UNIVERSITY OF PENNSYLVANIA
The Wharton School

FNCE 7170/2170:
FINANCIAL DERIVATIVES

Prof. Domenico Cuoco   Fall 2025

Assignment 1
(Part 2)

Background

In this assignment you are asked to price an equity swap on the S&P 500 index.

In order to answer some of the questions, you will need historical closing levels of the S&P 500 index. These can be obtained from a variety of online sources, such as S&P Global or Yahoo Finance.

Working Assumptions

Throughout this Assignment assume that:

- The index pays dividends continuously at a constant annualized rate δ.

- The term structure of risk-free rates is flat and constant at 5% (continuously compounded).

Questions

(a) How does the formula in equation (3) in Lecture Note 5 for the net cash flow on the generic payment date t_i to the equity receiver in an equity swap change if the swap is a price return (PR) swap instead of a total return (TR) swap?

(b) What trading strategy could be implemented at a time t with $t_{i-1} \leq t < t_i$ in order to replicate the receipt at time t_i of the cash flow in part (a)?

(c) What is the value of a $(t_{i-1} \times t_i)$ PR swaplet at a time t with $t_{i-1} \leq t \leq t_i$?

(d) What is the value of the PR swaplet at a time t with $0 \leq t \leq t_i$?

(e) How should the spread over the floating rate be set in order for the value of a PR swap on the trade date to be zero?

(f) On February 20, 2025, the settlement price of the March 2026 E-mini S&P 500 futures contract (ESH6) was 6,366.25. What was the implied dividend yield of the S&P 500 index?

(g) ABC Corp. (ABC) is the equity payer in a PR swap on the S&P 500 index with $10,000,000 notional and quarterly payments on both the equity leg and the floating leg. The swap was traded on February 20, 2025, will terminate on February 20, 2026 and required no upfront payment. What was the swap's fair spread over the floating rate?

(h) Assuming that the spread of ABC's swap was set at the level you determined in part (g) and that as of June 20, 2025 the implied dividend yield of the S&P 500 index was still at the level you determined in part (f), what was the value of ABC's swap position on June 20, 2025?

(i) How does your answer to part (h) change if as of June 20, 2025 the implied dividend yield of the S&P 500 index was 1.4%?