

Administration

- ▶ New due dates:
 - ▶ Homework #10 is available now, and will be due on Monday, December 9.
 - ▶ Final paper is due Wednesday, December 11.
 - ▶ Homework #11 will be due Friday, December 13.

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 - ▶ $\$1000 \cdot (1.02)^t$
 - ▶ This is an example of an **exponential function** (these look like $p \cdot a^t$ for constants p, a)

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 - ▶ If you invest $\$P$ with $k\%$ interest, compounded continuously, the investment is worth $P \cdot e^{kt}$

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- ▶ Potential problem: the exchange rate might change

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 - ▶ Would need \$1050

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- ▶ One possibility: borrow \$960 from the bank (at 1% monthly, compounded monthly)

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 - ▶ At end of the month, you owe the bank \$969.60
 - ▶ Problem: the bank is unwilling to lend you money

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- ▶ If the rate drops to $€1 = \$0.95$,

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- ▶ If the rate increase to €1 = \$1.05, you can **exercise your option**, and buy the euros for \$1000 from the option trader
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- ▶ There is also a type of contract where you agree to buy €1000 for \$1000, regardless of whether the rate drops or increases

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- ▶ If the rate increase to €1 = \$1.05, you can **exercise your option**, and buy the euros for \$1000 from the option trader
 - ▶ Total Expense is \$1030
- ▶ There is also a type of contract where you agree to buy €1000 for \$1000, regardless of whether the rate drops or increases
 - ▶ This is called a **future**

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- ▶ Options for portfolio:
 - ▶ Invest in euros
 - ▶ Borrow from bank

Hedging Strategy

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 - ▶ Charges you \$29.70

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 - ▶ Borrows \$470.30 from bank

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- ▶ Suppose that the rate **increases** to $\text{€}1 = \$1.05$
 - ▶ Euros are worth \$525

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- ▶ Their cash flow is \$0
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 - ▶ Euros are worth \$525
 - ▶ Owes bank \$475

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 - ▶ $50 = 1.05x - 1.01y$
 - ▶ $0 = 0.95x - 1.01y$

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 - ▶ $0 = 0.95x - 1.01y$
- ▶ Solve to get $x = 500, y = 470.30$

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 - ▶ The price they charged you

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- ▶ What happens if we have multiple Bernoulli trials?