Valuation, Cap Tables and Terms

Interview preparation summary · VC track

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INT.VT.1.a · Cap table arithmetic

Calculate pre-money and post-money valuation, price per share and ownership, and track founder dilution through successive rounds.

Post-money valuation is pre-money valuation plus the new money, and the new investor's ownership is the cheque divided by the post-money. Price per share is the pre-money divided by the fully diluted shares before the round, and the investor receives the cheque divided by that price in new shares. Every existing holder is then diluted by the same fraction: a holder with 40% before a round that sells 20% ends with 32%. Dilution compounds, so you multiply the retained fractions across rounds (0.8 times 0.85 is 0.68) and never add the percentages sold. Dilution is not value loss: a founder who owns less of a company worth far more is better off, and a round that sells 20% at a higher price than the last one lifts the value of every share. Interviewers ask this because it is the language of every term sheet. The usual mistakes are dividing the cheque by the pre-money, and adding dilution percentages.

WORKED EXAMPLE: TRACKING A CAP TABLE THROUGH TWO ROUNDS AT MARROW LABS

Marrow Labs has 12m fully diluted shares: founders 8m and the seed investor 4m. It raises a Series A of 6m at a pre-money valuation of 18m, and a year later a Series B of 12m at a pre-money valuation of 48m. Work out the price per share in each round, each holder's ownership after the Series B, and say what the seed investor's stake is now worth. Convention: ignore any option pool, and treat all shares as ordinary for ownership purposes.

Answer: Series A price 1.50, Series B price 3.00. After the Series B the founders own 40%, the seed investor 20%, the Series A investor 20% and the Series B investor 20%. The seed stake of 4m shares is worth 12m.

> **Interview tip:** Say the formula in one line (price is pre-money over fully diluted shares), then say that dilution compounds, so you multiply the fractions kept. Finish by saying that a smaller percentage of a much more valuable company is usually a good trade.

INT.VT.1.b · Cap table arithmetic

Explain the option pool shuffle and calculate the effective pre-money valuation and the price per share when a pool is created in the pre-money.

Investors usually require an unallocated option pool, often sized as a percentage of the post-money fully diluted shares, to be created or topped up before the round, so the new shares dilute only the existing holders. This is the option pool shuffle. The headline pre-money therefore overstates what existing holders are paid for. The effective pre-money is the headline pre-money less the value of the new pool shares at the round price, or equivalently the existing shares multiplied by the round price. For example, a 20m headline pre-money with a 3m pool in it is an effective 17m. The right pool size comes from the hiring plan for the next 18 to 24 months, not from a rule of thumb. Interviewers ask this to see whether a candidate looks past the headline. The usual mistake is to compare term sheets on pre-money alone, or to forget that an existing unallocated pool counts towards the target.

WORKED EXAMPLE: THE POOL SHUFFLE AT TINDLE ROBOTICS

Tindle Robotics has 13m fully diluted shares and no unallocated pool. A Series A investor offers 8m at a headline pre-money of 24m, and requires an unallocated pool of 10% of the post-money fully diluted shares, created in the pre-money. Find the price per share, the number of new shares, the pool and the effective pre-money. Convention: ignore options already granted.

Answer: The price is 1.60 a share against 1.85 without a pool. The effective pre-money is 20.8m, not 24m, and the existing holders end with 65% rather than 75%.

> **Interview tip:** Quote the headline and the effective pre-money together, for example 24m headline and 20.8m effective, and then say you would size the pool from the hiring plan and negotiate it, instead of accepting it as standard.

INT.VT.1.c · Cap table arithmetic

Work out how a SAFE or convertible note converts at a priced round using the valuation cap, discount and interest, and explain the dilution it causes.

A SAFE gives an investor the right to shares at a future priced round, with no maturity date and normally no interest. A convertible note is debt that accrues interest and converts at the round. Both usually convert at the lower of two prices: the round price less the discount, and the cap price, which is the valuation cap divided by the relevant share count. A note converts its principal plus accrued interest, not principal alone. Under a pre-money cap the cap is measured before the SAFEs convert; under a post-money SAFE the cap includes all converting SAFEs, so a 0.5m SAFE on a 5m post-money cap owns 10% of the company capitalisation before the new money, however many other SAFEs are signed. Rolling SAFEs can therefore dilute founders more than they expect. The cap only binds if the round is priced above it. Interviewers ask this because most seed deals use these instruments. The usual mistakes are ignoring interest and applying the discount and cap together.

WORKED EXAMPLE: A CONVERTIBLE NOTE CONVERTING AT COBALT CARTOGRAPHY

Cobalt Cartography has 5m shares. A seed investor lent 0.6m on a convertible note at 8% simple interest that converts after 6 months into the Series A shares. The note has a 20% discount and a valuation cap of 6m measured on the 5m shares. The Series A is priced at 2.00 a share and raises 4m. Work out how the note converts and what the holder owns afterwards. Convention: the note shares are in addition to the 5m shares, the round price is fixed at 2.00, and interest is simple.

Answer: The note converts 0.624m, including interest, at the cap price of 1.20 into 520,000 shares, which is 6.9% after the Series A and worth 1.04m at the round price.

> **Interview tip:** State the three prices (round, discount, cap), say the holder gets the lowest, and mention that you converted principal plus interest. Then say how much the cap is worth compared with the discount.

INT.VT.2.a · Terms and valuation

Compute exit proceeds under 1x non-participating, participating and stacked liquidation preferences, and decide when preferred stock converts.

A liquidation preference decides who is paid first when the company is sold. With 1x non-participating preferred, the investor takes the greater of its money back or its as-converted share, so it converts once the exit value exceeds the investment divided by its ownership. With participating preferred the investor takes its money back and then also shares in the rest pro rata, a double dip, often capped at 2x or 3x. In a standard stack the latest round ranks first; pari passu means the classes share pro rata to their preferences when proceeds fall short. Preferences matter little in a big exit and a great deal in a modest one, so a high headline valuation with heavy preference terms can leave common holders worse off. Compare terms by running the waterfall at several exit values. The usual mistakes are applying the preference and the conversion together, and treating a participating investor as converting.

WORKED EXAMPLE: COMPARING PREFERENCES AT ORCHARD HEALTH

Orchard Health sold 30% of itself to a Series A investor for 12m. The investor holds 3m of the 10m shares in issue. Compare the investor's proceeds under a 1x non-participating preference and an uncapped 1x participating preference at exits of 20m, 40m and 80m. Convention: no other preferred stock, no debt, and costs and option strikes ignored.

Answer: Non-participating gives the investor 12m, 12m and 24m at exits of 20m, 40m and 80m. Participating gives 14.4m, 20.4m and 32.4m. The investor converts only above 40m, and the participation costs the common holders 8.4m once the exit is above 40m.

> **Interview tip:** Give the conversion point first (investment over ownership), then the cost of participation to the common holders in money. Interviewers want to hear you run the waterfall at more than one exit value.

INT.VT.2.b · Terms and valuation

Compare full ratchet and broad-based weighted-average anti-dilution, and explain pro rata and the other main investor rights.

Anti-dilution protects a preferred investor if the company later sells shares below the investor's conversion price. Full ratchet resets the conversion price to the new, lower price whatever the size of the round, which hands the investor a large number of extra shares and can crush founders. Broad-based weighted average adjusts the price using the formula: new price equals old price times (A plus B) divided by (A plus C), where A is the fully diluted shares before, B is the shares the new money would buy at the old price and C is the shares actually issued; it is the usual market term and a small, cheap round moves it little. Pro rata is the right, not the duty, to buy a share of future rounds to keep ownership. Other rights include information rights, board seats, protective provisions that need investor consent, rights of first refusal and drag-along. The usual mistakes are confusing the formula terms, and thinking pro rata guarantees ownership.

WORKED EXAMPLE: ANTI-DILUTION IN A DOWN ROUND AT FENWICK OPTICS

Fenwick Optics has 20m fully diluted shares: founders 12m, a Series A investor 5m (bought at 2.00 for 10m) and others 3m. It raises 4m in a down round at 1.00, issuing 4m new shares. Work out the Series A conversion price and shares under full ratchet and under broad-based weighted average, and the founders' stake in each case. Convention: only the Series A is protected, and all other shares are unchanged.

Answer: Full ratchet resets the price to 1.00 and leaves the founders on 41.4%. Broad-based weighted average sets 1.833 and leaves them on 49.1%. Without protection they would hold 50.0%.

> **Interview tip:** Write the formula down in words, name what A, B and C are, and then give the founder percentage under each. The comparison is what shows you understand why full ratchet is rare.

INT.VT.2.c · Terms and valuation

Value a young company with the venture method, work back to the pre-money valuation you can pay, and cross-check it against comparables and the last round.

The venture method starts from an exit. Estimate the company's equity value at exit, divide the money you invest and the target multiple by it to get the ownership you need at exit, then divide by the share of your stake that survives later dilution (for example 0.8 times 0.85 is 0.68) to get the ownership you need today. Post-money is the cheque divided by that ownership, and pre-money is post-money less the cheque. The target multiple (often 10x or more at seed) is high because it has to cover the investments that fail, so it is not a forecast for one company. Cross-check with comparables, adjusted for growth, stage, scale and liquidity, using recent private rounds more than listed multiples, and with the last round, asking what has changed since. The usual mistakes are using a discounted cash flow for a loss-making start-up, ignoring future dilution, and anchoring on the last round regardless of performance.

WORKED EXAMPLE: THE VENTURE METHOD FOR QUILL ROBOTICS

You would invest 4m in Quill Robotics. You expect it to be sold for an equity value of 240m in six years, and you need 8x your money on a deal like this. You expect two more rounds that dilute existing holders by 20% and then 15%. Work out the ownership you need today, the post-money and the pre-money valuation, and the return you are really targeting. Convention: ignore the option pool and fees.

Answer: You need 19.6% today, which means a post-money of 20.4m and a pre-money of 16.4m. That is a 41.4% annual return, and any ask above 16.4m needs a larger exit or less dilution to work.

> **Interview tip:** Work backwards in this order: exit value, required ownership at exit, dilution, ownership today, post-money, pre-money. Then say the answer is a ceiling to negotiate under, not a valuation of the company.

Summary of the Charta interview-preparation topic. Companies and figures in the examples are invented. Draft content, not yet expert reviewed.