

## **B. VALUATION**

### **1. INTRODUCTION**

For many constituents, the value of the firm is important. Let's consider a corporation. A creditor will want to know the corporation's value before it lends money. A shareholder will want to know before she buys stock. An acquirer will want to know before it submits an offer to buy the corporation. The corporation will want to know before it acquires another firm by giving its shares to the target corporation's shareholders as consideration. A credit rating agency will want to know before it rates the corporation's debt. A regulator may want to know the financial health of a regulated company.

The equity value of a firm is most important. For a corporation, the equity value is the aggregate value of the outstanding shares. If a corporation is publicly traded the market price of its shares provides useful information about the value of the corporation, but does not necessarily determine what it would be worth to someone interested in buying the entire company. The aggregate value of all publicly traded shares is called the market capitalization (or "market cap"):  $\text{Market Cap} = (\text{Shares Outstanding}) \times (\text{Share Price})$ . If a corporation is private, there is no market price, and the value of the corporation is more difficult to determine.

A share of stock represents a discrete unit of economic claim on the corporation's total equity value. If a shareholder owns all 100 of the outstanding shares of a corporation (meaning shares held by shareholders), she owns 100% of the equity. However, if there are 10,000 shares outstanding, she owns 1% of the equity.

Importantly, the stock price is not, in and of itself, a measure of value. Suppose corporations A and B have stock prices of \$200 and \$100, respectively. Is corporation A twice as valuable as B? Uncertain, without more information. Suppose A has only 1 share outstanding and B has 2 shares. The total equity values are the same. In other words, corporation A can decrease its stock price to match the stock price of B by splitting its 1 share into 2 shares in a transaction known as a "stock split." This would have the effect of decreasing A's stock price to \$100 per share. Likewise, corporation B can increase its stock price to match the stock price of A by combining 2 shares of stock into 1 share in what is called a "reverse stock split," which would have the effect of increasing B's stock price to \$200 per share. We see that the stock price, in and of itself, is an arbitrary number. Only when the stock price is compared to some financial measure is stock price relevant to the concept of value. In other words, a stock price of \$1,000 per share may not necessarily be so impressive; nor is a stock of \$10 per share necessarily humble.

When considering the complexities of valuation, consider the underlying lesson in the following parable of attempting to value an apple tree.

## THE OLD MAN AND THE TREE: A PARABLE OF VALUATION

Once there was a wise old man who owned an apple tree. The tree was a fine tree, and with little care it produced a crop of apples each year which he sold for \$100. The man was getting old, wanted to retire to a different climate and he decided to sell the tree. He enjoyed teaching a good lesson, and he placed an advertisement in the Business Opportunities section of Wall Street Journal Online in which he said he wanted to sell the tree for “the best offer.”

The first person to respond to the ad offered to pay the \$50 which, the offeror said, was what he would be able to get for selling the apple tree for firewood after he had cut it down. “You are a very foolish person,” said the old man. “You are offering to pay only the salvage value of this tree. That might be a good price for a pine tree or perhaps even this tree if it had stopped bearing fruit or if the price of apple wood had gotten so high that the tree was more valuable as a source of wood than as a source of fruit. But my tree is worth much more than \$50.”

The next person to come to see the old man offered to pay \$100 for the tree. “For that,” said she, “is what I would be able to get for selling this year’s crop of fruit which is about to mature.”

“You are not quite so foolish as the first one,” responded the old man. “At least you see that this tree has more value as a producer of apples than it would as a source of firewood. But \$100 is not the right price. You are not considering the value of next year’s crop of apples, nor that of the years after. Please take your \$100 and go elsewhere.”

The next person to come along was a young man who had just started business school. “I am going to major in marketing,” he said. “I figure that the tree should live for at least another fifteen years. If I sell the apples for \$100 a year, that will total \$1,500. I offer you \$1,500 for your tree.”

“You, too, are foolish,” said the man. “Surely the \$100 you would earn by selling the apples from the tree fifteen years from now cannot be worth \$100 to you today. In fact, before the recent financial crisis, if you had placed \$41.73 in a bank account paying 6% interest, compounded annually, that small sum would grow to \$100 at the end of fifteen years with no risk to you because your deposit is federally insured. Therefore the present value of \$100 worth of apples fifteen years from now, assuming an interest rate of 6%, would have been only \$41.73, not \$100. The same principle applies even when interest rates are substantially lower. Pray,” said the old man, “take your \$1,500 and invest it more safely until you have graduated from business school and know more about finance.”

Before long, there came a wealthy physician, who said, “I don’t know much about apple trees, but I know what I like. I’ll pay the market price for it. The last fellow was willing to pay you \$1,500 for the tree, and so it must be worth that.”

“Doctor,” advised the old man, “you should get yourself a knowledgeable investment adviser. If there were truly a market in which apple trees were traded with some regularity, the prices at which they were sold might be a good indication of their value. But there is no such market. And the isolated offer I just

received tells very little about how much my tree is really worth—as you would surely realize if you had heard the other foolish offers I have heard today. Please take your money and buy a vacation home.”

The next prospective purchaser to come along was an accounting student. When the old man asked “What price are you willing to give me?” the student first demanded to see the old man’s books. The old man had kept careful records and gladly brought them out. After examining them the accounting student said, “Your books show that you paid \$75 for this tree ten years ago. Furthermore, you have made no deductions for depreciation. I do not know if that conforms with generally accepted accounting principles, but assuming that it does, the book value of your tree is \$75. I will pay that.”

“Ah, you students know so much and yet so little,” chided the old man. “It is true that the book value of my tree is \$75, but any fool can see that it is worth far more than that. You had best go back to school and see if you can find some books that will show you how to use your numbers to better effect.”

The next prospective purchaser was a young stockbroker who had recently graduated from business school. Eager to test her new skills she, too, asked to examine the books. After several hours she came back to the old man and said she was now prepared to make an offer that valued the tree on the basis of the capitalized earnings of the tree.

For the first time the old man’s interest was piqued, and he asked her to go on.

The young woman explained that while the apples were sold for \$100 last year, that figure did not represent profits realized from the tree. There were expenses attendant to the tree, such as the cost of fertilizer, the expense of pruning the tree, the cost of the tools, expenses in connection with picking the apples, carting them into town and selling them. Somebody had to do these things, and a portion of the salaries paid to those persons ought to be charged against the revenues from the tree. Moreover, the purchase price, or cost, of the tree was an expense. A portion of the cost is taken into account each year of the tree’s useful life. Finally, there were taxes. She concluded that the profit from the tree was \$50 last year.

“Wow!” kidded the old man, to see how she’d respond. “And here I thought I’d made \$100 off that tree.”

“That’s because you failed to match expenses with revenues, in accordance with generally accepted accounting principles,” she explained. “You don’t actually have to write a check to be charged with what accountants consider to be your expenses. For example, you bought a pickup some time ago and you used it part of the time to cart apples to market. The truck will last a while, and each year some of the original cost has to be matched against revenues. A portion of the amount has to be spread out over the next several years even though you expended it all at one time. Accountants call that depreciation. I’ll bet you never figured that in your calculation of profits.”

“Now we’re getting to the nitty gritty,” he replied. “Tell me more.”

"I also went back into the books for a few years and I saw that in some years the tree produced fewer apples than in other years, the prices varied and the costs were not exactly the same each year. Taking an average of only the last three years, I came up with a figure of \$45 as a fair sample of the tree's earnings. But that is only half of what we have to do so as to figure the value."

"So, what's the other half?" he asked.

"The tricky part," she told him. "We now have to figure the value to me of owning a tree that will produce average annual earnings of \$45 a year. If I believed that the tree was a one year wonder, I would say 100% of its value—as a going business—was represented by one year's earnings. But if I believe, as both you and I do, that the tree is more like a corporation, in that it will continue to produce earnings year after year, then the key is to figure out an appropriate rate of return. In other words, I will be investing my capital in the tree, and I need to compute the value to me of an investment that will produce \$45 a year in income. We can call that amount the capitalized value of the tree's earnings."

"Do you have something in mind?" he asked.

"I'm getting there. If this tree produced entirely steady and predictable earnings each year, it would be risk-free, like a U.S. Treasury bond, and I'd settle to a return equal to what I'd get on that. But its earnings are not guaranteed; so I'll need a higher return to be willing to take the additional risk. After all, apples could become a glut on the market one day, and I'd have to cut the price and increase the costs of selling them. Or some doctor could discover a link between eating an apple a day and heart disease. A drought could cut the yield of the tree. Or, heaven forbid, the tree could become diseased and die. These are all risks. And of course we do not know what will happen to costs that we know we have to bear."

"You are a gloomy one," reflected the old man. "There are some emerging technologies, you know, that may be able to increase the yield of the tree. This tree could help spawn a whole orchard."

"I recognize that the profits may be more than \$45 as well as less," she assured him. "That is part of what we mean by risk. The one thing we know is that we don't know with certainty what's going to happen in the future. But you want your money now; and if am going to pay you, I'm going to have to live with the risk. That's fine with me, but my investment resources are limited. I have to choose between your tree and the strawberry patch down the road. I cannot make both investments, and the purchase of your tree will deprive me of any alternative investments. That means I have to compare the opportunities and risks of buying your tree with those of investing my money elsewhere.

"To determine a proper rate of return," she continued, "I have looked at investment opportunities that are comparable to the apple tree, particularly in the agribusiness industry, where these factors have been taken into account. I have concluded that 20% would be an appropriate rate of return. In other words, assuming that the average earnings from the tree over the last three years (which seems to be a representative period) are indicative of the return I will receive, I am prepared to pay a price for the tree that will give me a 20% return on my investment. I am not willing to accept any lower rate of return because I don't have to; I can always buy the strawberry patch instead. That means the value of the

apple tree should equal an amount of money that will generate \$45 per year at a rate of 20%. Therefore, we can determine its value by dividing \$45 by 20%: \$45 divided by 0.2—or multiplied by 5, which is the same thing—equals \$225. That's my offer."

"Well, okay," he prodded, "but what about something I've heard of called price-earnings ratio. Can't we use that?"

"That's what Wall Street types call it, but it's basically the same thing," she replied. They determine the price-earnings ratio, or P/E—which they sometimes call a "multiplier"—of a public company, by dividing its price by its earnings for the last twelve months. In theory, at least, the price of the stock is a function of the market's prediction of the company's stream of future earnings, including their growth, and the risk associated with actually achieving those earnings. The higher the expected earnings growth, the higher the multiplier; but the greater the risk of achieving that growth, the lower. To the extent that the market really is a good predictor of value, it should be possible to use the same P/E to value a comparable company that is not publicly traded. You'd just multiply that company's earnings for the last twelve months by the P/E of the comparable public company. But, since no two companies are exactly alike, deciding what multiplier to use is a tricky business requiring a lot of judgment."

"With a small business it's even harder to use this technique because the earnings to which the multiplier will be applied are often harder to determine and it's harder to find comparables. If you want to use it, you have to look at past earnings, make a judgment on the representative baseline, and then apply the multiplier. As with a public company, the choice of the multiplier is only a guess as to what the future will bring—both risks and rewards. Since there aren't any publicly traded apple trees, I've used what I estimate would be the right multiplier for businesses that appear to have a similar risk profile as your tree. That's why I chose the strawberry patch."

The old man sat back and said he greatly appreciated the lesson. He would have to think about her offer, and he asked if she could come by the next day.

When the young woman returned she found the old man emerging from a sea of work sheets, small print columns of numbers and a calculator. "Glad to see you," he said. "I think we can do some business."

"It's easy to see how you Wall Street smarties make so much money, buying people's property for less than its true value. I think I can get you to agree that my tree is worth more than you figured."

"I'm open-minded," she assured him.

"The number you worked so hard over my books to come up with was something you called profits, or earnings that I earned in the past. I'm not so sure it tells you anything that important."

"Of course it does," she protested. "Profits measure efficiency and economic utility."



"Maybe," he mused, "but it sure doesn't tell you how much money you've got. I looked in my safe yesterday after you left and I saw I had some stocks that hadn't ever paid much of a dividend to me. And I kept getting reports each year telling me how great the earnings were, but I sure couldn't spend them. The only way that I could have gotten money from those stocks would be to sell them. It's just the opposite with the tree. You figured the earnings were lower because of some amounts I'll never have to spend. It seems to me these earnings are an idea worked up by the accountants. Now I'll grant you that ideas, or concepts as you call them, are important and give you lots of useful information, but you can't fold them up, and put them in your pocket."

Surprised, she asked, "What is important, then?"

"Cash flow," he answered. "I'm talking about dollars you can spend, or save or give to your children. This tree will go on for years yielding revenues after costs. And it is the future, not the past, that we're trying to predict."

"Don't forget the risks," she reminded him. "And the uncertainties."

"Quite right," he observed. "I think we can deal with that. Chances are that you and I could agree, after a lot of thought, on the possible range of future revenues and costs. I suspect we would estimate that for the next five years, there is a 25% chance that the cash flow will be \$40, a 50% chance it will be \$50 and a 25% chance it will be \$60. That makes the expected value of the cash flow \$50. (You can do the math.) Then let us figure that for ten years after that the average will be \$40. And that's it. The tree doctor tells me it can't produce any longer than that. Now all we have to do is figure out what you pay today to get \$50 a year from now, two years from now, and so on for the first five years until we figure what you would pay to get \$40 a year for each of the ten years after that. Then, throw in the 50 bucks we can get for firewood at that time, and that's that."

"Simple," she said. "You want to discount to the present value of future cash flow, including salvage value. Of course you need to determine the rate at which you discount."

"Precisely," he noted. "That's what all these charts and the calculator are doing." She nodded knowingly as he showed her discount tables that revealed what a dollar received at a later time is worth today, under different assumptions of the discount rate. It showed, for example, that at an 8% discount rate, a dollar delivered a year from now is worth 92 cents today, simply because 92 cents today, invested at 8%, will produce \$1 a year from now.

"You could put your money in a bank today and receive 1 or 2% interest, insured. Before the recent financial crisis when the return went to almost zero, you could also put your money into obligations of the United States Government which would have earned 5% interest. (These numbers will vary with prevailing interest rates. The principle remains the same.) Anywhere else you put your money deprives you of the opportunity to earn that rate.

Discounting by the risk free rate will only compensate you for the time value of the money you invest in the tree rather than in government securities. But the cash flow from the apple tree is not riskless, sad to

say, so we need to use a higher discount rate to compensate you for the risk in your investment. But the 20% P/E ratio you used is a bit high for a discount rate, considering that the riskless rate is already unusually low and this time we're talking about a stream of real cash, not just those fictional GAAP profits. Let us agree to use a discount rate of 15%, which is about the rate that is applied to investments with this level of risk. You can check that out with my cousin who just sold his strawberry patch yesterday.

According to my figures, the present value of the anticipated annual net revenues is \$267.42, and today's value of the firewood is \$6.14, making a grand total of \$273. I'll take \$270 even. You can see how much I'm allowing for the risk you are taking because if I discounted the stream at even 5% (which, as we said, is higher than today's risk free rate), it would come to \$482.53, and if I used a lower risk free rate, the present value would be even higher."

After a few minutes reflection, the young woman said to the old man, "It was a bit foxy of you yesterday to let me appear to be teaching you something. Where did you learn so much about finance as an apple grower?"

"Don't be foolish, my young friend," he counseled her. "Wisdom comes from experience in many fields. Socrates taught us how to learn. I'll tell you a little secret; I took a Corporations course in law school."

The young woman smiled at this last confession. "I have enjoyed this little exercise but let me tell you something that some of the financial whiz kids have told me. Whether we figure value on the basis of the discounted cash flow method or the capitalization of earnings, so long as we apply both methods perfectly we should come out at exactly the same point."

"Of course!" the old man exclaimed. "Some of the wunderkinds are catching on. But the clever ones are looking not at old earnings, but doing what managers are doing and projecting earnings into the future. The question is, however, which method is more likely to be misused. I prefer to calculate by my method because I don't have to monkey around with depreciation. You have to make these arbitrary assumptions about useful life and how fast you're going to depreciate. Obviously that's where you went wrong in your figuring."

"You are a crafty old devil," she rejoined. "There are plenty of places for your calculations to go off. It's easy to discount cash flows when they are nice and steady, but that doesn't help you when you've got some lumpy expenses that do not recur. For example, several years from now that tree will require some extensive pruning and spraying operations that simply do not show up in your cash flow projections. The labor and chemicals for that once-only occasion throw off the evenness of your calculations. But I'll tell you what, I'll offer you \$250. My cold analysis tells me I'm overpaying, but I really like that tree. I think the psychic rewards of sitting in its shade must be worth something."

"It's a deal," said the old man. "I never said I was looking for the highest offer, but only the best offer."