

# FINANCIAL STATEMENT ANALYSIS & VALUATION SPREADSHEETS

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## 1. Introduction and Summary

This document describes the spreadsheets and related textual narratives for FSA and valuation that are available for free at <http://www.godeohlson.com/>. These materials streamline the terminology and organize the topics in a coherent framework, and as a consequence, provide efficient implementation tools. The materials do not require a textbook; they can be used for self study. The materials can serve two distinct purposes. First, they can be used as core tools for teaching in academic or professional settings. Second, they can be used for practical investment analysis.

As to teaching FSA and valuation, our spreadsheets present a map of analysis which users can navigate piece-by-piece while always being aware as to where they are in the analytical sequence. The maps present the big picture and also delineate the “territories”, i.e., the major components of analysis. They provide a template that can be filled in with real data for hands-on illustrations. The power of spreadsheets becomes apparent when one compares them to the traditional sequence of text narratives, algebraic derivations, numerical examples, and computations of metrics for real cases. Spreadsheets condense this teaching material by an order of magnitude and enable what-if analyses; these help students see the big picture better. In addition to condensing the material and presenting it using spreadsheets, our materials also clean up the terminology and provide a logical sequence of otherwise disparate topics. They show how valuation drives FSA.

As to the use of the materials for actual investment analysis, these spreadsheets have three distinct uses. First, they provide three new metrics namely long-run return on book equity (ROBE), adjusted cash earnings (ACE), and excess implied return (EIR). Second, they summarize otherwise detailed models. Investment managers often face models that are too detailed and overwhelming. By bolting our summary spreadsheets and metrics as “dashboards” on top of these detailed models, the investment managers can internalize the key drivers of the models. Third, the spreadsheets show the equivalence of various valuation approaches used in practice. This helps investment managers reconcile apparent differences between various approaches they are presented with.

There are four spreadsheets on FSA and four on valuation. They are arranged in the increasing level of sophistication. The spreadsheets are accompanied by text narratives, which total about 60 pages. We elaborate upon the materials below:

### 1.1. Objective 1: Illustrate the concepts as well as their practical application

Much effort has been put into condensing the material. Key features are:

- Each spreadsheet lays out the conceptual map by delineating the (i) inputs required from financial statements, (ii) the building blocks of analysis and valuation, and (iii) the equations and the steps required to produce key analytical outputs.
- The spreadsheets are parsimonious. Multiple variations of a key ratio are omitted because they slow down an understanding of the relevant concepts. Few required inputs that can be easily extracted from financial statements speed up real case analysis.
- Spreadsheets enable “what if” analysis, which are hard to do using a traditional approach.
- The technology and design of spreadsheets reduce the need for extensive textual narratives. Accordingly, the narratives are an order of magnitude shorter than a typical textbook.
- The materials omit accounting and finance details. A rigorous prior course in financial accounting and another in finance should suffice. The spreadsheets highlight “advanced” sections that may be skipped.

## 1.2. Objective 2: Provide a coherent framework and terminology

The logical flow of spreadsheets provides an organizing framework for FSA and valuation. The flow underscores how valuation motivates FSA and how FSA supports valuation. The framework lists specific steps for conducting “hands on” FSA and valuation. Core concepts are highlighted and reinforced repeatedly.

The spreadsheets use consistent terminology that ties in to valuation precepts. They clean up and standardize the somewhat inconsistent and diverse terminology used in practice. Specifically, we do not use the term “operating” because of its ambiguous usage in GAAP and in practice. We categorize all line items in the financial statements into enterprise vs. financial items.

## 1.3. Objective 3: Provide new metrics based on latest research

The spreadsheets incorporate the latest research ideas in accounting-based valuation. They also develop new concepts that have not yet been discussed in research and practice.

## 2. Organization and brief description of the spreadsheets

The spreadsheets comprise two sets – FSA and valuation. The table below summarizes their brief headings:

FSA	Valuation
FSA1: Enterprise vs. financial activities	VAL1: Forecasting and valuation of cash flows
FSA2: Extracting recurring enterprise income	VAL2: Dividends, book values, and earnings
FSA3: Long-run historical ROE and IRR	VAL3: Adjusted analyst forecasts
FSA4: Adjusted Cash Earnings (ACE)	VAL4: Excess Implied Return (EIR)

[No one-to-one correspondence between FSA and valuation spreadsheets is implied.]

FSA and valuation are intertwined. Valuation requires projecting future performance. One of the ingredients of such projections is analysis of the past performance gleaned from FSA. The goal that FSA should support valuation helps narrow the scope of the FSA spreadsheets; we leave out analyses from the perspective of regulators, lenders, and consumers, etc.

### 2.1. The foundation: FSA1 and VAL1

FSA1 and VAL1 explain the core concepts necessary to understand the remaining spreadsheets. FSA1 provides the historical metrics necessary for projecting the key inputs in VAL1, and thus the relevance of FSA1 becomes apparent when one studies VAL1. Conversely, VAL1 relies on terminology and derivations explained in FSA1. Therefore, one should refer back and forth between FSA1 and VAL1 to understand both.

#### 2.1.1. FSA1: Enterprise vs. financial activities

This spreadsheet is the foundation for FSA. It does the following:

- Categorizes all items in the balance sheet and income statement into enterprise versus financial items.
- Derives enterprise cash flows as enterprise profits after tax minus change in net enterprise assets.
- Shows how enterprise cash flows have been financed if they are negative, or how they have been disbursed if they are positive.
- Computes key enterprise performance metrics such as enterprise profit margin after tax, net enterprise assets needed to generate sales, and return on invested capital. These enterprise performance metrics are used as inputs in forecasting future enterprise cash flows in VAL1.
- Shows how return on equity depends on return on invested capital and leverage.

### 2.1.2. VAL1: Equity valuation using the discounted cash flows model

The spreadsheet provides the framework for making the decision to invest in a stock. The first part of the spreadsheet computes intrinsic value using the DCF valuation model and the second step develops net income forecasts, which can be compared with analyst forecasts and are used to compute the forward PE ratio. The spreadsheet does the following:

#### Part 1: The DCF model

- Forecasts enterprise cash flows by projecting the drivers of enterprise cash flows identified in FSA1. These drivers are – sales, enterprise profit margin after tax, and net enterprise assets needed.
  - ♦ Enterprise cash flows = enterprise profit after tax – change in net enterprise assets
  - ♦ Sales = sales \* (1 + *forecasted sales growth*)
  - ♦ Enterprise profit after tax = sales \* *forecasted enterprise profit margin after tax*
  - ♦ Net enterprise assets = sales \* *forecasted ratio of net enterprise assets to sales*
- Discounts the enterprise cash flows at the enterprise cost of capital (wacc) to arrive at enterprise value
- Derives equity value by subtracting net financial liabilities from enterprise value

#### Part 2: Forecasting of net income and dividends for relative valuation

- Net financial liabilities = net enterprise assets \* *forecasted ratio of net financial liabilities to net enterprise assets*
- Net financial expense = net financial liabilities \* *forecasted net financial expense rate*
- Net income = enterprise profit after tax - net financial expense after tax. These forecasts of net income can be compared to net income forecasts provided by analysts.
- Computes three key valuation metrics for relative valuation: forward PE ratio, forward dividends to price ratio, and the price to book ratio

## 2.2. The six remaining FSA spreadsheets

These remaining FSA spreadsheets are self-contained once the reader is familiar with FSA1 and VAL1.

### 2.2.1. FSA2: Extracting data needed to forecast enterprise cash flows

FSA1 and VAL1 highlight that margins, growth, and net enterprise asset intensity drive enterprise cash flows. This spreadsheet computes these drivers for historical financial statements. Historical values are a starting point for forecasting these drivers going forward.

This spreadsheet does the following:

- Separates recurring items from non-recurring items and primary activities from secondary activities.
- Computes the primary and secondary enterprise profit margin, and their related tax rates. These margins and tax rates are key inputs in the forecasting of enterprise profit after tax.
- Computes the net enterprise assets needed relative to sales from primary activities. The ratio of enterprise profits after tax to net enterprise assets yields RNEA or ROIC.
- Computes the growth rate in sales and compares it to the growth rate in enterprise profits.

### 2.2.2. FSA3: Historical Long-run Return on Equity and IRR

Short-term metrics such as ROE are sensitive to accounting idiosyncrasies, which diminishes their usefulness as performance benchmarks. This spreadsheet develops long-run ROE and ROIC measures to remedy these problems. Specifically, this spreadsheet does the following:

- Shows how to compute historical ROE over multiple periods. This multi-period ROE is less sensitive to accounting idiosyncrasies compared to annual ROE, and thus is a better predictor of future ROE.
- Compares this multi-period historical ROE to historical IRR, which is a market-value based measure of historical performance over multiple periods.
- A separate spreadsheet shifts the analysis to the enterprise level and shows how to compute historical multi-period ROIC and unleveraged internal rate of return.

### **2.2.3. FSA4: Adjusted Cash Earnings (ACE)**

This spreadsheet develops a new measure of earnings, which we call Adjusted Cash Earnings (ACE). The difference between reported earnings and ACE measures the potential bias in reported earnings. A positive bias predicts a decline in future profit margin, and vice versa. Specifically, the spreadsheet does the following:

- Defines hard assets and hard liabilities. Accounting earnings equal change in equity minus net dividends, and equity equals assets minus liabilities. Some assets and liabilities are “hard” in the sense that they are objectively measurable, while others are “soft” in the sense that their valuation requires judgments. Examples of hard items are cash and marketable securities, and short-duration accounts receivables and payables. Examples of soft items are inventories, PP&E, intangible assets, deferred taxes, reserves and allowances, and deferred revenues.

The susceptibility of accounting income to these “soft” items has led some to ignore ALL accounting accruals and focus just on cash. They define cash earnings as change in cash minus net dividends. This view is too narrow and misses the reality that many items on the balance sheet are as hard as cash.

- Derive hard earnings: We define “hard” equity as “hard” assets minus “hard” liabilities. We define hard earnings as change in hard equity minus net dividends.
- Derive adjusted hard earnings, which we call Adjusted Cash Earnings: Considering changes in only the hard equity is too narrow especially for growth firms. The soft equity, which is difference between reported equity and hard equity, grows with sales. We therefore define adjusted hard earnings as hard earnings plus growth in soft equity in proportion to sales growth. We call these adjusted hard earnings as Adjusted Cash Earnings to connect with the use of the term Cash Earnings in the real world.

## **2.3. The remaining valuation spreadsheets**

Following VAL1 (and FSA1), the remaining valuation spreadsheets (2-4) are essentially self-contained. However, we recommend that they be read in order.

### **2.3.1. VAL2: Valuation anchored on dividends, book values, and earnings**

Many valuation models are often used in practice. This spreadsheet shows the conceptual equivalence of these approaches. It then explains why different equivalent approaches are still useful because each approach connects with a popular valuation metrics such as the dividend yield, market to book ratio, and the P/E ratio. Specifically, this spreadsheet does the following:

- Describes the three transformations of the dividend discount model (DDM). These three transformations are the dividend growth model, book value growth model (aka RIV), and earnings growth model (aka AEG).
- Demonstrates the equivalence of these three transformations for equity valuation.
- Explains how these transformations explain the drivers of the three valuation metrics used in practice—dividend yield, price to book ratio, and price to earnings ratio.
- A separate spreadsheet provides an enterprise-level version of VAL2.

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

### 2.3.2. VAL3: Adjusted analyst forecasts

Analyst forecasts can be optimistic. This spreadsheet shows how the analyst forecasts can be adjusted to correct for some of the common biases. Specifically, this spreadsheet does the following:

- Adjusts analyst forecasts by removing expectations of margin expansion. Such adjustments are useful if one considers margin expansion to be optimistic.
- Adjusts earnings growth for earnings foregone on dividends paid. This adjustment facilitates the comparison of earnings growth across firms.

### 2.3.3. VAL4: Excess Implied Return (EIR)

This spreadsheet develops a screen to identify stocks that appear mispriced considering their risk. It does the following:

- Infer the implied return from the current stock price and earnings forecasts. The implied return is the discount rate that makes the present value of expected future financial outcomes equal to the current stock price. Thus, the implied return is an IRR that measures expected return.
  - ♦ Innovation 1: We use the Ohlson-Juettner model that allows one to work directly with analyst earnings forecasts and dividend payout forecasts instead of developing a DCF model as in VAL1.
  - ♦ Innovation 2: We set the terminal growth rate equal to the implied return minus the earnings yield to capture the idea that risk and growth go together.
- Compute the required return via the CAPM.
  - ♦ Innovation 3: We use the implied market risk premium rather than the historical market risk premium. The former equals implied return on the market portfolio minus the risk free rate.
- Excess Implied Return = implied return – return required based on CAPM. EIR can be viewed as excess return. A positive EIR suggests underpricing, and vice versa. Of course, this is only an initial screen that identifies stocks that need further study.