Financial Mathematics

MATH 5870/6870[1]
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[1] Based on Robert L. McDonald's *Derivatives Markets*, 3rd Ed, Pearson, 2013.

Chapter 1. Introduction to Derivatives

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Common reasons to use derivatives

1. Risk management. Derivatives are a tool for companies and other users to reduce risks ($\sim$ hedging). Every form of insurance is a derivative.

2. Speculation. Derivatives can serve as investment vehicles ($\sim$ betting).

3. Reduce transaction costs. Sometimes derivatives provide a lower cost way to undertake a particular financial transaction.

4. Regulatory arbitrage. It is sometimes possible to circumvent regulatory restrictions, taxes, and accounting rules by trading derivatives.

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Three perspectives on derivatives

End users	Intermediaries	Economic Observers
Corporations Investment managers investors	Market-makers Traders	Regulators Researchers
How to use a derivative to meet the goal	Mathematical details of pricing and hedging	Make sense of the market

New securities can be designed by using existing securities

Financial engineering is the construction of a financial product from other products.

Principles for financial engineering (or security design):

1. Facilitate hedging of existing positions
2. Allow for creation of customized products
3. Enable understanding of complex positions
4. Render regulation less effective

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