

# Αμοιβαία Κεφάλαια και Εναλλακτικές Επενδύσεις

Private Equities



# Private Equity

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- ▶ Private equity funds are organized as **limited partnerships** that are not publicly traded.
- ▶ The investors in private equity are typically large institutional investors and wealthy individuals.
- ▶ Private equity firms are known for their extensive use of debt financing to purchase companies, which they restructure and attempt to resell for a higher value.
- ▶ Debt financing reduces corporate taxation burdens and is one of the principal ways in which private equity firms make business more profitable for investors.



# Limited Partnership

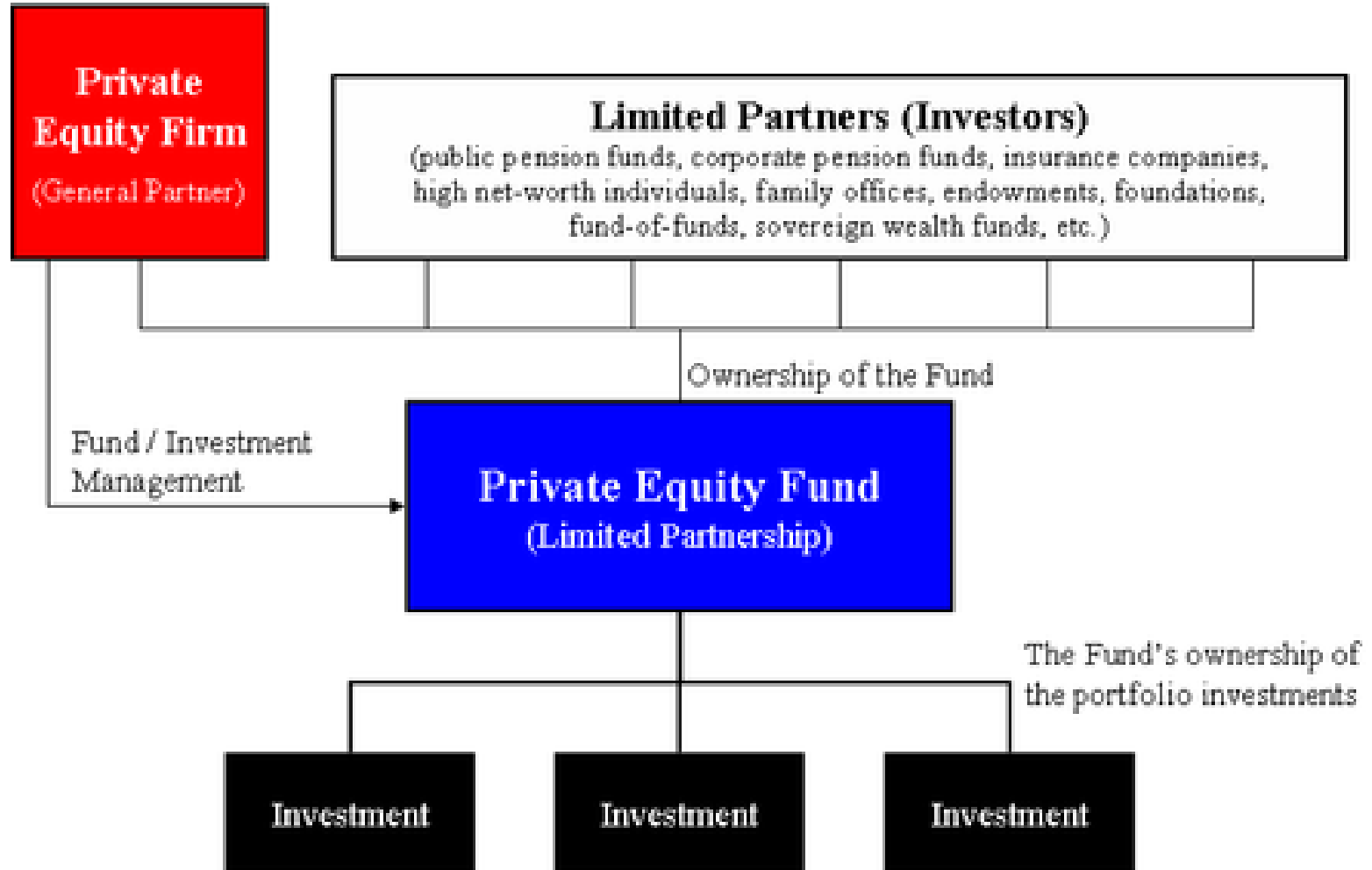
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- ▶ In a limited partnership, the limited partners (LPs) provide funding and do not have an active role in the management of the investments.
- ▶ Their liability is limited to what they have invested (i.e., they cannot be held liable for any amount beyond their investment in the fund).
- ▶ The general partner (GP) in a limited partnership is liable for all the firm's debts and, thus, has unlimited liability. The GP is the manager of the fund.



# Private Equity Fund Structure

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# Private Equity

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- ▶ Private equity firms make investments ranging from investments in early stage companies (venture capital investment) to investments in mature companies (leveraged buyout transaction).
- ▶ In private equity firms, managers are able to focus more on long-term performance because, unlike public companies, private companies do not face the scrutiny of analysts, shareholders and the broader market.



# Venture Capital and Leveraged Buyout Investments

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- ▶ **Venture capital** and **leveraged buyout** are the two main forms of private equity investments.
- ▶ Companies financed with venture capital are usually less mature than leveraged buyout targets. Venture capital firms usually have a specific industry focus (ex biotechnology) and emphasize revenue growth.
- ▶ When private equity firms make leveraged buyout purchases, the emphasis is on EBIT or EBITDA growth, and typically a portfolio of companies with stable earnings growth is purchased.



# Leveraged Buyout Investments

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- ▶ Leveraged buyout refers to a strategy where a company is acquired from the current shareholders typically with the use of financial leverage.
- ▶ The companies involved in these transactions are typically mature and generate operating cash flows, with a successful business model.
- ▶ Leveraged buyouts involve a private equity firm agreeing to an acquisition without committing all the capital required for the acquisition. To do this, it will raise debt.



# Example of Leveraged Buyout Investment

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- ▶ A private equity fund, XYZ Capital, borrows \$6bn from a bank.
- ▶ It adds \$1bn of equity – money from the private equity firm and from limited partners (institutional investors, high-net-worth individuals, etc.).
- ▶ With this \$7bn it buys all the shares of an underperforming company, ABC Corp (after due diligence, i.e. checking the books).
- ▶ It replaces the senior management in ABC Corp and reengineers the company's portfolio. The workforce is reduced, some assets are sold off, etc. The objective is to increase the value of the company for a sale.





# Example of Leveraged Buyout Investment

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- ▶ The stock market is experiencing a bull market, and ABC Corp is sold two years after the buy-out for \$9bn, yielding a profit of \$2bn.
- ▶ The original loan is paid off with interest of, say, \$0.1bn.
- ▶ The remaining profit of \$1.9bn is shared among the partners.



# Venture Capital Investments

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- ▶ Venture capital refers to equity investments made, typically in less mature companies.
- ▶ Venture capital investment is most often found in the application of new technology, new marketing concepts and new products that do not have a proven track record or stable revenue streams.
- ▶ Venture capital is sub-divided by the stage of development of the company ranging from early stage capital used for the launch of start-up companies, to late stage capital that is often used to fund expansion of existing business that are generating revenue but are not yet profitable.



# Venture Capital Investments

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- ▶ Entrepreneurs often develop products and ideas that require substantial capital during the formative stages of their companies' life cycles.
- ▶ Many entrepreneurs do not have sufficient funds to finance projects themselves, and therefore seek outside financing.



# Venture Capital vs. Buyout Investments

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Characteristic	Venture Capital Investments	Leveraged Buyout Investments
Cash Flows	Low predictability with potentially unrealistic projections	Stable and predictable cash flows
Products	Product is based on new technology with uncertain prospects	Established products
Management Team	New team	Strong and experienced team
Financial Leverage	Low debt use with a majority of equity financing	High amounts of debt
Private Equity Investment Returns	High returns come from a few highly successful investments with write-offs from less successful investments	Low variability in returns with failures being rare



# Advantages of Private Equity

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- ▶ **Active Involvement:** Private equity firms are involved in the running of business and will help a company to re-evaluate every aspect of its business to see how it can maximize its value.
  - ▶ **Incentives:** Private equity firms often borrow a lot of money to make their investments, and they have to pay that back and generate a return for their investors on top of that. Moreover, individual partners in the private equity firm often have their own money invested as well, and make additional money from performance fees if they make a profit, so they have strong personal incentives to increase the acquired company's value.
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# Advantages of Private Equity

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- ▶ **High Returns:** The combination of funding, expertise and incentives can be very powerful. A 2012 study by The Boston Consulting Group found that more than 70% of private equity deals resulted in the company's annual profits growing by at least 20%, and nearly 50% generated profit growth of 50% a year or more.



# Disadvantages of Private Equity

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- ▶ **Dilution/Loss of Ownership Stake:** With other funding options, the investment comes at a cost, but the company's owners have control of the company. With private equity, owners usually have to give up a large share of the business.
  - ▶ **Loss of Management Control:** Because the private equity firm will want to be actively involved in the management of the company, the owners of the company lose control of basic elements of the business like setting strategy, hiring and firing employees.
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# Disadvantages of Private Equity

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- ▶ **Different Definitions of Value:** A private equity firm exists to invest in companies, make them more valuable, and sell their stakes for large profits. But a private equity firm's definition of value focuses on the financial value of the business on a particular date about five years after the initial investment, when the firm sells its stake and books a profit. Business owners often have a longer-term outlook and more concern for things like relationships with employees and customers, and reputation.





# Valuation

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- ▶ Public companies are bought and sold on regulated exchanges daily.
- ▶ Private companies, however, are bought by buyers with specific interests at specific points in time, with each potential buyer possibly having a different valuation for the company.
- ▶ Valuing a private company is more difficult than valuing public companies because, PE firms often transform and reengineer the portfolio company such that future cash flow estimates are difficult to obtain.



# Exit Value

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- ▶ The exit value is a critical element in the return for the private equity firm and is considered carefully before the investment is undertaken.
- ▶ There are four exit routes that private equity firms typically use:
  1. an initial public offering (IPO),
  2. secondary market sale,
  3. management buyout (MBO), and
  4. liquidation.



# Initial Public Offering (IPO)

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- ▶ In an IPO, a company's equity is offered for public sale.
- ▶ An IPO usually results in the highest exit value due to increased liquidity, greater access to capital and the potential to hire better quality managers.
- ▶ However, an IPO is less flexible, more costly, and a more cumbersome process than the other alternatives.
- ▶ IPOs are most appropriate for companies with strong growth prospects and a significant operating history and size.



# Secondary Market Sale

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- ▶ In a secondary market sale, the company is sold to another investor or to another company interested in the purchase for strategic reasons (e.g., a company in the same industry wishes to expand its market share).
- ▶ Secondary market sales result in the second highest company valuations after IPOs.



# Management Buyout (MBO)

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- ▶ In an MBO, the company is sold to management, who utilize a large amount of leverage, since the management of a company will not usually have the money available to buy the company outright themselves.
- ▶ Although management will have a strong interest in the subsequent success of the company, the resulting high leverage may limit management's flexibility.



# Liquidation

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- ▶ Liquidation, the outright sale of the company's assets, is pursued when the company is deemed no longer viable and usually results in a low value.
- ▶ There is potential for negative publicity as a result of displaced employees and from the obvious implications of the company's failure to reach its objectives.



# Risks for Investors

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- ▶ *Liquidity risk*: Because private equity investments are not publicly traded, it may be difficult to liquidate a position.
- ▶ *Valuation risk*: The valuation of private equity investments reflects subjective, not independent, judgment.
- ▶ *Diversification risk*: Private equity investments may be poorly diversified, so investors should diversify across investment development stage and strategy of private equity funds.
- ▶ *Market risk*: Private equity is subject to long-term changes in interest rates, exchange rates, and other market risks. Short-term changes are usually not significant risk factors.



# Important Terms

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- ▶ *Committed Capital*: Capital that is committed by limited partners to a private equity fund. It is usually not invested immediately. It is "drawn down" and invested over time as investments are identified.
- ▶ *Capital Drawdowns*: The portion of the limited partner's committed capital that is invested when the general partner has identified a new investment.
- ▶ *Paid-in capital*: The cumulative amount of capital drawdowns.
- ▶ *Cumulative Distributions*: The cumulative amount of cash and stock that has been paid out to the limited partners.





# Important Terms

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- ▶ *Residual Value*: The value of non-exited investments of the PE fund.
- ▶ *Management fees*: These are fees paid to the GP on an annual basis as a percent of committed capital and are commonly 2%. Management fees could instead be based on NAV or paid-in capital.
- ▶ *Carried interest/performance fees*: This is the GP's share of the fund profits and is usually 20% of profits (after management fees).
- ▶ *Hurdle rate*: This is the IRR that the fund must meet before the GP can receive carried interest. It usually varies from 7% to 10% and incentivizes the GP.



# Important Terms

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- ▶ *NAV before distributions* (value of the investment portfolio) =  
$$\begin{aligned} & \text{NAV after distributions in prior year} \\ & + \text{capital called down} - \text{management fees} \\ & + \text{operating results} \end{aligned}$$
- ▶ *NAV after distributions* (value of the investment portfolio after distributions to LPs) =  
$$\begin{aligned} & \text{NAV before distributions} - \text{carried interest} \\ & - \text{distributions} \end{aligned}$$



# Performance Evaluation

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## ▶ **Quantitative Measures**

- ▶ *PIC (paid-in capital to committed capital)*. This is the capital utilized by the GP.

$$PIC = \frac{\text{Paid – in Capital}}{\text{Committed Capital}}$$

- ▶ *DPI (cumulative distributions to paid-in capital)*. This measures the LP's realized return and is the cumulative distributions paid to the LPs divided by the cumulative invested capital. It is net of management fees and carried interest.

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$$DPI = \frac{\text{Cummulative Distributions}}{\text{Paid – in Capital}}$$

# Performance Evaluation

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- ▶ RVPI (residual value to paid-in capital). This measures the LP's unrealized return and is the value of the LP's holdings in the fund divided by the cumulative invested capital. It is net of management fees and carried interest.

$$RVPI = \frac{\textit{Residual Value}}{\textit{Paid - in Capital}}$$

- ▶ TVPI (total value to paid-in capital). This measures the LP's realized and unrealized return and is the sum of DP and RVP. It is net of management fees and carried interest.

$$TVPI = DPI + RVPI$$

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# Performance Evaluation

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## ▶ **Qualitative Measures**

- ▶ The realized investments, with an evaluation of successes and failures.
- ▶ The unrealized investments, with an evaluation of exit horizons and potential problems.
- ▶ Cash flow projections at the fund and portfolio company level.



# Example

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- ▶ Two private equity funds, Fund A and Fund B, are being considered by an investor.

	Fund A	Fund B
Gross IRR	21.6%	2.2%
Net IRR	15.4%	-0.9%
Performance quantile	1	5
DPI	1.37	0.24
RVPI	1.71	1.12
TVPI	3.08	1.36
Maturity of fund	5 years	3 years

- ▶ Interpret and compare the financial performance of private equity funds A and B.
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# Answer

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- ▶ Examining its DPI, Fund A has distributed \$1.37 in return for every dollar invested.
- ▶ Additionally, the RVPI implies that it will return \$1.71 as other investments are harvested.
- ▶ Its Gross IRR of 21.6% is attractive, and after fees, the Net IRR is 15.4%. The fund ranks in the first quartile in its peer group of the same strategy and vintage.



# Answer

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- ▶ At three years, Fund B is a less mature fund than Fund A.
- ▶ Fund B's DPI is 0.24, indicating that the realized returns for the fund are not substantial.
- ▶ Unrealized returns (RVPI) indicate that its investments not yet harvested should provide an additional return.
- ▶ The low Gross and Net IRRs indicate that the firm may still be affected by the J-curve, where a fund experiences initial losses before experiencing later profits.
- ▶ Currently, the firm is lagging its peers, as it ranks in the fifth quartile.





# Example

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- ▶ The GP for private equity Fund C charges a management fee of 2% of paid-in-capital and carried interest of 20%, where carried interest is paid only when the value of the investment portfolio exceeds committed capital. The committed capital for the fund was \$150 million. The statistics for years 2012–2017 are shown in the following table (in millions).



# Example

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	Capital Called down	Paid-in Capital	Mngmt Fees	Operating Results	NAV before distributions	Carried Interest	Distributions	NAV after Distributions
2012	50			-10				
2013	20			-25				
2014	30			25				
2015	20			50			20	
2016	10			60			40	
2017	10			110			80	

Calculate the management fees, carried interest, NAV before distributions, NAV after distributions, distributed to paid in capital (DPI), residual value to paid in (RVPI) and total value to paid in (TVPI) of private equity Fund C.

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# Answer

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- ▶ Paid-in capital: This is just the cumulative sum of the capital called down. For example, in 2013, it is the sum of the capital called down in 2012 and 2013:  $\$50 + \$20 = \$70$ .
- ▶ Management fees: In each year, these are calculated as the percentage fee (here 2%) multiplied by the paid-in capital. For example, in 2013, it is  $2\% \times \$70 = \$1.4$ .
- ▶ Carried interest: Carried interest is not paid until the GP generates realized and unrealized returns (as reflected in the NAV before distributions) greater than the committed capital of \$150.



# Answer

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$$\begin{aligned} \text{NAV before distributions} &= \\ &= \text{NAV after distributions in prior year} \\ &+ \text{capital called down} - \text{management fees} \\ &+ \text{operating results} \end{aligned}$$

- ▶ For example in 2016, NAV before distributions is:  $\$132.6 + \$10 - \$2.6 + \$60 = \$200$ .


$$\begin{aligned} \text{NAV after distributions} &= \text{NAV before distributions} \\ &- \text{carried interest} - \text{distributions} \end{aligned}$$

- ▶ For example in 2016, NAV after distributions is:  $\$200 - \$9.40 - \$40 = \$150.60$ .
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# Answer

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- ▶ In 2015, the NAV before distributions exceeded the committed capital for the first time. In this first year, the carried interest is 20% multiplied by the NAV before distributions minus the committed capital:  $20\% \times (\$153.2 - \$150) = \$0.6$ .
  - ▶ In subsequent years, it is calculated using the increase in the NAV before distributions. For example, in 2016, it is:  $20\% \times (\$200 - \$153.2) = \$9.4$ .
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# Example

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	Capital Called down	Paid-in Capital	Mngmt Fees	Operat ing Results	NAV before distribu tions	Carried Interest	Distrib utions	NAV after Distribu tions
2012	50	50	1.0	-10	39.0			39.0
2013	20	70	1.4	-25	32.6			32.6
2014	30	100	2.0	25	85.6			85.6
2015	20	120	2.4	50	153.2	0.6	20	132.6
2016	10	130	2.6	60	200.0	9.4	40	150.6
2017	10	140	2.8	110	267.8	13.6	80	174.2



# Answer

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- ▶  $\text{DPI (2017)} = \text{cumulative distributions divided by the paid-in capital} = (\$20 + \$40 + \$80) / \$140 = 1.0.$
- ▶ This indicates that, in terms of distributed returns, the fund has returned every dollar invested.
- ▶  $\text{RVPI (2017)} = \text{the NAV after distributions (i.e., the net non-distributed value of the fund) divided by the paid-in capital} = \$174.2 / \$140 = 1.24.$
- ▶ This indicates that, although the distributed returns are not impressive for this fund, the fund has unrealized profits that should accrue to the LPs as investments are harvested.



# Answer

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- ▶  $TVPI(2017) = DPI + RVPI = 1.0 + 1.24 = 2.24$ .
- ▶ This indicates that on a realized and unrealized basis, the GP has more than doubled the investment of the LPs.





# Valuation

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- ▶ Public companies are bought and sold on regulated exchanges daily.
- ▶ Private companies, however, are bought by buyers with specific interests at specific points in time, with each potential buyer possibly having a different valuation for the company.
- ▶ Furthermore, valuing a private company is more difficult than valuing public companies because PE firms usually transform and reengineer the portfolio company such that future cash flow estimates are difficult to obtain.



# Private Equity Valuation Methodologies

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- ▶ There are three methodologies mostly used to value private equity portfolio companies.
  - ▶ **Discounted cash flow (DCF) analysis** is most appropriate for companies with a significant operating history because it requires cash flow estimation.
  - ▶ A **relative value approach** applies a price multiple, such as the price-earnings ratio, against the company's earnings to get an estimate of the company's valuation. This approach requires predictable cash flows and a significant history.
  - ▶ A third approach is the **venture capital method**.
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# Discounted Cash Flow Analysis

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- ▶ Market data is used with discounted cash flow (DCF) analysis, with the cost of capital estimated from public companies while adjusting for differences in operating and financial leverage between the private and public comparables.
- ▶ In DCF analysis, an assumption must be made regarding the company's future value. Typically a terminal value (i.e., an exit value) is calculated using a price multiple of the company's EBITDA.



# Relative Value Approach

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- ▶ To value private equity portfolio companies, many investors use price multiples from comparable public companies.
- ▶ Note that it is difficult to find public companies at the same stage of development, same line of business, same capital structure, and same risk.
- ▶ Therefore, a relative value or market approach should be used carefully.



# Venture capital method

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- ▶ At the time of a new investment in the company, the discounted present value of the estimated exit value,  $PV(\text{exit value})$ , is called the post-money value (after the investment is made).
- ▶ The value before the investment is made can be calculated as the post-money value minus the investment amount and is called the pre-money value.
- ▶  $POST = PV(\text{exit value}) = \frac{\textit{exit value}}{(1+r)^n}$
- ▶  $PRE = POST - INV$



# Venture capital method

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- ▶ In order to determine the number of new shares issued to the venture capital firm ( $shares_{VC}$ ) for an investment in an existing company, we need to determine the fraction of the company value (after the investment is made) that the investment represents.
- ▶ Based on the expected future value of the company (exit value) and the expected or required rate of return on the investment, we can do this in either of two ways with the same result. The fraction of VC ownership ( $f$ ) for the VC investment can be computed as:

$$f = \frac{INV}{POST}$$



# Venture capital method

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- ▶ Once we have calculated  $f$ , we can calculate the number of shares issued to the VC ( $shares_{VC}$ ) based on the number of existing shares owned by the company founders prior to investment ( $shares_{founders}$ ).

$$shares_{VC} = shares_{founders} \frac{f}{1 - f}$$

- ▶ The price per share at the time of the investment (price) is then simply the amount of the investment divided by the number of new shares issued.

$$price = \frac{INV}{shares_{VC}}$$



# Example

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- ▶ Gene Technologies is a biotech company. Its entrepreneur founders believe they can sell the company for \$40 million in five years. They need \$5 million in capital now, and the entrepreneurs currently hold 1 million shares.
  - ▶ The venture capital firm, VC Investors, decides that given the high risk of this company, a discount rate of 40% is appropriate. Calculate the pre-money valuation, post-money valuation, ownership fraction, and price per share applying the venture capital method with a single financing round.
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# Answer

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- ▶ The post-money (POST) valuation is the present value of the expected exit value (this assumes the investment was made in the company):

$$POST = \frac{40,000,000}{(1 + 0.40)^5} = 7,437,377$$

- ▶ The pre-money (PRE) valuation is what the company would hypothetically be worth without the investment:

$$PRE = 7,437,377 - 5,000,000 = 2,437,377$$

- ▶ To put \$5 million in a company worth \$7.4 million, the private equity firm must own 67.2% of the company:

$$f = \frac{5,000,000}{7,437,377} = 67.2\%$$

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# Answer

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- ▶ If the entrepreneurs want 1 million shares, the private equity firm must get 2.05 million shares to get 67.2% ownership:

$$shares_{VC} = 1,000,000 \frac{0.672}{1 - 0.672} = 2,051,572$$

- ▶ Step 5: Given a \$5 million investment and 2.05 million shares, the stock price per share (P) must be:

$$price = \frac{5,000,000}{2,051,572} = \$2.44$$



# Risk Management in Venture Capital

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- ▶ How changes in assumptions affect valuation?
- ▶ Projections by entrepreneurs are typically overly optimistic and based on an assumption that the company will not fail.
- ▶ Instead of arguing over the validity of the projections with the entrepreneurs, most investors simply apply a high discount rate that reflects both the probability of failure and lack of diversification available in these investments.



# Risk Management in Venture Capital

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## ▶ **Adjusting the Discount Rate**

- ▶ One approach to arriving at a more realistic valuation is to adjust the discount rate to reflect the risk that the company may fail in any given year. In the following formula,  $r^*$  is adjusted for the probability of failure,  $p$ :

$$r^* = \frac{1 + r}{1 - p} - 1$$

- ▶ where  $r$  is the unadjusted discount rate for probability of failure.



# Example

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- ▶ Suppose that a private equity investor has a discount rate of 30%. The investor believes, however, that the entrepreneur's projection of the company's success is overly optimistic and that the chance of the company failing in a given year is 25%.
- ▶ Calculate a discount rate that factors in the company's probability of failure.



# Answer

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- ▶ The adjusted discount rate for probability of failure is:

$$r^* = \frac{1 + 0.30}{1 - 0.25} - 1 = 73.33\%$$



# Risk Management in Venture Capital

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- ▶ **Adjusting the Terminal Value Using Scenario Analysis**
- ▶ A second approach to generating a realistic valuation is to adjust the terminal value for the probability of failure or poor results.
- ▶ Typically to obtain the terminal value, the future earnings are estimated and multiplied by an industry multiple. The problem is that almost by definition, early-stage companies are innovative with few true comparables.



# Risk Management in Venture Capital

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- ▶ Price multiples also fluctuate a great deal so that the current multiple may not be indicative of what can be obtained in the future. We should therefore use scenario analysis to calculate an expected terminal value, reflecting the probability of different terminal values under different assumptions.





# Example

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- ▶ Assume that the scenario analysis is performed and examines three possible scenarios:
- ▶ 1. The expected exit value is \$40 million, if the exit route is an IPO.
- ▶ 2. The company is not as successful, and the expected terminal value is \$10 million. For example, under a management buyout exit route.
- ▶ 3. The company fails, and its exit value is \$0.



# Answer

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- ▶ If each scenario is equally likely, each possible value is weighted by one-third, and the expected terminal value is:

$$\frac{1}{3} \times 40 + \frac{1}{3} \times 10 + \frac{1}{3} \times 0 = 16.7$$

- ▶ This is an alternative to adjusting the discount rate for the probability of failure.

