

Corporate Finance, Module 14: "The Capital Markets"

Homework Assignment

(The attached PDF file has better formatting.)

Jonathan is a consulting actuary who has developed an enterprise risk management (ERM) application that he intends to market to insurance companies. On January 1, 20X2, he invests \$100,000 of his own money to develop the application. On January 1, 20X5, he sets up a firm to raise more financing and market the product.

His firm raises \$1 million at *first-stage financing* on July 1, 20X5, from venture capitalists, and a **\$1.25 million** first-stage after-the-money valuation is placed on the firm. The venture capitalists contribute \$1 million of the \$1.25 million value of the firm, so they receive 80% of the stock of the firm.

The firm succeeds. When additional funds are needed three years later (July 1, 20X8), other venture capitalists contribute \$2 million in *second-stage financing* and the firm is now valued at \$4 million. The new venture capitalists contribute half the new value of the firm, so they receive half the new firm's stock.

- A. What is Jonathan's (paper) return from original investment to first-stage financing?
- B. What is Jonathan's (paper) return from first-stage financing to second-stage financing?
- C. What is Jonathan's (paper) wealth at second-stage financing?

Jacob: How do we determine the value of the firm at first-stage financing and second-stage financing?

Answer: The venture capitalists get a certain percentage of the firm's stock.

- ! At first-stage financing, the venture capitalists contribute \$1 million and get 80% of the firm's stock. The implicit value of the firm is $\$1 \text{ million} / 80\% = \1.25 million .
- ! At second-stage financing, the venture capitalists contribute \$2 million and get 50% of the firm's stock. The implicit value of the firm is $\$2 \text{ million} / 50\% = \4.00 million .

Question: How do the venture capitalists get 50% of the firm's stock at second-stage financing? Do Jonathan and the first venture capitalists each sell a certain amount of stock?

Answer: Suppose Jonathan and the first venture capitalists agreed on 1 million shares of stock at first-stage financing. Each share of stock is worth (on paper) \$1.25. Jonathan gets 200,000 shares and the venture capitalists get 800,000 shares. At second-stage financing, the firm issues another 1 million share of stock, which are given to the second venture capitalists in exchange for \$2 million.

Question: How do we evaluate Jonathan's (paper) wealth right after first-stage financing and second-stage financing?

Answer: At first-stage financing, Jonathan has 20% of the firm's stock, so his (paper) wealth is 20% of the firm's value, or \$250,000. At second-stage financing, he has 200,000 of a total 2 million shares, so his portion is 10% of \$4 million = \$400,000.

Question: Why are these paper returns and paper wealth?

Answer: Until the firm is publicly traded, Jonathan can not exchange his stock for cash.