

CONCEPTUAL FOUNDATION OF THE SPREADSHEETS

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1. Conceptual underpinnings

Anyone who considers using a set of spreadsheets will wonder about their conceptual underpinnings. Do they rest on certain core ideas, or are they better regarded as a set of independent tools without any links? The answer to this question is critical. In the former case, the user must understand and evaluate the appeal of the ideas. In the latter case, by contrast, the user would be more inclined to look at each spreadsheet independently and assess its potential usefulness on narrow pragmatic grounds.

We have the first objective in mind: the spreadsheets rest on a set of core ideas. Now the sequencing of the spreadsheets is significant because the ideas are hierarchical. Thus, the early spreadsheets rest on “core” concepts that must be fully internalized before one can move on to the more nuanced “second-order” set necessary to appreciate later spreadsheets.

1.1. FSA1

- A firm’s activities are split into either enterprise or financial activities. The two categories are exhaustive and mutually exclusive.
 - ♦ $\text{Net enterprise assets} = \text{enterprise assets} - \text{enterprise liabilities}$
 - ♦ $\text{Invested capital} = \text{equity} + \text{financial liabilities} - \text{financial assets}$
 - ♦ $\text{Net enterprise assets} = \text{invested capital}$
 - ♦ Financial activities do not create wealth except insofar they facilitate enterprise activities. In general, the classical Modigliani-Miller tenets apply. The market value of enterprise activities is independent of the capital structure and financing transactions. The market value of financial liabilities can be approximated by their book values.
- $\text{Enterprise cash flows} = \text{enterprise profit after tax} - \text{change in net enterprise assets}$
 - ♦ If net enterprise assets are a constant percentage of sales, then $\text{change in net enterprise assets} = \text{net enterprise assets as percent of sales} * \text{change in sales}$.
 - ♦ $\text{Return on invested capital [aka return on net enterprise assets]} = \text{enterprise profit after tax/net enterprise assets} = \text{enterprise profit margin after tax/net enterprise assets as percent of sales}$.
- $\text{ROE} = \text{ROIC} + (\text{ROIC} - \text{net interest rate after tax}) * \text{net financial liabilities/equity}$

1.2. VAL1

- $\text{Enterprise value} = \text{PV of expected enterprise cash flows using the enterprise cost of capital (aka wacc) as the discount rate}$
- There are three – and only three – enterprise value drivers: sales and its growth, the enterprise profit margin after tax, the net enterprise assets relative to sales.
 - ♦ The three value drivers determine the enterprise cash flows [aka unlevered free cash flows].
- Financial activities are value neutral, i.e., Modigliani-Miller applies.
- $\text{Equity value} = \text{enterprise value} - \text{fair value of net financial liabilities}$

1.3. FSA2

- The purpose of analyzing financial statements is to assess the firm's record regarding the three key value drivers namely – enterprise profit margin after tax, net enterprise assets relative to sales, and sales growth. Such record is useful in predicting the future.
 - ♦ Distinguishing between recurring and non-recurring enterprise items is central to the forecasting of recurring enterprise profit margins.

1.4. VAL2

- PVED can be transformed to move from discounting expected distribution of wealth (dividends) to the expected creation of wealth (earnings and change in book values). The latter transformations lead to residual income valuation, RIV, and abnormal earnings growth (AEG) valuation. Reverse engineering these transformations demonstrates how risk and growth move together.

Transformation of DDM	Anchor: Starting point in valuation	Relative valuation metric
Dividend growth model	Forthcoming dividend/cost of equity	Price to forthcoming dividend ratio
Book value growth model	Current book value	Price to book ratio
Earnings growth model	Forthcoming earnings/cost of equity	Price to forthcoming earnings ratio

Transformation of DDM	Popular names
Dividend growth model	--
Book value growth model	Residual income valuation model (RIV, RIM) A variation is called the economic value added model (EVA™)
Earnings growth model	Abnormal earnings growth model (AEG)

1.5. FSA3

- Multi-period ROE is defined as follows:

$$= \frac{\text{cumulative earnings over the period plus earnings foregone over dividends paid in the period}}{\text{beginning of period book value}}$$

This measure of equity profitability can be applied for a varying number of years going back in time. It relates closely to a firm's internal rate of return per books.

- ♦ The measure smoothes out year-by-year variations in ROE and it reduces the effect of a firm's accounting conservatism.
- ♦ One can develop a similar measure of profitability by substituting a firm's market value for its book value. One obtains a measure of the firm's ability in the past to create wealth relative to its current market value.

1.6. VAL3

- Analysts' forecasts of growth in EPS often serve as inputs in the estimation of equity value. These growth estimates are often far too optimistic due to presumed increase in the after tax profit margin.
 - ♦ Earnings growth estimates are not comparable across firms due to differential dividend payouts. Growth estimates can be corrected for this factor.

1.7. FSA4

- The growth in sales should generally mirror the growth in net enterprise assets. If the growth in net enterprise assets has exceeded the growth in sales, then it makes sense to hypothesize that the

future/subsequent profit margin will decline. The logic is straightforward: the net enterprise assets must be expensed in subsequent periods.

- The analysis of a potential bias in the current profit margin depends on an identification of those assets/liabilities that are likely to cause measurement problems (and “manipulation”). Financial assets and liabilities are relatively problem free as compared to enterprise assets and liabilities. However, in this context one can argue that some enterprise assets and liabilities such as accounts receivables and payables are also often relatively problem free.

1.8. VAL4

- Growth and risk are the key explanatory variables of a forward PE.
 - ♦ PEG ratios are a popular indicator of mispricing even though they do not consider risk.
 - ♦ Cost of capital is inferable from financial forecasts if one stipulates a post horizon growth.
 - ♦ Growth and risk should, on average, move together.
 - ♦ A stock’s risk should relate to its inferred expected return (inferred cost of capital).