9

Relative (multiple) valuation models

Multiples for valuation purposes are a ratio between a market value and an accounting item. These come in various forms, with Price/Earnings (P/E), Price/Book (P/B) and Enterprise Value/EBITDA, as the most commonly used. P/E and P/B relate the market value of equity to the earnings or book value belonging to the same capital, EV/EBITDA (Earnings before interests, taxes, depreciation and amortisation) relate the combined market value of equity and debt capital to the (broadly defined) operating profit to be split between the owners of these claims.[14]

Multiples primarily serve three different purposes:

- To value a company using the relevant multiples from comparable companies and multiplying with the related accounting item (denominator) for the company being valued.
- To test the plausibility of forecasted cash-flows by estimating the implied multiples from a DCF-valuation model and comparing these to those of comparable companies.
- To identify how the market views a company's performance and strategic position compared to its competitors.

Generally speaking, multiples valuation has the benefit of simplicity and immediate market calibration, compared to a DCF valuation. The main challenge is that one needs to settle on only *one* accounting number for

[14] A range of different valuations multiples are being used, often adapted to specific market, industry or state conditions.

the denominator, thus leaving no opportunity to include expected future developments. In most cases finding truly comparable companies is also particularly challenging.

9.1 Selection of peers

In a valuation analysis, e.g., of a private company, it is challenging to find a sufficiently broad and still relevant set of peer companies. For example, there are only slightly more than 200 listed companies on the Oslo Stock Exchange, and the industry mix is rather biased, thus making it particularly challenging to find peers in industries that are not well represented here. In addition to the need to find companies in the same industry, one preferably should also find companies of comparable size, scope (activities and geography), development stage and riskiness.

In a valuation recognizing ESG issues, these challenges come in addition to the already demanding task of finding comparable companies. A starting point is to compare the current status of the companies regarding those main ESG issues that are deemed material in their industry. A related approach could be to adjust the profit or capital multiple denominators for known effects from recognizing ESG risks, costs or opportunities. In general, ESG status is more relevant for finding comparable companies and assessing development levels, than to be applied directly in a multiples valuation, unless the other main valuation items are sufficiently similar.

9.2 Combining and comparing DCF vs. multiples models

Figure 9.1 provides an example of how key parameters in a DCF valuation relate to an enterprise value valuation multiple. These parameters of growth, cost of capital, tax and return on invested capital may either be assumptions behind the DCF valuation or estimated following a DCF analysis.

In addition to analysing the consistency across different valuation models, this approach also allows the estimation of implied parameters in cases where the value is reliably observed in a transaction or a market.

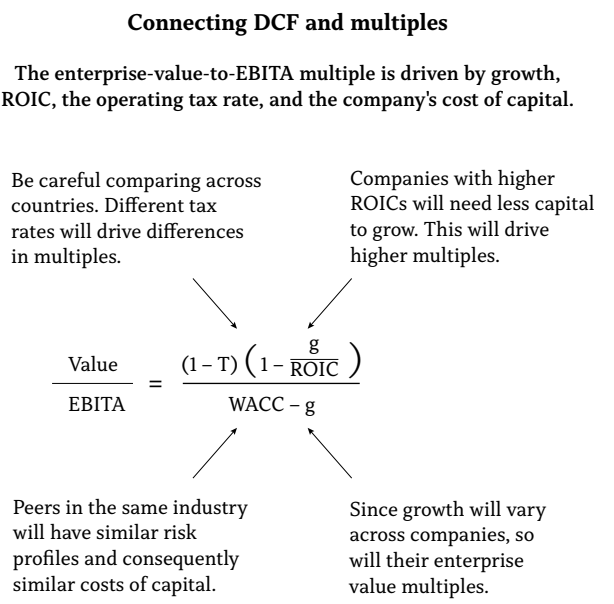

Figure 9.1 Comparing DCF parameters and multiples. Source: NHH.

9.3 Scenarios

Scenario analysis is a straightforward idea: instead of modelling the average expected cash flow for the firm, we model several different outcomes. Often these reflect a good, medium and bad state of the world. However, one can also model specific material developments like high versus low CO_2 taxes to look at the impact of specific measures.

Take the example of an airline or cruise (shipping) company. Regarding the Covid-19 pandemic, they both lacked meaningful alternatives to CO_2 based technologies. Their value would then depend upon 1) the arrival of non-CO_2 based technologies, 2) taxation of CO_2, and 3) changes in preferences among consumers. Additionally, and along a different dimension, their value fundamentally depends on the distribution of an effective Covid-19 vaccine.

One approach to modelling will then be based on different assumptions when these technologies become available and/or changes to CO_2 taxes:

early technological arrival coupled roughly with relatively low taxes and a scenario with late technological arrival coupled with high taxes. Each scenario is then weighted by its probability to get an average cash flow. On top of this comes likely scenarios regarding the impact of the Covid-19 developments.

For example, this approach also allows the analyst to consider the probability for stranded assets since it can include a scenario where assets are stranded and one where they aren't. We cover stranded assets in more detail in Section 10.

Scenario analysis has two main components: the specific scenarios based on a consistent set of assumptions for a development, and the probabilities for each alternative scenario. There exist various generic sources for both, e.g. "The Network for Greening the Financial System's Climate Scenarios for central banks and supervisors"[15]. Their scenarios, sorted in a 2 *x* 2 matrix of physical risks and transition risks are shown in Figure 9.2. Such scenarios typically take a societal perspective and describe high-level scenarios well but are less clear on probabilities. In a scenario-based company valuation, one needs to develop company-specific scenarios on the back of more generic ones, as well as the related probabilities. Note that scenario analysis like the climate scenarios developed by NGFS, is a methodology that may also be used to model any other possible ESG-related events with varying probabilities and conditional outcomes.

[15] www.ngfs.net/sites/default/files/medias/documents/820184_ngfs_scenarios_final_version_v6.pdf

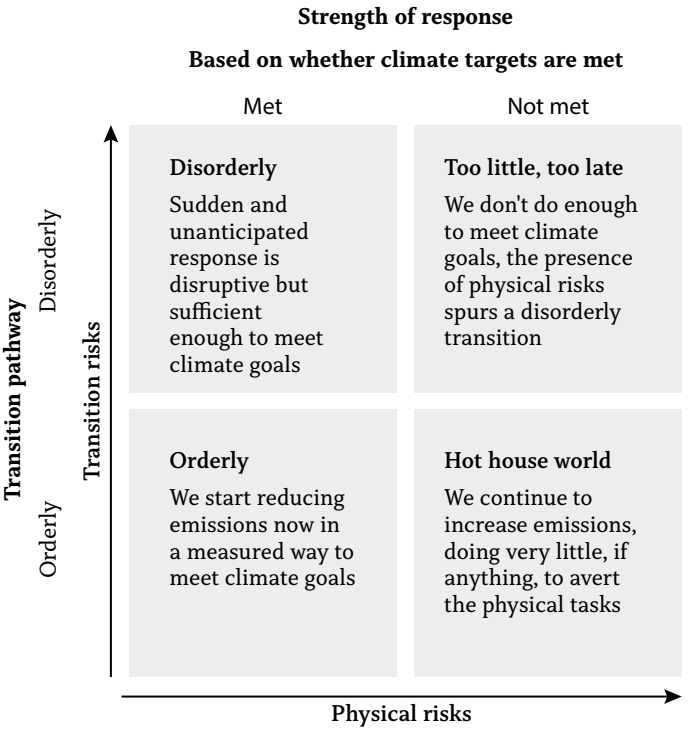

Figure 9.2 NGFS Climate Scenarios Framework. Source: NGFS (2019a).

9.4 Optionality

Real options are a powerful yet underutilised tool for dealing with informational uncertainty much better than standard DCF methods. A standard introduction can be found in most corporate finance textbooks such as (Berk & DeMarzo, 2020).

We will consider two types of options here. A standard type of real option is the option to expand production. We will focus on this case first. In our case we can easily see the use of such an option: Firms that produce environmentally friendly products can invest now and see if future demand rises to expand production.

How does one spot the option? Two conditions are necessary:

- Information will become available in the future.
- This information affects our decision.

How does one value the option? As in pricing of financial options, two methods are available, namely binomial option pricing and an approach based on the Black Scholes formula. Both have advantages and disadvantages. In any case, two inputs need to be adapted. The "strike" (exercise) price for the option and the value of the stock. We note that the strike price of the real options is simply the investment amount whereas the stock price (or firm value) is simply the value of the project (excluding the investment amount):

- Strike Price = Investment Amount
- Stock Price = Project Value

Finally, a measure of uncertainty is necessary. At its simplest, this can be a guesstimate of something like: we have a 50% chance of winning this lawsuit.

These probabilities should reflect the riskiness of the underlying asset. For more advanced methods of getting probabilities, the chapters in (Berk & DeMarzo, 2020) for example, are a good starting point.

Lawsuits or past liabilities can be valued as a real option too, but we need to change our setup somewhat. Typically, we assume being "long" in the option, meaning we get the benefit of the option. Losing a lawsuit means that we might receive a large negative shock to the firm. That means we have to think of being "short" in the option. Being short in a call option can potentially mean unlimited losses and provides a good framework for thinking such possibilities. This methodology captures situations where a requirement for compensation for past liabilities effectively causes bankruptcy and liquidation of the company, and thus normally wipes out the equity.

9.5 Additional issues

Companies are dependent on authorities for licenses and approvals, and financial institutions for financing. In both cases, the counterparties are increasingly aware of the ESG dimensions. Thus, in a valuation model these provide license to operate as well as controlling access to financing. Some examples of additional issues are:

- Government policies include firm-specific support schemes to finance the transition towards more sustainable operations. These are general and industry-specific, grants and loans, and from national and supra-national sources, e.g., from the European Commission.
- Banks are including sustainability assessments and requirements in their credit assessments, and these criteria may limit access to funds, impact credit margins and/or result in new covenants. See the discussion in Section 3.3.1 above.
- Insurance companies may deny property/casualty-coverage for companies with particularly high exposure on ESG issues that represent real risks to the insurers, e.g., flooding.
- The government itself, both when granting various licenses and when procuring various products, may enforce strong ESG-based criteria that forces the private companies to recognize these challenges to be allowed in contracts with local or national governments.