

APPLE TREES AND EXPERIENCE

If market price is the last thing an investor or manager should look at in determining the value of a business or an ownership interest in it, the first thing to consider is its fundamental economic characteristics. There are so many approaches to appraising those fundamentals that many people use the relatively lazy metric of market price as a guideline in valuation, but that is a mistake. Of all the approaches to appraising business value, just a few do virtually all the hard work, and those are the ones you need. A parable will illustrate the basics, and the rest of this part will fill in the details.¹

FOOLS AND WISDOM { RRM Model / discount cashflow Model

Once there was a wise old man who owned an apple tree. It was a fine tree, and with little care it produced a crop of apples each year which he sold for \$100. The man wanted to retire to a new 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 *The Wall Street Journal* in which he said he wanted to sell the tree for "the best offer."

SOME RED HERRINGS

The first person to respond to the ad offered to pay \$50, which, he said, was what he could get for selling the apple tree for firewood after he cut it down. "You don't know what you are talking about," the old man chastised. "You are offering to pay only the salvage value of this tree. That might be a good price for a pine tree or 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 you are obviously not competent to understand these things, so you can't see that my tree is worth far more than 50 bucks."

The next person who visited the old man offered to pay \$100 for the tree. "For that," she opined, "is what I would be able to get for selling this year's crop of fruit, which is about to mature." "You are not as out of your depth 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 or that of the years after. Please take your \$100 and go elsewhere."

The third person to come along was a young man who had just dropped out of business school. "I am going to sell apples on the Internet," he said. "I figure that the tree should live for at least another 15 years. If I sell the apples for \$100 a year, that will total \$1,500. I offer you \$1,500 for your tree." "Oh, no, dot-commer," lamented the man, "you're even more ill informed about reality than the others I've spoken with."

"Surely the \$100 you would earn by selling the apples from the tree 15 years from now cannot be worth \$100 to you today. In fact, if you placed \$41.73 today in a bank account paying 6% interest, compounded annually, that small sum would grow to \$100 at the end of 15 years. So the present value of \$100 worth of apples 15 years from now, assuming an interest rate of 6%, is only \$41.73 not \$100. Pray," advised the beneficent old man, "take your \$1,500 and invest it safely in high-grade corporate bonds and go back to business school and learn something 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 tell you something about their value. But not only is there no such market, even if there were, taking its price as the value is just mimicking the stupidity of that last knucklehead or the others before him. Please take your money and buy a vacation home."

The next would-be buyer 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 a book that shows you how to use your numbers to better effect."

A DIALOGUE ON EARNINGS

The final prospect to visit the old man 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 prepared to make an offer that valued the tree on the basis of the capitalization of its earnings. 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 the profits realized from the tree. There were expenses attendant to the tree, such as the cost of fertilizer, pruning, tools, picking apples, and carting them to town and selling them.

Somebody had to do those 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!" The old man blushed. "I thought I 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 station wagon some time ago and used it part of the time to cart apples to market. The wagon 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."

"I'll bet you're right," he replied. "Tell me more."

"I also went back into the books for a few years and saw that in some years the tree produced fewer apples than it did 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 to figure the value."

"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 we agree that the tree is more like a corporation in that it will continue to produce earnings year after year, 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."

"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 like a U.S. Treasury bond. But its earnings are not guaranteed, so we have to take into account risks and uncertainty. If the risk of its ruin was high, I would insist that a single year's earnings represent a higher percentage of the value of the tree. After all, apples could become a glut on the market one day and you would have to cut the price, thus increasing the costs of selling them."

"Or," she continued, "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 the tree could become diseased and die. These are all risks. And we don't even know whether the costs we are sure to incur will be worth incurring."

"You are a gloomy one," reflected the old man. "There could also be a shortage of apples on the market, and the price of apples could rise. If you think about it, it is even possible that I have been selling

the apples at prices below what people would be willing to pay and that you could raise the price without reducing your sales. Also, there are treatments, you know, that could be applied to increase the yield of the tree. This tree could help spawn a whole orchard. Any of these would increase earnings."

"The earnings also could be increased by lowering costs of the sort you mentioned," the old man continued. "Costs can be reduced by speeding the time from fruition to sale, managing extensions of credit better, and minimizing losses from bad apples. Cutting costs boosts the relationship between overall sales and net earnings or, as the financial types say, the tree's profit margin. And that in turn would boost the return on your investment."

"I am aware of all that," she assured him. "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."

"That's fine with me, but then I have to look through a cloudy crystal ball, and not with 20/20 hindsight. And my resources are limited. I have to choose between your tree and the strawberry patch down the road. I cannot buy 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 a proper rate of return," she continued, "I looked at investment opportunities comparable to the apple tree, particularly in the agribusiness industry, where these factors have been taken into account. I then adjusted my findings based on how the things we discussed worked out with your tree. Based on those judgments, I figure that 20% is an appropriate rate of return for the tree."

"In other words," she concluded, "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. Now, to figure the price, we simply divide \$45 of earnings per year by the 20% return I am insisting on."

"Long division was never my strong suit. Is there a simpler way of doing the figuring?" he asked hopefully.

"There is," she assured him. "We can use an approach we Wall Street types prefer, called the price-earnings (or P/E) ratio. To compute the ratio, just divide 100 by the rate of return we are seeking."

If I were willing to settle for an 8% return, that would be 100 divided by 8, which equals 12.5. So we'd use a P/E ratio of 12.5 to 1. But since I want to earn 20% on my investment, I divided 100 by 20 and came up with a P/E ratio of 5:1. In other words, I am willing to pay five times the tree's estimated annual earnings. Multiplying \$45 by 5, I get a value of \$225. That's my offer."

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.

A DIALOGUE ON CASH

When the young woman returned, she found the old man emerging from behind a sea of work sheets, small print columns of numbers, and a calculator. "Delighted to see you," he said, enthralled. "I think we can do 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 \$45 number you came up with yesterday 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."

"Fair enough," he mused, "but it sure doesn't tell you how much money you're getting. I looked in my safe yesterday after you left and saw some stock certificates I own that never paid a dividend to me. And I kept getting reports each year telling me how great the earnings were. Now I know that the earnings increased the value of my stocks, but without any dividends I couldn't spend 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, like depreciation on my station wagon," the old man went on. "It seems to me these earnings are an idea worked up by the accountants."

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

"Cash," he answered. "I'm talking about dollars you can spend, 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, we need to reckon with."

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

"Quite right," he observed. "If we can agree on the possible range of future revenues and costs and that earnings averaged around \$45 the last few years, we can make some fair estimates of cash flow over the coming five years: How about that there is a 25% chance that 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," the old man figured. "Then let's just say 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," he finished up, "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 20 bucks we can get for firewood."

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

"Precisely," he concurred. "That's what my charts and the calculator are for." She nodded as he showed her discount tables that revealed what a dollar received at a later time is worth today under different assumptions about the discount rate. It showed, for example, that at an 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 savings account that is insured and receive 5% interest. But you could also buy U.S. Treasury obligations with it and earn, say, 8% interest, depending on prevailing interest rates. 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 Treasuries. 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."

"Let's agree to 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 that out with my neighbor, who just sold his strawberry

patch yesterday. According to my figures, the present value of the expected yearly profit is \$268.05, and today's value of the firewood is \$2.44, for a grand total of \$270.49. I'll take \$270 even. You can see how much I'm allowing for risk because if I discounted the stream at 8%, it would come to \$388.60."

After a few minutes of 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?"

The old man smiled. "Wisdom comes from experience in many fields."

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

"Of course!" the old man exclaimed. "The wunderkinds are catching on. The clever ones are not simply looking at old earnings but copying managers by projecting cash flows into the future. The question is which method is more likely to be misused."

"I prefer my method of using cash rather than earnings because I don't have to monkey around with costs like depreciation of my station wagon and other long-term assets. You have to make these arbitrary assumptions about the useful life of the thing and how fast you're going to depreciate it. That's where I think you went wrong in your figuring."

"Nice try, you crafty old devil," she rejoined. "You know there is plenty of room for mistakes in your calculations too. 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 need serious pruning and spraying that don't show up in your flow. The labor and chemicals for that once-only occasion throw off the evenness of your calculations."

"But I'll tell you what," she bellied up. "I'll offer you \$250. My cold analysis tells me I'm overpaying, but I really like that tree. I think the delight of sitting in its glorious shade must be worth something."

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

LESSONS

The parable of the old man and the tree introduced a number of alternative methods of valuing productive property, whether a single asset or an entire business enterprise. The original \$50 bid was based on the tree's salvage value, also sometimes called its scrap value. This valuation method will virtually always be inappropriate for valuing a productive asset, business, or share of stock (though many bust-up takeover artists of the 1980s popularized the opposite claim).

The \$100 bid was based only on one year's earnings and ignores the earning power over future time. The Internet apple maven's \$1,500 overvaluation ignored the concept of the time value of money by simply adding together the raw dollar amounts of expected earnings over future years. Neither of these approaches even qualifies as an appropriate valuation method.

The doctor's bid drew on a market-based valuation technique that considers what other willing buyers had offered. But that technique will be helpful only if the property under consideration or similar properties are regularly traded in reasonably well developed markets. Even then, it is circular because it uses the question (What's it worth, according to others?) to get the answer (What it's worth, according to others).

The deal was ultimately sealed when the buyer and the old man agreed that the two methods they used—capitalizing earnings and discounting cash flows—made the most sense (noting that these two techniques, if perfectly applied, give the same answer). The buyer preferred to use earnings because accounting rules regarding earnings are intended to reflect economic reality pretty well. The old man had less confidence in those rules principally because they call for deducting from revenues accounting depreciation, which he was not sure accurately reflected economic reality.

Although reasonable people can differ, both methods show that valuation is not a fool's game. The buyer and the old man both wisely and rightly acknowledged the importance of keen judgment in business analysis. As the type of investment you consider becomes more uncertain, your judgment must become proportionately more razor-sharp.

Picking an index fund or even a mutual fund requires the least amount of knowledge or judgment; picking a classic stock a bit more, a vintage stock much more, and a rookie stock the greatest. In terms of apples, the apple tree the old man just sold is much like a classic

business, a GE, say, or DuPont or United Technologies. It is mature and productive and has an extensive track record.

At the other extreme might be a dot-com start-up business whose only record is on paper—a business plan that is the apple tree equivalent of a bag of seeds. Even if the ingredients are there, the execution is entirely in front of you. You may still have a basis for gauging the probable future—the quality of the seeds, soil, fertilizer, and farmer—but you are leaving more to judgment than in the case of the mature tree.

A few additional morals of the parable: Methods are useful as tools, but good judgment comes not from methods alone but from experience. And experience comes from bad judgment. Listen closely to the experts and hear the things they don't tell you. Behind all the sweet sounds of their confident notes there is a great deal of discordant uncertainty. One wrong assumption can carry you pretty far from the truth. Finally, you are never too young to learn.

HORSE SENSE (7/2)

The old man and his ultimate buyer shared a business analysis mind-set. That mind-set focuses on individual businesses but must be formed against the backdrop of a few general conditions—what economists call macroeconomic conditions: interest rates, taxes, inflation, and the time value of money (or compounding).

COMPOUNDING

A powerful and intuitive introduction to the time value of money is given by this characteristically witty vignette by a 32-year-old Warren Buffett:

I have it from unreliable sources that the cost of the voyage Isabella originally underwrote for Columbus was approximately \$30,000. This has been considered at least a moderately successful utilization of venture capital. Without attempting to evaluate the psychic income derived from finding a new hemisphere, it must be pointed out that . . . the whole deal was not exactly another IBM. Figured very roughly, the \$30,000 invested at 4% compounded annually would have amounted to something like \$2,000,000,000,000. . . .