

Which of the following statements is TRUE? (1 mark)

- A) Portfolios with lower volatility have historically rewarded investors with higher average returns.
- B) Individual stocks with higher volatility have consistently rewarded investors with higher average returns.
- C) Volatility seems to be a reasonable measure of risk when evaluating returns on large portfolios.
- D) Volatility seems to be a reasonable measure of risk when evaluating returns on individual stocks.

Answer: C

Which of the following is NOT a systematic risk? (1 mark)

- A) The risk that oil prices rise, increasing production costs
- B) The risk that the RBA raises interest rates
- C) The risk that the economy slows, reducing demand for your firm's products
- D) The risk that your new product will not receive regulatory approval

Answer: D

Explanation: The risk that your new product will not receive regulatory approval is a firm-specific risk.

Which of the following statements is FALSE? (1 mark)

- A) Securities that tend to move more than the market have betas lower than 0.
- B) Securities whose returns tend to move in tandem with the market on average have a beta of 1.
- C) Beta corresponds to the slope of the best-fitting line in the plot of the securities excess returns versus the market excess return.
- D) The statistical technique that identifies the best-fitting line through a set of points is called linear regression.

Answer: A

Explanation: Securities that tend to move more than the market have betas greater than 0.

Which of the following statements is FALSE? (1 mark)

- A) The standard error provides an indication of how far the sample average might deviate from the expected return.
- B) The 95% confidence interval for the expected return is defined as the historical average return plus or minus three standard errors.
- C) We can use a security's historical average return to estimate its actual expected return.
- D) The standard error is the standard deviation of the average return.

Answer: B

Explanation: The 95% confidence interval for the expected return is defined as the historical average return plus or minus two standard errors.

Suppose you invest \$20,000 by purchasing 200 shares of Abbott Labs at \$50 per share, 200 shares of Lowes Companies, Inc. at \$30 per share, and 100 shares of Ball Corporation at \$40 per share. The weight on Abbott Labs in your portfolio is: **(1 mark)**

- A) 50%.
- B) 40%.
- C) 30%.
- D) 20%.

Answer: A

Explanation: Value of portfolio = $(200 \times \$50) + (200 \times \$30) + (100 \times \$40) = \$20,000$
 $w_i = \text{value of security}/\text{value of portfolio} = (200 \times \$50)/\$20,000 = .50$ or 50%

Consider the following price and dividend data for Ford Motor Company:

Date	Price (\$)	Dividend (\$)
December 31, 2018	\$14.64	
January 26, 2019	\$13.35	\$0.10
April 28, 2019	\$9.14	\$0.10
July 29, 2019	\$10.74	\$0.10
October 28, 2019	\$8.02	\$0.10
December 30, 2019	\$7.72	

Assume that you purchased Ford Motor Company stock at the closing price on December 31, 2018 and sold it at the closing price on December 30, 2019. What is your realised annual return for the year 2019? Show your calculations. **(3 marks)**

Answer: -45.1%

Explanation:

Date	Price (\$)	Dividend (\$)	Return	(1 + return)
December 31, 2018	\$14.64			1
January 26, 2019	\$13.35	\$0.10	-8.13%	0.918716
April 28, 2019	\$9.14	\$0.10	-30.79%	0.692135
July 29, 2019	\$10.74	\$0.10	18.60%	1.185996
October 28, 2019	\$8.02	\$0.10	-24.39%	0.756052
December 30, 2019	\$7.72		-3.74%	0.962594

- Realised return from your investment in the share from t to t+1 is

$$R_{t+1} = \frac{Div_{t+1} + P_{t+1} - P_t}{P_t} = \frac{Div_{t+1}}{P_t} + \frac{P_{t+1} - P_t}{P_t}$$

$$= \text{Dividend Yield} + \text{Capital Gain Yield}$$

- For quarterly returns, annual realised return, R_{annual} , is calculated by compounding:

$$1 + R_{\text{annual}} = (1 + R_1)(1 + R_2)(1 + R_3)(1 + R_4)$$

$$1 + R_{\text{annual}} = (0.918716)(0.692135)(1.185996)(0.756052)(0.962594) = 0.548845$$

$$R_{\text{annual}} = -0.45116$$

Suppose there are two pharmaceutical companies: A and B. Company A has a potential drug, which is waiting for approval from the Food and Drug Administration (FDA). If approved, this drug will produce \$1 billion in net income for company A. Company B has 10 separate drugs before the FDA waiting for approval. If approved, each of these drugs would produce \$100 million in net income. The probability of the FDA approving a drug is 50%. Which pharmaceutical company faces less risk? Show your calculations. (3 marks)

Answer: Company B, because it has a lower standard deviation of expected net income.

Company A

Expected payoff = prob of payoff \times amount if successful
 = $.5 \times \$1 \text{ billion} = \500 million

Standard deviation = $\sqrt{.5(\$1000 - \$500)^2 + .5(\$0 - \$500)^2}$ million = \$500 million

Company B

Expected payoff = prob of payoff \times amount if successful
 = $.5 \times \$1 \text{ billion} = \500 million

Standard deviation for one drug = $\sqrt{.5(\$100 - \$50)^2 + .5(\$0 - \$50)^2}$ million = \$50 million

Standard deviation (all drugs) = $SD(\text{one drug})/\sqrt{\text{number of drugs}} = \$50 \text{ million}/\sqrt{10} = \15.81 million

Consider an economy with two types of firms, S and I. S firms always move together, but I firms move independently of each other. For both types of firm there is a 70% probability that the firm will have a 20% return and a 30% probability that the firm will have a -30% return.

What is the expected return for an individual firm? What is the standard deviation for the return on an individual firm? What is the standard deviation for the return on a portfolio of 20 type S firms? What is the standard deviation for the return on a portfolio of 20 type I firms? (4 marks = 1+1+1+1)

Answer

What is the expected return for an individual firm?

Answer: 5%

Explanation: Expected Return = $.7(20\%) + .3(-30\%) = 5\%$

The standard deviation for the return on an individual firm is 22.9% (or 23%)

Explanation: Expected Return = $.7(20\%) + .3(-30\%) = 5\%$

Standard Deviation = $\sqrt{.7(.20 - .05)^2 + .3(-.30 - .05)^2} = .2291$

The standard deviation for the return on a portfolio of 20 type S firms is 22.9% (or 23%)

Explanation: Expected Return = $.7(20\%) + .3(-30\%) = 5\%$

Standard Deviation = $\sqrt{.7(.20 - .05)^2 + .3(-.30 - .05)^2} = .2291$

Since all these firms move the same, there is no adjustment to the standard deviation.

The standard deviation for the return on a portfolio of 20 type I firms is 5.1% (or 5%)

Explanation: Expected Return = $.7(20\%) + .3(-30\%) = 5\%$

Standard Deviation = $\sqrt{.7(.20 - .05)^2 + .3(-.30 - .05)^2} = .2291$

Since all these firms move independently, $stdev = stdev(\text{single firm})/\sqrt{\text{number of observations}} = .2291/\sqrt{20} = .0512$

Suppose Wyatt Oil Company has three divisions. Based on the following information, calculate the cost of capital for each of the three divisions. For each of the three divisions, calculate the value of the incremental free cash flows as a growing perpetuity (in \$ millions). What is the overall value of the incremental free cash flows (in \$ millions) of Wyatt Oil? Show your calculations. (5 marks = 2+2+1)

Division of Wyatt Oil	Asset Beta	Next Period's Expected Free Cash Flow (\$mm)	Expected Growth Rate
Oil Exploration	1.4	450	4.0%
Oil Refining	1.1	525	2.5%
Gas & Convenience Stores	0.8	600	3.0%

The risk-free rate of interest is 3% and the market risk premium is 5%.

Answer

Division of Wyatt Oil	Cost of capital	PV
Oil Exploration	$r_i = r_{rf} + \beta(r_m - r_{rf}) = .03 + 1.4(.05) = .10$	$V = \frac{FCF}{r - g} = \frac{\$450}{10\% - 4\%}$ million = \$7500 million
Oil Refining	$r_i = r_{rf} + \beta(r_m - r_{rf}) = .03 + 1.1(.05) = .085$	$V = \frac{FCF}{r - g} = \frac{\$525}{8.5\% - 2.5\%}$ million = \$8750 million
Gas & Convenience Stores	$r_i = r_{rf} + \beta(r_m - r_{rf}) = .03 + 0.8(.05) = .07$	$V = \frac{FCF}{r - g} = \frac{\$600}{7\% - 3\%}$ million = \$15,000 million

Total Value = \$7500 million + \$8750 million + \$15,000 million = \$31,250 million

What kind of corporate debt has a maturity of less than 10 years? (1 mark)

- A) Asset-backed bonds
- B) Debentures
- C) Notes
- D) Mortgage bonds

Answer: C

Asset securitization is the process of creating a(n): (1 mark)

- A) collateralized security.
- B) asset-backed security.
- C) municipal security.
- D) payment security.

Answer: B

Which of the following statements is FALSE? (1 mark)

- A) After deciding to go public, managers of the company work with an underwriter, an investment banking firm that manages the offering and designs its structure.
- B) The shares that are sold in the IPO may either be new shares that raise new capital, known as a secondary offering, or existing shares that are sold by current shareholders (as part of their exit strategy), known as a primary offering.
- C) Many IPOs, especially the larger offerings, are managed by a group of underwriters.
- D) At an IPO, a firm offers a large block of shares for sale to the public for the first time.

Answer: B

Explanation: The shares that are sold in the IPO may either be new shares that raise new capital, known as a primary offering, or existing shares that are sold by current shareholders (as part of their exit strategy), known as a secondary offering.

Which of the following statements regarding firm commitment IPOs is FALSE? (1 mark)

- A) If the entire issue does not sell out, the remaining shares must be sold at a lower price and the underwriter must take the loss.
- B) The underwriter purchases the entire issue (at the offer price) and then resells it at a slightly higher price to interested investors.
- C) It is the most common underwriting arrangement.
- D) The underwriter guarantees that it will sell all of the stock at the offer price.

Answer: B

Explanation: The underwriter purchases the entire issue (at a price slightly lower than the offer price) and then resells it at the offer price to interested investors.

Galt Industries has just issued a callable, \$1000 par value, five-year, 6% coupon bond with semi-annual coupon payments. The bond can be called at par in three years or anytime thereafter on a coupon payment date. The bond is currently trading for \$978.94. What is the bond's yield to maturity? What is its yield to call? (4 Marks = 2+2).

Answer: YTM = 6.5%

Explanation: $PV = -978.94$, $PMT = 60/2 = 30$, $FV = 1000$, $N = 5 \times 2 = 10$, compute $i = 3.8250048$, then $3.8250048\% \times 2 = 6.5\%$

YTC = 6.78%

Explanation: $PV = -978.94$, $PMT = 60/2 = 30$, $FV = 1000$, $N = 3 \times 2 = 6$, compute $i = 3.393852$, then $3.393852\% \times 2 = 6.7877\%$

Explain why a callable bond has a higher yield compared to a non-callable bond issued by the same firm with all other bond characteristics the same (e.g. maturity, coupon rate, coupon frequency, seniority). (3 marks)

Answer. The firm has the option to call the bond not the investor (1 mark). The firm will generally call a bond when it is trading at a premium and the bond's coupon rate is higher than the bond's yield. In this situation, investors would prefer to retain the bonds because the coupon rate is above prevailing interest rates available on other bond investments with similar risk exposure. Therefore, all else equal, investors prefer non-callable bonds to callable bonds

and will pay a higher price for the non-callable bond than for the callable bond. There is an inverse relationship between bond prices and yields, therefore the callable bond has a higher yield than the non-callable bond. (2 marks).

As the owner of a concession booth in a major airport, you decide to purchase insurance that will pay \$2,500,000 in the event the airport terminal is destroyed by terrorists. Suppose the likelihood of such a loss is 20%, the risk-free interest rate is 4%, and the expected return of the market is 12%. If the risk has a beta of -2.0, what is the actuarially fair insurance premium? (3 marks)

Answer: \$568,000

Explanation: $r_L = r_f + \beta L(r_m - r_f) = 4\% + (-2.0)(12\% - 4\%) = -12\%$

$$\text{Insurance Premium} = \frac{\text{Pr(Loss)} \times E[\text{Payment}]}{1 + r_L} = \frac{20\% \times \$2.5 \text{ million}}{1 - .12} = \$568,000$$

You are a risk manager for Security First Trust Savings and Loan (SFTSL). SFTSL's balance sheet is as follows (in millions of dollars):

Assets		Liabilities	
Cash Reserves	100	Checking & Savings	200
Auto Loans	200	Certificates of Deposit	150
Mortgages	<u>300</u>	Long-Term Financing	<u>200</u>
Total Assets	600	Total Liabilities	550
		Owner's Equity	<u>50</u>
		Total Liabilities and Equity	600

The duration of the auto loans is three years and the duration of the mortgages is eight years. Both cash reserves and checking and savings have zero duration. The CDs have a duration of two years and the long-term financing has a ten-year duration.

1. What is the duration of SFTSL's equity? What does it imply? (4 marks = 3+1)
2. Suppose SFTSL experiences a rash of auto loan prepayments, reducing the size of the auto loan portfolio from \$200 million to \$100 million and increasing the cash reserves to \$200 million. How does it affect SFTSL's exposure to interest rate risk? Explain your answer. (2 marks = 1+1)

Answer:

(1) The duration is 14 years.

$$\text{Explanation: } D_{\text{assets}} = \frac{\$100M}{\$600M} \times 0 \text{ (cash)} + \frac{\$200M}{\$600M} \times 3 \text{ (auto)} + \frac{\$300M}{\$600M} \times 8 \text{ (mortgage)} = 5 \text{ years}$$

$$D_{\text{liabilities}} = \frac{\$200M}{\$550M} \times 0 \text{ (checking)} + \frac{\$150M}{\$550M} \times 2 \text{ years (CDs)} + \frac{\$200M}{\$550M} \times 10 \text{ years (Long Term)} =$$

4.18 years

$$D_{\text{equity}} = D_{\text{assets}} - \text{liabilities} = \frac{A}{A-L} D_A - \frac{L}{A-L} D_L$$

$$= \frac{\$600M}{\$600M - \$550M} (5 \text{ years}) - \frac{\$550M}{\$600M - \$550M} (4.181818 \text{ years}) = 14.00 \text{ years}$$

If interest rates fall by 1%, the value of SFTSL's equity will increase by about 14%.

(3 marks for calculation: 1 for D_A , 1 for D_L , 1 for D_E ; 1 for correct interpretation)

(2) With prepayment of auto loans, duration has changed to 8 years. (1 mark for calculation)

$$\text{Explanation: } D_{\text{assets}} = \frac{\$200M}{\$600M} \times 0 \text{ (cash)} + \frac{\$100M}{\$600M} \times 3 \text{ (auto)} + \frac{\$300M}{\$600M} \times 8 \text{ (mortgage)} =$$

4.5 years

$$D_{\text{liabilities}} = \frac{\$200M}{\$550M} \times 0 \text{ (checking)} + \frac{\$150M}{\$550M} \times 2 \text{ years (CDs)} + \frac{\$200M}{\$550M} \times 10 \text{ years (Long Term)}$$

= 4.181818 years

$$D_{\text{equity}} = D_{\text{assets}} - \text{liabilities} = \frac{A}{A-L} D_A - \frac{L}{A-L} D_L$$

$$= \frac{\$600M}{\$600M - \$550M} (4.5 \text{ years}) - \frac{\$550M}{\$600M - \$550M} (4.181818 \text{ years}) = 8.00 \text{ years}$$

Interpretation: If interest rates fall by 1%, the value of SFTSL's equity will increase by about 8%. That means, exposure to interest rate risk has been reduced. (1 mark for correct interpretation).

Which of the following statements is FALSE? (1 mark)

- A) The relative proportions of debt, equity, and other securities that a firm has outstanding constitute its capital structure.
- B) The most common choices for financing a new project are financing through equity alone and financing through a combination of debt and equity.
- C) The NPV created by a project represents the value to the new investors of the firm.
- D) When corporations raise funds from outside investors, they must choose which type of security to issue.

Answer: C

Explanation: The NPV created by the project represents the value to the existing shareholders of the firm.

Which of the following statements is FALSE? (1 mark)

- A) Modigliani and Miller's conclusion verified the common view, which stated that even with perfect capital markets, leverage would affect a firm's value.
- B) We can evaluate the relationship between risk and return more formally by computing the sensitivity of each security's return to the systematic risk of the economy.
- C) Investors in levered equity require a higher expected return to compensate for its increased risk.
- D) Leverage increases the risk of equity even when there is no risk that the firm will default.

Answer: A

Explanation: Modigliani and Miller's conclusion went against the common view that even with perfect capital markets, leverage would affect a firm's value.

Which of the following is NOT one of Modigliani and Miller's set of conditions referred to as perfect capital markets? (1 mark)

- A) All investors hold the efficient portfolio of assets.
- B) There are no taxes, transaction costs, or issuance costs associated with security trading.

- C) A firm's financing decisions do not change the cash flows generated by its investments, nor do they reveal new information about them.
- D) Investors and firms can trade the same set of securities at competitive market prices equal to the present value of their future cash flows.

Answer: A

Which of the following statements is FALSE? (1 mark)

- A) Leverage decreases the risk of the equity of a firm.
- B) Because the cash flows of the debt and equity sum to the cash flows of the project, by the Law of One Price the combined values of debt and equity must be equal to the cash flows of the project.
- C) Franco Modigliani and Merton Miller argued that with perfect capital markets, the total value of a firm should not depend on its capital structure.
- D) It is inappropriate to discount the cash flows of levered equity at the same discount rate that we use for unlevered equity.

Answer: A

Explanation: Leverage increases the risk of the equity of a firm.

Galt Industries has 50 million shares outstanding and a market capitalization of \$1.25 billion. It also has \$750 million in debt outstanding. Galt Industries has decided to delever the firm by issuing new equity and completely repaying all the outstanding debt. Assume perfect capital markets.

- (i) What is the number of shares that Galt must issue to delever? (2 Marks)
- (ii) Suppose you are a shareholder in Galt industries holding 100 shares, and you do not like the decision to delever the firm. What can you do to undo the effect of this decision? (2 marks)

Answer: (i) Number of new shares = 30 million

Explanation: Share price = $\frac{\$1250 \text{ million market cap}}{50 \text{ million shares}} = \25

Number of new shares = $\frac{\$750 \text{ million}}{\$25} = 30 \text{ million}$

(ii) You can borrow \$1500 and buy 60 shares of stock, which will keep your position unaffected.

Explanation: Share price = $\frac{\$1250 \text{ million market cap}}{50 \text{ million shares}} = \$25 \rightarrow \text{Value of equity} = \$25 \times 100 =$

\$2500

Galt's pre-delevered Debt/Equity = $\frac{\$750}{\$1250} = .60 \rightarrow \text{for every } \$1 \text{ equity need } \$0.60 \text{ debt, so you}$

need to borrow $0.60 \times \$2500 = \1500 and then buy $\$1500/\$25 = 60$ more shares of stock.

Consider two firms, With and Without, that have identical assets that generate identical cash flows. Without is an all-equity firm, with 1 million shares outstanding that trade for a price of \$24 per share. With has 2 million shares outstanding and \$12 million in debt at an interest rate of 5%.

According to MM Proposition 1, what is the stock price for With? (2 Marks)

Answer: \$6.00

Explanation: Under MM I, the total value of With and Without must be the same.

Value(Without) = 1,000,000 × \$24 = \$24 million

Value(levered equity) = value(With) - debt = \$24 M - \$12M = \$12 M

Price per share = $\frac{\$12\text{M}}{2\text{M}} = \6.00