CALLABLE AND PUTABLE BONDS

- Introduction to options
- Introduction to bonds with embedded options
- Gains/losses from calling a bond
- Pricing
- Returns
- Duration and convexity

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INTRODUCTION TO OPTIONS

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OPTIONS

- What is an option?
  - A derivative security that gives the holder the right (but not the obligation) to buy or sell the underlying instrument at a pre-specified price by a pre-specified date
  - The option buyer pays the option seller for the option at the time the contract is agreed upon. The price is called the option price or option premium
- Option to buy underlying security = call option
- Option to sell underlying security = put option

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OPTIONS (CONT.)

- Buy an option: pay the premium
- What can you do with an option?
  - Exercise
  - Allow to expire
  - Trade
- Four features characterize an option
  - Underlying security
  - Exercise (or strike) price
  - Expiration date
  - Exercise commencement date

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PAYOFF AND PROFIT DIAGRAMS

- Payoff diagrams provide a useful way of graphing payoffs to a security (especially a derivative security) at one point in time
  - These diagrams aid in replicating and valuing derivative securities
  - The graph plots the payoff of one security (the derivative) as a function of the payoff of another security (the original or underlying security)
- Profit diagrams
  - Profit = Payoff +/- Option's price

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PAYOFF AND PROFIT DIAGRAMS: EXAMPLES

- Assume:
  - The current price of a bond, P_0, is $100
  - We examine all payoffs at some point in time t = T
  - The value of underlying security at T is P_T
  - A call option with exercise price of $101 at time T
  - A put option with exercise price of $101 at time T
  - Both the call option and the put option currently cost $1
- Plot the payoff diagram for buying the call, buying the put, selling the call or selling the put
- Plot the profit diagrams for the same positions

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OPTION PAYOFF/PROFIT EXAMPLE

Consider a call option on bond X with an exercise price of $112 that expires in 3 months. Today the option's price is $4.

- What is your payoff if you buy the option today and in 3 months bond X is selling for $100? What is your profit/loss?

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OPTION PAYOFF/PROFIT EXAMPLE

Consider a call option on bond X with an exercise price of $112 that expires in 3 months. Today the option's price is $4.

- What is your payoff if you sell the option and in 3 months bond X is selling for $100? What is your profit/loss?

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OPTION PAYOFF/PROFIT EXAMPLE

Consider a call option on bond X with an exercise price of $112 that expires in 3 months. Today the option's price is $4.

- What is your payoff if you buy the option and in 3 months bond X is selling for $120? What is your profit/loss?

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