

ENTERPRISE AND FINANCIAL ACTIVITIES

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1. Overview

A firm's business activities – what we will refer to as “enterprise activities” – are the main source of value creation. Such activities stand in contrast to financial activities, in particular borrowing and lending.

Analysis of enterprise activities naturally focuses on the following questions:

- How much cash did the enterprise generate?
- How profitable is the enterprise, and what are the drivers of this profitability?
- How do we quantify enterprise growth?

Analysis of financial activities focusses on the following questions:

- How did the firm finance negative enterprise cash flows or use the positive enterprise cash flow?
- How did the firm's financial policy affect its return to shareholders?

To answer these questions, FSA1 does the following:

- It categorizes all line items in the financial statements into two basic categories, **enterprise vs. financial**. Broadly speaking, enterprise activities are those that focus on the revenue generating process, while financial activities typically involve transactions with lenders and shareholders and investments in passive marketable securities.

	Enterprise	Financial
Income statement	Enterprise profit after tax: EPAT	Net financial expense after taxes: NFEAT
Balance sheet	Net enterprise assets: NEA	Enterprise or invested capital: [EC or IC] = Net financial liabilities [NFL] + Equity [EQ]
Cash flows	Enterprise cash flow: ECF	Financial cash flows [FinCF] = Cash flows for net financial liabilities + Cash flows for equity

One starts by identifying the financial items because they are less numerous. All items that are not classified as financial items must be classified as enterprise items. These enterprise items are the focus of the spreadsheet.

- It highlights the drivers of return on invested capital [or return on net enterprise assets].

Return on invested capital [ROIC] = EPAT/Invested capital.

Since invested capital = net enterprise assets, ROIC = EPAT/Net enterprise assets = Return on net enterprise assets [RNEA]

$$\begin{array}{c}
 \text{RNEA} = \frac{\text{Driver 1}}{\text{Sales}} \times \frac{\text{Driver 2}}{\text{Net enterprise assets}} \\
 \text{Enterprise profit margin after tax} \quad \text{Net enterprise asset turnover}
 \end{array}$$

- It derives enterprise cash flows and identifies its two drivers.

Enterprise cash flow (ECF) = EPAT – Change in NEA = NEA * (EPAT/NEA – Change in NEA/NEA)

$$\text{ECF} = \text{NEA} \times (\text{RNEA} - \text{growth in NEA})$$

- It shows two levels at which performance can be evaluated, and how leverage affects performance.

	Unleveraged or Enterprise level	Leveraged or Equity level
Ratio: Return on investment	Return on invested capital [ROIC]	Return on equity [ROE]
Numerator: Profit	Enterprise profit after tax [EPAT]	Net income [NI]
Denominator: Investment	Enterprise or invested capital [IC]	Equity [EQ]

One moves to ROE from ROIC by incorporating the effects of a firm's financial policy as follows:

$$\text{ROE} = \text{ROIC} + (\text{ROIC} - \text{after-tax borrowing rate}) \times \text{leverage}$$

After-tax borrowing rate = net financial expense after tax/Net financial liabilities

Leverage = net financial liabilities/equity.

1.1. Terminology

Ours	Alternatives used in practice
Enterprise profit after tax [EPAT]	Net operating profit after tax [NOPAT] Earnings before interest but after taxes [EBIAT] Unleveraged NI, prefinancing NI
Enterprise assets [EA]	Operating assets [OA]
Enterprise liabilities [EL]	Operating liabilities [OL]
Net enterprise assets [NEA = EA – EL]	Net operating assets [NOA = OA – OL]
Enterprise cash flows [ECF = EPAT – Change in NEA]	Free cash flows to the firm [FrCF or FCF] Unlevered cash flows
Financial assets [FA]	“Cash” or cash and marketable securities
Financial liabilities [FL]	Debt
Net financial liabilities [NFL = FL- FA]	Net debt = Debt – “Cash”

Enterprise activities are often referred to as operating activities. We do not use the word “operating” because there is ambiguity about its precise meaning. In particular, operating cash flows differ from enterprise cash flows.

1.2. Enterprise vs. financial activities: Motivation

Enterprise activities involve activities dealing with customers, vendors, and employees. Financial activities involve activities dealing with lenders, shareholders, and investments in marketable securities.

The following three closely connected reasons motivate splitting a firm's activities into enterprise and financial activities:

- Enterprise activities define a firm. The question "What does firm XYZ actually do?" is answered by a description of its enterprise activities. Financing activities enable enterprise activities but they are not the main activities. The question "How is the company doing?" must address the outcome of enterprise activities before addressing the outcome of financing activities.
- Enterprise activities are perceived as being positive NPV activities -- companies have an "edge" in their product/service offerings in markets that are less competitive than financial markets. Since it is hard for a firm to have an edge in competitive financial markets, financial activities are generally zero NPV activities. It follows that valuation centers on computing enterprise value as the present value of projected enterprise cash flows. One then subtracts the market value of net financial liabilities. In many cases, the market values of net financial liabilities are close to their book values.

- Enterprise assets and liabilities are likely to be driven by sales. In contrast, the level of financial assets and liabilities depend on a firm's financial policy, which is not directly related to sales. For example, a firm may finance its initial growth with a mix of debt and equity. As the growth slows down and it generates cash flows, it can pay down debt.

The spreadsheet defines financial assets and financial liabilities narrowly. Only cash, marketable securities, amounts owed to financial institutions (loans payable) and financial markets (bonds payable) are classified as financial items. One may argue that receivables and/or payables should also be treated as financial items if they are sufficiently close to the more "pure" financial/assets liabilities. In practice, this is rarely done, so the spreadsheet provides this option only implicitly via the category "other".

1.2.1. *Classifying enterprise and financial items: Consistency requirements*

Balance sheet	Income statement	Cash flows
Enterprise assets and liabilities	Enterprise profit after tax	Enterprise cash flows
Financial assets and liabilities	Net financial expense after tax	Financial cash flows

If an item is classified as an enterprise item on any one of the statements, then the related items on the other two statements must be classified as enterprise items. The same holds for financial items. Thus, interest income is a financial item only if it arises from financial assets and interest expense is a financial item only if it arises from financial liabilities. Thus, one should not automatically classify all interest income or all interest expense as financial items. For example, interest costs on pension and healthcare liabilities are enterprise items, not financial items, because the pension and healthcare liabilities are enterprise liabilities, not financial liabilities. Similarly, interest income from long-term customer financing receivables is an enterprise item because the receivables are classified as enterprise items.

1.3. Incorporating other comprehensive income for accuracy

1.3.1. *Other comprehensive income*

Some changes in fair value of assets and liabilities bypass the income statement and are included in "other comprehensive income." OCI appears in the statement of changes in equity. Examples of OCI items are foreign currency translation adjustments, adjustments to pension and healthcare assets and liabilities, gains and losses on cash flow hedges, and unrealized gains/losses on marketable securities.

Comprehensive income [CI] = Net income [NI] + Other comprehensive income [OCI]

From the perspective of the equity statement,

Comprehensive Income = Change in Equity + Net Dividends

1.3.2. *OCI items affect the derivation of cash flows*

One needs to incorporate enterprise OCI into the derivation of enterprise cash flows (ECF) as shown in the example below. Suppose the only event during a year is a change in exchange rates, which causes receivables of a foreign subsidiary to increase by \$10.

Inaccurate: Ignores OCI	Accurate: Considers OCI
EPAT = 0 (Change in receivables) = (10) = Enterprise cash flow = (10)	Comprehensive EPAT = 10 (Change in receivables) = (10) = Enterprise cash flow = 0

Non-cash changes in enterprise assets and liabilities due to enterprise OCI affect the balance sheet but not the enterprise profit after tax (EPAT). Two approaches can be used to correct for OCI in the derivation of ECF.

- ECF = EPAT – (Change in NEA - Change in NEA due to Enterprise OCI)
- ECF = Comprehensive EPAT – Change in NEA.

The spreadsheet uses the second approach because it is easier to implement.

1.3.3. *Adjusting for OCI to derive enterprise cash flows correctly*

The comprehensive section requires only two additional inputs from the equity statement as stated below:

- Comprehensive Income
- Financial OCI items, primarily unrealized gains/losses on marketable securities, and gains/losses due to hedging activities

It then infers Comprehensive EPAT as follows:

- Enterprise OCI = OCI – Financial OCI
- Comprehensive EPAT = EPAT + Enterprise OCI.

To derive the enterprise cash flows correctly, one must replace NI by comprehensive Income, EPAT by Comprehensive EPAT, and NFE by Comprehensive NFE.

The rest of the "comprehensive version" of the spreadsheet is otherwise no different from the first part, and thus the detailed steps have been omitted.

2. Detailed steps to be read with the spreadsheet

2.1. Income statement: Enterprise vs. financial activities

A simplified version of the income statement
Sales (S)
- COGS
= Gross profit
- Selling, general, & administrative expenses (SG&A)
- Research and development costs
= Enterprise profit or Earnings before interest and taxes (EBIT)
+ Financial income [=Financial assets * financial income rate (r_c)]
- Financial expense [=Financial liabilities * financial expense rate (r_d)]
= Earnings before tax (EBT) or profit before taxes (PBT)
- Tax expense [EBT * tax rate (t)]
= Net income (NI) to common equity
Less Net income attributed to non-controlling interest
Less Preferred dividends
= Net income attributed to common shareholders of the parent

Derivation of enterprise profit after tax using the bottom-up approach
Enterprise profit after tax = Net income + Net financial expense after tax
Net financial expense after tax = Net financial expense - Tax (benefit) allocated to net financial expense
Tax (benefit) allocated to net financial expense = - net financial expense * financial tax rate
For simplicity, we assume that all differences between the effective tax rate and the statutory tax rate arise from enterprise activities. In that case, financial tax rate equals statutory rate.

The "bottom-up" approach (which starts with net income) is simpler than the "top down" approach (which starts with sales) because of two reasons: (a) There are fewer financial items than enterprise items, and (b) their tax consequences are easy to identify.

Real financial statements are seldom this simple. They often have “other income” such as equity income and non-recurring items such as restructuring charges. Real companies also have other comprehensive income that is not included on the income statement.

2.1.1. *Derive enterprise profit before tax: Spreadsheet steps*

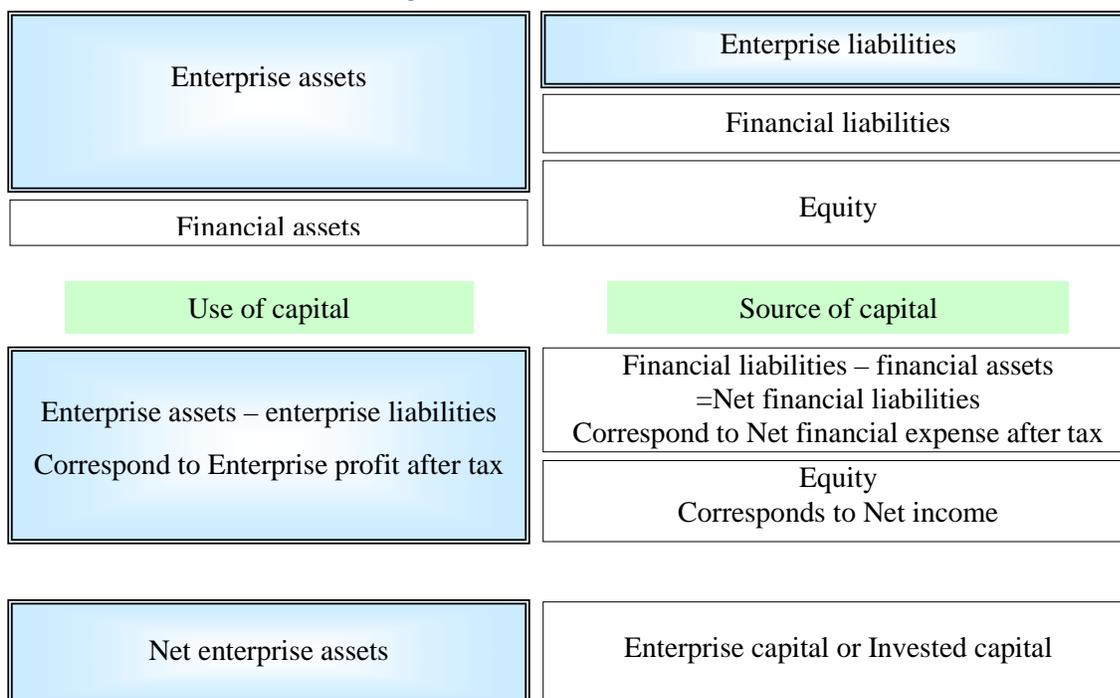
We are using the bottom-up approach to derive EPAT from NI.

1. Input: Net income (loss) to common equity. Enter loss as a negative number.

Income statement	Balance sheet
Net income before attribution to non-controlling interest and preferred dividends	Equity
Less: Income attributed to non-controlling interest	Less: Non-controlling interest
Less: Preferred dividends	Less: Preferred equity
= Net income to common equity	= Common equity

- 1.1. Reflects both enterprise and financial activities
2. Refer to NI in the input row.
3. Input: Financial expense as a positive number [FE]
 - 3.1. Primarily interest expense due to financial liabilities
 - 3.2. Occasionally gains (losses) on retirement of financial liabilities are also included here.
4. Refer to the input row for financial expense.
5. Input: Financial income as a positive number [FI]
 - 5.1. Primarily interest income and realized gains (losses) on financial assets
 - 5.2. Interest income might not be disclosed separately on the income statement. It may be netted against the interest expense or it may be in other income. You have to read the notes for details.
6. Refer to the negative of the input row for financial income.
7. Net financial (income) expense [NFE] = Financial expense – Financial income
 - 7.1. This is before taxes.
8. Input: Tax rate on financial activities [t_f]
 - 8.1. Typically, statutory federal rate [35%] adjusted for state and local taxes [2%]. Can be different if financial activities occur outside US.
 - 8.2. Some companies have tax-exempt financial income. That can also affect the tax rate.
9. Tax shield due to net financial expense = net financial expense (income) * tax rate on financial activities
10. Net financial expense after tax [NFEAT] = Net financial expense - Tax shield due to net financial expense.
11. Enterprise profit after tax [EPAT] = Net income [NI] + Net financial expense after tax [NFEAT]
 - 11.1. This is what the net income would be if the firm had no financial assets and financial liabilities. This is why it is called pre-financing or unlevered net income.

2.2. Balance sheet: Enterprise vs. financial activities



Examples [Include both current and non-current items for all subgroups listed below]

Financial assets: All assets that yield financial income below the enterprise profit line. For example, cash and marketable securities – current as well as non-current.

Enterprise assets = Total assets – Financial assets

Receivables, Inventories, prepayments and deferred expenses, net PP&E, strategic equity investments, deferred tax assets, intangible assets, net pension and health-care assets

Financial liabilities: All liabilities that yield financial expense below the enterprise profit line. For example, debt – current and non-current.

Enterprise liabilities = Total liabilities – Financial liabilities

Accounts payables, accrued expenses, deferred revenues, deferred tax liabilities, net pension and health-care liabilities

2.2.1. Enterprise capital or invested capital = Net financial liabilities + Equity

We now identify how the net enterprise assets have been financed.

12. Input: Equity
13. Refer to input for equity.
14. Input: Financial liabilities
 - 14.1. Typically, all forms of borrowings from financial institutions and markets.
 - 14.2. Give rise to financial expense on the income statement.
15. Refer to the input for financial liabilities

16. Input: Financial assets

16.1. Typically includes cash and short-term investments. As a practical matter, allocating cash to enterprise activities for liquidity needs is generally not worth the effort.

16.2. Financial assets are usually marked to market.

16.3. Long-term investments fall into two types:

16.3.1. Equity investments made for strategic reasons. These could be accounted for using the equity method or the cost method. Strategic equity investments should not be treated as financial assets.

16.3.2. Long-term debt investments and restricted cash. These should be treated as financial assets.

17. Subtract financial assets.

18. Net financial liabilities (assets) = Financial liabilities – Financial assets

19. Enterprise capital or invested capital = Net financial liabilities + Equity

19.1. Represents funds provided by outsiders that have been invested in the business

2.2.2. Enterprise assets

20. Input: Total assets

21. Refer to the input for total assets

22. Subtract financial assets entered earlier.

23. Enterprise assets = Total assets – financial assets

23.1. One can, of course, itemize and add all enterprise assets in a top-down approach. The bottom-up approach used here is easier and faster.

2.2.3. Enterprise liabilities

24. Total liabilities = Total assets - Equity

25. Refer to financial liabilities entered earlier.

26. Enterprise liabilities = Total liabilities – Financial liabilities

26.1. One can, of course, itemize and add all enterprise liabilities in a top-down approach. The bottom-up approach used here is easier and faster.

2.2.4. Net enterprise assets needed and their financing via invested capital

27. Net enterprise assets = Enterprise assets – Enterprise liabilities

27.1. Represents funds needed by the business to generate enterprise profit after tax.

28. Check: Net enterprise assets – enterprise capital or invested capital = 0

2.3. Cash flow statement: Enterprise vs. financial activities

The cash flow statements presented below do not follow GAAP. They are analytically useful ways of looking at cash flows.

Enterprise cash flow in the direct format [Conceptual]

Receipts from customers
 (Payments to vendors for goods and services, employees)
 (Capital expenditures)
 (Taxes on enterprise profits)
 = Enterprise cash flow

Enterprise cash flow in the indirect format

Enterprise profit after tax
 – Change in net enterprise assets
 = Enterprise cash flows

Enterprise vs. financial cash flows: Explaining the change in cash

Enterprise cash flow
 - Net payments for financial expenses (income) after tax
 - Net payments for financial liabilities
 - Net purchases of financial assets other than cash
 - Net payments to shareholders
 = Change in cash balance [aka net cash flow]

Enterprise vs. financial cash flows: Treating change in cash as a financial cash flow

The spreadsheet includes cash in financial assets, therefore, we get the following:

Enterprise cash flow
 - Net payments for financial expenses (income) after tax
 - Net payments for financial liabilities
 - Net purchases of financial assets: includes change in cash or net cash flow
 - Net payments to shareholders
 = 0

That is, enterprise cash flow + financial cash flow = 0

Reconciling GAAP cash flows to enterprise cash flows [Approximation]

Reported operating cash flows
 + Interest paid, net of tax
 - Interest received, net of tax
 = operating cash flows without financial items

Reported investing cash flows
 + Investments into short-term investments of cash such as securities
 = investing cash flow without financial items

Operating cash flows without financial items
 + investing cash flow without financial items
 = Enterprise cash flows

[This is an approximation because GAAP statements show only explicit cash flows while enterprise cash flows incorporate the effect of implicit cash flows such as non-cash capital expenditures.]

2.3.1. **Enterprise cash flows**

Enterprise cash flow equals the enterprise profit generated minus the investment needed in growing the net enterprise assets.

29. Refer to enterprise profit after tax derived earlier.
 - 29.1. The derivations in this section do not adjust for other comprehensive income. These adjustments are discussed later.
30. Subtract change in net enterprise assets.
31. Enterprise cash flow = Enterprise profit after tax – Change in net enterprise assets
 - 31.1. Advanced point that may be skipped: The equation above uses change in net enterprise assets from the balance sheet. We do not use adjustments for such changes from GAAP (or IFRS) cash flow statements. Usually the amounts of adjustments on the cash flow statements differ from changes in balance sheet items. These differences arise from four causes:
 - 31.1.1. Items included in investing section instead of operating section such as those due to acquisitions made for cash.
 - 31.1.2. Significant non-cash items such as capital leases and acquisitions in exchange for stock.
 - 31.1.3. Items included in equity such as stock compensation: There are three items of interest: (i) The stock compensation expense booked over the vesting period equals the fair value on the grant date. (ii) Cash received upon exercise equals the strike price. (iii) Cash paid to buy back stock equals the stock price on the exercise date. Thus, the net cash cost equals increase in stock price until exercise. Adjustments to enterprise cash flow for the difference between the compensation expense and the net cash cost and their related tax effects are beyond the scope of this document.
 - 31.1.4. Other comprehensive income items such as foreign currency translations, pensions, and healthcare liability adjustments. At the bottom of the spreadsheet, we redo the analysis using comprehensive income instead of net income.

2.3.2. **Financing cash flows [= - enterprise cash flows]**

If enterprise cash flows are positive, then cash is available for distribution to lenders and shareholders, or for investment in financial assets. If enterprise cash flows are negative, then cash must be raised by selling financial assets, borrowings from lenders, or contributions from shareholders. That is, the books must balance; i.e., enterprise cash flow + financial cash flow [including net cash flows] = 0.

32. Start with negative of the net financial expense after tax
33. Add increase (decrease) in net financial liabilities
34. Add increase (decrease) in equity due to financial activities such as contributions and distributions
 - 34.1. Net contributions (distributions) = Contributions – distributions = Change in equity – Net income
 - 34.2. Net contributions = - net distributions
 - 34.3. Net distributions are also called net dividends
35. Financing cash flows raised (distributed) equals the sum of the above items
36. Check: Enterprise cash flow created (needed) + Financial cash flow raised (distributed) = 0

2.3.3. *The concept of cash earnings: “Undoing” the accruals*

One of the criticisms of accrual accounting is the subjectivity of the accruals. Analysts therefore often want to assess what the earnings would have been had there been no accruals. Such earnings are called cash earnings. We show below how this concept relates to enterprise cash flows.

EPAT = Enterprise cash flows + Change in NEA

NEA represents enterprise accruals. Had there been no change in NEA, then EPAT would be equal to enterprise cash flows. Thus,

“Cash” EPAT = Enterprise cash flows

Extending this concept to the equity level is straightforward. We define cash earnings as follows:

Cash earnings = Enterprise cash flows – net financial expense after tax = EPAT – Change in NEA – net financial expense after tax = **NI – Change in NEA.**

The concept of cash earnings is further developed in FSA4.

2.4. Key metrics: Basic ratio analysis

2.4.1. *We use beginning balances for ratios instead of ending or average balances*

Ratios often involve balance sheet numbers. This spreadsheet uses beginning balances for ratios. For example, ROE = NI/Beginning equity and Leverage = Beginning net financial liabilities/Beginning equity. One can use ending or average balances instead as long as one uses them consistently.

2.4.2. *Growth*

37. Growth rate of sales = (Sales this year/Sales prior year)-1

37.1. Sales growth can include transitory elements due to acquisitions and foreign currency movements.

38. Growth rate in net enterprise assets = Change in net enterprise assets over the period divided by the net enterprise assets at the beginning of the period

38.1. If revenues grow faster than net enterprise assets, then net enterprise asset turnover improves, which, in turn, improves ROIC. [See computation of enterprise cash flow drivers below.] A qualification is necessary: the growth in sales may lag the growth in net enterprise assets. In such a case, the sales growth may look inadequate relative to the investment growth.

2.4.3. *Return on invested capital [ROIC]*

39. Return on invested capital = Profit earned on invested capital divided by beginning invested capital

39.1. Profit earned on invested capital equals hypothetical net income assuming no financial income or financial expense. This “unlevered” or “prefinancing” net income represents what the net income would be had net financial liabilities been replaced by equity. As derived earlier, profit on invested capital is the same as enterprise profit after tax.

39.1.1. To be consistent with our terminology, invested capital should be called enterprise capital. However, we will use the name invested capital to conform to the wide usage of this term.

39.1.2. Since invested capital equals net enterprise assets, return on invested capital is also called return on net enterprise assets.

39.2. ROIC is not meaningful if invested capital is negative. This can happen because of two unrelated reasons: (i) assets are understated due to conservative accounting, or (ii) firm relies on its suppliers for credit, i.e., it substitutes enterprise liabilities for financial liabilities.

39.3. As discussed later, ROIC is biased upward or downward depending on the sign of enterprise cash flows.

40. Input: Sales

41. Refer to the input for sales.

42. Enterprise profit margin after tax = Enterprise profit after tax/Sales

43. Net enterprise asset turnover = Sales/Beginning net enterprise assets

43.1. One can also use average net enterprise assets instead of beginning net enterprise assets

44.

$$\begin{aligned} \text{ROIC} &= \frac{\text{Enterprise profit after tax}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Net enterprise assets}} \\ &= \text{Enterprise profit margin after tax} \times \text{Net enterprise asset turnover} \end{aligned}$$

45. Check: ROIC – margin * turnover = 0

2.4.4. Enterprise cash flow drivers: ROIC and growth

ECF = EPAT – Change in NEA

ECF/Beginning NEA = EPAT/Beginning NEA – Change in NEA/Beginning NEA

ECF yield on net enterprise assets = ROIC – growth rate in beginning NEA

46. Enterprise cash flow yield = enterprise cash flow/Beginning net enterprise assets

47. Start with ROIC = EPAT/Beginning NEA

48. Less: Growth rate in net enterprise assets = Change in net enterprise assets over the period divided by the net enterprise assets at the beginning of the period

49. = Enterprise cash flow yield on net enterprise assets, which is the ratio of enterprise cash flow to beginning net enterprise assets

49.1. Highly valued companies are likely to have high RNEA and a high growth in sales and NEA. The high growth makes ECF less than EPAT. In fact, ECF is negative if the growth rate in NEA exceeds ROIC. Therefore, enterprise cash flows should not be used to measure wealth creation.

49.2. In the future, one expects ECF and EPAT will grow while ROIC can stay the same

50. Check: Enterprise cash flow yield: Enterprise cash flow/Beginning NEA

2.4.5. Equity performance [ROE]: Enterprise performance (ROIC) and leverage

$$\text{Return on equity [ROE]} = \frac{\text{Profit earned on equity}}{\text{Equity}} = \frac{\text{Net income}}{\text{Equity}}$$

r_d = Financial expense rate, after tax = Financial expense, after tax/Financial liabilities

r_c = Financial income rate, after tax = Financial income, after tax/Financial assets

We derive the following equation below:

$$\text{ROE} = \text{ROIC} + (\text{ROIC} - \text{net financial expense rate, after tax}) * \frac{\text{NFL}}{\text{Equity}}$$

The derivation runs as follows:

$$\text{ROE} = \text{NI}/\text{Equity}$$

$$= (\text{Enterprise profit after tax} - \text{financial expense, after tax} + \text{financial income, after tax})/\text{Equity}$$

$$= (\text{ROIC} * \text{IC} - r_d * \text{financial liabilities} + r_c * \text{financial assets})/\text{Equity}$$

$$= (\text{ROIC} * (\text{Equity} + \text{FL} - \text{FA}) - r_d * \text{FL} + r_c * \text{FA})/\text{Equity}$$

$$\text{ROE} = \text{ROIC} + (\text{ROIC} - r_d) * \frac{\text{FL}}{\text{Equity}} - (\text{ROIC} - r_c) * \frac{\text{FA}}{\text{Equity}}$$

Netting the FA and FL yields the equation we set out to derive.

51. $\text{ROE} = \text{Net income}/\text{Beginning equity}$

51.1. One can use average equity instead of beginning equity in the denominator.

51.2. ROE does not equal economic return if accounting is conservative. See discussion of ROIC above.

51.3. ROE is also not meaningful if equity is negative.

52. $\text{Net financial expense rate, after tax} = \text{Net financial expense, after tax}/\text{Net financial liabilities}$

53. $\text{Spread} = \text{ROIC} - \text{net financial expense rate, after tax}$

54. $\text{Leverage} = \text{Beginning net financial liabilities}/\text{Beginning equity}$

55. $\text{ROE after tax} = \text{ROIC after tax} + \text{Spread} * \text{Leverage}$

56. Check: $\text{Actual ROE} - \text{computed ROE} = 0$

Net financial expense rate, after tax can be negative. Consider the following example:

Financial tax rate	0%
Financial assets	100
Interest income rate	2%
Financial income	2
Financial liabilities	80
Financial expense rate	10%
Financial expense	8
Net financial expense	6
Net financial liabilities	(20)
Net interest rate	(30%)

Negative net interest rates are not meaningful. In such a case, one must separate financial liabilities and financial assets as shown next.

57. $\text{Financial expense rate } [r_d] = \text{Financial expense, after tax}/\text{Financial liabilities}$

58. $\text{Financial liabilities}/\text{Equity} [\text{FL}/\text{EQ}]$

59. Effect of financial liabilities on ROE: $(\text{ROIC} - r_d) * \text{FL}/\text{EQ}$.

59.1. $\text{ROE} > \text{ROIC}$ if $\text{ROIC} > r_d$, and vice versa.

60. $\text{Financial income rate } [r_c] = \text{Financial income, after tax}/\text{Financial assets}$

61. $\text{Financial assets}/\text{Equity} [\text{FA}/\text{EQ}]$

62. Effect of financial assets on ROE: $-(\text{ROIC} - r_c) * \text{FA}/\text{EQ}$

62.1. $\text{ROE} < \text{ROIC}$ if $\text{ROIC} > r_c$, and vice versa.

63. $\text{ROE} = \text{ROIC} + (\text{ROIC} - r_d) * \text{FL}/\text{EQ} - (\text{ROIC} - r_c) * \text{FA}/\text{EQ}$

2.4.6. *Bias in ROIC due to conservatism*

Both the denominator and the numerator of ROIC are affected by conservatism. The denominator is always biased downwards by conservatism. For example, companies omit R&D assets and book value of PPE is below its market value. The numerator, EPAT, is biased downwards by conservatism if NEA is growing, and vice versa. The overall bias in ROIC depends on the sign of enterprise cash flows (ECF).

Conservatism in NEA biases ROIC upwards if ECF is positive and downwards if ECF is negative.

This is shown below. We start with the bias in EPAT, the numerator of ROIC, and then discuss the outcome when one divides EPAT by the downwardly biased NEA.

$$\text{EPAT} = \text{ECF} + \text{Change in NEA} = \text{ECF} + \text{growth rate in NEA} * \text{Beginning NEA}$$

ECF is unaffected by conservatism. NEA is lowered by conservatism. However, on average, the growth rate in NEA is unaffected by conservatism. Therefore, the higher the growth rate in NEA, the bigger is the impact of understated NEA on EPAT.

Dividing both sides by the beginning NEA yields the following:

$$\text{ROIC} = \text{EPAT}/\text{NEA} = \text{ECF}/\text{NEA} + \text{growth rate in NEA}.$$

Since the growth rate in NEA is not affected by conservatism, the effect of biased NEA on ROIC depends on the sign of ECF.

The primary determinants of ECF are growth and the internal rate of return on the firm's investments. High growth firms generally have negative ECF. However, some high growth firms also have high IRRs, which make their ECF positive.

Given the importance of ECF, one can think of ECF/Enterprise Value as a "buy/sell" indicator; that is, ECF should be "bought as cheaply as possible." The analysis here suggests a caution: one needs to control for growth in NEA, or sales, or some combination thereof. Growth has an adverse effect on ECF, yet firms invest in growth when they have attractive investment opportunities.

2.4.7. *Debiasing ROIC: Market-based ROIC (MROIC)*

To scrub the effect of conservative accounting, one can replace the NEA in the denominator of ECF/NEA with enterprise value. Enterprise value equals market value of equity plus market value of net financial liabilities. We call our new measure market-based ROIC as defined below:

$$\text{Market-based ROIC} = \frac{\text{ECF}}{\text{Enterprise value}} + \text{Growth rate in NEA}$$

$$\text{Market-based ROE} = \text{MROIC} + (\text{MROIC} - r_n * (1-t)) * \frac{\text{MV of net FL}}{\text{MV of Equity}}$$

3. Questions addressed by the spreadsheet: Summary

FSA1 starts the analysis because it addresses the following core questions about a business:

1. Did the enterprise generate or use enterprise cash flows (ECF)? How did the two drivers of ECF – return on invested capital (ROIC) and growth in net enterprise assets (NEA) – influence ECF?

2. If the ECF was positive, how much was paid to lenders, distributed to shareholders, or kept as financial assets. If the ECF was negative, then how much was borrowed from lenders, received from shareholders, or received from liquidating financial assets?
3. Regarding the first driver of ECF, what was the ROIC? What were the levels of the two components of ROIC namely enterprise profit margin after tax and net enterprise asset turnover? (These metrics are essential to valuation in the VAL1 spreadsheet.) That is, is it a high margin business or a low asset intensity business relative to other firms or industries?
4. Are the net financial liabilities positive or negative? What was the ratio of the net financial liabilities to equity? What was the spread between after-tax ROIC and after-tax interest rate? How did leverage and spread cause ROE to differ from ROIC?
5. Compare the growth in sales to the growth in invested capital. Does the difference reflect positively, or negatively, on net enterprise asset turnover?