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ADVANCED FINANCIAL INSTRUMENTS AND MARKETS

Lecture No. 06
Term Structure of Interest

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Interest Rates

- * An interest rate is the price paid by a borrower to a lender for the use of resources that will be used during some time period then returned.
- * Real rate
- * Risk-free rate
- * Short-term rate

Theories of Interest Rates

- * Fisher's Classical Approach
- * Loanable Funds Theory
- * Keynes' Liquidity Preference Theory

Fisher's Classical Approach

- * Supply of Savings
 - * Marginal rate of time preference
 - * Income
 - * Reward for saving
- * Demand for Borrowed Resources
 - * Marginal productivity of capital
 - * Rate of interest
- * Equilibrium Rate of Interest

Fisher's Law

- * Nominal Rate of Interest (i)
- * Real Rate of Interest (r)
- * Premium for Expected Inflation (p)
- * Fisher's Law

$$(1 + i) = (1 + r)(1 + p)$$

or

$$i = r + p$$

The Loanable Funds Theory

- * Demand for and Supply of Funds by Firms, Governments, and Households
- * Changes in the money supply
- * Government deficits
- * Changes in preferences by households
- * New investment opportunities for firms
- * Equilibrium Rate of Interest

The Liquidity Preference Theory

- * Demand for Money Balances
 - * Transactions demand
 - * Precautionary demand
 - * Speculative demand
- * Supply of Money
- * Equilibrium Rate of Interest

Changes in the Demand for Money and Interest Rates

- * Liquidity Effect
 - * If increasing, causes the interest rate to rise.
- * Income Effect
 - * If increasing, causes the interest rate to rise.
- * Price Expectations Effect
 - * If increasing, causes the interest rate to rise.
- * Net Effect:
 - * The interest rate may rise, fall, or remain unchanged depending on the net effect of changes in desired liquidity, income, and price expectations.

Features of a Bond

- * Time to Maturity
- * Principal or Par Value
- * Coupon Interest
- * Yield-to-Maturity (YTM)
 - * If $YTM = \text{coupon rate}$, market price = par value
 - * If $YTM > \text{coupon rate}$, market price < par value
 - * If $YTM < \text{coupon rate}$, market price > par value

Determinants of the Structure of Interest Rates

- * The Base Interest Rate
- * Risk Premiums Are Determined By:
 - * Issuer Type
 - * Credit risk
 - * Term to maturity
 - * Embedded options
 - * Taxability of interest
 - * Liquidity

Types of Issuers

- * Treasury Market Sector
- * Corporate Market Sector
 - * Utilities
 - * Industrials
 - * Finance
 - * Banks
- * Intermarket and intramarket Sector

Default or Credit Risk

- * Rating Companies
 - * Moody's, S&P, Fitch
- * Credit Ratings
 - * Investment grade
 - * Non-investment grade
- * Credit Spread

Term to Maturity

- * The volatility of a bond's price is influenced by its maturity.
- * The longer the maturity of a bond, the greater its price sensitivity to a change in market yields.
- * Maturity spread or yield curve spread

Embedded Options

- * Call option
 - * benefits issuer
 - * increases required return on Treasuries
- * Conversion option
 - * benefits bondholder
 - * reduces required return on bonds
- * Prepayment option
 - * Benefits issuer
 - * Increases required return on mortgage-backed securities

Tax Treatment

- * Yield on taxable bond
 - * $\text{After-tax yield} = \text{Pretax yield} \times (1 - \text{Marginal tax rate})$
- * Equivalent taxable yield
 - * $\text{Taxable yield} = \text{Tax-exempt yield} / (1 - \text{Marginal tax rate})$

Liquidity

- * The greater the expected liquidity of a security issue, the lower the required yield.
- * The size of the issue is an important factor that affects its liquidity.

Session - II



The Yield Curve

- * Relationship between yield and maturity for bonds of the same credit quality but different maturities.
- * Yield curve shapes
 - * Normal
 - * Inverted
 - * Flat
 - * Humped

Using the Yield Curve to Price a Bond

- * Any financial asset can be viewed as a package of zero-coupon instruments.
- * Maturity of an instrument is the coupon payment date or maturity date.
- * Value of the asset equals the total value of the component zero-coupon instruments.
- * Spot Rate
 - * Rate on zero-coupon bond

Theoretical Spot Rate Curve

- * The process of creating a yield curve based on theoretical spot rates is called bootstrapping.
- * The theoretical value of a bond is equal to the present value of its periodic cash flows discounted at the corresponding theoretical spot rate for each period.

Forward Rates

- * Market's Consensus Prediction of Future Interest Rates
 - * The implied forward rate is calculated from either the spot rates or yield curve.
 - * The yield curve can be used to calculate the implied forward rate for any investment horizon or any sub-period within that horizon.

Relationship Between Spot Rates and Short-Term Forward Rates

* The relationship between the spot rate on an instrument maturing in six months (the current six-month spot rate), and the implied monthly forward rates for the next six months is:

$$z_t = [(1 + z_1)(1 + f_1)(1 + f_2)(1 + f_3)\dots(1 + f_{t-1})]^{1/t} - 1$$

Forward Rate as a Hedgeable Rate

- * Forward rates do not predict future interest rates.
- * Forward rates do indicate how an investor's expectations must differ from the market consensus in order to make the correct decision.

Determinants of the Shape of the Term Structure

- * (Pure) Expectations Theory
- * Liquidity Theory
- * Preferred Habitat Theory
- * Market Segmentation Theory

Pure Expectations Theory

- * Yields on bonds with different maturities are based only on expectations of future short-term rates.
- * Term structure might be normal, inverted, humped, or flat.
- * Ignores price risk and reinvestment risk.
- * Interpretations include broad, local and return-to-maturity.

Liquidity Theory

- * Yields on bonds with different maturities are based only on expected future rates plus a liquidity premium that increases with maturity.
- * Term structure might be normal or flat.
- * Presupposes that all lenders want to lend short-term and all borrowers want to borrow long-term.
- * In reality, there are lenders for short and long-terms and borrowers for short and long-

Preferred Habitat Theory

- * Yields on bonds with different maturities are based only on demand and supply at each maturity.
- * Term structure might be normal, inverted, humped, or flat.
- * Issuers and buyers of bonds have maturity preferences but will shift to other maturities if the prices or yields are attractive enough.
- * Yields are completely unrelated to expectations of future rates.

Market Segmentation Theory

- * Yields on bonds with different maturities are based only on demand and supply at each maturity.
- * Term structure might be normal, inverted, humped, or flat.
- * Issuers and buyers of bonds have maturity preferences and will not shift to another maturity because each maturity is a separate market.
- * Yields are completely unrelated to

Thank You!


