

2220 - Entrepreneurial Finance and Venture Capital

Problem set 3

We return to the same scenario we considered in problem set 2. In January 2017, Arthur Clarke, the CEO of Heuristic Algorithms, is negotiating a \$5 million investment with Stefanie Powers of Athena Venture Partners. There are 1 million shares outstanding before the deal, and they expect to sell the company in December 2021 for \$125 million without any further investment. Powers is targeting a 50% IRR, which implies a post-money valuation of \$16.5 million, as we calculated in question d) of problem set 2. They now move on to negotiating what type of security to use.

- a) Powers proposes taking participating convertible preferred stock with 1X liquidation preference in return for her \$5 million investment. Draw Powers' payoff diagram for this security, assuming she invests the \$5 million at the valuation she is proposing.
- b) What is her cash-on-cash return and IRR if Heuristic Algorithms is sold in December 2021 at a \$125 million valuation, as planned? Why might Clarke feel this is unfair?
- c) What is a reasonable counter-proposal for Clarke to offer Powers? Hint: what share of the company does Powers actually require if she is given participating convertible preferred stock and her annual rate of return is still 50%?
- d) If Powers accepts Clarke's counter-proposal, what is the implied pre and post-money valuation? How many new shares should Powers purchase? What will be the share price? Assume an option pool worth 15% of the company at exit is created before her investment.
- e) Draw the pay-off diagrams from Powers' perspective, comparing the choice of taking convertible preferred at the valuation in a) with taking participating convertible preferred at the valuation in c).
- f) At what valuation would the two securities have an equal payout? Which deal offers Powers greater downside protection? Which one creates stronger incentives for her to add value?

Another option Clarke is considering is to delay the \$5 million investment and first do a smaller \$500,000 round with a group of angel investors, using a convertible note. If Powers later invests the \$5 million and takes 20% of the company, what equity stake will the angel investors receive upon conversion if the convertible note

- g) Has no discount and no cap
- h) Has a 30% discount
- i) Has a 30% discount and a \$20 million cap

Suppose Clarke and Powers move forward with the convertible preferred at the valuation in a), and that the option pool is created before Power's investment. However, things don't go according to plan on the technology front. According to multiple reports, the AI-powered personal assistant is exhibiting unpredictable behavior that is upsetting users. It is now January 2020 and, desperate for cash, they are forced to raise \$3 million at a share price of \$3.75 from a second VC.

Calculate what Powers' stake will be after this round under each of the following scenarios:

- j) She has no anti-dilution protection
 - k) She has full ratchet anti-dilution protection
 - l) She has weighted average anti-dilution protection
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- m) Two years after the second VC invests, the company's progress is still unimpressive. A more successful competitor offers to buy 100% of the shares for \$5 per share. Both VCs would like to accept the offer but Clarke refuses, arguing the company is worth at least 10x as much. What contractual terms might help the VCs make the deal happen anyway?