Valuation: VC edition

New Venture Valuation

☐ Conceptually, just like any other valuation.

☐ But, what's special about new venture valuation?

   ■ Risks higher (?)

   ■ Potential rewards higher (?)

   ■ Exit and liquidity are more important;

   ■ Not just a go-no/go decision; the actual valuations matter.

Valuation Approaches

- ☐ **Discounted Cash Flow analysis:**
    - ■ Weighted Average Cost of Capital (WACC)
    - ■ Adjusted Present Value (APV)
- ☐ **Comparables**
- ☐ **Comparable Transactions**
- ☐ **Venture Capital Method**
    - ■ Several variations. We present the basics.

Venture Capital Method

Step 1: Estimate the VC's exit date

Step 2: Forecast free cash flows to equity until the exit date

Step 3: Estimate the exit price, use it as TV.

Step 4: Choose a high discount rate (VC discount rate)

Step 5: Discount FCF and TV using this discount rate

Step 6: Determine the VC's stake in the company

Step 1: Exit Date

- ☐ VC money is not long-term money: Typically, the VC plans to exit after a few years
- ☐ Estimate the likely time at which the VC will exit the investment
- ☐ This determines your forecasting period
- ☐ The VC usually will have a specific exit strategy in mind:
    - ▪ IPO
    - ▪ Sale to a strategic buyer (e.g., a larger firm in the industry)
    - ▪ Restructuring

Step 2: FCF to (Levered) Equity

- ☐ Forecast FCF to (levered) equity (or Equity FCF) until exit

- ☐ These are cash flows received by equity-holders (VC included)
    - ■ EFCF=Net Income + Dep. - CAPX – ΔNWC
    - ■ Principal Repayment + New Borrowing

- ☐ Need to forecast the firm's operations. May be very uncertain

- ☐ Cash flow forecasts are the key to sound valuation

- ☐ Oftentimes, these cash flows are zero or negative

Step 2: FCF to (Levered) Equity

- ☐ In DCF methods, we used FCF to all-equity firm (aka Capital Cash Flows), i.e., we ignored the impact of leverage.

- ☐ For calculating the FCF to (levered) equity, we do take into account interest payment, i.e., we subtract them from EBIT.

- ☐ In practice, FCF to (levered) equity often equal FCF to an all-equity firm because the firms considered often have no debt.

- ☐ If NI = EBIT(1-T) and Principal Repayments = New Debt= 0 , we then clearly EFCF = FCF.

- ☐ Forecast the company's value at the exit date (i.e., forecast the company's value at the IPO or in a sale).

- ☐ Use this value as the Terminal Value

- ☐ Typically, this value is calculated by estimating the company's

  - ■ earnings, EBIT, EBITDA, sales or customers (or other valuation-relevant figure)

  - ■ and applying an appropriate multiple

- ☐ The multiple is typically based on comparable publicly traded companies or comparable transactions

Step 4:
VC Discount Rate

- ☐ Determine a rate for discounting the FCF to leveraged equity and the exit or terminal value back to the present

- ☐ Typically, discount rates range from 25% to 80%:
  - ■ lower for investments in later stage or more mature businesses
  - ■ higher for seed investments

- ☐ These discount rates are typically higher, and oftentimes much higher, than those calculated using a CAPM-based type model

Step 5:
Valuation (Pre-Money)

☐ Use the discount rate to estimate:
- ■ the PV of all FCF to levered equity
- ■ the PV of the Exit Value

☐ This gives the Pre-Money Value of the company.
- ■ This is the value of the firm before the investment is made
- ■ Go ahead only if this is positive

☐ Post-Money Value: Firm value after the VC has injected funds.

Post-money value = Pre-money value + VC Inv

☐ It is what an investor would pay for the firm up and running

☐ Post-funding, VC's stake is worth a fraction of the post-money value → for an equity stake the VC should be willing to pay:

VC % Stake * Post-money value

☐ This implies:

VC % Stake = VC Investment / Post-money value

☐ Suppose the VC was able to convince the firm owners that the firm is (i) more, (ii) less valuable than they think. Which would the VC do and why?

☐ Suppose the owners were able to convince the VC that the firm is (i) more, (ii) less valuable than the VC think. Which would the owners do and why?

Example

- ☐ Oz.com is a privately owned company:
  - ■ 1.6M shares outstanding,
  - ■ seeking $4M investment by a VC.

- ☐ The $4M will be used immediately to buy new equipment.

- ☐ Negotiations over the equity stake the VC should receive

Oz.com

Step 1: Exit Date

- ☐ The idea is for Oz.com to go public in 5 years.

	Year 0	Year 1	Year 2	Year 3	Year 4
FCF	-4	0	0	0	0

Step 2: Forecast FCF to (Levered) Equity

- ☐ Five-year forecast of FCF:

	Year 0	Year 1	Year 2	Year 3	Year 4
FCF to (leveraged) equity	-4	0	0	0	0

- ☐ Oz.com will not have any debt, will not require additional equity investments.

Oz.com

Step 3: Exit Value

- ☐ In five years, VC forecasts Oz.com's net income to be $5M.

- ☐ Today, publicly traded companies in the same business as Oz.com trade at price-earnings (P/E) ratios of about 30 times.

- ☐ Estimate an exit value of 30 * 5 = $150M.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
FCF to (leveraged) equity	-4	0	0	0	0	150

Oz.com

Step 4: VC Discount Rate

☐ The VC's target rate of return for this investment is 50%

Oz.com

Step 5: Valuation

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
FCF to (leveraged) equity	-4	0	0	0	0	150
Discount rate	1.000	0.667	0.444	0.296	0.198	0.132
PV each year	-4	0	0	0	0	20
PV @ 50%	**16**					
PV excluding initial investment	20					

Step 6: VC's Equity Stake?

☐ Oz.com's pre-money value = $16M.

☐ If the VC injects $4M, Oz.com post-money value =16+4 = $20M,

☐ To invest $4M, the VC will ask for 4M/20M = <u>20%</u> equity stake.

Quick Question

- ☐ A biotech start-up is developing a new drug which will be finished in 4 years
  - ■ With 50% probability a competitor will develop the drug first rendering the start-up worthless
  - ■ With 50% probability no competitor succeeds and the drug is sold to Merck for $100M

- ☐ The appropriate discount rate is 25%

- ☐ Start up asks you to invest $25M, what share of equity do you ask for? What if its only $15M?

Quick Question

- ☐ The expected present value is $V = .5 \cdot 100/1.25^4 = 20.48M$

- ☐ Let α be the share of equity you receive

- ☐ Even if you were offered $\alpha=100\%$ you would only receive 20.48M which is smaller than \$25M so for no amount of equity would you invest

- ☐ $15 = V\alpha = 20.48\alpha \rightarrow \alpha = 15/20.48 = 73.2\%$

Why Are the Discount Rates So High?

☐ Such high discount rates cannot be explained as being a reward for systematic risk.

☐ In most practical cases, CAPM would give discount rates well below 25%, let alone 80%.

☐ Three (limited) "rationales"

- ■ Compensate VC for illiquidity of investment
- ■ Compensate VC for adding value
- ■ Correct optimistic forecasts

Rationale 1:
Investment Illiquidity

- ☐ The VC cannot sell an investment in a private company as easily as it could sell public company stock

- ☐ All else equal, this lack of marketability makes private equity investments less valuable than easily-traded public investments

- ☐ The question is, how much less valuable?

- ☐ Practitioners in private equity investments often use liquidity discounts of 20%-35%, i.e., they estimate the value of a private equity stake to be 20% to 30% less than an equivalent stake in a publicly traded company

Caveats

- Practitioners use these rates not only to value private equity transactions, but also to calculate estate taxes. Higher rate → Lower valuation → Lower taxes → Take these with grain of salt
- VC make most of money at/after IPO when the firm is fully liquid
- Typical VC fund investors are large institutions (pension funds, financial firms, insurance companies, university endowments)
- Illiquidity is probably not a big concern these investors as private equity investments is a small portion of their portfolios they have plenty of other liquid investments

Rationale 2:
VC Adds Value

☐ VCs are active investors and bring more to the deal than just money:

- ■ spend a large amount of time
- ■ reputational capital
- ■ access to skilled managers
- ■ industry contacts, network
- ■ and other resources

☐ A large discount rate is a crude way to compensate the VC for this investment of time and resources

Caveats

- ☐ How do we know how to adjust the discount rate?

- ☐ The higher discount rate implicitly charges for the VC services as long as the VC expects to be invested in the company

- ☐ In reality, a successful VC may add more value earlier on and relatively little later

- ☐ It would be more accurate to compensate the VC explicitly for the value that they are expected to add

Rationale 3:
Optimistic Forecasts

☐ Forecasts tend not to be expected cash flows (i.e., an average over many scenarios)

☐ Rather they typically assume that the firm hits its targets

☐ A higher discount rate is a crude way to correct forecasts:

- ■ that the VC judges optimistic;
- ■ that are objectively optimistic (best case scenario)

Caveats

☐ Better to try and make the adjustment explicit -- i.e., apply probabilities to the forecast cash flows to come up with true expected cash flow forecasts.

☐ May yield very different and more precise forecasts.

Alternative to
High Discount Rates

☐ It's better to model the sources of uncertainty and to put probabilities on the various events.

■ Some major uncertainties will get resolved soon

■ Others will take more time

■ Some scenarios will require you to take different actions

☐ Other advantage: Allows you to identify and value (roughly) the options embedded in many start-ups, particularly: options to abandon, to expand, to switch strategies

☐ Black-Scholes is usually an over-kill here. Simple decision trees are more appropriate. (Simulations can be very useful)

Example

- ☐ Put up $10M now
- ☐ In 2 years:
  - ■ Good news (proba.1/3): Invest $60M → Get out $300M
  - ■ OK news (proba.1/3): Invest $60M → Get out $150M
  - ■ Bad news (proba.1/3): Invest $60M → Get out $30M
- ☐ If do not invest $60M, the firm is worth nothing
- ☐ One approach would be to discount the cashflow from the best case scenario (300 - 60) using a high discount rate to correct for prob. of less favorable outcomes. But which one? And why?
- ☐ Alternatively, analyze each scenario and realize that you won't invest if bad news arrives, so expected payoff in year 2 is really:

$$1/3 * (300-60) + 1/3 * (150-60) + 1/3 * 0$$

Conclusion

- Though VCs will certainly use the previous method -- and you need to know how to do it -- it does not preclude you from
  - having healthy skepticism
  - taking a more sophisticated approach to the problem
- In particular, even if illiquidity, value added, and optimistic scenarios are important considerations, one-size-fits-all discount rate adjustment is not appropriate
  - Illiquidity will differ in magnitude in different situations
  - VC value added varies across VCs, and from deal to deal
  - The difference between optimistic forecast and average forecast varies across deals, entrepreneurs