Private Markets: Mock Exam 1 - Session 1 - Answer

Passage for Questions 1.1–1.4

TOPIC: PORTFOLIO CONSTRUCTION
TOTAL POINT VALUE OF THIS QUESTION SET IS 12 POINTS

After working for several years as an associate portfolio manager, Alejandra Herrera has been selected to oversee her firm's newest fixed-income fund. As manager of the Yield Opportunity Fund, Herrera will have an enhanced indexing mandate with an objective to outperform the fund's benchmark while closely matching its primary risk factors.

In a letter to her firm's clients introducing the new fund, Herrera articulates her willingness to purchase bonds that other investors are unwilling to hold due to liquidity constraints. She adds the following comment: "The Yield Opportunity Fund seeks to earn liquidity premiums, which are negatively related to issue size and credit quality."

In a passage explaining her willingness to hold inflation-indexed bonds in the fund, Herrera includes the following statements:

- Statement 1: "In order to effectively hedge against unanticipated inflation, it is necessary for inflation-indexed bonds to pay coupons based on a floating rate."
- Statement 2: "The volatility of returns on inflation-indexed bonds is primarily determined by the volatility of nominal interest rates."

Later in the letter, Herrera elaborates on her approach to fixed-income portfolio management during periods of market turmoil. After mentioning that her fund's proprietary models allow her to conduct stress testing and scenario analysis, she makes the following statements about her expectations in the event of a period of economic crisis:

- Statement 3: "During periods of extreme market turbulence, the correlation between returns on high-quality government bonds and the returns on high-yield corporate bonds will increase. The correlation between government bonds and equities will also increase."
- Statement 4: “In the event of a higher interest rate volatility during a period of market stress, the increase in near-term return volatility relative to historical average levels will be higher for bonds with longer maturities than it is for bonds with shorter tenors. The relative increase in return volatility will also be greater for bonds with lower yield levels compared to high-yield bonds.”

Question 1.1

3 points

Herrera's comment about factors affecting liquidity premiums is *most likely*:

A. correct.

B. incorrect with respect to issue size.

C. incorrect with respect to credit quality.

Written Solution

Liquidity premiums are available to investors who are willing to hold securities characterized by a relative lack of liquidity. Bonds that are part of a relatively small issue trade less frequently and are therefore more likely to provide a liquidity premium. As Herrera correctly notes, the relationship between liquidity premiums and issue size is negative--the likelihood of earning a liquidity premium decreases as issue size increases (and vice versa).

Herrera is also correct in describing liquidity premiums as being negatively related to credit quality. In both the sovereign and corporate sectors, the bonds of issuers with higher credit quality are typically more liquid than those of less creditworthy issuers.

Question 1.2

3 points

What is the *most* accurate assessment of Herrera's statements about inflation-indexed bonds?

A. Statement 1 and Statement 2 are both incorrect

B. Statement 1 is correct and Statement 2 is incorrect

C. Statement 1 is incorrect and Statement 2 is correct

Written Solution

Statement 1 is incorrect. Inflation-linked bonds can be structured in various ways and do not need to pay coupons based on a floating rate. For inflation-linked bonds that pay fixed coupon rates (including zero-coupon inflation-linked bonds), the face value (principal) can be adjusted to reflect the underlying rate of inflation.

Statement 2 is also incorrect. The volatility of returns on inflation-indexed bonds is determined by the volatility of real interest rates, which are typically less volatile than nominal interest rates.

Question 1.3

3 points

Herrera's claim in Statement 3 is *most likely*:

A. correct.

B. incorrect with respect to equities only.

C. incorrect with respect to both equities and high-yield bonds.

Written Solution

During periods of extreme turbulence, investors typically seek the relative certainty provided by low-risk, low-return assets and are less willing to hold high-risk securities. This flight to quality increases the prices of government bonds and decreases the prices of riskier investments such as equities and high-yield bonds. Compared to their observed levels under normal market conditions, the correlations between the returns of both of these asset classes and the returns of government bonds decrease during economic crises.

Question 1.4

3 points

Herrera's claim in Statement 4 is *most likely*:

A. correct.

B. incorrect with respect to maturities.

C. incorrect with respect to yield levels.

Written Solution

Compared to bonds with shorter maturities, long-term bonds experience a greater increase in volatility relative to their historical average in response to more volatile interest rates.

Similarly, the relative increase in return volatility (compared to historical average levels) during a period of market stress will be more significant for high-yield bonds than for low-yield (high credit quality) bonds.

Passage for Questions 2.1–2.2

TOPIC: PRIVATE MARKETS
TOTAL POINT VALUE OF THIS QUESTION SET IS 12 POINTS

Valerie Stirling manages the Orion Distressed Debt Fund based in London, United Kingdom. Stirling is analyzing an opportunity to purchase a bond issued by Falstaff Industries, a UK-based manufacturer of industrial equipment that has recently faced declining sales and profitability due to increased competition and deteriorating economic conditions. Stirling believes that despite Falstaff's challenges, this bond may offer an attractive return if priced appropriately.

Falstaff's 8.4% annual coupon bond with one year remaining to maturity is currently priced to yield 45.8% due to concerns about the company's long-term solvency. However, Stirling believes that yield-to-maturity is an inappropriate measure to use when evaluating distressed debt opportunities. Instead, her decision about whether to add Falstaff's bond to her fund's portfolio will be based on a comparison of its current market price to the fair value estimated using the credit valuation adjustment framework.

Stirling estimates that the Falstaff bond has a 40% probability of default over the next year. In the event of default, she expects a 25% recovery rate. The current risk-free rate is 4.8%.

Question 2.1

4 points

Discuss *two* assumptions on which the yield-to-maturity measure is based that make it inappropriate as an indicator of expected return for distressed debt.

Model Solution

The two key assumptions of the yield-to-maturity (YTM) measure that make it inappropriate for estimating rates of return on distressed debt are:

1. Receipt of cash flows: A bond's YTM assumes all of its promised payments will be paid on time and in full. For distressed debt, there is a high probability of default, making full repayment unlikely. This assumption causes YTM to overestimate a bond's expected return.

2. Reinvestment return: A bond's YTM assumes that all coupon payments can be reinvested at this rate until maturity. For distressed bonds, this is unrealistic given their high yields and relatively short time to maturity (or default). Additionally, if a bond does default, there will be no coupons to reinvest. This assumption further inflates the expected return implied by YTM.

Grading Guide

- 2 points for each assumption discussed (maximum 4 points)

Question 2.2

8 points

Determine whether Stirling will add Falstaff's bond to her fund's portfolio. **Justify** your answer.

Model Solution

The first step is to determine the bond's current market price using a financial calculator:

N = 1
I/Y = 45.8
PMT = 8.4
FV = 100
CPT PV = -74.35

Stirling wil purchase this bond if the price estimated using the credit value adjustment (CVA) framework is less than 74.35 per 100 of par value.

The first step in the CVA valuation process is to determine the bond's value in each of the two possible scenarios — default or no default. If the bond does not default, lenders will receive 108.4, which includes 100 of principal and a coupon payment of 8.4. In the event that the bond defaults, the amount received by lenders will be determined by the recovery rate:

$$108.4 \times 25\% = 27.10$$

With a 40% probability of default, which implies a 60% probability of survival, the bond's expected value is:

$$40\%(27.10) + 60\%(108.40) = 75.88$$

This amount is discounted at the 4.8% risk-free rate to get the present value of expected future cash flows:

$$\frac{75.88}{(1.048)^1} = \$72.40$$

Stirling will not purchase the bond at its current market price of 74.35 because this exceeds the fair value of 72.40 that is estimated using the CVA framework. The bond appears to be overpriced at its current market value.

Grading Guide

- 2 points for calculating the bond's current market price
- 3 points for calculating the bond's expected future value

- 1 point for calculating the bond’s estimated fair value
- 2 points for explaining that Stirling will not purchase the bond

Passage for Questions 3.1–3.2

TOPIC: PRIVATE MARKETS
TOTAL POINT VALUE OF THIS QUESTION SET IS 12 POINTS

In the UK government's latest auction for renewable energy projects, WindScot Energy Limited (WSEL) has been granted a contract for difference (CfD) for an 800-MW offshore wind farm located off the West coast of Scotland. The CfD strike price will be £58.90 per MWh during the project's first year of operation and will increase with inflation each year thereafter. Currently, analysts are forecasting that the average intermittent market reference price (IMRP) will be £59.20 during the project's first year.

The project will consist of 320 2.5-MW turbines, which have a 40% efficiency rating, meaning their expected performance will be as if they are operating at full capacity 40% of the time and idle for the rest of the time. Additionally, 4% of all potential generation hours will be lost due to routine maintenance. Operating expenses will be 25% of annual revenue. Maintenance capital spending will be £8 million during the first year of operation and increase annually with inflation, which is expected to be 2.3%.

The total installation cost for the wind farm will be £960 million, with 35% of the capital needed coming from equity investors. To raise the additional capital, WSEL will issue a 6.0% construction and development (C&D) loan secured by the project's assets. When the wind farm becomes operational in three years, the C&D loan will be repaid and replaced with a £624 million loan with a 5.2% coupon rate. This fully-amortizing term loan will be serviced with level monthly payments until it matures after 20 years, which matches the expected life of the turbines.

Alison McGregor, an analyst with WSE, has been asked to forecast the project's expected net cash flow from operations during the first year after construction is completed.

Question 3.1

7 points

Calculate the project's net cash flow from operations based on the information provided in the case.

Model Solution

Step 1: Calculate total annual energy production in terms of megawatt hours (MWh)

- Total potential hours: 365 days × 24 hours = 8,760 hours
- Efficiency-adjusted hours: 8,760 × 40% = 3,504 hours
- Maintenance-adjusted hours: 3,504 × (1 - 4%) = 3,363.84 hours
- Annual energy production: 3,363.84 hours × 800 MW = 2,691,072 MWh

Step 2: Determine total revenue

Regardless of what the IMRP is currently projected to be (or what it ends up being), the project's total revenue will be the product of the CfD strike price and the expected MWh output:

2,691,072 MWh × £58.90/MWh = £158,504,141

Step 3: Calculate operating and maintenance expenses

O&M expenses: 25% × £158,504,141 = £39,626,035

Step 4: Determine net cash flow from operations

$$\begin{aligned}\text{Net CFO} &= (\text{Revenue} - \text{Operating expenses}) - \text{CapEx} \\ &= (158{,}504{,}141 - 39{,}626{,}035) - 8{,}000{,}000 \\ &= 110{,}878{,}106\end{aligned}$$

Grading Guide

- 2 points for calculating expected output in terms of MWh
- 2 points for calculating expected revenue
- 1 point for calculating operating expenses
- 2 points for calculating net cash flow from operations