



IGNITE

Finance

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Summer 2023



STANFORD
BUSINESS

GRADUATE
SCHOOL OF

What's a good investment in the world of early high-risk ventures?

What types of securities are used to finance such ventures?

How much money should you raise?

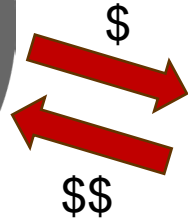


What's a good investment?



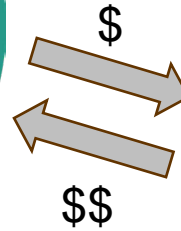
Investor /
Limited Partner
(LP)

*Universities, Pension
Funds, Individuals, etc.*

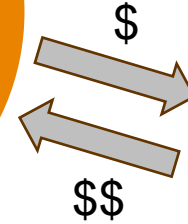


Investor /
General Partner
(GP)

*VCs, Angel investors, PE
firms, Banks, etc.*



Entrepreneurial
Venture
Corporation, Ltd.



*R&D, technology,
customers, inventory,
equipment etc.*

Who invests? What do they invest in?

What's a good investment?

LPs' Perspective: Required Rate of Return

Investors need to be compensated for **time** and **risk**. If investors invest \$1 today, they expect, on average, to receive

$$\$1 \times (1+r)^t$$

at a future time t .

What's investors' required rate of return r ?



What's a good investment?

Foundations: Required Rate of Return

$$\text{Investors' Required Rate of Return} = \text{Risk-Free Interest Rate} + \text{Risk Premium} + \text{Liquidity Premium}$$

Typically use US treasury bonds

Investors must be compensated for **non-diversifiable/ systematic/ market risk** but not for diversifiable/ idiosyncratic risk

$\beta \times \text{market risk premium}$

For investments that cannot be easily converted into cash without incurring significant costs or price discounts, investors require a higher rate of return

What's a good investment?

LPs' Perspective: Required Rate of Return & Target Net Multiple

$$\begin{array}{ccccccc} \text{Investors' Required Rate of Return} & = & \text{Risk-Free Interest Rate} & + & \text{Risk Premium} & + & \text{Liquidity Premium} \\ 12\% & = & 3\% & + & 2 \times 4\% & + & 1\% \end{array}$$

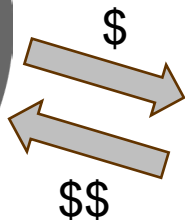
In a typical 10-year early-stage fund, capital is invested for an average of ~8 years
Target Net Multiple:

$$(1+12\%)^8 = 2.5x$$



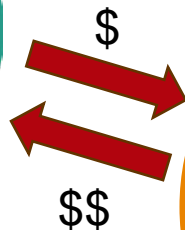
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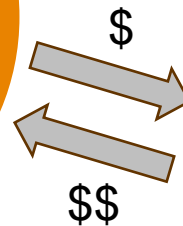


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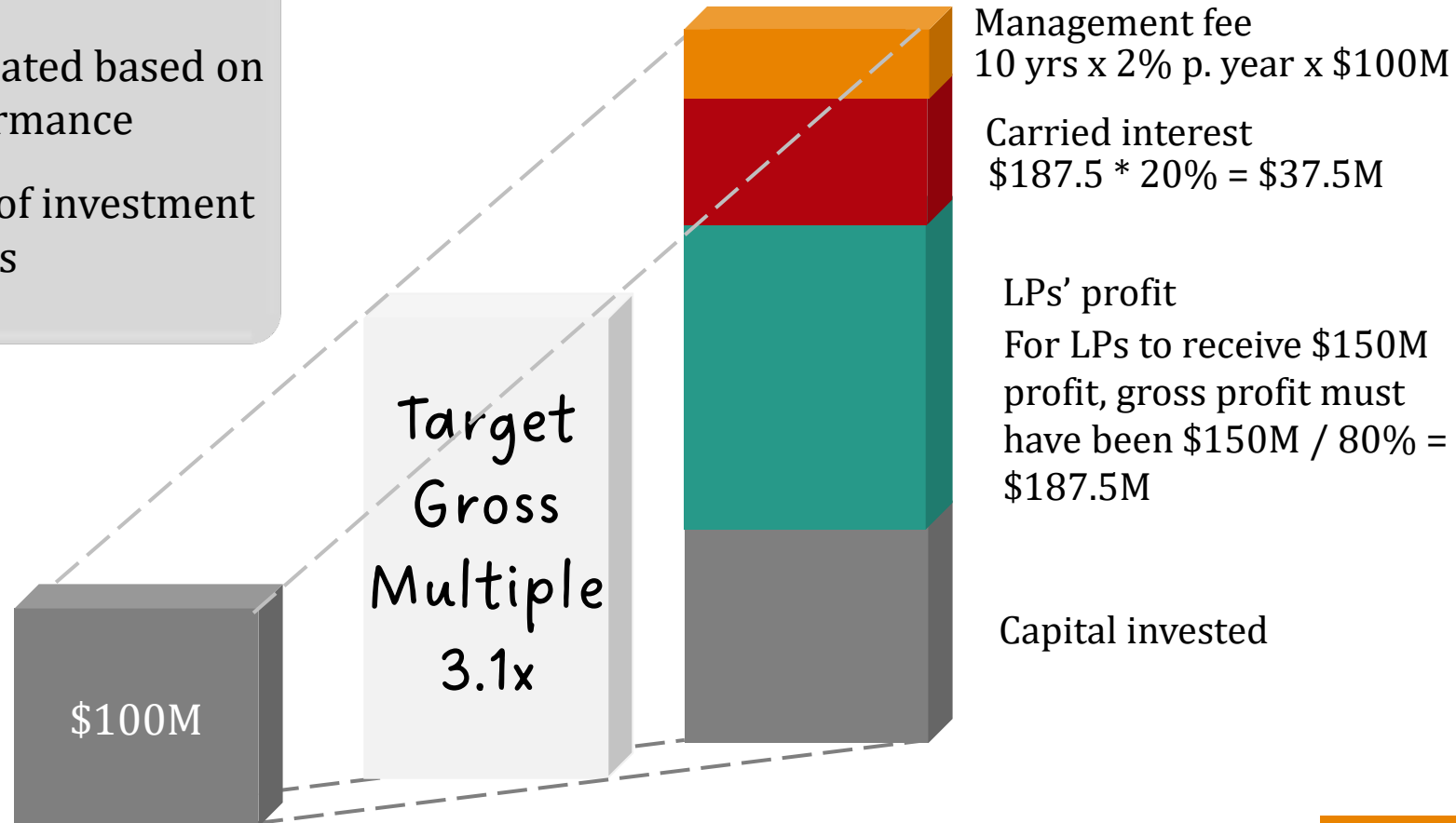
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What's a good investment?

VCs' Perspective: Target Gross Multiple

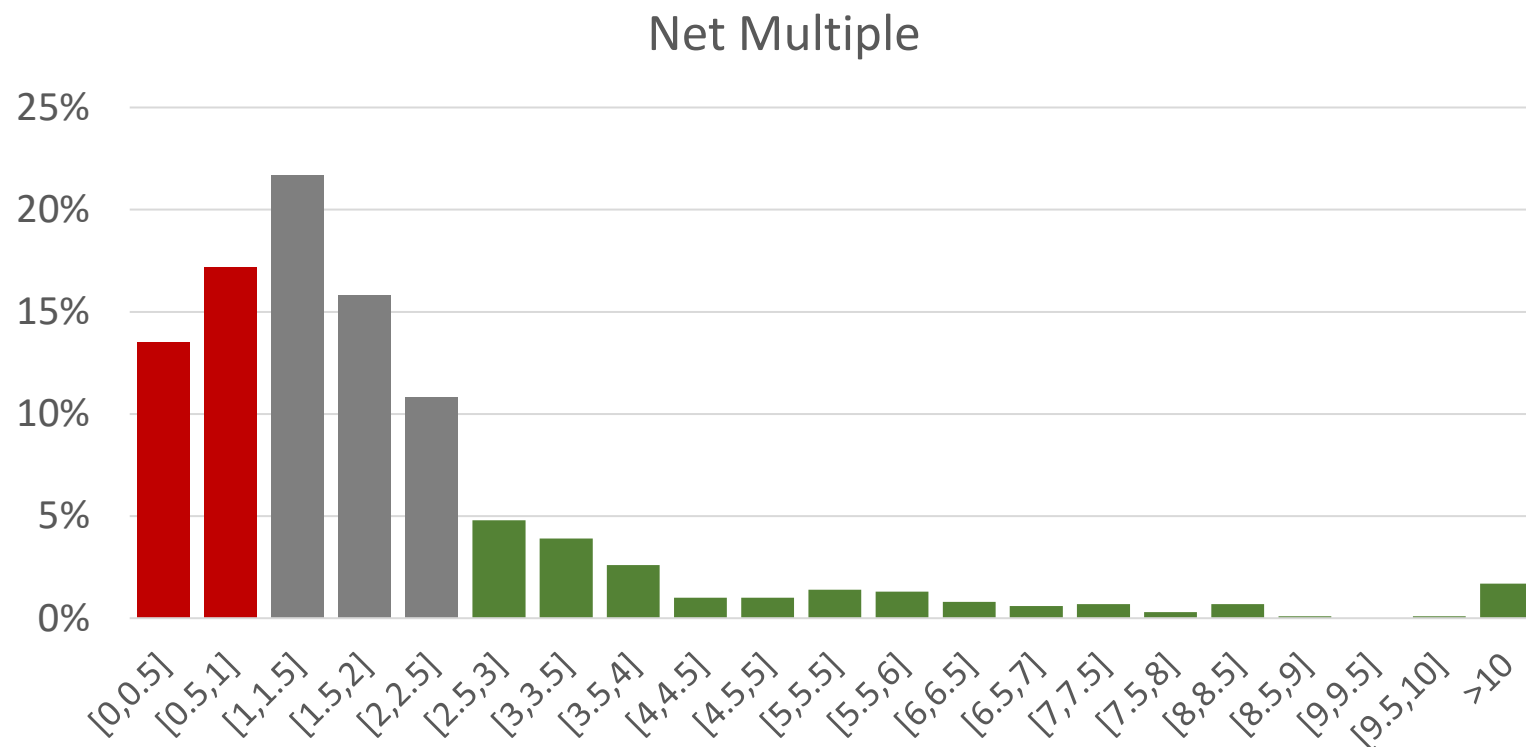
VC Economics: How are VCs compensated?

- 1 2% **management fee** per year (calculated based on fund size): independent of fund performance
- 2 20% **carried interest** (aka carry): % of investment profits that a fund manager receives as compensation



What's a good investment?

VCs' Perspective: It's a tough business – Part I



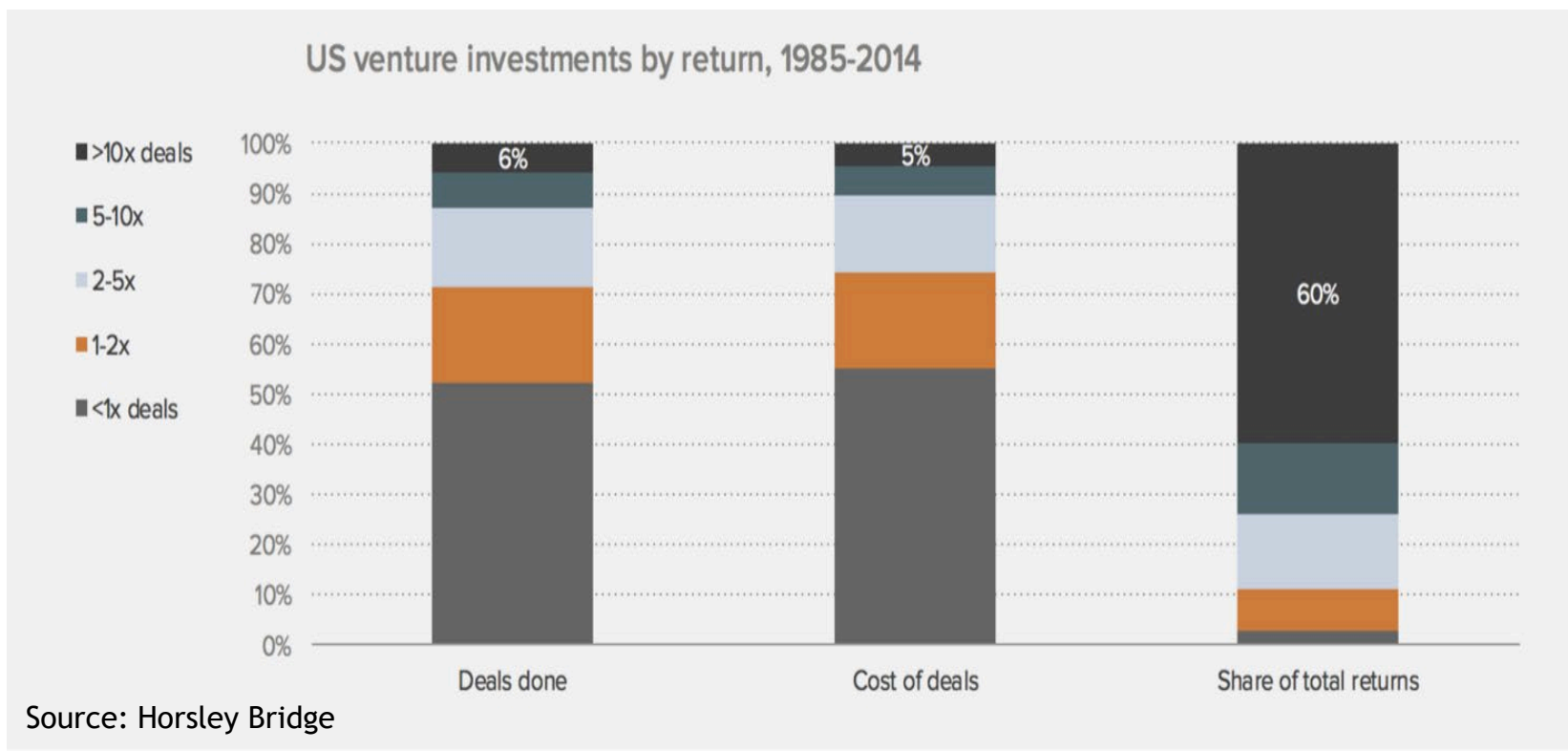
About **30% of funds lose money** and less than 20% of funds achieve a multiple of at least 2.5.

Based on data provided by Preqin for Venture Capital funds that have been liquidated.

N=1,101

What's a good investment?

VCs' Perspective: It's a tough business – Part II



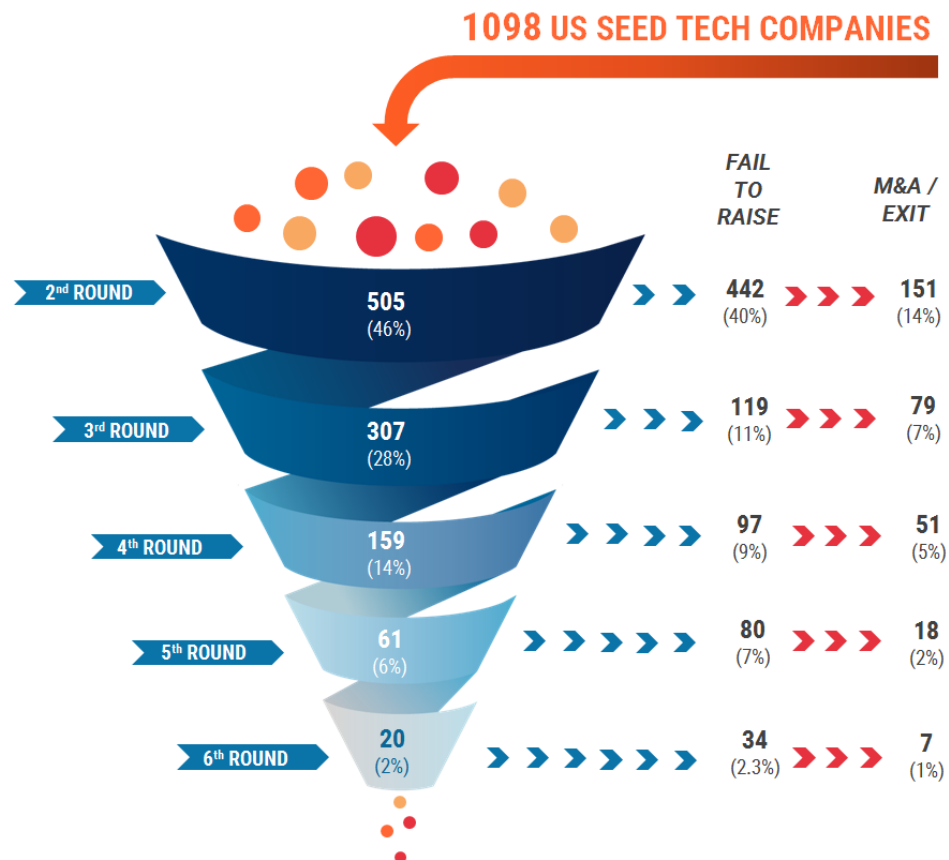
About half of VC investments fail

6% of deals generate 60% of returns

“The VC power law curve”

What's a good investment?

VCs' Perspective: It's a tough business – Part IIb



Source: CBI – September 2018

Seed investment outcomes:

~70% fail at some point

~30% are acquired

~1% go public

What's a good investment?

VCs' Perspective: What start-ups are attractive?

% of Deals	Returns	Exp. Contribution to Fund Returns
55%	0x	0
20%	1.5x	0.3
15%	3x	0.45
5%	7x	0.35
5%	40x	2
100%		3.1x

Each investment must have the potential to earn a 40x return (in practice, it varies between 20-100x for early-stage inv.)

Target Gross Multiple

Billion-dollar company

If early investors say that they are looking for the next billion-dollar company, they are not kidding. Their business model requires it.



Importance of right to make follow-on investments if company is successful ("pro-rata rights").



Given the odds, each fund needs a sufficient number of "shots on goal."
→ Typically, we see 25-40 investments per fund.

What's a good investment?

VCs' Perspective: What start-ups are attractive?



Example:

Suppose VC invests \$10M

Target Gross Multiple: 40x

Required Investment Value at Exit: \$400M

Revenue Multiple: 5x

Revenue at Exit: \$800M

Projected/Required Firm Value at Exit: \$4B

Required/Projected Ownership at Exit: 10%

Jointly determined by start-up's capital needs and VC's fund size.

How do investors value (more) mature companies?

Why do VCs often think of exit valuations in terms of multiples of revenue?

Million (or Billion) Dollar Question:
How big can the company grow?

Exit valuation & ownership level necessary for this to be an attractive investment opportunity for a VC.

What's a good investment?

Exit Valuation: How do investors value (more) mature companies?

*Assuming
constant growth
and discount rate*

$$\text{Firm Value} = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} + \dots = \frac{CF_1}{r - g}$$

Dividends-based
Valuation Model

Free-Cash-Flows based
Valuation Model

Earnings-based
Valuation Model

Revenue-based
Valuation Model

Perspective }

Distributed Value

Distributable Value

Created Value

Firm Value

What are the cash flows we are discounting?
Aren't companies valued based on revenues?

What's a good investment?

VCs' Perspective: What start-ups are attractive?



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Revenue Multiple: 5x

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Projected/Required Firm Value at Exit: \$4B

Required/Projected Ownership at Exit: 10%

Jointly determined by start-up's capital needs and VC's fund size.

In practice, we look for a comparison set of publicly traded companies and calculate their valuation multiple.

Million (or Billion) Dollar Question:
How big can the company grow?

Exit valuation & ownership level necessary for this to be an attractive investment opportunity for a VC.

LPs' Target Net Multiple

for fund. Depends on LPs' required rate of return and average time capital is deployed.

LPs' Required Rate of Return

LPs are well diversified investors: risk-free rate, beta x market risk premium, liquidity premium determine their required rate of return

VCs' required return potential for each deal

Start-ups' failure rates are high. Each investment must have the potential to earn an outsized return.

VCs' Target Gross Multiple

Depends on LPs' target net multiple and VCs' compensation (management fee & carried interest)

VCs' investment terms: valuation

What valuation should/can the VC offer today?

VCs' ownership at exit

VCs' target gross multiple together with their check size determines the required valuation of their ownership stake at exit (company's exit valuation x VCs' ownership). Typically, company exit valuations are estimated based on multiples of revenues, and check size depends on fund size and company's capital needs.

What's a good investment?

VC's perspective: What's the value of the company today?



Example:

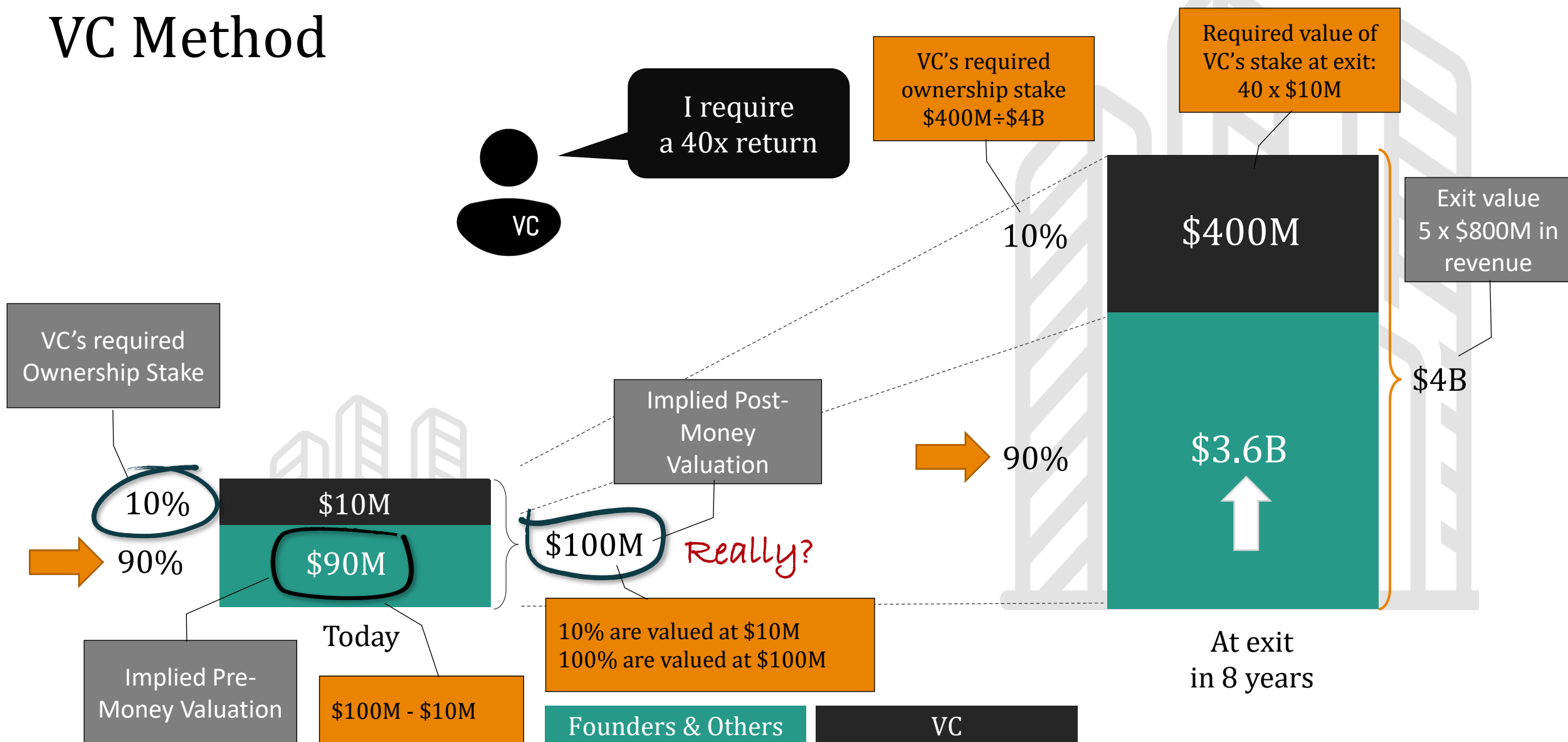
Investment: company requires a \$10M investment today, VC investors requires a return of 40x

Projection: valuation at 5x revenue with \$800M revenue projected at exit (in 8 years)

What fraction of the company's ownership does the VC need?

What is the company's implied valuation?

VC Method



What's a good investment?

VC's perspective: What's the value of the company today?



Example: Multiple Rounds of Financing

Company requires 2 rounds of financing:

VC1: initial investment of \$10M; investor requires a return of 40x

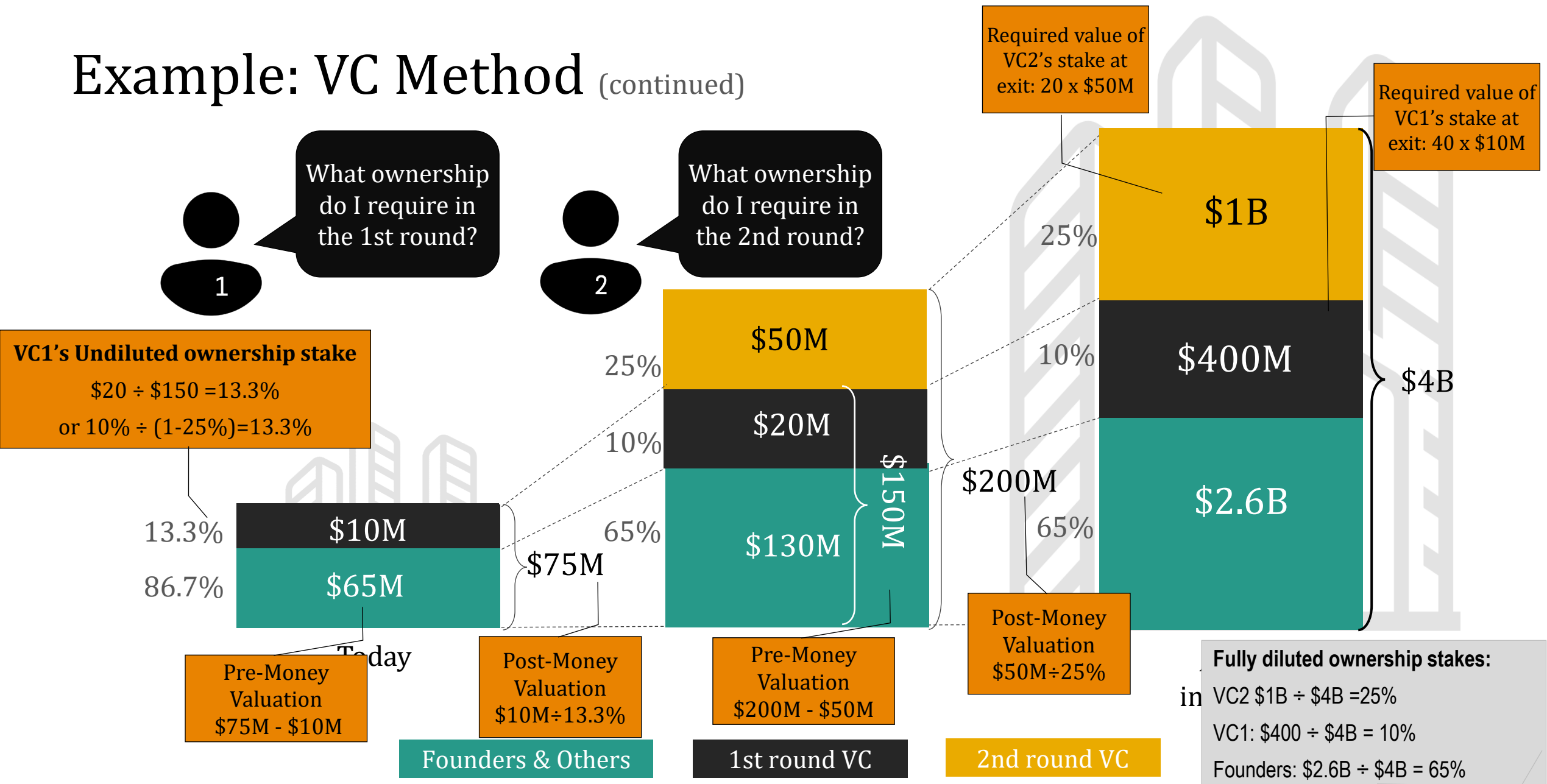
VC2: additional investment of \$50M after 2 years; investor requires a return of 20x

Projection: valuation at 5x revenue with \$800M revenue projected at exit (in 8 years)

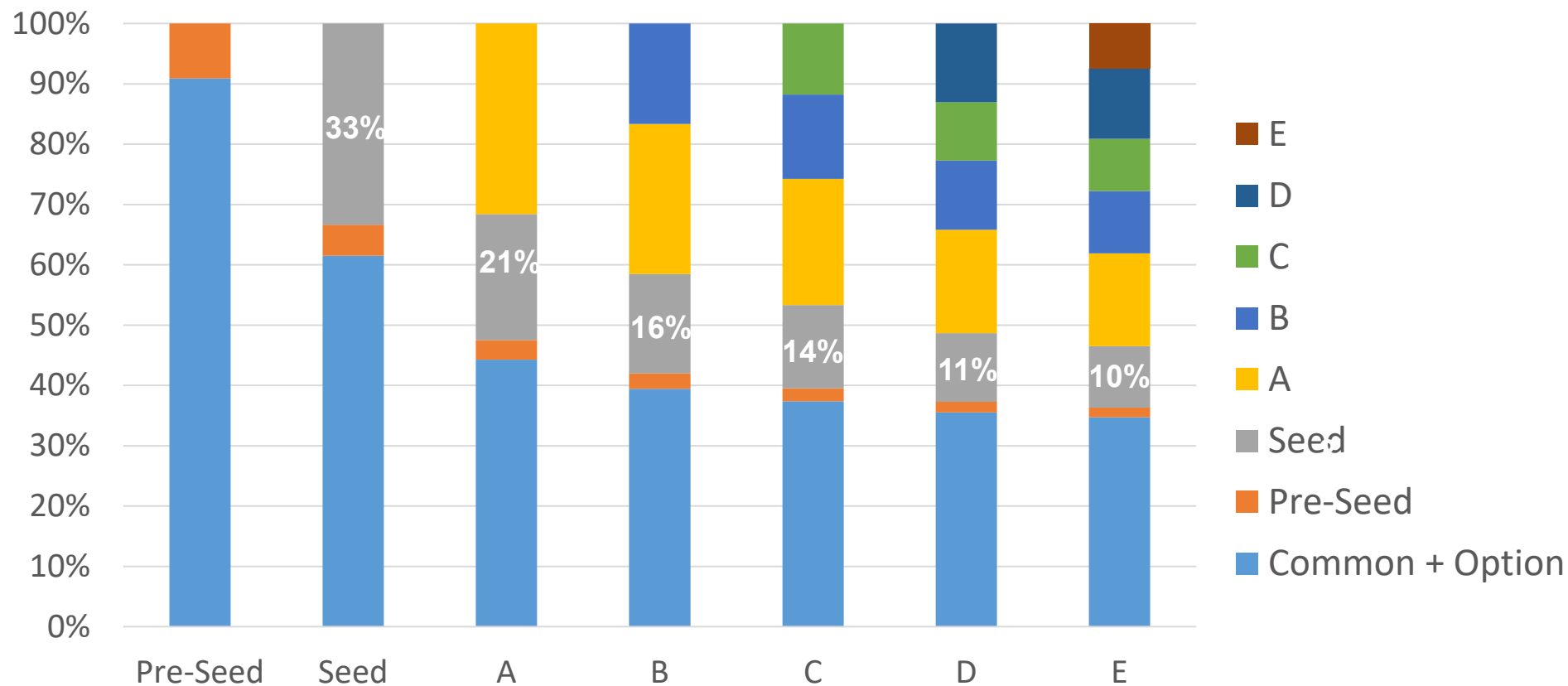
What fraction of the company's ownership do the VCs need?

What is the company's implied valuation?

Example: VC Method (continued)



Example: Multi-Round Funding



(More) realistically,
Seed investor can
only offer a \$30M
post-money
valuation.

in millions	Pre-Seed	Seed	A	B	C	D	E
Investment	\$1	\$10	\$30	\$50	\$80	\$150	\$200
Pre-Money	\$10	\$20	\$65	\$250	\$600	\$1,000	\$2,500
Post-Money	\$11	\$30	\$95	\$300	\$680	\$1,150	\$2,700
Return Multiple at \$4B Exit	63.0x	40.8x	20.5x	8.3x	4.3x	3.1x	1.5x

Summary: VC Method

Method to value startups: “VC Method”

Inputs: Exit valuation and return multiple

Outputs: Ownership % required by investor, implied valuation

If there are **multiple funding rounds** solve backward

We know the valuations but what's the price per share and how many shares should be issued to the investors?

→ Capitalization tables (“cap tables”)

Valuation

Implied valuation: a company's valuation implied by the amount of capital invested in a round and the ownership stake that the investor received in exchange for the investment

Post-money valuation: a company's estimated value after receiving outside funding

Pre-money valuation + Investment = Post-money valuation

Dilution

decrease in existing shareholders' ownership stake in the company due to new shares being issued

Cap Table – Example



Assume:

10,000,000 shares held by founders before the VC invests

First round of financing (Pre-Seed):

\$1,000,000 investment by VC for \$1.00 per share

Second round of financing (Seed):

\$10 million investment by VC on a \$30 million post-money valuation

Seed terms specify 10% post-money employee option pool, i.e., unallocated option pool equal to 10% of the company's fully diluted shares

Cap Table – Example (Cont.)

Pre-Seed:
\$1M at
\$1.00/share

Class	Shares	Valuation	Price per share	Percentage
Founders	10,000,000	\$10,000,000		90.9%
Pre-Seed investors	1,000,000	\$1,000,000	\$1.00	9.1%
Total	11,000,000	\$11,000,000		100%

Seed: \$10M
at \$30M post-
money val.
incl. 10%
option pool

Class	Shares	Valuation	Price per share	Percentage
Founders				
Pre-Seed investors				
Seed investors				
Option pool				
Total				

Cap Table – Example (Cont.)



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Seed: \$10M
at \$30M post-
money val.
incl. 10%
option pool

Class	Shares	Valuation	Price per share	Percentage
Founders	10,000,000	\$15,454,545		51.5%
Pre-Seed investors	1,000,000	\$1,545,455	\$1.00	5.2%
Seed investors	6,470,588	\$10,000,000	\$1.55	33.3%
Option pool	1,941,176	\$3,000,000		10.0%
Total	19,411,765	\$30,000,000		100%

Capitalization Table

noun.

Capitalization tables (“cap tables”) describes who owns what part of the company

A **term sheet** will almost always contain summary cap tables that show who owns how much before/after the financing round

Important tool to understand and keep track of the dilution consequences of financing rounds

What will I own if a VC invests \$X in my company at a \$Y valuation?

LPs' Target Net Multiple

for fund. Depends on LPs' required rate of return and average time capital is deployed.

LPs' Required Rate of Return

LPs are well diversified investors: risk-free rate, beta x market risk premium, liquidity premium determine their required rate of return

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Start-ups' failure rates are high. Each investment must have the potential to earn an outsized return.

VCs' Target Gross Multiple

Depends on LPs' target net multiple and VCs' compensation (management fee & carried interest)

VCs' investment terms: valuation

The company's future capital needs and valuations determine future dilution which impacts VC's required ownership today and, equivalently, valuation offered. Capitalization tables are an important tool to keep track of the dilution consequences of financing rounds.

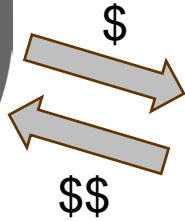
VCs' ownership at exit

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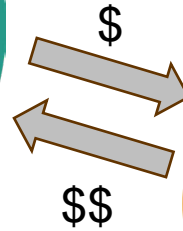
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Venture
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Who invests? What do they invest in?

Continuum: Debt – Equity

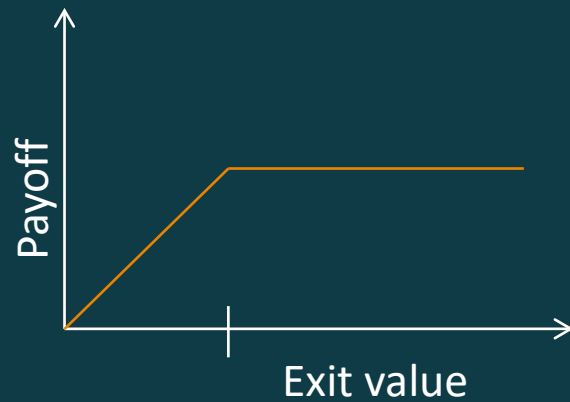
Common stock – Preferred stock – Convertible Note – Venture Debt

Hybrid Securities

Debt

Focus on downside

Avoid risk and
uncertainty



Preferred stock

SAFEs

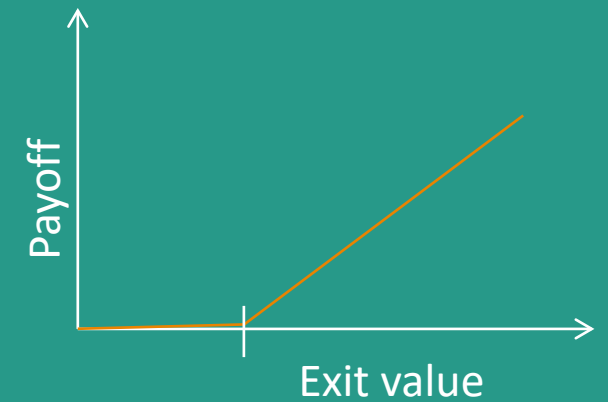
Convertible Notes

Venture Debt

Equity

Focus on upside

Swing for the fences



Venture Debt – Convertible Note – SAFE – Preferred Stock – Common Stock

Debt contract

(Principal, interest, Maturity)

Common terms: 2-5 years, secured, period of interest only followed by period of principal & interest payments

Usually comes with **warrants** (options to purchase preferred stock)

Often available only in conjunction with an equity round; uncommon for very early ventures

Debt contract

(Principal, interest, Maturity)

That is **convertible into equity** in a future financing round

Common additional features: **Cap** and **Discount**

No need to coordinate among investors to put together a round

Delays valuation until more information is available (but cap still set expectations)

Simple Agreement for Future Equity

Conversion into equity in future financing

May have **Caps** and/or **Discounts**

No need to coordinate among investors to put together a round

Delays valuation until more information is available (but cap still set expectations)

Delaware statutory law:

no guidance on nature of preferred stock's rights and obligations

Delaware case law mandates some preference over common stock, *typically* in the form of dividend or liquidation pref.; internationally even more variation

Almost all VCs require preferred stock

Prescribed by law

One vote & prorated share of common stock dividends

(+limited liability; right to inspect; right to transfer)

Founders and employees receive common stock (or options to purchase common stock)

Variation = Need for Negotiation

Preferred Stock

Term Sheets: Preferred Stock

CASH FLOW RIGHTS AT LIQUIDATION

Liquidation Preferences

Conversion

Participation

Dividends

OTHER COMMON TERMS

Pro Rata Rights
Anti-Dilution Provision

Right Of First Refusal
Co-Sale Rights
Tag-Along Rights

Drag-Along Rights
Redemption Rights

Even within the same class of shares these rights may differ
("Major Investor Clause")!

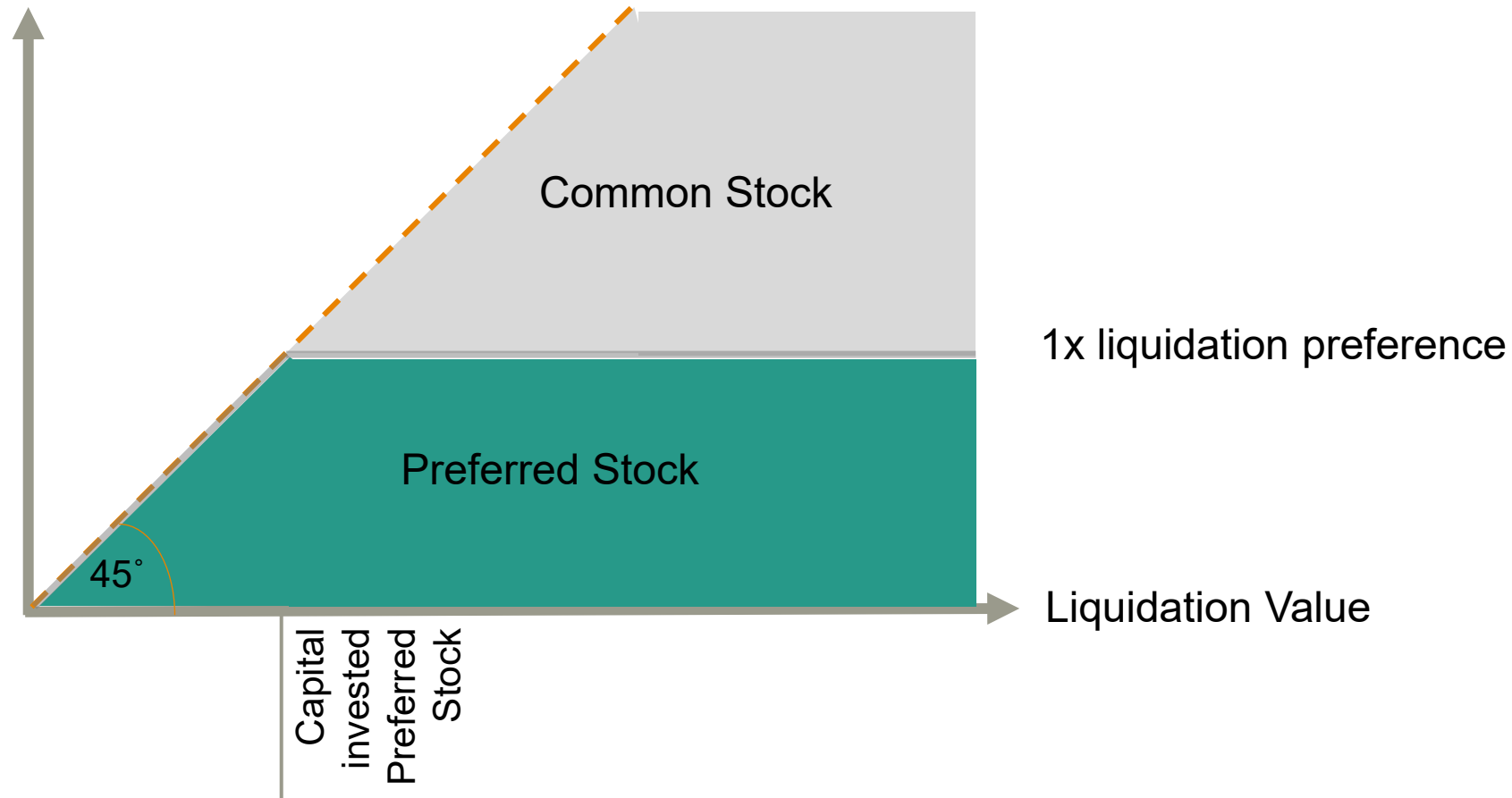
Preferred Stock

1x liquidation preference w/o conversion & participation

Liquidation Preferences

Conversion

Participation



That's the same as the payoff chart for debt. So, how does debt differ?

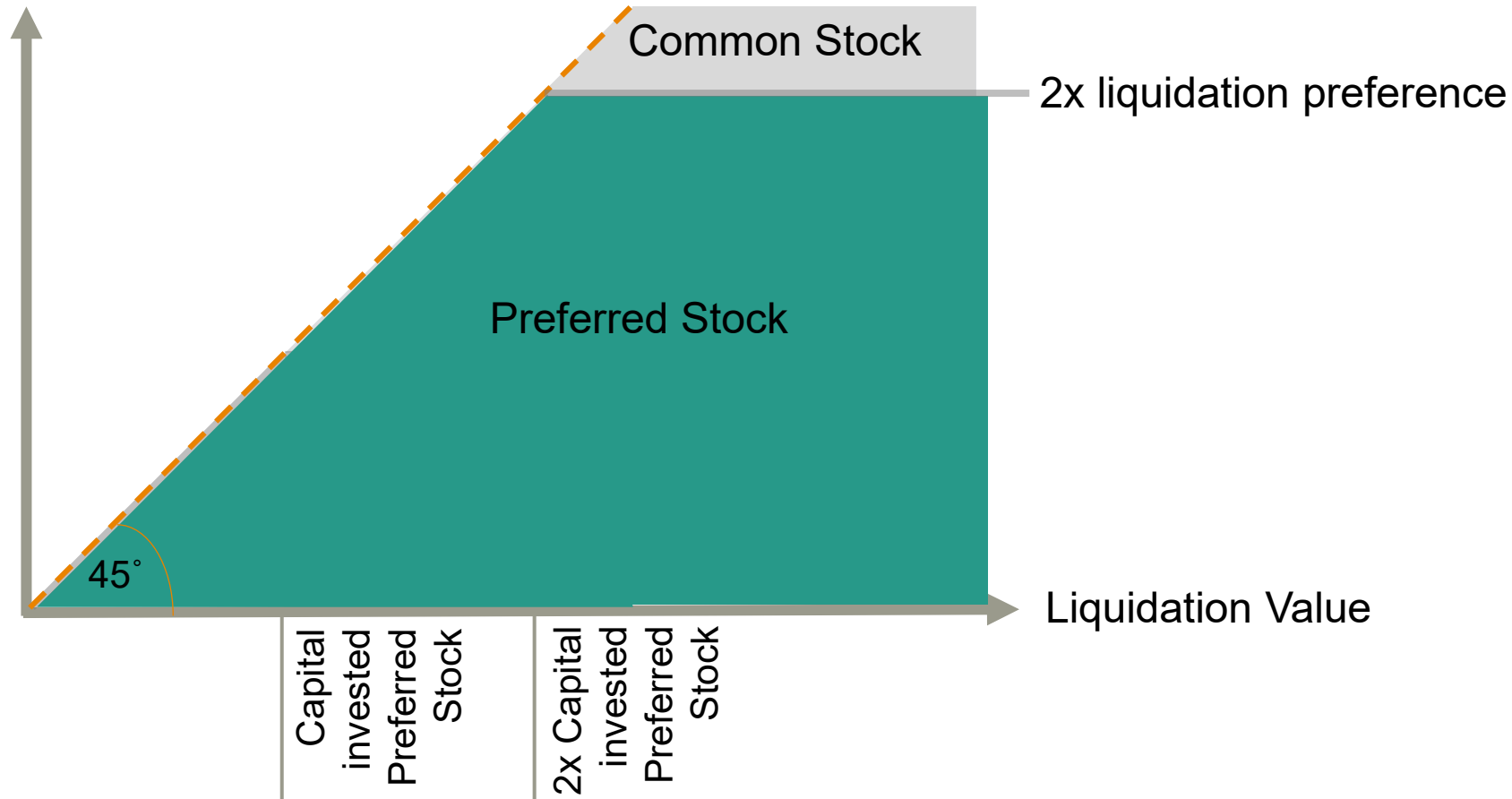
Preferred Stock

2x liquidation preference w/o conversion & participation

Liquidation Preferences

Conversion

Participation



Preferred stock w/o conversion is uncommon in Venture Capital

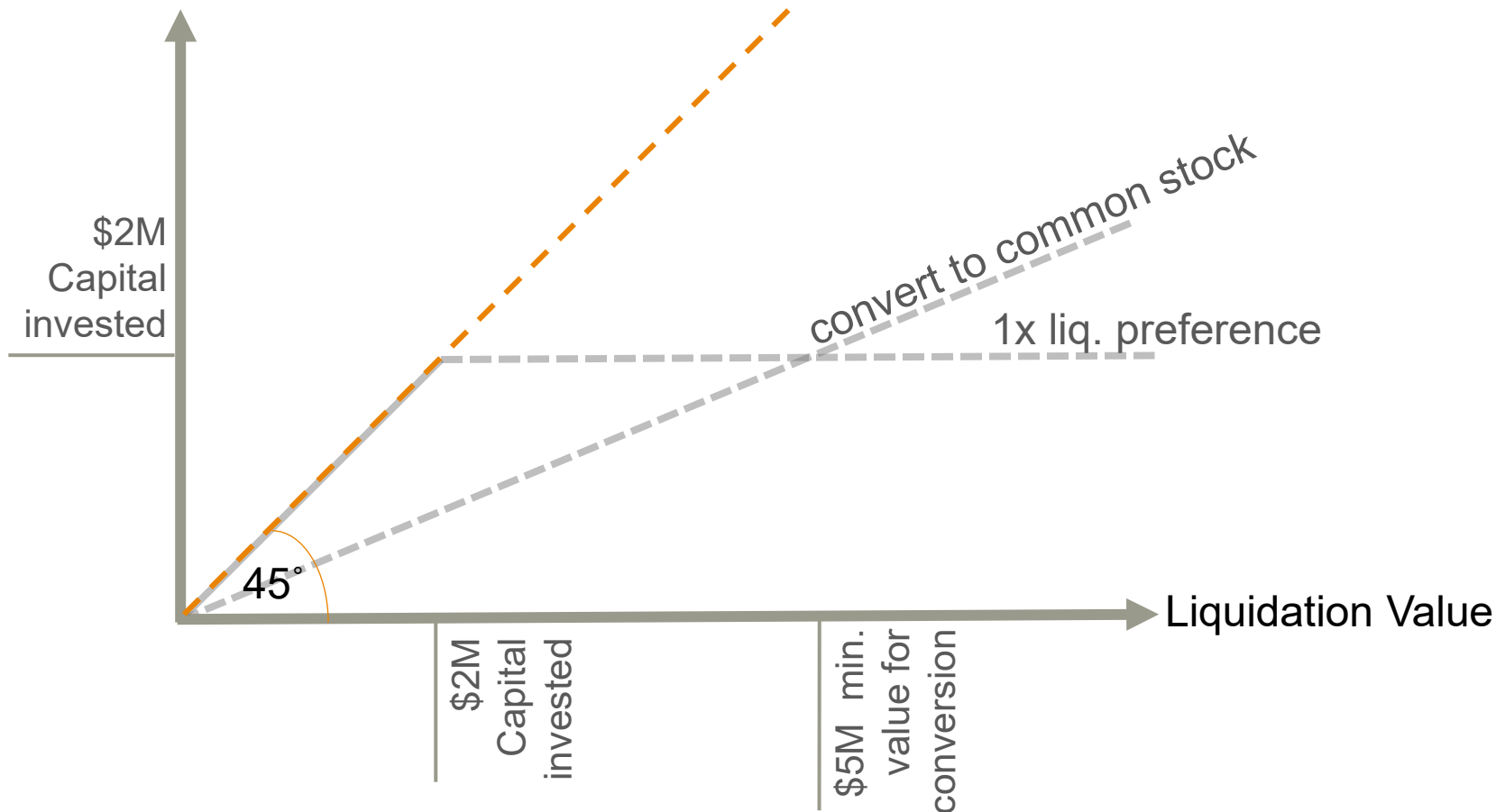
Convertible Preferred

1x liquidation preference with conversion but no participation

Liquidation Preferences

Conversion

Participation



Example

- Convertible preferred stock
- 1x Liquidation preference
- Investment of \$2M for 40% ownership

When will investors convert?

- Convert if 40% ownership > \$2M
- Convert if 1x liq. preference > \$2M

Most common terms:
non-participating
convertible
preferred with 1x
liq. preference

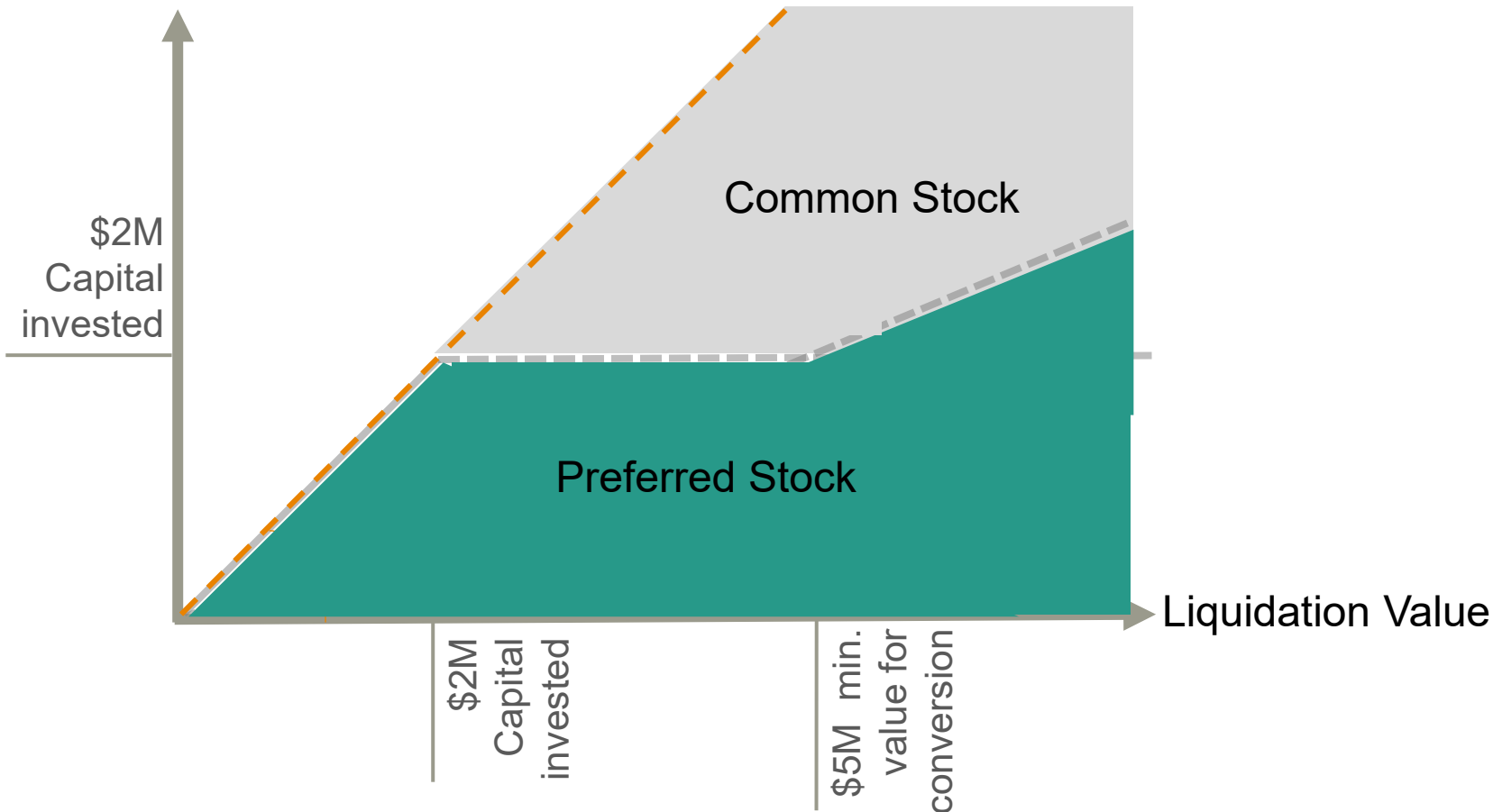
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Liquidation Preferences

Conversion

Participation



Example

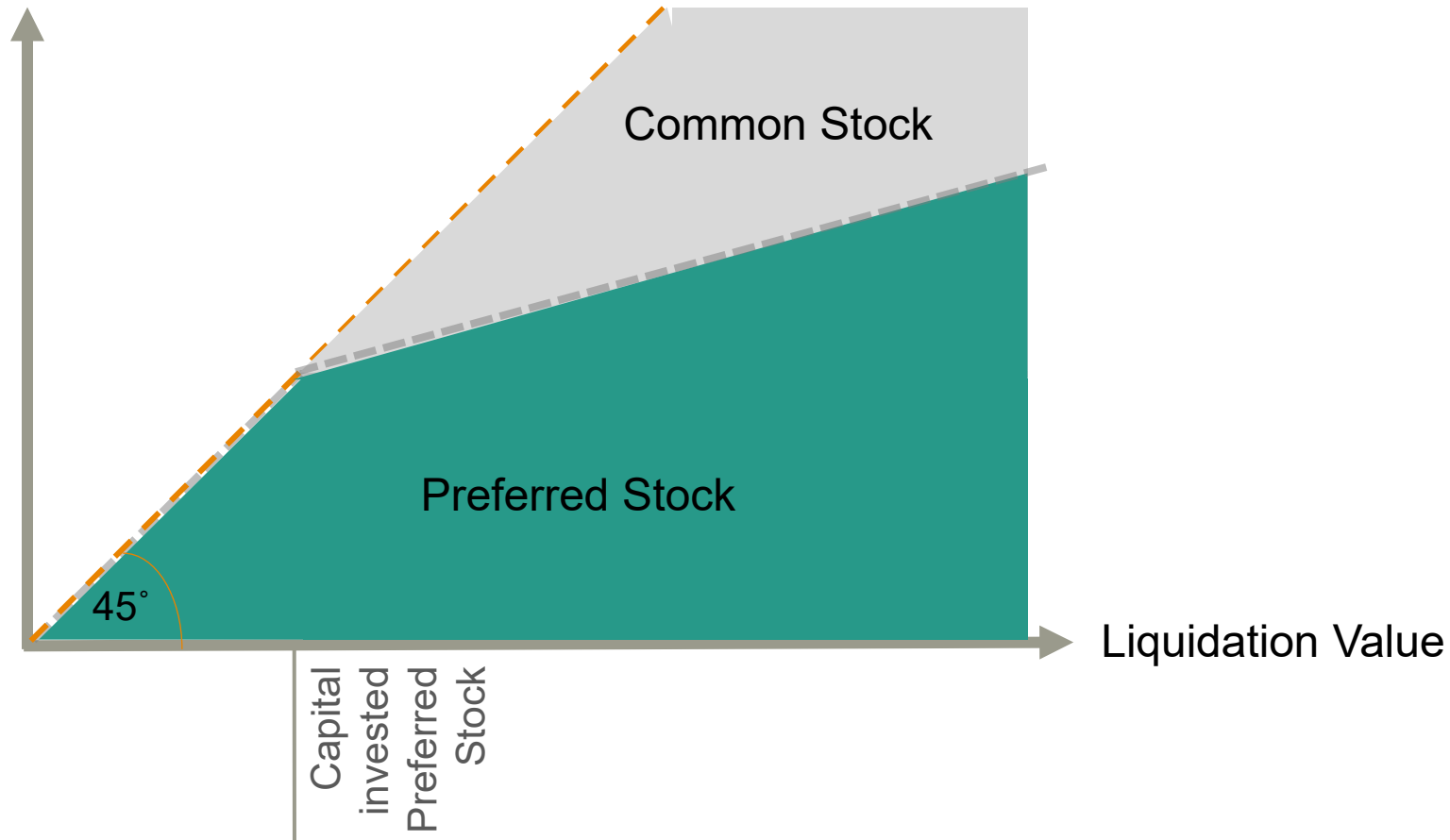
- Convertible preferred stock
- 1x Liquidation preference
- Investment of \$2M for 40% ownership

When will investors convert?

- Convert if $40\% \times \text{Liquidation Value} > \$2M$
- Convert if Liquidation Value $> \$5M$

Participating Preferred

1x liquidation preference with participation



Liquidation Preferences

Conversion

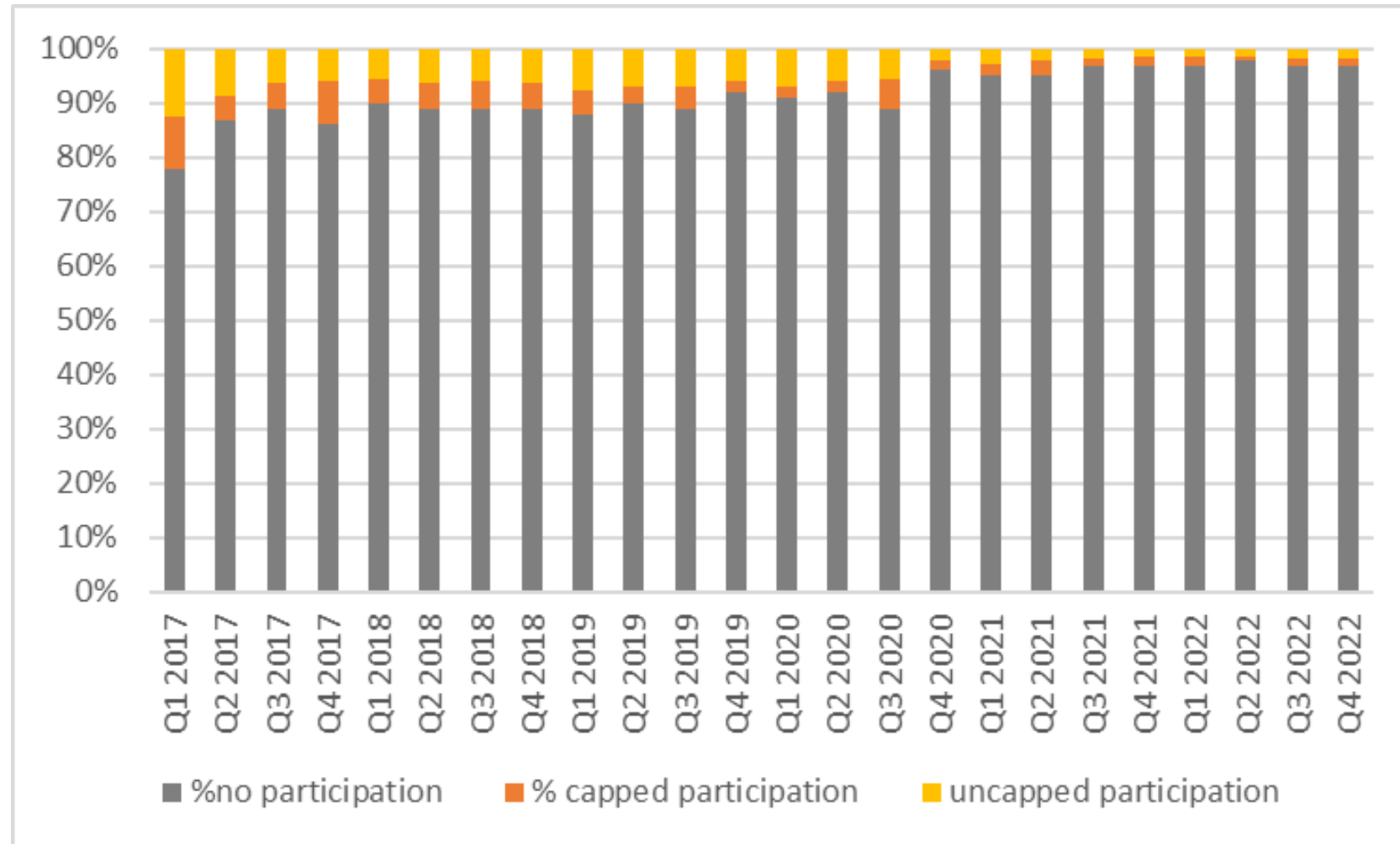
Participation

“Double dipping”

Participation might be subject to cap

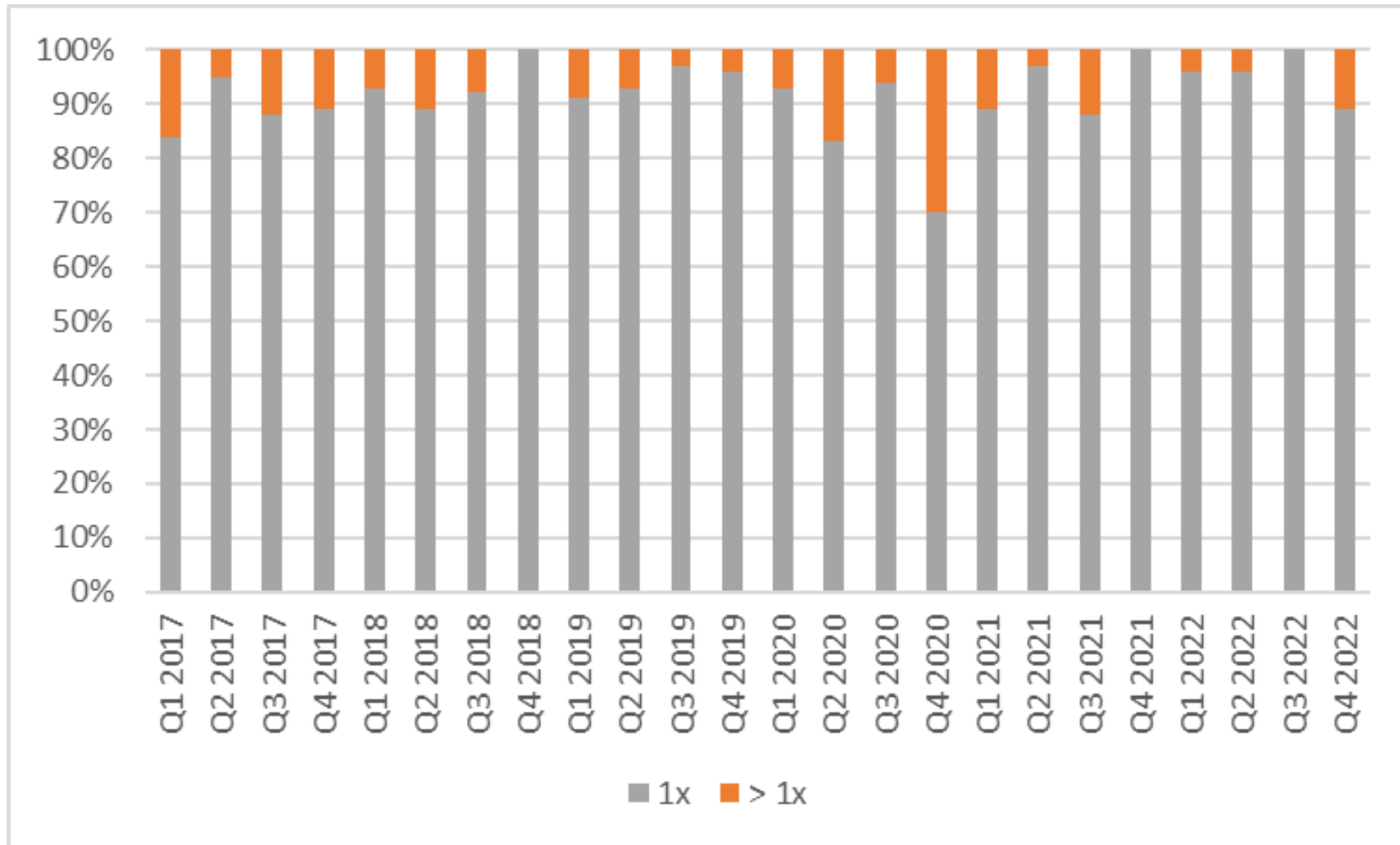
e.g., 2x cap → Investor can choose between (1) participation but payoff is limited to 2x investment and (2) non-participating

Trends: How common is participation?



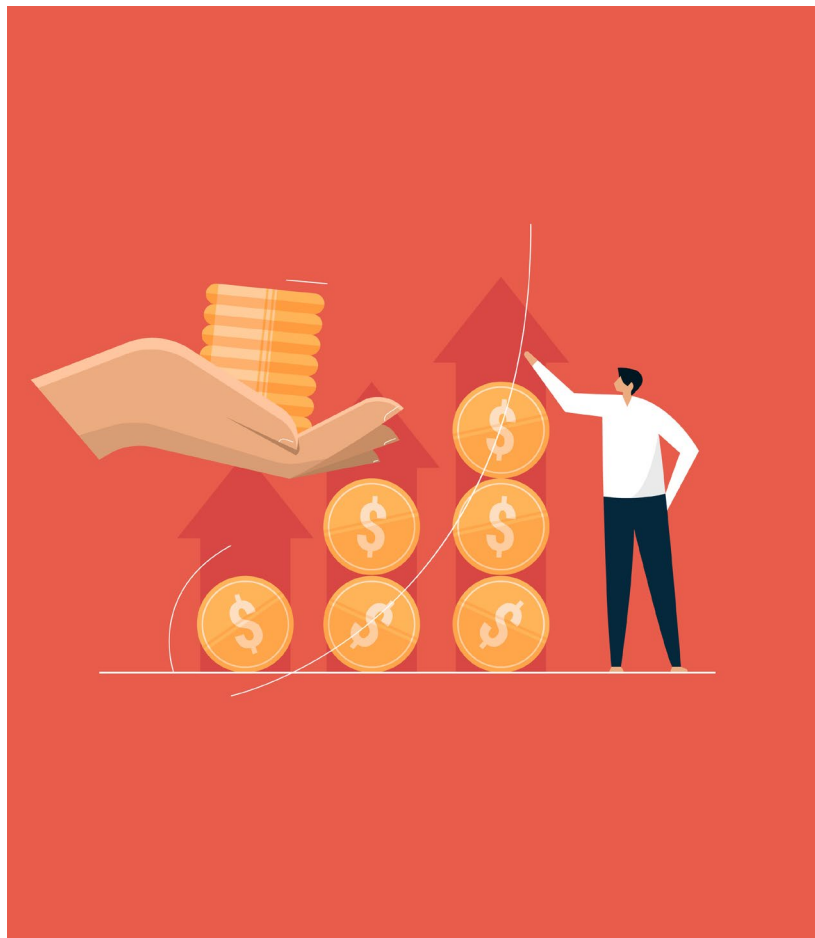
Source: Fenwick and West Venture Capital Survey

Trends: How common are liquidation preferences >1x?



Source: Fenwick and West Venture Capital Survey

Do These Pay-off Structures Matter?



Yes! Investors' and entrepreneurs' payoffs can vary widely

Especially for moderate exits

Yes! Preferred Stock yields:

Strong incentives for entrepreneurs to create high payoffs

Convertible Note: Cap and Discounts

Convertible Note – Example

Pre-financing

# founder shares	1,000,000
------------------	-----------

Seed investors: Convertible Note Terms

Principal + Accrued interest	\$ 750,000
------------------------------	------------

Cap (pre-money)	\$ 6,000,000
-----------------	--------------

Discount	20%
----------	-----

Minimum conversion size	\$ 2,000,000
-------------------------	--------------

VC: Series A Terms

Investment	\$ 4,000,000
------------	--------------

Ownership	40%
-----------	-----

What's the
cap table
following
Series A?

Convertible Note – Example

Pre-financing

founder shares

1,000,000

Seed investors: Convertible Note Terms

Principal + Accrued interest

\$ 750,000

Cap (pre-money)

\$ 6,000,000

Discount

20%

Minimum conversion size

\$ 2,000,000

VC: Series A Terms

Investment

\$ 4,000,000

Ownership

40%

Conversion price
is capped at
\$6 per share

Seed investors receive a
20% discount on Series A
price per share

Series A investment > Min. conversion size
→ Note converts automatically

Seed investors
convert at \$6/share
or the discounted
Series A price,
whichever is lower

→ convert at \$6 if
 $\$6 < (1-20\%) \cdot P_A$
or $P_A > \$7.50$

Convertible Note – Example

Pre-financing

founder shares 1,000,000

Seed investors: Convertible Note Terms

Principal + Accrued interest \$ 750,000

Cap (pre-money) \$ 6,000,000

Discount 20%

Minimum conversion size \$ 2,000,000

VC: Series A Terms

Investment \$ 4,000,000

Ownership 40%

If discounted Series A price per share is below the cap of \$6 per share, seed investors:	If discounted Series A price per share is above the cap of \$6 per share, seed investors:
convert at a price of $(1-20\%) * P_A$	convert at a price of \$6/share
receive $\$750,000 / ((1-20\%) * P_A)$ shares	receive $\$750,000 / \$6 = 125,000$ shares
Value of these shares $X * P_A = \$750,000 / (1-20\%)$ $= \$937,500$	Value of these shares $125,000 * P_A$

the same if $P_A = \$7.50$

Convertible Note – Example

Pre-financing

founder shares 1,000,000

Seed investors: Convertible Note Terms

Principal + Accrued interest \$ 750,000

Cap (pre-money) \$ 6,000,000

Discount 20%

Minimum conversion size \$ 2,000,000

VC: Series A Terms

Investment \$ 4,000,000

Ownership 40%

Suppose the Series A price per share is \$7.50...

	Shares	Valuation	Ownership %
Founder	1,000,000	\$7,500,000	
Seed		\$937,500	
Series	\$750,000 / (1-20%) Or 125,000 x \$7.50	\$4,000,000	$P_A = \$7.50$
Total		\$12,437,500	

Given these terms, will the discounted Series A price per share be above or below the cap of \$6/share? **Below!**

Convertible Note Example: Discounted Series A price is below the cap

Pre-financing

founder shares 1,000,000

Seed investors: Convertible Note Terms

Principal + Accrued interest \$ 750,000

Cap (pre-money) \$ 6,000,000

Discount 20%

Minimum conversion size \$ 2,000,000

VC: Series A Terms

Investment \$ 4,000,000

Ownership 40%

	Shares	Valuation	Ownership %
Founder	1,000,000	\$5,062,500	50.625%
Seed	185,185	\$937,500	9.375%
Series A	790,124	\$4,000,000	40%
Total	1,975,309	\$10,000,000	100%

Series A price per share: $\$10\text{M} / 1,975,309 = \$5.06$
Conversion price per share: $80\% \times \$5.06 = \$4.05$

Same as: $\$750,000 / 185,185$

Convertible Note Example: Discounted Series A price is above the cap

Pre-financing

founder shares 1,000,000

Seed investors: Convertible Note Terms

Principal + Accrued interest \$ 750,000

Cap (pre-money) \$ 6,000,000

Discount 20%

Minimum conversion size \$ 2,000,000

VC: Series A Terms

Investment \$ 4,000,000

Ownership 20%

	Shares	Valuation	Ownership %
Founder			
Seed			
Series A			
Total			

Post-money valuation
\$4M / 20% = \$20M

> \$12,437,500

→ discounted Series A price per share will be above the cap of \$6 per share

Convertible Note Example: Discounted Series A price is above the cap

Pre-financing

founder shares 1,000,000

Seed investors: Convertible Note Terms

Principal + Accrued interest \$ 750,000

Cap (pre-money) \$ 6,000,000

Discount 20%

Minimum conversion size \$ 2,000,000

VC: Series A Terms

Investment \$ 4,000,000

Ownership 20%

	Shares	Valuation	Ownership %
Founder	1,000,000	\$14,222,222	71.11%
Seed	125,000	\$1,777,778	8.89%
Series A	281,250	\$4,000,000	20%
Total	1,406,250	\$20,000,000	100%

Series A price per share: $\$20\text{M} / 1,406,250 = \$14.22$

Conversion price per share: \$6

Size of Series A

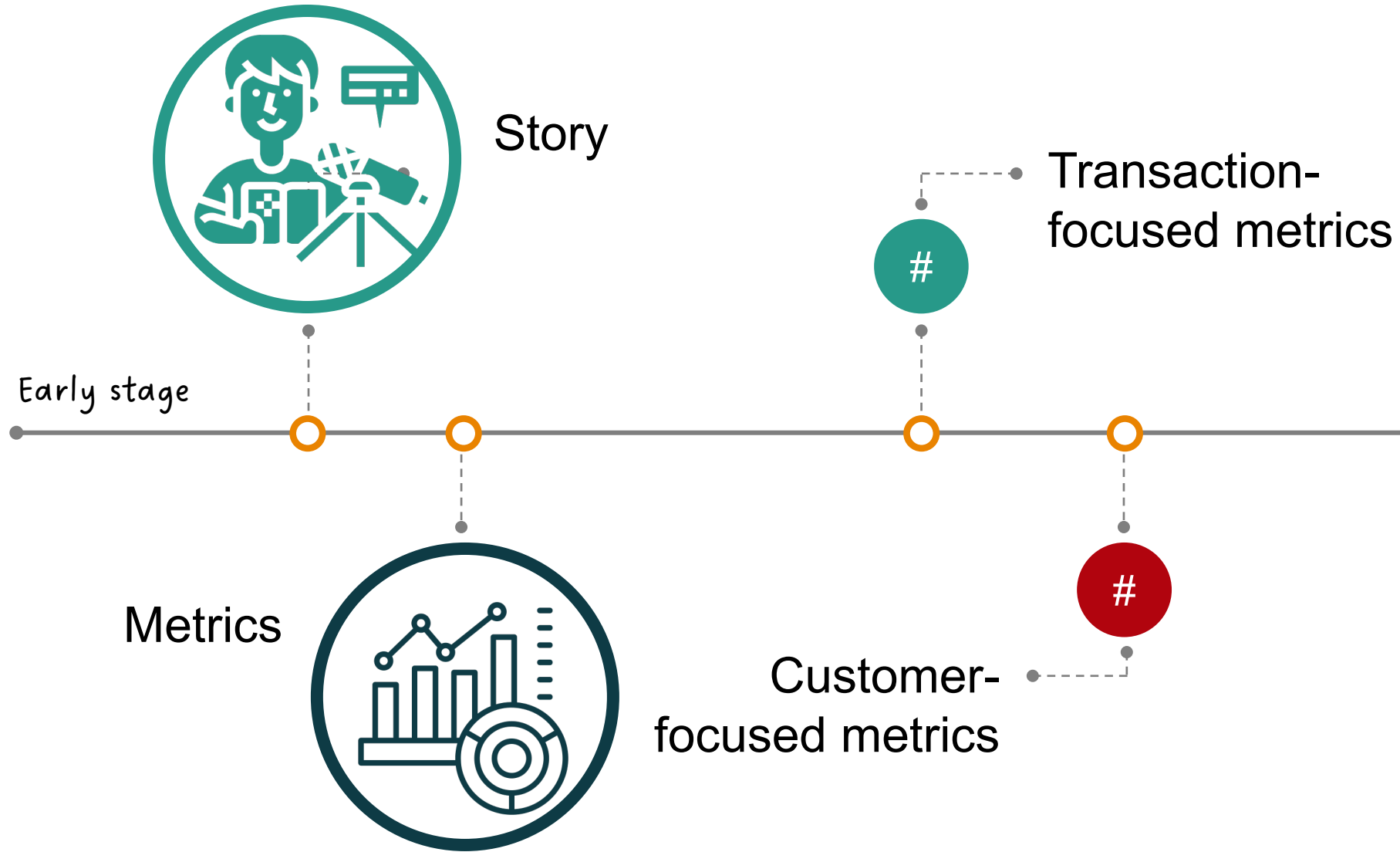
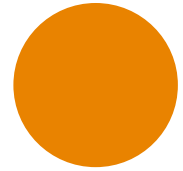
Victoria Athletic

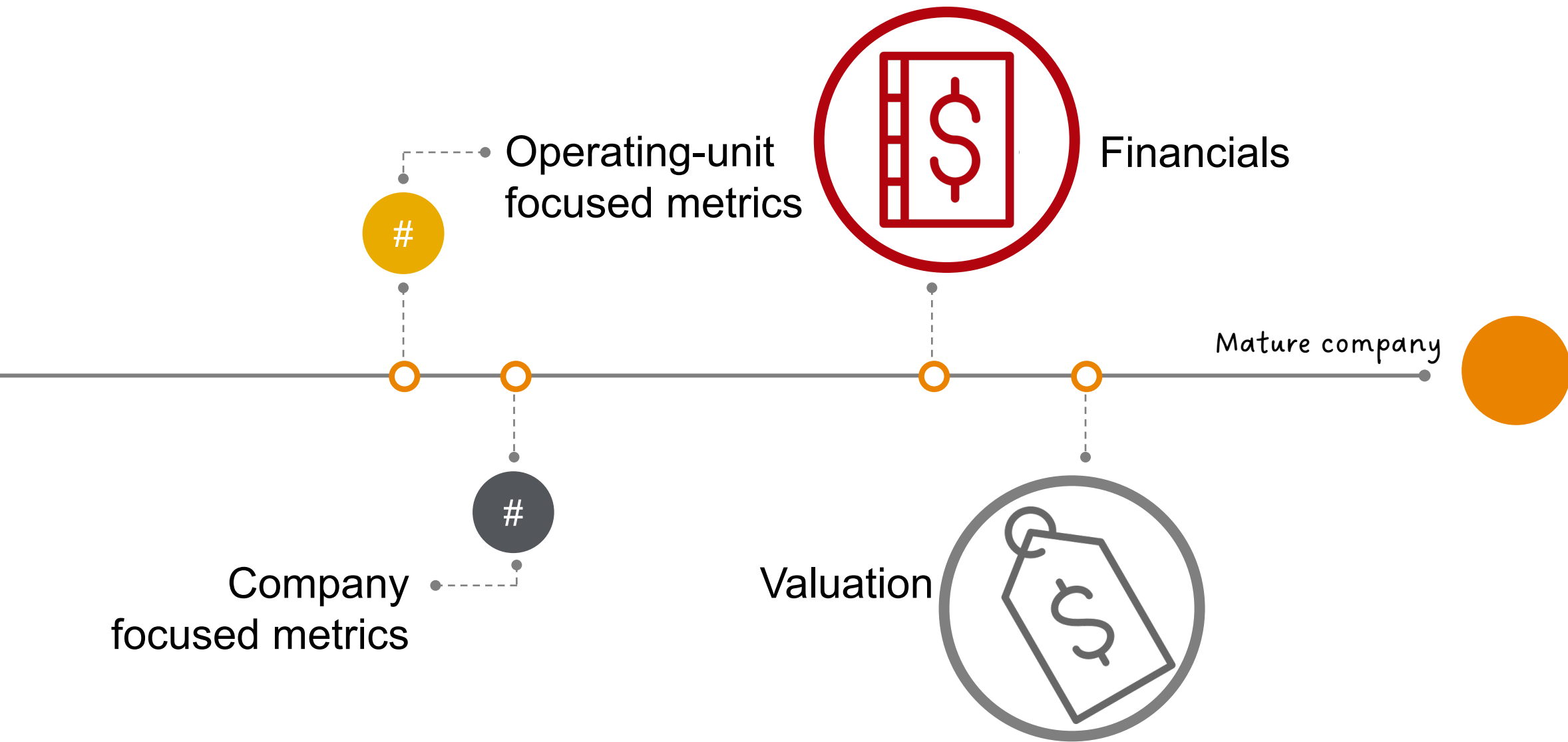
How much capital should Lee try to raise in Victoria Athletic's Series A?

How to Build a Financial Model

Why build a
financial model?

What do
investors
look for?





Free Cash Flow:

Cash Flow from Operations net of cash required to finance capital expenditures

Successful mature companies have positive Free Cash Flow and use it to pay debt and equity investors (dividends, share repurchases, interest and principal payments). The value of a company (or any asset for that matter) lies in its ability to generate **positive Free Cash Flow**.



For **startups** this is typically negative and aka “**the burn rate**”. Negative Free Cash Flows require access to outside funding such as debt or venture capital.



How do we calculate **Free Cash Flow**?

- Cash received from customers
 - + Other Cash received from operations (rare)
 - Cash paid for employees incl. taxes, insurance etc.
 - Cash paid for inventory
 - Cash paid for other aspects of operations (e.g., marketing, rent, professional services)
 - Cash paid for long-term assets (capex)
-

Free Cash Flow



- Earnings before interest and taxes (EBIT)
 - Taxes
 - + Depreciation and other non-cash items
 - Change in Net working capital (e.g., inventory, A/R, A/P)
 - Cash paid for long-term assets (capex)
-

Free Cash Flow



Financial Model

Victoria Athletics – In one or two sentences describe how the following elements are modeled?

Revenues from Hardware Sales

Revenue from Software Subscriptions

Expenses

Free Cash Flow

What are take-aways for how to build a financial model?

Financial Models

Best practices

Identify key processes

**Start by forecasting key
non-financial metrics of
these processes**

**Refine your model as your
understanding of the
business improves**

Forecasting

Example: Victoria Athletics

Victoria Athletics – shoes sold per month

Productive
sales reps

x

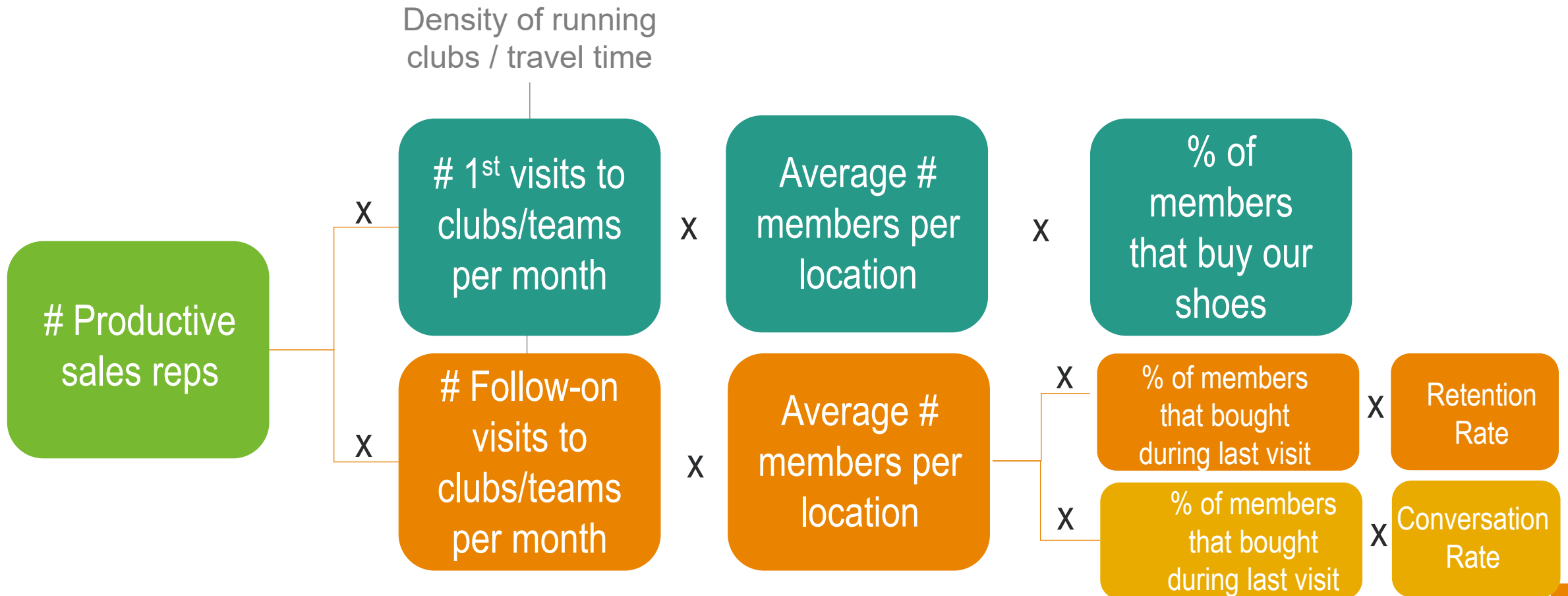
shoes per
month and
sales rep

What would be a
way to refine this
forecast?

Forecasting

Example: Victoria Athletics

Victoria Athletics – shoes sold



Size of Funding Rounds

How much money do you need?

Size of Series A

Victoria Athletic

How much capital should Lee try to raise in Victoria Athletic's Series A?

Size of Funding Rounds

Factors that matter



Ownership
targets of
investors



Startup's cash
needs:
projected burn
rate & planned
timing of next
round

Everything takes longer and
costs more than planned.

Staged Financing

What's the best timing for the next round of financing?



When the venture has been de-risked

(usually by reaching certain milestones)

Lower risk gives rise to higher valuation and, therefore, less dilution.

What VCs Look to Mitigate in a Funding

Technical risk – Can it be built?

Execution risk – Is this the right team?

Market risk – Will the dogs eat the dog food?

Financing risk – Who will provide future funding?



In Summary

Match?

Find the right investors for your business. Know your investors' objectives.

Terms

Valuation, Cash flow rights (type of security, liquidation references, participation, cap, discount etc.), Anti-dilution, Governance, Vesting & Employment.

Funding needs

Fund in stages. What milestones will significantly de-risk the business? Free cash flow model to determine cash burn.

Metrics

Measure success. In the beginning mostly non-financial. Must be tied to strategy.

change lives. change organizations. change the world.

