Forward Pricing Analysis Report

FORTIS Healthcare Limited

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Date: November 7, 2025

Assignment: DRM Assignment 1 - Forward Pricing Analysis

Github : https://github.com/AmRitJain0442/DRM-Assignment

(I have added a github repository as well so that the examiner can review my code in an structured manner)

Selected Stock Overview

- **Company Name:** FORTIS Healthcare Limited

- **Stock Ticker:** FORTIS.NS

- **Exchange:** NSE (National Stock Exchange of India)

- **Sector:** Healthcare

- **Industry:** Hospital & Healthcare Services

Current Market Price: ₹1,020.00 (as of November 7, 2025)

Data Source and Sample

Data Source:

- **Provider:** Yahoo Finance API

- **Access Method:** yfinance Python library

- **Data Type:** Historical daily OHLC (Open, High, Low, Close) + Volume

- **Data Quality:** Real-time market data from NSE

Data Sample:

- **Period Covered:** November 8, 2023, to November 7, 2025 (2 years)

- **Total Trading Days:** 494 days

First 5 Trading Days:

Date	Open (₹)	High (₹)	Low (₹)	Close (₹)	Volume
2023-11-08	337.80	340.35	332.02	339.15	879,120
2023-11-09	339.85	345.38	338.15	341.09	750,240
2023-11-10	342.39	364.82	339.95	358.24	3,712,746
2023-11-13	358.64	371.94	350.86	367.51	3,020,750
2023-11-15	371.60	371.70	355.25	357.94	2,621,313

Last 5 Trading Days:

Date	Open (₹)	High (₹)	Low (₹)	Close (₹)	Volume
2025-11-03	1,024.00	1,040.50	1,018.30	1,030.70	1,501,905
2025-11-04	1,031.00	1,034.50	1,016.00	1,019.10	1,773,694
2025-11-05	1,019.10	1,019.10	1,019.10	1,019.10	0
2025-11-06	1,025.00	1,029.90	995.10	1,009.90	2,298,960
2025-11-07	1,007.00	1,022.50	1,000.80	1,020.00	1,719,482

Performance: The stock price has increased from ₹339.15 to ₹1,020.00, reflecting a **+200.7% return** over the past two years.

Estimated Parameters

Key Input Parameters for Forward Pricing Model

Parameter	Symbol	Value	Source/Justification
Spot Price	S_o	₹1,020.00	Current market price from Yahoo Finance (Nov 7, 2025)
Risk-Free Rate	r	6.00% p.a.	Indian Government Bond yield (10-year G-Sec benchmark)
Dividend Yield	q	0.80% p.a.	Conservative estimate based on historical dividend policy and sector averages
Time to Maturity	T	Various (0.083 to 3 years)	Multiple maturities analyzed for a comprehensive comparison

Forward Price Calculation Formula

The forward price is calculated using the continuous compounding formula:

$$F = S_0 \times e^{(r-q) \times T}$$

Where:

- **F** = Forward Price
- **S$_0$** = Current Spot Price (₹1,020.00)
- **r** = Risk-free rate (0.06 or 6%)
- **q** = Dividend yield (0.008 or 0.8%)
- **T** = Time to maturity (in years)
- **e** = Euler's number (2.71828...)

Net Carry Cost

The **Net Carry Cost** is calculated as:

$$\text{Net Carry Cost} = r - q = 6.00\% - 0.80\% = 5.20\%$$

This positive net carry cost implies that the market is in **contango**, with forward prices trading at a premium to the spot price.

Forward Price Table

Forward Prices for Various Maturities

Maturity	Time (Years)	Spot Price (₹)	Forward Price (₹)	Difference (₹)	Difference (%)
1 Month	0.083	1,020.00	1,024.43	+4.43	+0.43%
3 Months	0.250	1,020.00	1,033.35	+13.35	+1.31%
6 Months	0.500	1,020.00	1,046.87	+26.87	+2.63%
9 Months	0.750	1,020.00	1,060.57	+40.57	+3.98%
1 Year	1.000	1,020.00	1,074.44	+54.44	+5.34%
1.5 Years	1.500	1,020.00	1,102.75	+82.75	+8.11%
2 Years	2.000	1,020.00	1,131.79	+111.79	+10.96%
3 Years	3.000	1,020.00	1,192.20	+172.20	+16.88%

Impact of Dividend Yield on Forward Prices (1-Year Maturity)

Dividend Yield Scenario	Dividend Yield (%)	Forward Price (₹)	Difference from Spot (₹)	Difference (%)
No Dividend	0.0%	1,083.07	+63.07	+6.18%
Low Dividend	0.5%	1,077.67	+57.67	+5.65%
Current Estimate	0.8%	1,074.44	+54.44	+5.34%
High Dividend	1.5%	1,066.95	+46.95	+4.60%
Very High Dividend	2.0%	1,061.63	+41.63	+4.08%

Key Insight: A 1% increase in dividend yield reduces the 1-year forward price by approximately ₹10.50, demonstrating the inverse relationship between dividend yield and forward prices.

Discussion

Forward Price Behavior with Maturity

The forward price exhibits a **positive exponential relationship** with the time to maturity. As shown in the forward price table, the premium over the spot price rises from 0.43% for a 1-month forward to 16.88% for a 3-year forward contract. This growth is driven by the net carrying cost (5.20%), which compounds continuously over time. The 1-year forward price of ₹1,074.44 reflects a 5.34% premium, while the 2-year forward almost doubles the premium to 10.96%. The 3-year forward price is ₹1,192.20, representing a 16.88% premium. This non-linear progression reflects the compounding nature of continuous interest and time value in the formula $F = S_o \times e^{((r-q) \times T)}$.

Effect of Dividend Yield on Forward Prices

The dividend yield has a **negative impact** on forward prices, as seen by comparing various dividend yield scenarios. For example, when the dividend yield increases from 0% to 2%, the 1-year forward price decreases from ₹1,083.07 to ₹1,061.63, reflecting a reduction of ₹21.44 (around 2% of the spot price). The dividend yield reduces the forward premium because dividends are paid to the spot holder, not the forward contract holder. As expected, FORTIS's estimated dividend yield of 0.8% results in a modest reduction of approximately ₹8.63 in the 1-year forward price compared to a no-dividend scenario.

Additional Insights

Market Implications

1. **Contango Market:** FORTIS forward prices are in contango, indicating a premium for forward contracts over the spot price. This reflects positive net carry costs due to a higher risk-free rate than the dividend yield.

2. **Arbitrage-Free Pricing:** The calculated forward prices represent theoretical fair values. Any significant deviations from these values in actual market prices could indicate arbitrage opportunities.

3. **Hedging Applications:** Investors can lock in a 1-year forward price of ₹1,074.44. If the stock price rises above this value, holding a long forward position would be profitable. Conversely, if the stock price falls below ₹1,074.44, a short forward position would be advantageous.

4. **Risk Management:** Forward contracts can effectively eliminate spot price uncertainty, but they introduce basis risk and counterparty risk.

Limitations and Assumptions

- The model assumes a constant risk-free rate and dividend yield throughout the contract duration.

- Transaction costs and bid-ask spreads are excluded from the analysis.

- The model uses continuous compounding for theoretical pricing.

- Dividend yield is estimated based on sector averages, and actual dividends may vary.

Conclusion

This forward pricing analysis of FORTIS Healthcare demonstrates that forward prices increase exponentially with maturity due to positive net carrying costs, while dividend yield serves as a moderating factor, reducing forward premiums. The calculated 1-year forward price of ₹1,074.44 represents a fair theoretical value, reflecting a 5.34% premium over the spot price of ₹1,020. These calculations are grounded in real market data and realistic assumptions for the Indian equity market.

Report Generated: November 7, 2025

Analysis Tool: Python (Jupyter Notebook)

Data Verification: Prices and calculations verified against Yahoo Finance real-time data