Chapter 4
The Meaning of Interest Rates

Learning Objectives

- **Calculate** the **present value** of **future cash** flows and the **yield** to **maturity** on the four **types** of **credit market instruments**.
- **Recognize** the **distinctions** among yield to **maturity**, **current yield**, **rate** of **return**, and **rate** of **capital** gain.
- Interpret the **distinction** between **real** and **nominal interest rates**.

Introduction

- To go further into the study of money, banking, and financial markets, we must understand exactly what the phrase interest rates means.
- One used measures of Interest rate is the yield to maturity.

Measuring Interest Rates

Present value

- The value in the present of a sum of money

That is,

- A dollar paid to you one year from now is **less valuable** than a **dollar** paid to you today.

Why:

- Because: a dollar deposited today can earn interest and become $1 x (1+i) one year from today.

Four Types of <u>Credit Market Instruments</u> (debt instruments)

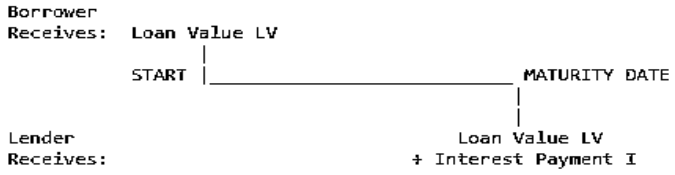
- **Simple Loan**
- **Fixed Payment Loan**
- **Coupon Bond**
- **Discount Bond**

Credit Market Instruments (debt instruments)

- Particular types of **contractual agreements** that require the **borrower** to pay the **lender** certain **fixed dollar amounts** at **regular intervals** until a specified time is reached (the maturity).

Simple Loan Contracts

- Under the terms of a simple loan contract, the **borrower** (contract issuer) receives from the **lender** (contract buyer) a specified amount of funds (the **loan value *LV*** or **principal**) for a specified period of time (the **maturity**).
- The **borrower** agrees that, at the end of this period of time -- referred to as the **maturity date** -- the borrower will **repay** the loan value to the lender together with an additional payment referred to as the **interest *payment***.

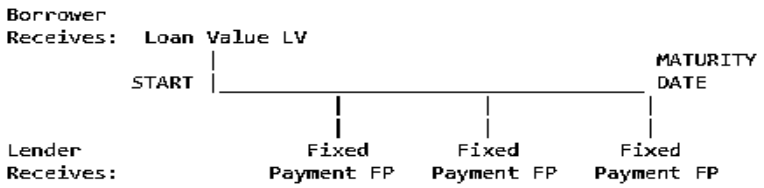


Example of a Simple Loan Contract:

A borrower receives a loan on January 1, 1999, in amount $500.00, and agrees to pay the lender $550.00 on January 1, 2000. Thus, the loan value is $500.00, the maturity is one year, the maturity date is January 1, 2000, and the interest payment is $50.00. The simple (annual) interest rate for this loan is then $50/[$500] = 0.1, or 10 percent.

Fixed-Payment Loan Contracts

- Under the terms of a **fixed-payment** loan **contract**, the **borrower** (**contract issuer**) receives from the lender (contract buyer) a **specified** amount of **funds** -- the ***loan value*** -- and, in return, makes **periodic fixed payments** to the lender until a **specified maturity** date.
- These periodic fixed payments include both **principal** (loan value) and **interest**, so at maturity there is **no lump sum** repayment of principal.

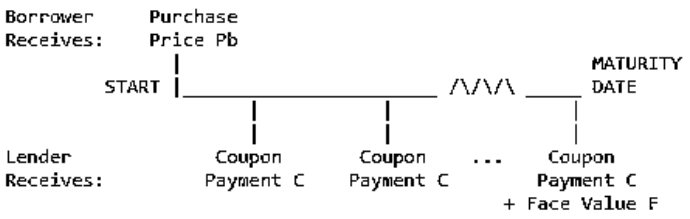


Example of a Fixed-Payment Loan Contract:

Joe arranges a 15-year installment loan with a finance company to help pay for a new car. Under the terms of this loan, Joe receives $20,000 now to finance the purchase of a new car but must make payments of $**2000** every year for the next **15** years to the finance company.

Coupon Bond

- Under the terms of a coupon bond, the **borrower** (**bond issuer**) agrees to pay the **lender** (**bond buyer**) a fixed amount of funds (the **coupon payment**) on a periodic basis until a **specified** maturity date, at which time the borrower must also pay the lender the **face value** (or **par value**) of the bond.
- The **coupon rate** of a coupon bond is, by definition, the amount of the coupon payment divided by the face value of the bond.

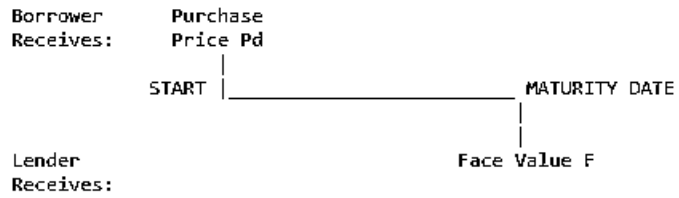


Example of a Coupon Bond:

- Suppose a coupon bond has a face value of $1000, a maturity of five years, and an annual coupon payment of $60. Then, at the end of each year for the next five years, the **borrower** (**bond issuer**) must pay the lender (bond buyer) a coupon payment of $60.
- In addition, at the end of five years (the maturity date), the **borrower** must pay the lender the face value of the bond, $1000. The coupon rate for this coupon bond is $60/$1000 = .06, or 6 percent.

Discount Bond (or Zero-Coupon Bond)

- Under the terms of a discount bond, the **borrower** (**bond issuer**) immediately receives from the **lender** (**bond buyer**) the purchase price of the bond, which is typically less than the **face value** of the bond.
- In return, the **borrower** promises that, at the **bond's maturity** date, he will pay the lender the face value of the bond.



Discount Bond Example:

- On January 1, 1999, a **borrower** gives a lender a **discount bond** with a face value of $200 and a maturity of 2 years, and the lender gives $150 to the borrower.
- The borrower must then pay the lender $200 on January 1, 2001.

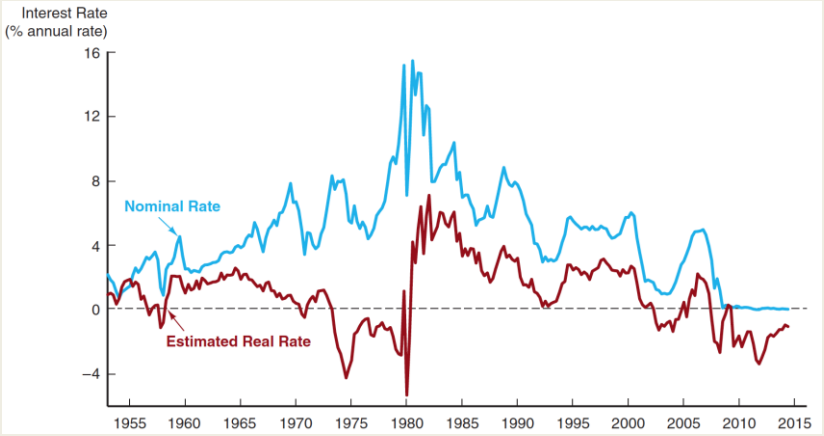
Yield to maturity:

The **interest rate** that **equates** the **present value** of **cash flow payments** received from a **debt** instrument with its **value today**.

The Distinction Between Real and Nominal Interest Rates

- **Nominal interest rate** makes **no allowance** for inflation.
- **Real interest rate** is **adjusted** for changes in **price** level so it more **accurately** reflects the **cost** of **borrowing**.
  - **Ex ante real interest rate** is adjusted for **expected** changes in the price level
  - **Ex post real interest rate** is adjusted for **actual** changes in the price level

Figure 1 Real and Nominal Interest Rates (Three-Month Treasury Bill), 1953–2014



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