receive the face amount from the issuer when the bond matures. *Face amount* is synonymous with *par value*.
Indenture	The contract that accompanies a bond and specifies the terms of the loan agreement. It includes management restrictions, called covenants.
Market rate	The interest rate currently in effect in the market for securities of like risk and maturity. The market rate is used to value bonds.
Maturity	The number of years or periods until the bond matures and the holder is paid the face amount.
Par value	The same as *face amount*.
Yield to maturity	The yield an investor will earn if the bond is purchased at the current market price and held until maturity.

Finding the Value of Coupon Bonds

Let’s use a simple example to illustrate the bond pricing idea.

What is the price of two-year, 10% coupon bond (semi-annual coupon payments) with a face value of $1,000 and a required rate of 12%?

Finding the Value of Coupon Bonds

Solution:

1. Identify the cash flows:
   - $50 is received every six months in interest
   - $1000 is received in two years as principal repayment

2. Find the present value of the cash flows (calculator solution):

   N = 4, FV = 1000, PMT = 50, I = 6

   Computer the PV. PV = 965.35

Investing in Bonds

Bonds are the most popular alternative to stocks for long-term investing.

Even though the bonds of a corporation are less risky than its equity, investors still have risk: *price risk* and *interest rate risk*

Investing in Bonds

The next slide shows the amount of bonds and stock issued from 1983 to 2006.

Note how much larger the market for new debt is. Even in the late 1990s, which were boom years for new equity issuances, new debt issuances still outpaced equity by
over 5:1.

Investing in Bonds

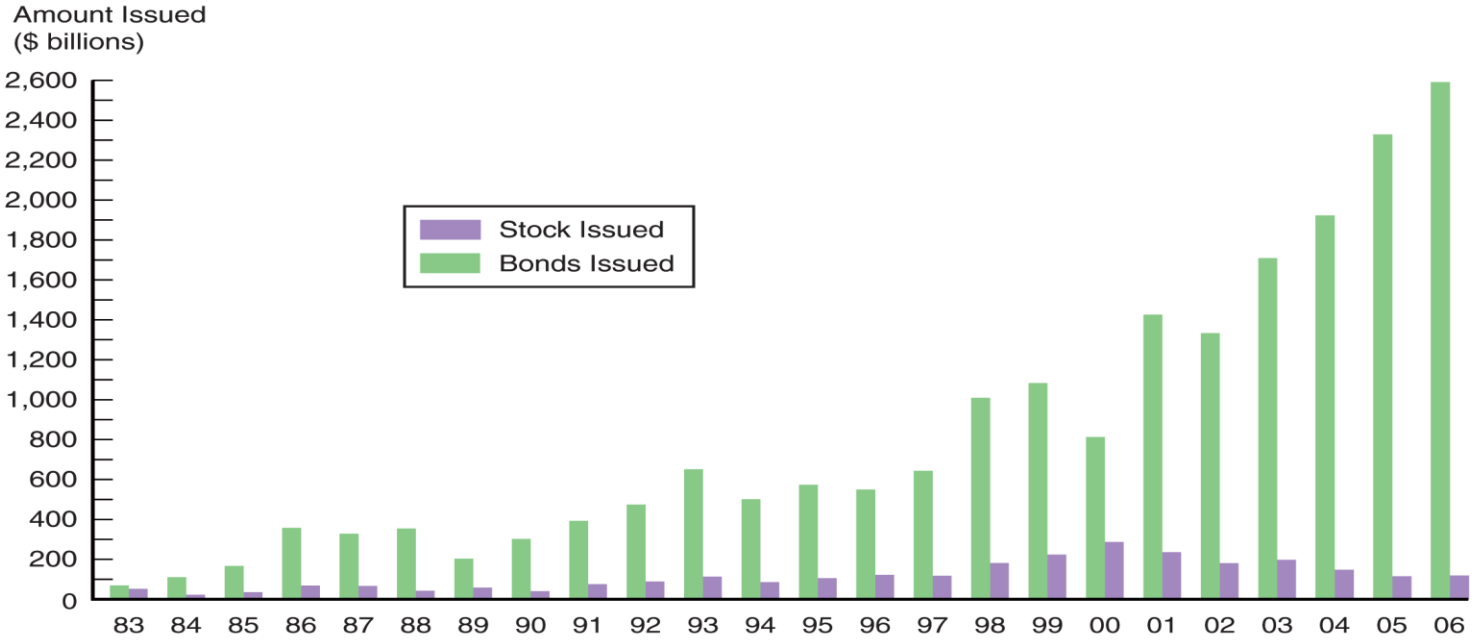


Figure 10.6 Bonds and Stocks Issued, 1983–2006

Source: Federal Reserve Bulletin, various issues. Table 1.46.

Risks Associated with Bond Investing

Interest-rate Risks - Associated with Bond Investing , thereby reducing a bond's price (also called market risk).

- The major risk faced by bond investors.

Reinvestment risk – the risk that the interest rate at which intermediate cash flows can be reinvested will fall.

Call risk – the risk the issuer may "call" or retire all or part of the issue before the maturity date.

Risks Associated with Bond Investing

Credit risk – risk that issuer will fail to satisfy the terms of the bond.

1. Default risk: Risk the issuer does not repay part or all of its financial obligation.
2. Credit spread risk: Risk that an issuer's obligation will decline due to an increase in the credit spread (the part of the risk premium or yield spread attributable to default risk).
3. Credit deterioration risk: Risk that the credit quality of the issuer decreases (closely related to credit spread risk).

Risks Associated with Bond Investing

Inflation risk – the risk that the purchasing power of a bond's cash flows may decline.

- Floating rate bonds have a lower level of inflation risk than coupon bonds.

Exchange rate risk – if a bond is denominated in a foreign currency (e.g., the euro), the value of the cash flows in US$ will be uncertain.

Cont. . ..

Liquidity risk – the risk that the bond cannot be sold with ease at (or near) its current value.

- Unimportant for investors holding a bond to maturity.
- Liquidity can be measured by the bid-ask spread.
- The wider the spread the less liquid a bond is. Sometimes called marketability risk.

Cont….

Volatility risk – the value of embedded options is determined partly by the volatility of interest rates

- The price of a bond with embedded options will change as interest rate volatility changes.

Risk risk – The bond market has been a hotbed of financial innovation.

- The risk/return characteristics of innovative securities are not always understood. Risk risk is “not knowing what the risk of a security is.”

More types..

Debentures

Debentures are unsecured long-term debt.

For issuing firm, debentures provide the benefit of not tying up property as collateral.

For bondholders, debentures are more risky than secured bonds and provide a higher yield than secured bonds.

Subordinated Debenture

There is a hierarchy of payout in case of insolvency.

The claims of subordinated debentures are honored only after the claims of secured debt and unsubordinated debentures have been satisfied.

Mortgage Bond

Mortgage bond is secured by a lien on real property.

Typically, the value of the real property is greater than that of the bonds issued.

Eurobonds

Securities (bonds) issued in a country different from the one in whose currency the bond is denominated.

For example, a bond issued by an American corporation in Japan that pays interest and principal in dollars.

Convertible Bonds

Convertible bonds are debt securities that can be converted into a firm’s stock at a pre-specified price.

Thank You