1) Fishman Catering Inc. (FCI) hosts the birthday party for the Dean each year at the Allen Center. The project requires an investment of $800 each year and generates an expected after-tax profit of $1600 the following year (the corporate tax rate is 35%). The actual after-tax income can be as high as $2050 and as low as $1320. It will vary for idiosyncratic reasons (more out of town alumni come when the dean's birthday falls on a weekend) and systematic reasons (more alumni come when the economy is doing well, and they have more discretionary income). The success of this year's birthday celebration is uncorrelated with next year's birthday celebration. The project is taken every year. The discount rate for the project is 10% and is based on a risk-free rate of 1.44% and a project β of 1.07. Fishman Catering has 400 shares outstanding and no debt.

A) Fishman Catering is due to announce and then pay a dividend today. What is the current market value of Fishman Catering's equity? This is the number of shares times the cum-dividend price per share. (10)

B) A surprisingly large number of alumni were able to attend Dean Jacobs's party. Thus, the profits were higher than expected at $1,800. After investing the required $800, the remaining cash will be paid out as a dividend. When the dividend is announced, how much (if any) will the value of Fishman Catering's equity rise or fall? Explain completely. Assume that none of the shareholders attended this year's birthday party, so they are not aware of this year's profits prior to the dividend announcement. (10)

C) Since the management of Fishman Catering Inc. knows investors like to receive more dividends than less, they have decided to pay a total dividend that is $500 more than in B). They will finance the dividend by borrowing $500. Interest and principal are due next year. When they announce the dividend (and the borrowing), how much more (or less) will the value of Fishman Catering's equity rise (or fall) than your answer to B). Explain as completely as possible. (15)

D) After announcing the dividend increase and financing, will the expected return on Fishman Catering's equity over the next two years change relative to its prior value? Explain as completely as possible. (15)

E) Instead of paying a dividend, Fishman Catering could have invested the cash. They considered spending $700 to print "Think Bravely" hoodies for next year's party. This project is only available today (hoodies are a fad). The "Think Bravely" hoodies will be pre-ordered and paid for by alumni, so Fishman Catering is guaranteed a payment of $740 next year on their investment. Since the return on this project is less than FCI's cost of capital (10%), this decision (investing instead of paying a dividend) destroys value. True, False, or Uncertain. Explain. (10)

2) Spirit Airlines, Inc. is an ultra-low cost carrier headquartered in Miami and operating scheduled flights to destinations in the US, Bahamas, Caribbean, and Latin America. Spirit's fuel prices are highly correlated with the economy. Fuel prices rise in booms and fall in recessions.

A) If Spirit Airlines wants to reduce the volatility of their fuel costs, recommend a derivative transaction which the airline could use. Explain briefly. (10)

Call – option to buy jet fuel at $42/barrel, If jet fuel is $32, they pay $32.
If jet fuel is $52/barrel, pay $52 plus early 52-42 = 10, so net cost 42
Cap, do one of these each year for the next N years

B) If Spirit Airlines enters into the derivatives transaction you described in A), would their $\beta_{\text{Total Assets}}$ rise or fall? Explain completely. (15)

C) While investigating the derivatives transaction you described in A), Spirit's management team learned that oil prices are expected to fall over the next year. Should they wait for oil prices to fall before entering into the contract? Explain completely. (10)

3) Element Fresh is an innovative food concept based in Shanghai and founded by CEO Scott Minoie. They are part of the clean and transparent food trend; food is prepared in their restaurant in view of customers. The value of their restaurants today is ¥5,000M to ¥11,000M depending in part upon how fast consumers' income (the economy) grows. The value of their restaurants also depends upon whether consumers' demand for clean and transparent (C&T) food continues or is a fad. If the trend continues, Element Fresh sales and profits will be higher. The possible values of Element Fresh's restaurants along with the NPV of renovations which could be made today are reported in the table below (in millions of yuan or M¥). Assume that Element Fresh has no cash and no debt. The risk-free rate is 2% and there are 100M shares outstanding. The asset β is 1.2.

	Economy Shrinks		Economy Grows			
Clean/Transparent Trend	Fad	Continue	Fad	Continue		
State	1	2	3	4		
Probability	25%	25%	25%	25%		
V[Current stores]	5,000	7,400	9,400	11,000		
NPV[Investment]	300	0	0	500		
Pre-Issue Equity Value						
Equity Raised						
Post-Issue Equity Value						

A) Element Fresh has the opportunity to renovate or expand their restaurants, but the value depends upon how fast incomes (the economy) grows and whether the trend toward clean and transparent food continues or reverses (is a fad). If the trend continues and the economy grows, they will need to expand their kitchens. This project has an NPV of ¥500M but will require that they raise ¥1,000M in external capital. If the economy shrinks and the clean and transparent trend reverses, they will need to reconfigure their restaurants to increase the efficiency of the kitchen (preparation areas no longer would be visible to the customers).[1] This project has an NPV of ¥300M and will require that they raise ¥1,000M in external capital. If the market believes the four states are equally likely and the managers have not announced their plans, what is Element Fresh's stock price? Show your work and explain briefly. Assume the market believes managers know the state and will invest in all positive NPV projects. (15)

[1] In the other two states, both projects are available but have negative NPVs.

B) If the managers announce they are going to raise ¥1,000M in equity to invest, how much does the stock price change when the announcement is made? Assume the market believes the managers know the state and always invest in positive NPV projects. Explain why the stock market reacts to this news as it does. (15)

C) What fraction of the equity will the market demand in exchange for ¥1,000M? Assume the equity issue is a zero NPV conditional on the market's expectation (i.e., the belief that managers take all positive NPV projects). Explain your calculation. (15)

D) Assume the managers can issue equity on the terms you described in C). Will managers sell equity and invest in the project? Explain completely. (20)

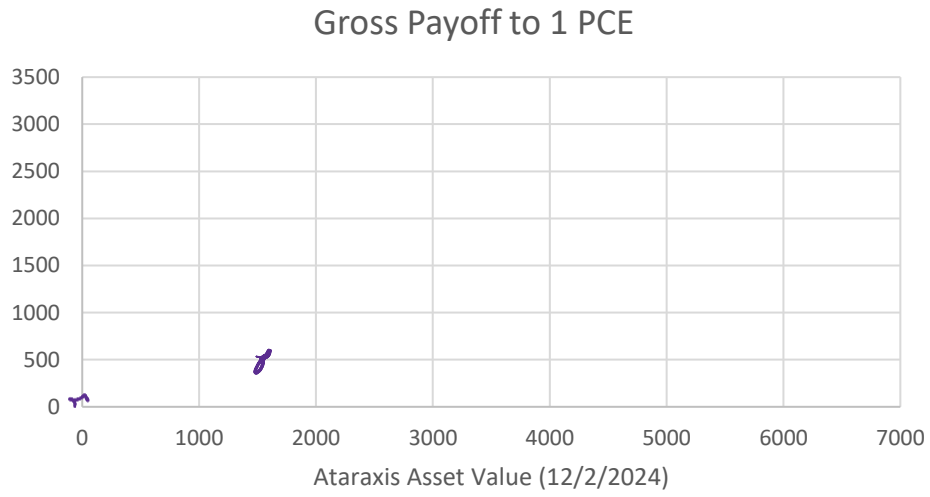
E) If managers maximize the wealth of current shareholders, should they issue equity in any additional states (beyond the states described in D)? Explain completely. (15)

4) Ataraxis has developed a real-time affordable method for suppliers of meat to credibly verify that their products are free of antibiotics and other adulterants. To finance further development, they announced last month that they had sold 1M shares of convertible preferred equity (CPE). Each share of CPE will pay an annual dividend rate of 5.5% on the $1,000 liquidation value. This dividend rate is high, given Ataraxis does not currently pay a dividend (nor do they expect to in the next two years). Dividends are paid quarterly with the last dividend payment made on November 20, 2024. On December 2nd, 2024, each CPE will convert into shares of Ataraxis common stock. The owner of the CPE does not have the option to convert; conversion is mandatory. However, the number of shares of common stock that each CPE owner will receive is uncertain and will be calculated as:

$$\text{Number of common shares per CPE} = \text{Min}\left[10, \frac{1000}{P_{\text{Ataraxis common stock price on 12/2/2024}}}\right] \quad (1)$$

Currently there are no options traded on Ataraxis stock.

A) Draw the gross payoff diagram for one share of convertible preferred equity (CPE) as a function of the asset value of Ataraxis on December 2nd, 2024. Ataraxis has no debt and there are currently 20M shares of common stock outstanding. Make sure you graph is clearly and completely labeled, including all critical points. If you get stuck, explain the key points (i.e., asset values) in the diagram. (20)



Payoff 1 PCE = P_S * Nshares = P_S Min(10, 1000/P_S) = min (10 P_S , 1000)
Kink occure = 10 P_S = 1000 → P_S = 100
N_PCE → Equity 10 * 1M = 10M New shores, Old shares = 20M → 30M
100 * 30M == 3000M

B) The convertible preferred equity gives investors the opportunity to invest in Ataraxis common stock but with a higher dividend. Should the CPE sell for more or less than 10 times the current stock price based on public information? Explain completely. (15)

V_PCE = 10 P_S - 10 Calls (X=100) / 10 Warrants (100) + PV(div 5.5% for maturity PCE)

C) Ataraxis could have raised the $1000M by issuing a two-year, non-amortizing bond with a 5.5% coupon rate. Explain how issuing the debt instead of issuing the CPE would have increased or decreased management's incentive to invest in riskier projects. Explain your logic completely. (15).

D) You have been studying the market for food testing and you think the market is underestimating the volatility of Ataraxis's stock returns. Since the preferred equity is required to convert into common (they do not have a choice), you do not have a way to monetize your view. True, False or Uncertain. Explain completely. You cannot short securities. (15)

Equations and Facts

Risk premiums:

$$E\left[r_{Market}-r_{risk\text{-}free}\right]=8.0\% \tag{2}$$

Payoff to Options

$$\begin{aligned}\text{Call Payoff}&=\text{Max}\left[\text{Stock price-Strike price},0\right]\\ \text{Put Payoff}&=\text{Max}\left[\text{Strike price-Stock price},0\right]\end{aligned} \tag{3}$$

Assets, Debt, and Equity Value and Cash Flows

$$\begin{aligned}\text{Asset}&=\text{Debt}+\text{Equity}\\ CF_{Asset}&=CF_{Debt}+CF_{Equity}\end{aligned} \tag{4}$$

Cash Flow to Assets:

$$\begin{aligned}\text{Cashflow}_{Assets}&=\text{Revenue}-\text{Costs}-\text{Depreciation}-\text{Taxes}\left[R-C-D\right]\\ &+\text{Depreciation}-\text{Capital Expenditure}-\text{Increase in NWC}\\ &=\text{Net income}-\text{Net investment}\end{aligned} \tag{5}$$

Expected Return on Debt, Equity, and Assets

$$\begin{aligned}r_{Asset}&=r_{Debt}\frac{D}{D+E}+r_{Equity}\frac{E}{D+E}\\ r_{Equity}&=r_{Asset}+\frac{D}{E}\left(r_{Asset}-r_{Debt}\right)\\ r_{Asset}&=r_{Risk\text{-}free}+\beta_{Asset}E\left[r_{Market}-r_{Risk\text{-}free}\right]\\ r_{Debt}&=\left(1-p\right)r_{promised}+p\,r_{default}\end{aligned} \tag{6}$$

NPV of Project

$$\text{NPV}\left[\text{Project}\mid\text{Capital Structure is Irrelevant}\right]+\text{NPV}\left[\text{Financing}\right] \tag{7}$$

Value of an Asset

$$V_{Asset}=\frac{\text{Cashflow}_{Asset,1}}{\left(1+r_{Asset}\right)^{1}}+\frac{\text{Cashflow}_{Asset,2}}{\left(1+r_{Asset}\right)^{2}}+.... \tag{8}$$

Be Greater than Average

$$B>\frac{1}{N}\sum_{i=1}^{N}x_i \tag{9}$$