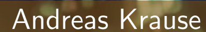

Valuing Futures and swaps

Arbitrage pricing

- Derivatives are securities or contracts whose values are derived from the value of other securities or assets
- A common way to determine their value is by arbitrage
- The principle of arbitrage is that if two securities provide the same payment in all circumstances, their value must be identical
- This technique is used particularly in option pricing

The use of derivatives

- Most derivatives have originally been developed to allow investors to hedge risks
- Their characteristics also allow investors to take large risks without making large investments, making them attractive to traders
- The value of a derivative is often referred to as its premium and this premium is small compared to the potential profits and losses

Use of futures

- Suppose a company will receive a payment from a customer in the future and in a foreign currency
- This exposes the company to currency risk
- Suppose a company will have to obtain a commodity for its production in the future
- This exposes the company to commodity price risk
- Futures and forwards allow the company to avoid such risk
- We will first look at the valuation and use of such forward and future contracts

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Forwards and futures

Key characteristics of futures and forwards

- Futures and forwards are a contract in which the buyer (seller) has the obligation to buy (sell) the underlying asset at the agreed time and agreed price
- The value of a futures and forwards can be obtained from the profits expected at maturity, adjusted for the net costs of obtaining the underlying asset instantly

? Would anyone purchase a futures which has a negative value?

! If a futures has a negative value, the purchaser would be paid for buying the futures, compensating him for the negative value

Futures and forwards for hedging

- Futures are available for a range of standard financial securities, currencies and commodities and more contracts can be agreed using forwards
- We will see how futures and forwards can be used to eliminate risks for investors
- Not for all investments futures can be found or forwards be agreed, investors will use an imperfect hedge with a closely related underlying asset to reduce risks
- If portfolios with many components are the be hedged, the costs may also prevent the use of a large number of futures and forwards

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Hedging with futures

Futures and forwards eliminating risks and opportunities

- Futures and forwards allow to eliminate risks completely if the underlying asset matches the risk
- These contracts also eliminate any possible gains that investors could make
- Most futures are short-term and for long-term hedges, contracts need to be rolled over frequently
- Forwards can agreed to provide more long-term hedging

Use of swaps

- A company has obtained a loan in their home country and invest this loan into an overseas subsidiary
- The investment takes the form of a loan, which is denominated in the subsidiary's currency
- Receiving payments from the subsidiary in a different currency is exposing the company to currency risk
- A bank attracts deposits on which it agrees to pay interest that tracks the current interest rate in the money market
- These deposits are used to provide loans for which fixed conditions, including the loan rate, are agreed
- This exposes the bank to interest rate risk
- Swaps can be used in both cases to eliminate these risks

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Swaps

Swaps allowing to hedge multiple payments

- Swaps can be used to exchange payments that are determined differently, in different currencies or at different interest rates
- As with futures, swaps eliminate any opportunity to make gains

? Why would investors use a swap rather than hedge their risks with futures?

! Swaps hedge multiple payments over a long period of time, negating the need for a large number of futures contracts and avoiding the problem of having no long-term futures contracts available

Summary

- Futures, forwards, and swaps allow to hedge against adverse movements in markets, but they also eliminate any possible gains
- These instruments have been designed to eliminate the risks arising from future payments, either to be made or to be received
- The value of these derivatives depends on the payments that are made and/or received, adjusted for any costs

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