

DRM Assignment 1: Forward Pricing of Stocks using Python (10 Marks)

Objective

You are required to select a publicly listed stock of your choice in the Excel sheet shared separately through email. Download the historical price data for the selected stock, estimate relevant parameters, and use Python to **calculate the fair prices of 1-month, 3-month, and 6-month forward contracts** on the selected stock.

Assignment Tasks

Stock Selection

- Choose any stock traded on a major exchange (NSE, BSE, NYSE, NASDAQ, etc).
- Mention the full name and ticker symbol in your report.

Data Acquisition

- Download the last 6 months' daily closing price data for your selected stock using Python.
- Recommended libraries: `yfinance`, `pandas`, or any other approved data source.
- Include your data download code and a sample of at least 10 recent observations.

Parameter Estimation

- For forward pricing, use the current stock price as the spot.
- Estimate the **risk-free interest rate** (recent 91-day T-bill yield, RBI repo rate, or similar).
- Assume a reasonable **annualized dividend yield** (look up or estimate from the last few quarters).

Forward Price Calculation

- Using the risk-free rate, dividend yield, and spot price, compute the *theoretical forward price* for maturities of 1 month, 3 months, and 6 months.
- Write and submit the Python code used for the calculation.

Output and Interpretation

- Display all inputs and calculated forward prices for each maturity in a clear table.
- Briefly interpret and discuss: How does the forward price change as maturity increases? What effect did the dividend yield have?

Submission Requirements

- Your Jupyter Notebook/Python script with all code and outputs clearly shown and commented.
 - A short PDF or doc summarizing:
 - ✓ The stock you selected (name, ticker).
 - ✓ Source and sample of data.
 - ✓ Estimated parameters.
 - ✓ Forward price table.
 - ✓ Brief discussion (1-2 paragraphs).
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Hints

- Use `numpy.exp` for exponentials in your Python code.
- For dividend yield, if the company declared dividends in the last year, find total dividends, divide by average stock price, and annualize if needed.
- The `yfinance` library can be used as:

```
python
import yfinance as yf
data = yf.download('AAPL', start='2025-01-01', end='2025-07-01')
```

- Risk-free rates: Use RBI T-bill information (India) and annualise for use in formulas.

Academic Integrity

All work must be your own. Cite all external sources (data, code snippets, references).