The Old Man and the Tree: A Parable of Valuation

Adapted from Solomon, Schwartz & Bauman,
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Once there was an old, wise man who owned an apple tree. It was a fine tree. With modest care it yielded a crop of apples which he sold for $100 each year. The man wanted money for new pursuits and thought of selling the tree. So, hoping to teach a good lesson, he placed an ad in the Business Opportunities section of the *Wall Street Journal*: "For sale, apple tree - best offer."

Asset valuations
    Salvage value
    Book value

Cash flow valuations
    Current production
    Future (undiscounted) production
    Discounted earnings method
        Net returns
        Discounting future returns
        Computing risk (capitalization rate)
        Cash flows
        Expected cash flows
        Discount rate
        Comparision DCF and capitalization of earnings

Comparables
    Market price
    Price/earnings ratio

Salvage value

A lumberjack was the first to answer the ad. He offered to pay $50. "That's what it would fetch if I cut it down for firewood." The old man moaned, "You are foolish. You see only the tree's salvage value. Perhaps, your price would be good for a pine tree or perhaps even an apple tree no longer bearing fruit. Or perhaps if apple wood had become prized, more than apples. But my tree is worth much more than $50. No, thank you."

Current production

A grocer was next. She offered $100. "I will harvest and sell this year's crop." The old man smiled, "You are not quite so foolish as the first one. You see this tree has more value as a producer of apples than as a source of firewood. But $100 is not the right price. What of next year's crop? And the many crops after? Your price will not do."

Future (undiscounted) production

A marketer then answered the ad. He lived by the adage, "Buy low, sell high." So he offered $1499. "I figure the tree should live for at least another fifteen years. If I sell the apples for $100 a year, that will total $1,500." The old man wrinkled his nose, "You think ahead, but not carefully enough. Will the $100 you earn by selling apples fifteen years from now be worth $100 to you today? Stop and consider that if you placed $41.73 today in a bank account paying 6% interest, compounded annually, you would have $100 at the end of fifteen years. The present value of $100 worth of apples fifteen years from now, assuming an interest rate of 6%, is only $41.73, not $100. You offer to buy high and sell low. I cannot take your money."

Market price

A wealthy physician was next. "You get what you pay for," she announced. "I'll pay the market price -- whatever your last serious offer." The old man laughed, "You can't be serious, doctor. Now if there were truly a market in which apple trees were traded with some regularity, the prices at which they traded would be an indicator of their value. But there is no such market. The isolated offer I just received tells very little. If you had only heard the other foolish offers I had today!! You should seek advice before you invest."

Book value

An accountant soon answered the ad, demanding first to see the old man's books. The old man had kept careful records and gladly shared them. After examining them, the accountant declared, "You paid $75 for this tree ten years ago. You have made no deductions for depreciation. Assuming this conforms with generally accepted accounting principles, the book value of your tree if $75. I will pay that." The old man chided the accountant, "It is true the tree has a book value of $75, but is that its worth? Why, in just one year I can sell more than $75 in apples. Your accounting numbers look to the past, not the future."

Discounted future earnings

A young stock broker was next. She too asked to examine the books and after several hours announced she was prepared to offer. "I will value the tree on the basis of the capitalization of its earnings." The old man's interest was piqued. The broker continued, "While the apples sold for $100 last year, those weren't your profits from the tree. You had expenses. There was the cost of fertilizer and tools. You paid for others to prune the tree, to pick the apples, to cart them to market, to sell them. These costs and expenses should charged against the revenues from the tree. Moreover, the purchase price of the tree was an expense, a portion of which should be taken into account each year of the tree's useful life. Finally, there were taxes. Your profit from the tree was a mere $50 last year." The old man exclaimed, "Wow. I thought I made $100 off that tree."

Net returns

"You should have matched expenses with revenues, in accordance with generally accepted accounting principles," she explained. "And you don't actually have to write a check to be charged with an expense. For example, you bought a station wagon some time ago and you sometimes used it to cart apples to market. Some of the wagon's original cost has to be matched against revenues. A portion of the amount has to be deducted each year 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." The old man said, "No, I didn't. Tell me more."

"I also noticed in your books that in some years the tree produced less apples than in other years, and 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 we're only halfway to figuring the value." The old man asked, "What's the other half?"

Discounting future returns

"The tricky part," she told him. "We now have to figure how much I value owning something that produces $45 in earnings every year. If I believed the tree were 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 we both do, that the tree is like a corporation that will keep producing earnings year after year. What am I willing to pay to receive $45 in earnings every year into the future. That will be the capitalized value of the tree." The old man was ready to hear an offer, "Do you have something in mind?" he asked.

"I'm getting there. If this tree's earnings were steady and predictable, like a U.S. Treasury bond, it would be easy. But its earnings are not guaranteed. So we have to take into account risk and uncertainty. If the risk of its ruin is high, I would insist that a single year's earnings represent a higher percentage of the value of the tree. After all, apples could glut on the market one day and you would have to cut the price and increase the costs of selling them. Or some doctor could discover that eating an apple a day is linked to heart disease. A drought could cut the yield of the tree. Or the tree could become diseased and die. These are all risks. And, on top of this, we don't know what will happen to costs related to the tree." The old man sought to brighten her perspective, "There are treatments, you know, that could be applied to increase the yield of the tree. In fact, this tree could spawn a whole orchard."

Computing risk (capitalization rate)

"I know," she assured him. "We will include that in the calculus. The fact is, we are talking about risk, and investment analysis is a cold business. We don't know with certainty what's going to happen. You want your money now and I'm supposed to live with the risk. Your tree isn't the only game in town. I have to choose between your tree and the strawberry patch down the road. I cannot do both and the purchase of your tree will deprive me of alternative investments. That means I have to compare the opportunities and the risks."

"To determine the proper rate at which we should capitalize earnings, 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 an appropriate rate of return is 20%. In other words, assuming the average earnings over the last three years are representative, I am willing to pay a price that will earn me a 20% return on my investment. If you say I should take a lower rate of return, I'll simply go buy the strawberry patch instead. Now, to figure the price, we simply divide $45 by .20." The old man hesitated, "Long division was never my long suit. Is there a simpler way of doing the figuring?"

"There is," she assured him. "The reciprocal of .20 is 5. If you don't want to divide by the capitalization rate, you can multiply by its reciprocal, which we Wall Street types prefer. We call that reciprocal the price-earnings (or P-E) ratio. To compute the ratio, we divide 100 by the percentage rate of return we are seeking. If I was willing to take an 8% return, the P-E ratio would be 12.5 to 1. Since I want to earn 20%, by P-E ratio is 5:1. I'm willing to pay five times the tree's estimated annual earnings or $225 -- $45 times 5. The old man sat back. "I appreciate the lesson. Let me think about your offer. Can we meet again tomorrow?"

Cash flows

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. Perhaps we can do business. It's easy to see

how you Wall Street smartened make money, buying people's property for a fraction. But I think you'll agree my tree is worth more than you figured." The broker was willing to listen, "I'm open minded."

"You worked so hard over my books to come up with something you called profits, or earnings. I'm not so sure it tells you anything that important." She protested, "Yes, it does. Profits measure efficiency and economic utility."

"Maybe," he mused, "but it sure doesn't tell you how much money you've got. Yesterday I looked in my safe and found some stocks that hadn't ever paid much of a dividend. The company sent me reports telling me how great earnings were, but I couldn't spend them. It's just the opposite with the tree. You figured the earnings were lower because of some amounts you called depreciation that I never had to spend. It seems to me these earnings, after depreciation, are an idea worked up by the accountants. Now ideas are useful, but you can't fold them and put them in your pocket." The broker was surprised, "What's important, then?"

"Cash flow," the old man declared. "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." She sputtered, "what about the risks, the uncertainties?"

Expected returns

"Ah, yes," the old man observed, "I think we can deal with that. Chances are that you and I could agree, after some thought, on the possible range of 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 $50 our best guess, if you average it out. Then let us figure that for the next ten years that the average will be $40. And that's it. The tree doctor tells me the tree won't last longer than 15 years. Now all we have to do is figure out what you pay today to get $50 each year for the next five years, and $40 each year for ten more years. Then, throw in the $50 we can sell the tree for firewood at the end of 15 years."

Discount rate (and comparable P/E ratio)

"Simple," she said, again on familiar ground. "You want to discount to the present value of future receipts. 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 a 8% discount rate, a dollar delivered a year from now is worth $.93 today, simply because $.93 today, invested at 8%, will produce $1 a year from now.

"You could put your money in a bank and receive 5% interest, insured. But you could also put your money into obligations of the U.S. Government and earn 8% interest. That looks like the risk free rate of interest to me. Anywhere else you put your money deprives you of the opportunity to earn 8% risk free. Discounting by 8% will only compensate you for the time value of the money you invest in the tree rather than in government securities. But I concede that the cash flow from the apple tree is not riskless, sad to say, so we can use a higher discount rate to compensate you for the risk in your investment. Let us agree that we discount the receipt of $50 a year from now by 15%, and so on with the other deferred receipts. That is about the rate that is applied to investments with this magnitude of risk. You can check with my cousin who sold his strawberry patch yesterday. According to my figures, the present value is –

Year	Cash flow	Present value (assume 8% discount rate)	(assume 15% discount rate)
1	50	$ 46.30	$ 43.48
2	50	$ 42.87	$ 37.81
3	50	$ 39.69	$ 32.88
4	50	$ 36.75	$ 28.59
5	50	$ 34.03	$ 24.86
6	40	$ 25.21	$ 17.29
7	40	$ 23.34	$ 15.04
8	40	$ 21.61	$ 13.08
9	40	$ 20.01	$ 11.37
10	40	$ 18.53	$ 9.89
11	40	$ 17.16	$ 8.60
12	40	$ 15.88	$ 7.48
13	40	$ 14.71	$ 6.50
14	40	$ 13.62	$ 5.65
15	40	$ 12.61	$ 4.92
salvage	50	$ 15.76	$ 6.14
		$ 398.07	**$ 273.56**

That is, the total present value of all the net cash flows is $273.56. You can see how much I'm allowing for risk because if I discounted the stream at 8%, it would come to $398.07. I'll take $270 -- to round it off."

After a few minutes reflection, the young broker 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?" He counseled her softly, "Don't be foolish, my young friend. Wisdom comes from experience."

Comparison DCF and capitalization of earnings

The young woman smiled. "I have enjoyed this lesson. But I'll tell you something that some financial whiz kids say whether you 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. "But which method is more likely to be misused? I prefer my method because I don't have to monkey around with depreciation. You have to make assumptions about useful life and how fast you're going to depreciate. That's where you went wrong in your figuring."

"You are crafty," she rejoined. "But your calculations aren't perfect, either. It's easy to discount cash flows when they are nice and steady, but what if you have some lumpy expenses? For example, several years from now that tree will need pruning and spraying that you didn't include in your cash flow. The costs of that will throw off your calculations. Tell you what. "I'll offer $250. My cold analysis says I'm overpaying, but I've come to like that tree. Maybe I'll sit in its shade."

"It's a deal," said the old man. "I never said I was looking for the *perfect* offer, but only the *best* offer. You make good sense."

Moral

There are several. First, methods are useful tools, but good judgment comes from mixing methods and experience. And experience comes from mistakes. Second, listen closely to the experts, and hear what they don't say. Behind all their elegant sounds, there is much discordance and uncertainty. One wrong assumption can carry you far off track. Finally, you are never too young or old to learn.