Excerpt from
***Introduction to Real Estate Finance and Investment: Sample Problems, Student Edition*, by Frank Gallinelli**

Chapter 16: Discounted Cash Flow

The good news is, you already know how to calculate Discounted Cash Flow (DCF) – assuming, of course, you didn't start reading this book from the middle. Go back to Chapter 4, Present Value, and have a quick review. In that chapter you learned how to find the Present Value of a single cash flow. With a real estate investment, unless you hold it for a very short time, you expect not just one cash flow but rather a series of them. As you saw in Chapters 13 and 15, you expect to receive cash flows each year you operate a property and also a one-time cash flow when you sell.

With Discounted Cash Flow, you perform a Present Value calculation on each of the cash flows in the series. When you have figured out the Present Value of each future cash flow, you add the PVs up and that number represents the Present Value of the entire income stream.

You can accomplish this manually, by looking up the PV factor for the rate and period of time:

Annual Present Value Factors

Years	9.875%	10.000%	10.125%	10.250%	10.375%	10.500%	10.625%	10.750%
1	0.910125	0.909091	0.908059	0.907029	0.906002	0.904977	0.903955	0.902935
2	0.828328	0.826446	0.824571	0.822702	0.820840	0.818984	0.817134	0.815291
3	0.753882	0.751315	0.748759	0.746215	0.743683	0.741162	0.738652	0.736154
4	0.686127	0.683013	0.679918	0.676839	0.673778	0.670735	0.667708	0.664699
5	0.624461	0.620921	0.617405	0.613913	0.610445	0.607000	0.603578	0.600180
6	0.568338	0.564474	0.560641	0.556837	0.553064	0.549321	0.545607	0.541923
7	0.517259	0.513158	0.509095	0.505068	0.501078	0.497123	0.493204	0.489321
8	0.470770	0.466507	0.462288	0.458112	0.453977	0.449885	0.445835	0.441825

Or you can use a simple Excel model to perform the calculation. Downloads of both the table and the model are available at http://www.realdata.com/book.

To do this with the table of factors, it will help if you have some sort of form to organize your information. The one below should work. In the first column of figures, list your cash flows. In the second, specify the discount rate at the top, then fill in the factor for each intersection of rate and years. Multiply the cash flow by the factor to fill in the PV column, then add up the PVs to determine the entire Discounted Cash Flow.

		Factor @ x%	PV
Cash Flow, End of Year 1	0	0	0
Cash Flow, End of Year 2	0	0	0
Cash Flow, End of Year 3	0	0	0
Cash Flow, End of Year 4	0	0	0
Cash Flow, End of Year 5	0	0	0
Cash Flow, End of Year 6	0	0	0
Cash Flow, End of Year 7	0	0	0
Cash Flow, End of Year 8	0	0	0
Cash Flow, End of Year 9	0	0	0
Cash Flow, End of Year 10	0	0	0
TOTAL PV			0

Problem 16-1:

You estimate the following cash flows from your property over the next four years:

Year 1:	90,003
Year 2:	91,803
Year 3:	93,639
Year 4:	95,512

You also expect to sell the property at the end of Year 4 and realize cash proceeds of $1,694,000. You believe that the appropriate discount rate for your market is 10.0%. Perform a Discounted Cash Flow Analysis to determine the Present Value of this stream of future cash flows.

Problem 16-2:

In the scenario of Problem 16-1, suppose your sale proceeds are $1,750,000. Revise your Discounted Cash Flow Analysis to determine the Present Value of this stream of future cash flows.

Answer 16-1:

You will need to fill in the form in order to find and then sum the Present Values. Start by entering the cash flows. Remember that you must add the operating cash flow and the sale proceeds for Year 4 (95,512 + 1,694,000 = 1,789,512).

Then look up the PV factor for each year under the 10.0% discount column. Multiply each cash flow by its corresponding factor to determine its PV, then add up the PVs.

		Factor @ 10.0%	PV
Cash Flow, End of Year 1	90,003	0.909091	81,821
Cash Flow, End of Year 2	91,803	0.826446	75,870
Cash Flow, End of Year 3	93,639	0.751315	70,352
Cash Flow, End of Year 4	1,789,512	0.683013	1,222,260
TOTAL PV			1,450,303

The Present Value of this series of cash flows is $1,450,303.

Answer 16-2:

Again, you add the operating cash flow and the sale proceeds for Year 4 (95,512 + 1,750,000 = 1,845,512). Now the table of PVs looks like this:

		Factor @ 10.0%	PV
Cash Flow, End of Year 1	90,003	0.909091	81,821
Cash Flow, End of Year 2	91,803	0.826446	75,870
Cash Flow, End of Year 3	93,639	0.751315	70,352
Cash Flow, End of Year 4	1,845,512	0.683013	1,260,509
TOTAL PV			1,488,552

The Present Value of this series of cash flows is $1,488,552.