

Earning \$73,000 per year is very similar to saving \$73,000 per year, and you may notice that the cost savings approach is somewhat related to the income approach to valuation.

Income Approaches—Discounted Cash Flow (DCF)

The income approach to valuation assesses value today based on income streams predicted to be generated in future, and the likelihood that the income streams will materialize according to the forecast. Where an asset or business operation generates a stream of revenues, its value can be determined by calculating the total net income the asset will generate in the coming years. The time-value-of money is then factored in to discount the future revenue streams to determine what those future incomes might be worth today.

The time value of money is a concept that is simple to understand. If someone offered you the choice of having \$1,000 today, or a promise to give you \$1,000 in twelve months' time, you would likely go for the option paying you \$1,000 today. This is the logical choice if you want to spend the money today, but it's also the logical choice if you don't need the money for twelve months, as you could invest the \$1,000 and earn interest so that your money is worth more than \$1,000 when it has been invested for the 12 months period. So, a dollar today is worth more than a promise of a dollar tomorrow. The difference in value is referred to as the “discount rate”, and the income stream projections, when adjusted by applying the discount rate, are referred to as the “discounted cash flows”. The total value today of all the discounted cash flows is referred to as the “net present value”.



Hold on to your hat, we're now going to use a mathematical formula. The net present value of an asset is calculated as the sum of the discounted cash flows, and the following mathematical formula is used:

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

Where:

- DCF is the sum of discounted cash flows, or net present value of the future cash flow (CF).
- C is the net income (cash flows) projected for a future period;
- r is the discount rate and reflects the interest rate or the level of risk associated with the flows not materializing as projected;
- n is the time in years before the future cash flow occurs.

As an example showing how a simple discounted cash flow analysis might be applied:

- *Projected net cash flow, year 1 (after tax) = \$1 m.*
- *Projected net cash flow, year 2 (after tax) = \$2 m.*
- *Projected net cash flow, year 3 (after tax) = \$2 m.*
- *Discount rate = 30%*
- *Discounted cash flow projection, year 1 = \$1 m / (1.30) = \$0.77 m.*
- *Discounted cash flow projection, year 2 = \$2 m / (1.30)² = \$1.18 m.*
- *Discounted cash flow projection, year 3 = \$2 m / (1.30)³ = \$0.91 m.*
- *3 year cash flow = \$1 m + \$2 m + \$2 m = \$5 m.*
- *3 year discounted cash flow = \$0.77 m + \$1.18 m + 0.91 m = \$2.86 m.*

This example shows that a projected cash flow of \$5m with \$1m in year 1, \$2m in year 2, and \$2 million in year 3 would have a net present value today of \$2.86m after the discount rate of 30% per year is applied. If a discount rate of 5% is used instead of 30%, the value of the same (\$1m+\$2m+\$2m) income stream is \$4.49m. Clearly, under this valuation method, the value of a revenue stream is heavily affected by the discount rate that's applied. So, what discount rate do you choose for a particular income stream? The answer is driven by the risk factors involved. The

higher the probability the income streams will not materialize as projected, the higher the discount rate that should be used

If the risk factor is very low, the income is essentially guaranteed (by an unquestionably reliable guarantor), then the discount rate used should be equivalent to the rate of interest that you could earn by putting the cash in the bank, or another form of secure, interest-bearing account. If the interest rate you could earn on cash deposits is 5%, it's reasonable to use this 5% figure as the discount rate when calculating the discounted cash flows from guaranteed, secure income streams. For investors, the discount rate reflects the opportunity cost as well as the risk associated with the investment in question. If an investor is able to earn a return on an alternative investment, this is factored in to setting the discount rate to be applied to a particular investment. Investors calculate the discount rate by calculating the internal rate of return, a rate of return that is specific to their particular business.

Clearly, the discount rate should increase with the level of risk associated with the opportunity, but there are no hard and fast rules about which discount rate to apply to an income stream. Investors calculate the rates based on their understanding of the business or assets involved, their tolerance to risk, and the alternative investments opportunities they have available. Nevertheless, this table might represent a useful guide:

Risk of Income Failing to Materialize	Projected Income Streams	Discount Rate (Example)
Zero, or extremely low.	Virtually guaranteed.	5%
Low.	Highly predictable.	10%
Moderate.	Somewhat predictable.	20%
High.	Speculative.	30%
Extremely high.	Highly speculative.	40%+

Investors accustomed to applying discount rates to real estate investments, government bonds and securities offered by large, stable corporations are familiar with discount rates in single digits or low double digits. The traditional investors might be unaccustomed to the high discount rates applied to intangibles such as startup companies, patents and high-risk ventures such as lawsuits. The valuation of startups, especially early-stage startups involves unusually high levels of risk, so the discount rates applied in these scenarios can exceed 50 or 60%, and seed stage investors can use discount rates as high as 80%. Investors in high risk ventures such as seed stage startup companies, where more than nine out of ten investments fail, will apply high discount rates as high as 70%². Intangible assets and investments in the technology sector involve some of the highest risks in business and this is reflected by use of some of the highest discount rates in valuation calculations.

² “Venture capitalists typically use discount rates in the range of 30 to 70 percent. During the startup stage of venture-capital financing, discount rates between 50 to 70 percent are common.” WHY DO VENTURE CAPITALISTS USE SUCH HIGH DISCOUNT RATES?. Sanjai Bhagat, University of Colorado at Boulder.

Market Forces of Supply & Demand

In a free market, the rules of economics govern the price of companies, shares and technology assets as well the price of apples, oranges, jet planes and everything else. A principle you should consider when considering price says that the price will tend to rise when you introduce additional competing buyers; and conversely, the price will tend to fall when additional competing sellers are introduced to the marketplace.

Let's take the example of an old-school farmers' market for fruit. Let's say that on any particular market day, there are 10 farmers selling apples and 100 customers buying apples and all the apples are of similar quality. The market has settled at a price of \$1 per pound and all the vendors are selling at or near the \$1 per pound price. This state of affairs continues for some time, then one Monday, a passenger train breaks down nearby. A thousand hungry passengers leave the train to find food and hurriedly enter the farmers market. The 10 farmers with stalls suddenly find themselves with lines of hungry customers asking for apples. One customer standing in line realizes there are not so many apples to go around, he might go hungry and waves a \$10 bill at the farmer, saying "forget your \$1 asking price, I'll pay \$10 for a pound of apples". The farmer duly accepts, and realizing other customers will pay the same price, he resets his price tags increasing the price for \$1 to \$10, then starts selling to other customers at the new \$10 per pound price. Other farmers see what's happening, and they set the price at \$10 per pound. As the apples become start to sell out, a farmer sets the price at \$20 per pound, and even he manages to sell out of apples as customers continue to flow into the market from the train and are grow increasingly anxious to buy. Farmers call home and tell their farm hands to go out and pick as many ripe apples as they can.

Law of Demand:

The price will tend to rise when additional competing buyers enter the market.

The price will tend to fall when additional competing sellers enter the market.