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About the financial and cash-flow models

There would be two sets of forecasting models. One that the firm uses and might be made available to professional investors with or without management's assumptions and forecast exogenous variables. The second would be a simplified one made available to all and published in the CORE report and on the website with all the simplified assumptions and exogenous variables and data. This would allow any stakeholder to run the model with their own assumptions and perform their own sensitivity analysis and stress tests. We think that we should probably enforce a no-questioning of the model, the assumptions, any exogenous data, or the results except by the auditors (obviously) and at the AGM. Otherwise we could imagine management time taken up with many questions on the model, the modelling process and the assumptions.

So the actual forecasting model used by the company in its published forecast may be based on a more complicated model. The one that is published for users to run can be much simplified. However, it should be capable of producing a similar forecast (say a profit or turnover figure within 10% or so for at least three years out). If the model can't then there should be an adjustment factor and some explanations of why the two models could not produce results within the 10% margin.

Of the elements in a forecast, the most important element is the cash-flow forecast. We have used the word physical variables. By that we mean items such as units of production, units of sales, these might be by type or line, sector/segment, operating units, or broken down into something that makes sense for that particular company. It also would encompass raw material costs of the same items, headcount by classes of wage range. The one would need all the price cost data on a unit basis. Of course, some companies, services, would need to fashion a typical project (e.g. a building project) and then gross up from that typical project. Cost would be subject to a mix variation. Prices too – if there is a more expensive set of products or services being sold then that would be a higher unit price and perhaps margins.

This is not a book about financial modelling – Krish has written several, so we are not going to dwell on the mechanics. But we believe that every director on a board should be capable of building and running a financial model. And understanding its consequences.

What we have done is to provide more information about financial models for forecasts in Appendix 14.7. Here the fundamentals of the basic set of variables and financial pretenders are specified, and we hope to develop a set of these industry specific with the aid of one of the accounting and consulting firms. These will be presented in Appendix 14.5 with links to other sites.

However, the build-up of the revenue figures of Whitbread's Premier Inn hotel division and the Costa coffee division provides some flesh from which a financial model could be derived.

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Whitbread revenue build up for financial modelling and forecasting purposes

An example of how to build up a revenue figure is given below in relation to Whitbread.

Hotels revenue build-up: NFIs and KPIs.

Macro assumptions. Good to have an econometric model from macro assumptions to the number of hotel rooms demanded.

Assumption about competition for the relevant segments.

Hotel markets split by segment (Business, tourists, overseas and UK). This would then lead to a forecast of the number of rooms for each type. Then this would split down, with assumptions, the total UK hotel market (which Whitbread do 2011 to 2017 and then a forecast for 2017 and 2021

Whitbread split this into budget branded, other branded (probably Travelodge, Days Inn, Ibis Budget and others) and independents. It has a share for each. We would like to split this down to the major competitors (which Whitbread does not do understandably) and the market share assumptions (which Whitbread does) for each segment. Then we need occupancy rates for each segment. (Whitbread has an aggregate figure). Then an average price per room and average restaurant spend for the hotels. Supply side constraints and influencing variables.

For the separate restaurants, we need a similar type of analysis leading down to table occupancy rates for the number of sittings or table places, and an average spend per seat/place, and any mix changes or assumptions.

On quality, Whitbread has its own measures which look realistic. But we would like some more independent survey data over time and assumptions about the future; and any impact on occupancy or average price mix.

We might also want a mix effect for forecasting, especially if the group is likely to go upmarket.

Coffee revenue build up: NFIs and KPIs.

Macro and weather assumptions.

Assumption about competition for the relevant segments. Here three major competitors are Starbucks and Caffè Nero plus a string of smaller chains.

The Costa group non-financial information and KPIs is less sophisticated. Not only do they probably face more competition, but their approach to performance measurement, may be, we feel, flawed. But then we do have a wealth of experience of building thousands of financial and forecasting models, and we know the critical non-financial variables for most industries and sectors. Krish feels that the Manchester City Football Club model was most challenging. Whitbread measure as their main KPI a variable defined in 'total system sales' measure as a monetary value. We would like to build this up from:

- Macro assumptions
- Demand for coffee split by segment
- Routine demand for coffee units from coffee bars UK total and coffee units from express machines UK total
- Market shares
- Average sales per transaction including mix assumptions about what is sold
- Factors that may influence footfall independent of total market considerations

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- Factors that may affect average mix price
- Supply side influencing variables.

Business cycles

In terms of business cycles, we recommend the usual adoption of a cycle being shown for the current year and at least two or three further years, then a bridge and then trend values from then onwards. The bridge is just a figure numerically averaged between the last cycle year and the next trend year. See Box below. Though once all the solved values are made the figure may look very different. This may defy logic but allows the reader to judge what would happen if the business cycle switched. If the company believes that there will be no impact of a business cycle then it could provide just a cycle year for all forecast years. Some firms do not believe in cycles, or they think they are irrelevant. Then whatever assumption about business cycles are made, should be explicitly stated.

Box: Cycle, bridge and trend forecasts						
Current Year	**Year+1**	**Year+2**	**Year+3**	**Year+4**	**Year+5**	**Year+6**
Cycle	Cycle	Cycle	Cycle	Bridge	Trend	Trend

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Sensitivity analysis and a classification of variables
Box 14.7 shows a classification of variables in a financial forecasting model. The independent or exogenous variables are the ones that might change and upset any forecast – such as exchange rate changes (and outside the control of the company). Hence sensitivity analysis is used to assess the impact of changes in these independent or exogenous variables.

Sensitivity analysis is a technique used to determine how different values of an independent variable (normally exogenous such as exchange rates) impacts on a particular dependent variable (such a profit, or cash-inflows) under a given set of assumptions which are normally held constant. So, one variable such as exchange rates can be varied systematically to show the impact on profits.

Stress test creates a whole scenario of changes to these exogenous variables and may be some endogenous variables. It simulates the effect of a serious crisis with many things going wrong simultaneously. The model is run with these pessimistic assumptions to see how resilient the forecasts are when a whole plethora of bad news is assumed. And if the forecasts are not good what has to happen to enable the company to survive.

So we propose that management should undertake a series of stress tests with or without residual action to enable the company to survive. The firm should, as of now, consider resilience in 'severe but plausible' scenarios. In this case sensitivities being the impact on forecasts of combined risks not just specifically identified risks in isolation. We haven't seen much evidence of this being undertaken as of 2018, but we think this should be undertaken and documented at board level with these financial and cash-flow models. We also think the external auditors should make their own runs under the combined effect of a range of assumptions and sensitivities and document those. Both sets should be available to public scrutiny – at least in what the combined effect of certain variables is on the firm's profit and cash-flows over the six-year forecast period. There should be some combined set of assumptions run under sensitivity analysis which shows a poor result. If this is not undertaken then the model has not been designed correctly.

EY in their report on viability suggest two further tests[1] on the current viability regulations. Again, we have not found much evidence of this in practice though this is the FRC recommendation. But this is useful in connection with our financial model:

1) Reverse stress testing – flexing forecasts to the extent necessary to 'bust the business', then considering mitigating actions.
2) Headroom considerations – after applying sensitivities, how much headroom does the business have in terms of, for example, cash and covenants?

What it takes to bust the business is very important. Now it may be that the company does not want to publish precise figures. So, this could be summarised in words stating that a fall in sales of 20% and the GB pound falling by 15% coupled with wage rates increasing by 12% and

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[1] http://www.ey.com/Publication/vwLUAssets/EY-The-viability-statement-March-2015/$FILE/EY-The-viability-statement-March-2015.pdf

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production issues causing a loss of production of 14% of planned production, etc., would lead to a breakeven situation and a required increase in borrowing of, say, £526m. Or even Capita's right issues netting £662m.

For the largest companies whose profitability is marginal, one could even envisage a situation where the FRC, or some official body, conducts (and may be publishes) their own parallel stress tests using the company financial model.

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Box: Classification of variables in a financial forecasting model

Policy variables
> Products, markets, outlets. Online
> Number of customers/visitors/visits, footfall, etc.
> Pricing
> Capacity (may be a function of other variables and solved for)
> Fixed costs (may be a function of other variables and solved for)
> Acquisitions, disposals and mergers (may be a function of cash-flows and profitability)
> Financing – debt and equity issues (might be solved for)
> Capital expenditure (may be a function of other variables and solved for)
> R and D, product development
> Dividends (though this could be solved for i.e. dependent on a number of

conditions)
> Reaction to competitor actions
> Payment terms (customers, suppliers and contractors)
> Inventory control policy
> Quality factors
> Purchasing strategy
> Productivity and automation
> IT, telecoms and software
> Loyalty policy

Exogenous variables
> Macroeconomic growth and performance
> Inflation
> Exchange rates
> Taxation (which might affect sales and production)
> Interest rates
> Behaviour of competitors

Endogenous variables
> Volume sales
> Product/pricing mix
> Production
> Variable headcount
> Variable material costs
> Corporate tax
> Debtors and creditors
> Stock and inventory levels

Accounting variables
> Depreciation
> Provisions
> Valuation