

LO.a: Explain sources of value creation in private equity.

1. Which of the following is *least likely* a way in which a private equity firm can add value in a buyout transaction?
 - A. Ability to re-organize and re-engineer the portfolio firm.
 - B. Ability to raise debt on favorable terms.
 - C. Significantly increase the sales revenue of the portfolio firm.

LO.b: Explain how private equity firms align their interests with those of the managers of portfolio companies.

2. The *most likely* reason for the alignment of economic interests between private equity owners and the managers of portfolio firms is:
 - A. the absence of noncompete clause imposed on founders.
 - B. proper incentives and results-oriented pay packages for management.
 - C. reduction of corporate board seats in event of company sale, takeover, IPO or restructuring.

LO.c: Distinguish between the characteristics of buyout and venture capital investments.

3. Buyout firms generally invest in:
 - A. businesses with low cash flow predictability.
 - B. new firms with weak asset base.
 - C. well established firms with steady and predictable cash flows.
4. Risk assessment amongst the three types of investments - venture capital investments, buyout investments and publicly listed stocks, is *most difficult* for:
 - A. venture capital investments.
 - B. buyout investments.
 - C. publicly listed stocks.

LO.d: Describe valuation issues in buyout and venture capital transactions.

5. Value creation in a LBO transaction *most likely* comes from:
 - A. negotiations between providers of capital and management of the target company.
 - B. earnings growth, multiple expansion, and debt repayment.
 - C. lower business costs, timing of exit, and strategic analyses.

Table 1: Information related to a private equity transaction

Enterprise value	\$4,000 million
PE fund preference shares	\$1,900 million
PE fund common equity	\$96 million
Equity owned by management	\$4 million
Debt	\$2,000 million partially retired to \$1,500 m by end of 4 th year
Exit Value after 4 years	\$8,000 million

Annual return promised to preference shares	15% paid at exit.
PE fund promised	96% of residual value
Management equity holders	4% residual value

6. Based on Table 1, the payoff for the PE fund preference shares and the PE fund equity in millions are *closest* to:
 - A. \$3,000, \$3,400.
 - B. \$3,323, \$6,240
 - C. \$3,300, \$3,050.
7. Based on Table 1, the IRR realized by the management of the PE fund is:
 - A. 137%.
 - B. 34%.
 - C. 93%.
8. Which of the following is *most likely* correct about the LBO model?
 - A. The debt level of portfolio companies increases over time.
 - B. The debt level of portfolio companies decreases over time.
 - C. The debt level of portfolio companies remains stable over time.
9. A venture capital firm invests \$1.5 million in a portfolio company with a \$2.5 million pre-money valuation. The proportionate ownership of the venture capital investor is:
 - A. 40.00%.
 - B. 35.50%.
 - C. 37.50%
10. The *least appropriate* valuation methodology used to determine value in VC transactions is:
 - A. the income approach.
 - B. the venture capital approach.
 - C. real option methodology

LO.e: Explain alternative exit routes in private equity and their impact on value.

11. An initial public offering as an exit route for private equity firms offers the *most likely* advantage of:
 - A. low costs.
 - B. higher valuation multiples.
 - C. high flexibility.
12. A relatively small private equity firm with moderate growth prospects is contemplating exit routes which will not require significant costs or add leverage. Which of the following is the *most appropriate* exit route for such a firm?
 - A. IPO.
 - B. MBO.
 - C. Secondary market sale to strategic investors.

LO.f: Explain private equity fund structures, terms, valuation, and due diligence in the context of an analysis of private equity fund returns

13. Private equity funds are mostly structured as a(n):
- limited partnership.
 - corporate structure.
 - open-end equity fund.
14. The commitments from investors in a private equity fund are made during the:
- draw down phase.
 - marketing phase.
 - Realization or returns phase.
15. A private equity fund has committed capital of \$150 million, carried interest of 20% and a hurdle rate of 8%. It makes an investment in target company A of \$50 million and in company B of \$50 million at the beginning of year 1. It exits from both investments a year later with a \$10 million profit in company A and realizes a loss of \$5 million in company B. The GP is entitled to carried interest on a deal-by-deal basis. What is the carried interest paid to the GP on each deal?
- 0 for either investments.
 - \$2 million for A, 0 for B.
 - \$0.5 million for A, \$0.5 million for B.
16. A clawback provision requires the:
- profit to be distributed to the GP only when the entire committed capital is returned to LPs.
 - LPs to return profit to GP in excess of the agreed profit distribution between LPs and GP.
 - GP to return money to LPs in excess of the agreed profit distribution between the GP and LPs.
17. Due diligence of private equity fund is important because of the:
- wide performance range between funds.
 - high liquidity in private equity investments.
 - inconsistent fund returns over time.

LO.g: Explain risks and costs of investing in private equity.

18. Which of the following is *least likely* a risk associated with private equity investments?
- illiquidity of investments.
 - investments in unquoted securities.
 - short-term market fluctuations.

19. Consider the following PE funds:

	PE Fund A	PE Fund B	PE Fund C
Management fees	2%	1.5%	1.5%

Transaction fees	100% to GP	50/50 split	50/50 split
Carried interest	20%	20%	25%
Hurdle rate	8%	11%	11%
Distribution waterfall	Total return	Total return	Total return

Which fund(s) would you recommend to an LP investor?

- A. Fund A.
- B. Fund B.
- C. Fund C.

LO.h: Interpret and compare financial performance of private equity funds from the perspective of an investor.

20. Which of the following performance measure relates cash flows between the private equity and LP investors?
- A. Net IRR.
 - B. Gross IRR.
 - C. Net income.
21. The cash-on-cash return is also called:
- A. PIC.
 - B. DPI.
 - C. RVPI.
22. According to GIPS, which of the following is the most appropriate measure of private equity performance?
- A. IRR.
 - B. NPV.
 - C. Payback period.

LO.i: Calculate management fees, carried interest, net asset value, distributed to paid in (DPI), residual value to paid in (RVPI), and total value to paid in (TVPI) of a private equity fund.

The following information related to questions 23 to 25:

Consider the CTV private equity fund with committed capital for \$135 million, management fee of 2% and carried interest of 20%. The distribution waterfall is calculated according to the total return method whereby the GP receives carried interest only after the fund has returned the entire committed capital to LPs. Management fees are calculated on the basis of paid-in capital. Following table gives the **cash flows and distribution of CTV (in \$ Millions)**.

Year	Called-down(1)	Paid-in Capital(2)	Mgmt. Fees(3)	Operating Results(4)	NAV b/f Distrib.(5)	Carried Interest(6)	Distributions(7)	NAV after Distrib.(8)
2011	60	60	1.2	-5	53.8			53.8
2012	10	70	1.4	-10	52.4			52.4

2013	15	85	1.7	20	85.7			85.7
2014	20	105	2.1	45	148.6		25	
2015	20	125	2.5	55	193.4	9.0	45	139.4

23. The carried interest (in \$ million) paid in Year 2014 is *closest* to:
- 2.7.
 - 29.7.
 - 27.0.
24. The NAV of CTV, after distributions (\$ million) in Year 2014 is *closest* to:
- 193.
 - 121.
 - 149.
25. The DPI and RVPI of CTV as of the report date (Year 2015) are *closest* to:
- 0.2x, 1.5x.
 - 0.36x, 1.5x.
 - 0.56x, 1.1x.

LO.j: Calculate pre-money valuation, post-money valuation, ownership fraction, and price per share applying the venture capital method 1) with single and multiple financing rounds and 2) in terms of IRR.

The following information relates to questions 26 to 29:

A start-up company Trex Comp (TC) is seeking financing from a venture capital firm called SV. The entrepreneurs (Trex Comp.) want to own 1 million shares. The following table gives the financial information related to TC.

Estimated exit value	\$30,000,000
Time to exit	4 years
Discount rate	40%
Investment sought	\$4,000,000
No. of existing shares owned by entrepreneurs	1,000,000

26. Applying the venture capital method calculate post-money valuation and pre-money valuation of TC.
- POST = \$7,809,246, PRE = 3,809,246.
 - POST = \$30,000,000, PRE = \$26,000,000.
 - POST = \$115,248,000, PRE = \$111,248,000.
27. After making an investment of \$4 million the ownership fraction of SV is *closest* to:
- 105.00%.
 - 48.78%.
 - 51.22%.

28. The number of shares required by SV is closest to:

- A. 1,050,021
- B. 1,000,051
- C. 950,876

29. The price per share is *closest* to:

- A. \$3.8.
- B. \$7.4.
- C. \$2.0.

LO.k: Demonstrate alternative methods to account for risk in venture capital.

30. Assume that a venture capital fund, uses a risk-adjusted discount of 20% for valuation of a portfolio company such that the post-money valuation is \$14,467,593. Suppose that the probability of failure of the portfolio company every year is 14.30%. The discount rate incorporating “risk of failure” and “risk-diversification component” is *closest* to:

- A. 86%.
- B. 20%.
- C. 40%.

Solutions

1. C is correct. In a buyout transaction, the private firm is likely to have steady cash flows. Value is generally created by making the firm more efficient and by raising debt at favorable terms. It is unlikely that a private equity firm will be able to significantly increase the revenue of a firm that already has stable cash flows. A & B will add value in a case of a buyout. Section 2.1.
2. B is correct. Results oriented pay packages and incentives along with contractual clauses such as tag-along, drag-along rights for management are helpful in better aligning of economic interests between private equity owners and managers of the companies they control. A & C are incorrect because noncompete clause and corporate board seats are contractual clauses to ensure management stays focused on achieving the business goals. Section 2.1.
3. C is correct. Buyout investments are in firms with steady and predictable cash flows and significant asset base. Section 2.3.
4. A is correct. “Assessment of risk for venture capital investments is difficult because of new technologies, new markets and lack of operating history.” Section 2.3.
5. B is correct. Value creation in LBOs is due to earnings growth from operational efficiency and enhanced corporate governance, multiple expansion depending on identification of exits, and debt reduction prior to exit. A & C are incorrect. Section 2.4.1.
6. C is correct. Debt holders receive \$1,500 million. Preference shares are paid 15% return for 4 years, so they receive $\$1,900 (1.15)^4 = \$3,323 \text{ million}$. PE fund equity receives 96% of the terminal equity value $0.96[8000 - (3,323 + 1,500)] = \$3,049.92$. Section 2.4.1.
7. A is correct. Management invested \$4 million and received at the end of 4 years $8,000 - 3,323 - 1,500 - 3,050 = \127 million . Using the financial calculator: $CF_0 = -4$, $CF_4 = 127$, IRR CPT = 137%. Section 2.4.1.
8. B is correct. A reduction in financial leverage over time is essential for providing higher returns to the shareholders in LBO transactions. Section 2.4.1.
9. C is correct. $POST = PRE + I = 2.5 + 1.5 = \4 million . *Proportionate ownership* = $I/POST = 1.5/4 = 37.5\%$. Section 2.5.
10. A is correct. The traditional valuation methodologies such as the income approach (the DCF approach) is rarely used to determine value in VC transactions because of the unpredictability of future cash flows. B & C are valuation approaches used in VC valuation. Section 2.5.

11. B is correct. IPOs offer the advantage of higher valuation multiples due to enhanced liquidity, access to capital and the possibility to attract capable managers. The IPO process is cumbersome, costly and not very flexible. Section 2.6.
12. C is correct. Secondary market sale of stake to strategic investors in the same market or business segment seems the most appropriate. The two main advantages are 1) the possibility to achieve the highest valuation multiples in the absence of an IPO, 2) specialized firms have the skill to bring their portfolio companies to the next level and sell to either a strategic investor or another PE firm having a different skill set. A & B are incorrect because IPOs are costly and MBOs use large amounts of debt. Section 2.6.
13. A is correct. Private equity funds in most jurisdictions are structured as a limited partnership. Such funds are governed by a limited partnership agreement between the fund's investors called limited partners (LPs) and the fund manager-the general partner (GP). Section 3.1.
14. B is correct. The commitments from investors are received in the premarketing or marketing phase which may last between 1 to 2 years. Section 3.1.
15. B is correct. For the first investment, the drawn amount is \$50 million and the exit value is \$60 million 1 year later hence $IRR = 20\%$. This is higher than the hurdle rate of 8%. On a deal-by-deal basis the GP receives $\$10 \text{ million} \times 20\% = \2 million . The second investment in company B results in a loss hence the GP receives nothing. Section 3.1.
16. C is correct. Clawback provision is a corporate governance term which requires the GP to return any capital contributions which exceed the agreed profit split between the GP and LPs of the private equity fund. A is incorrect because it explains the total return waterfalls. B is incorrect because GPs NOT LPs are required to return the excess profit to LPs. Section 3.1.
17. A is correct. One of the reasons for due diligence of private equity funds is that the performance range between funds is very large. B & C are incorrect because liquidity is limited and returns are persistent in private equity funds hence require the due diligence process. Section 3.3.
18. C is correct. Private equity investments are for a long-term hence temporary short-term market fluctuations are generally irrelevant. A & B are risk factors in investing in private equity. Section 3.2.
19. B is correct. Relative to Fund A, Fund B has lower management fees and transaction fees. In addition, it has a higher hurdle rate (11% versus 8%). Funds B and C are similar except that B has lower carried interest which is better for an LP investor. Section 3.1.
20. A is correct. The IRR is viewed as the most appropriate measure of private equity performance by the Global Investment Performance Standards (GIPS). Net IRR relates cash flows between the private equity and LPs. "Gross IRR relates cash flows between the private equity fund and its portfolio companies." Section 3.5.1.

21. B is correct. DPI – distributed to paid in - is the ratio of cumulative distributions paid to LPs to cumulative invested capital. This ratio is also called cash-on-cash return. It provides a measure of the realized return of a private equity fund. Section 3.5.1.
22. A is correct. “The IRR, a cash-flow-weighted rate of return, is deemed the most appropriate measure of private equity performance by the Global Investment Performance Standards (GIPS), Venture Capital and Private Equity Valuation Principles, and by other venture capital and private equity standards.” Section 3.5.1.
23. A is correct. Carried interest is paid in year 2014, since this is the year that NAV is higher than committed capital of \$135 m. Carried interest = $0.20[NAV(\text{column 5}) - \$135m] = 0.20(148.6 - 135) = \2.72 million . Section 4.
24. B is correct. NAV after distributions = *NAV before distributions – carried interest – distributions* = $148.6 - 2.7 - 25 = \$120.9m$. Section 4.
25. C is correct. $DPI = \frac{25+45}{125} = 0.56 \times$. $RVPI = \frac{139.4}{125} = 1.115 \times$. Section 4.
26. A is correct. $POST = 30,000,000 / (1.40)^4 = \$7,809,246$. $PRE = POST - I = \$7,809,246 - \$4,000,000 = \$3,809,246$. Appendix 1.1.
27. C is correct. Ownership fraction of $F = I / POST = 4,000,000 / 7,809,246 = 51.22\%$. Ownership of TC (entrepreneurs) = $1 - F = 48.78\%$. Appendix 1.1.
28. A is correct. SV require 51.22% ownership after making an investment of \$4,000,000. The number of shares $y = x[F / (1 - F)] = 1,000,000 (0.5122 / 0.4878) = 1,050,021 \text{ shares}$. Appendix 1.2.
29. A is correct. Price per share = $I / y = \$4,000,000 / 1,050,021 = \3.809 . Appendix 1.2.
30. C is correct. Using the formula to calculate the discount rate = $\tilde{r} = (1 + r) / (1 - \pi) - 1 = (1 + 0.20) / (1 - 0.143) - 1 = 40\%$. where $\pi = \text{probability of failure in any one year} = 14.30\%$. Appendix 3.