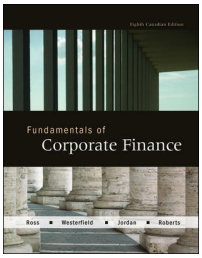
Finance for Management and Organizational Studies

MOS 2310

Chapter 6
Discounted Cash Flow Valuation

Danny L. Morrison, M.B.A. CPA, CMA



Western Dan Management and Organizational Studies

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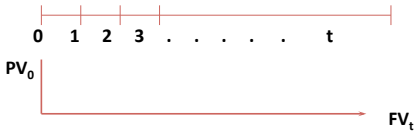
Discounted Cash Flow Valuation

- Future and Present Values of Multiple Cash Flows
- Valuing Level Cash Flows: Annuities and Perpetuities
- Comparing Rates: The Effect of Compounding
- Loan Types and Loan Amortization

Future Value (FV)

- End of year



Where: → $FV_t = PV (1 + r)^t$

r = interest rate

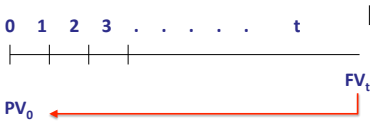
t = periods (# of years)

FV_t = Future Value at time period N

PV = Present Value (now, today, N = 0)

Present Value (PV)

End of year



← $PV_0 = FV_t / (1 + r)^t$

Finding PVs is discounting, and it's the reverse of compounding.

Annuities Terminology

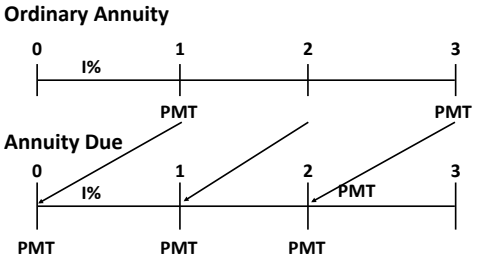
Annuity: a series of equal (level) payments made at regular intervals for a period of time

Ordinary annuity: end-of-period payments

Annuity due: beginning of period payments

Perpetuity: Stream of level cash payments that never ends [for an infinite number of periods]; lasts forever

Ordinary Annuity versus Annuity Due



Annuities – Basic Formulas

$$PVA = C\left[\frac{1-\frac{1}{(1+r)^t}}{r}\right]$$

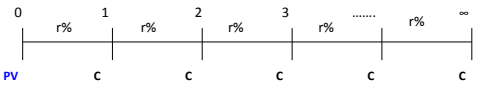
$$FVA = C\left[\frac{(1+r)^t-1}{r}\right]$$

Annuity due value = Ordinary annuity value x (1+r)

PVA_{due} = (1+r) PVA FVA_{due} = (1+r) FVA

PV of Perpetuity

The PV of a perpetuity is calculated by dividing the level cash flow by the interest rate



PV of perpetuity = $\frac{\text{Cash payment}}{\text{interest rate}} = \frac{C}{r}$

NB: This formula gives you the present value of a perpetuity starting one period from now

$PV = \frac{PMT}{I}$

Growing Perpetuity

- an annuity which grows at a constant rate (g) and continues forever!

$$PV = \frac{C_1}{r - g}$$

Kinds of Interest Rates

Nominal: means "in name only"; This is sometimes the quoted rate

Periodic rate: the amount of interest you are charge each period, (e.g., like each month)

Annual Percentage Rates: quoted or stated rate dictated by the Bank Act. (APRs) do not recognize the effect of compound interest. Posted rates = rate per period x the # of periods. e.g., 1% month.

1% x 12 = 12% per year.

Effective Annual Rate (EAR)

Effective Annual Rate: The rate that you actually get charged on an annual basis. Remember you are paying interest on interest

- annualizes using compound interest

$$EAR = \left(1 + \frac{APR}{m}\right)^m - 1$$

where
APR = Annual Percentage Rate, r
m = number of compounding periods in year

Monthly	12
Quarterly	4
Semiannually	2
Daily	365

Continuous Compounding

Continuous Compounding involves compounding over every microsecond.

FV_n(continuous) = PV * (e^{k*n})

$FVIF_{k,n}$(continuous) = e^{k*n}

Where e is a constant, has a value of 2.7183

Computing APRs from EARs

- If you have an effective rate, how can you compute the APR? Rearrange the EAR equation and you get:

$$APR = m\left[(1 + EAR)^{1/m} - 1\right]$$

FV Formula with Different Compounding Periods

The more frequently interest is compounded, the greater the amount of money accumulated.

$$FV_t = PV\left(1 + \frac{r_{NOM}}{M}\right)^{(M)(t)}$$