Integrated 3 Statement Forecasts – Linking the Balance Sheet, Profit and Loss and Cash Flow statements

Start with the balance sheet:

$A = L + OE$

Look at the changes (Delta, Δ) in each amount since last year. So for example, $\Delta A = A1 - A0$ where now is time 1 and last year was time 0.

$\Delta A = \Delta L + \Delta OE$

Break these changes in the balance sheet items into their current and non-current components:

$\Delta CA + \Delta NCA = \Delta CL + \Delta NCL + \Delta OE$

Make the following 4 substitutions:

ΔCA = ΔCash + ΔCAExclCash

ΔCL + ΔNCL = ΔCLExclIBL + ΔNCLExclIBL + ΔIBL,

Where ΔIBL = Increase in interest bearing liabilities such as loans, bonds, debentures, promissory notes and bank accepted bill liabilities, but not employees' long service leave liabilities (a type of NCLExclIBL), for example, which bear no interest.

ΔNCA = ΔPPEAndIntangibles + ΔNCAExclPPEAndIntangibles

Note that ΔNCAExclPPEAndIntangibles includes ΔDTA (increase in deferred tax assets), and ΔNCLExclIBL includes ΔDTL (increase in deferred tax liabilities) which both belong in the category OperatingCashflows, whereas ΔPPEAndIntangibles belongs to InvestingCashflows.

$$\Delta OE = \Delta ContributedEquity + \Delta RetainedEarnings + \Delta Reserves$$

$$= \Delta ContributedEquity + (NetIncome - Dividends) + \Delta Reserves$$

$$= (EquityRaisings - Buybacks) + (NetIncome - Dividends) + \Delta Reserves$$

$$= NetIncome + \Delta Reserves - EFCF$$

After substituting:

$$\Delta Cash + \Delta CAExclCash + \Delta PPEAndIntangibles + \Delta NCAExclPPEAndIntangibles =$$

$$\Delta CLExclIBL + \Delta NCLExclIBL + \Delta IBL + \Delta ContributedEquity + NetIncome - Dividends + \Delta Reserves$$

Re-arrange these so they're grouped into the 3 categories of the cash flow statement, $\Delta Cash = OperatingCashflows + InvestingCashflows + FinancingCashflows$:

$$\Delta Cash = NetIncome - (\Delta CAExclCash - \Delta CLExclIBL - \Delta NCLExclIBL + \Delta NCAExclPPEAndIntangibles) - (\Delta PPEAndIntangibles - \Delta Reserves) + \Delta IBL + \Delta ContributedEquity - Dividends$$

Let Depr = depreciation + amortisation from the P&L, and then add and subtract Depr in two separate places on the right hand side of the equation, which is like adding zero:

$$\Delta Cash = NetIncome + Depr - (\Delta CAExclCash - \Delta CLExclIBL - \Delta NCLExclIBL + \Delta NCAExclPPEAndIntangibles) - (\Delta PPEAndIntangibles + Depr - \Delta Reserves) + (\Delta IBL + \Delta ContributedEquity - Dividends)$$

$$= OperatingCashflows + InvestingCashflows + FinancingCashflows$$

Where:

$$OperatingCashflows = NetIncome + Depr - (\Delta CAExclCash - \Delta CLExclIBL - \Delta NCLExclIBL + \Delta NCAExclPPEAndIntangibles)$$

$$= NetIncome + Depr - \Delta NOWC$$

InvestingCashflows = - (ΔPPEAndIntangibles + Depr - ΔReserves)

= - CapEx

FinancingCashflows = ΔIBL + ΔContributedEquity - Dividends

= ΔIBL + EquityRaisings - Buybacks - Dividends

Notes:

ΔReserves is assumed to be the increase in asset revaluation reserves. Other types of reserves such as 'foreign currency translation reserves' are not addressed in these formulas. However, the *forecast* increase in foreign currency translation reserves would normally be expected to be zero since significant foreign exchange rate changes are difficult to predict in an efficient market.

ΔIBL = DebtNow - DebtBefore, where Debt is the same as interest bearing liabilities (IBL).

= DebtBefore*(1+rD)^1 + DebtRaisings - DebtRepayments - DebtBefore

= DebtBefore + DebtBefore*rD + DebtRaisings - DebtCouponAndPrincipalPayments - DebtBefore

= DebtBefore*rD + DebtRaisings - DebtCouponAndPrincipalPayments

= IntExp - DebtCashFlowToDebtHolders

Where: DebtCashFlowToDebtHolders = DebtCouponAndPrincipalPayments - DebtRaisings

Note that IntExp is an accrual and is defined by accountants as Debt0*rD (rD is yield to maturity), it's not necessarily a cash flow paid to anyone. For example, zero coupon bonds incur IntExp yet pay no coupon.

FFCF = DebtCF + EFCF

Remember that equity free cash flow equals:

EFCF = -EquityRaisings + Buybacks + Dividends

= -ΔContributedEquity + Dividends

Substitute this EFCF and ΔIBL into the ΔCash formula and re-arrange into the form firm free cash flow, FFCF = DebtCashFlowToDebtHolders + EFCF:

ΔCash = NetIncome + Depr - (ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles) - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp - DebtCashFlowToDebtHolders – EFCF

FFCF = DebtCashFlowToDebtHolders + EFCF

= NetIncome + Depr - (ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles) - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp - ΔCash

ΔCash: Add to ΔNWC or DebtCashFlowToDebtHolders?

FFCF = DebtCashFlowToDebtHolders + EFCF

= NetIncome + Depr - (ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles) - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp - **ΔCash**

There's two ways to think about the increase in the firm's cash holdings since last year, **ΔCash**. You can add it to the:

- Increase in Net Working Capital (ΔNWC) if you think the extra cash is needed to keep the business solvent, for example, as an extra cash buffer to be able to pay employee wages and trade payables on time. Let's call this **ΔCashForBusinessSolvency**; or
- DebtCashFlowToDebtHolders (also called DebtCF) since an increase in 'cash at bank' deposits is really lending to the bank, which is one of the

firm's debt-holders, hence why it's a positive cash flow to the debt holder. A negative ΔCash would be a negative cash flow to the debt holder, the bank, which is equivalent to borrowing more or lending less. Let's call this amount **ΔExcessCash**, since ordinary non-financial firms' core business is not lending to the bank, so any cash they have sitting in the bank in excess of what's needed to stay solvent is unnecessary and in excess of their requirements.

Some analysts even see this idle cash as wasteful, and advocate for it to be paid to debt or equity holders. For example, in 2014 activist investor Carl Icahn pressured Apple's CEO Tim Cook to distribute it's huge excess cash pile to shareholders via a share buyback.

Break the increase in cash into its two components:

ΔCash = ΔCashForBusinessSolvency + ΔExcessCash

Remember the firm free cash flow formula:

FFCF = NetIncome + Depr - (ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles) - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp - **ΔCash**

Replace **ΔCash** with its components:

FFCF = NetIncome + Depr - (ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles) - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp - **ΔCashForBusinessSolvency – ΔExcessCash**

Break the FFCF down into that which is paid to debt and equity holders:

FFCF = DebtCashFlowToDebtHolders + EFCF

Then re-arrange the formula so that **ΔCashForBusinessSolvency** is in the ΔNWC section and the **ΔExcessCash** is part of DebtCashFlowToDebtHolders:

DebtCashFlow**Ex**cludingExcessCash + **ΔExcessCash** + EFCF = NetIncome + Depr - (**ΔCashForBusinessSolvency +** ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles) - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp

This can be re-written as:

DebtCashFlow**In**cludingExcessCash + EFCF = NetIncome + Depr - ΔNWC - (ΔPPEAndIntangibles + Depr - ΔReserves) + IntExp

Where:

DebtCashFlow**In**cludingExcessCash = DebtCashFlow**Ex**cludingExcessCash + **ΔExcessCash**

ΔNWC = **ΔCashForBusinessSolvency +** ΔCAExclCash - ΔCLExclIBL - ΔNCLExclIBL + ΔNCAExclPPEAndIntangibles

Modelling CashForBusinessSolvency using the 'percent-of-sales' method

CashForBusinessSolvency on the balance sheet can be modelled as a constant proportion of revenue, called the 'percent of sales' method.

So if revenue is forecast to grow then **CashForBusinessSolvency** will be also be forecast to grow by the same proportion. For example, say now is time zero and the firm's financial statements were just released, and you wanted to forecast cash next year at time 1, then:

CashForBusinessSolvency1 = Revenue1*(CashForBusinessSolvency0/Revenue0)

Cash1 = Cash0 + **ΔCashForBusinessSolvency + ΔExcessCash**

Where **ΔExcessCash = ΔCash - ΔCashForBusinessSolvency**

Negative ExcessCash: Funding Shortfall

ExcessCash may be negative for high growth firms with high CapEx and ΔNWC, or firms that are paying out large cash flows to their debt and equity holders.

Negative ExcessCash indicates a funding shortfall. You can't leave the balance sheet amount ExcessCash as a negative number, so often 'if' statements are used to make overdrafts equal to ExcessCash multiplied by minus one if ExcessCash is negative, and make the ExcessCash show zero rather than the negative number.

But be aware that overdrafts are an expensive way to fund a business due to their high interest rate. So rather than forecast huge overdrafts, it's best to increase the forecast amount of longer term debt funding such as loans or bonds until overdrafts are smaller, or decrease equity payouts such as dividends and buybacks, or increase equity raisings through rights issues, for example, which boost ContributedEquity.