OPTIMUM
CONSULTING

Lower the risk of overpaying for your next acquisition

By Jens Wrang

Numerous analyses have documented that a majority of company acquisitions end up as financial failures because the price that was paid exceeds the value.

The reasons behind the tendency to overpay surely varies. However, without relevant information on the table, factors such as the human overoptimism about the likelihood of success, the economic worldview promoting and demanding growth along with the managerial strive for results, are likely to play a decisive role in the pricing process and increase the risk of overpaying.

The information needed to make informed pricing decisions is, however, easily provided: By working out an integrated sensitivity analysis of the valuation of the target company, the relationship between a price and the expected value of the company can be established and used actively in the pricing process.

The valuation of a company is based on an assessment of the future financial results of the company in question. The assessment is based on an estimation of the parameters that are decisive for the company's future value creation including growth in revenues and earnings and the ability to utilize the capital invested.

The estimation of the parameters is an assessment of the future to find the most likely outcome of future states and will as such always involve elements uncertainty. As a result, the valuation in itself is uncertain and the value resulting from the valuation will represent the most likely value.

To make active use of the valuation, the total sample space of all possible values resulting from the use of all combinations of likely values of the key parameters needs to be established and described. With this information at hand, it becomes possible to evaluate the price on a relevant scale: The likelihood that the value is higher or lower than a given price, subject to the uncertainty of the combined set of parameters upon which the valuation is based.

The relation between price and value

Likelihood that value exceeds price
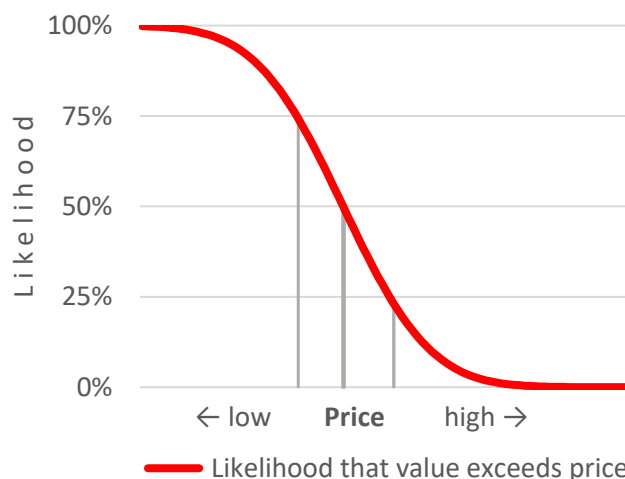
This relationship between price and expected value may be described as a "Z-curve" and the derivation of it and an example of it's use follows below.

An integrated sensitivity analysis and the Z-curve

The likely sample space for the value of a company can be found by estimating the likely interval and statistical distribution of each of the key parameters on which the valuation is based, and include them in a combined calculation, which is repeated a large number of times, with the parameters being changed randomly for each recalculation. – A so-called Monte Carlo-simulation.

In a typical company valuation, the key parameters used are the current normalized cash earnings and the short-term growth rate of these, the level of return on invested capital, the long-term growth rate and the discount factor.

The outcome of the simulation is a normal distributed sample space[1] showing the number of scenario results within each of a number of equally large value-ranges that the total span of possible values has been divided into. The result is illustrated in Exhibit 1., where the distribution function, the "S-curve", shows the share of scenarios, which results in a lower value than indicated by the S-curve. By mirror inverting this curve, the "Z-curve" is obtained.

The Z-curve is illustrated in Exhibit 2. and shows the share of scenarios which, at a given price, results in a higher estimated value. The repeated simulations allow for this statistical description of the relationship between price and estimated value of a company measured on a relevant scale, namely the likelihood that the estimated value is higher than a given price.

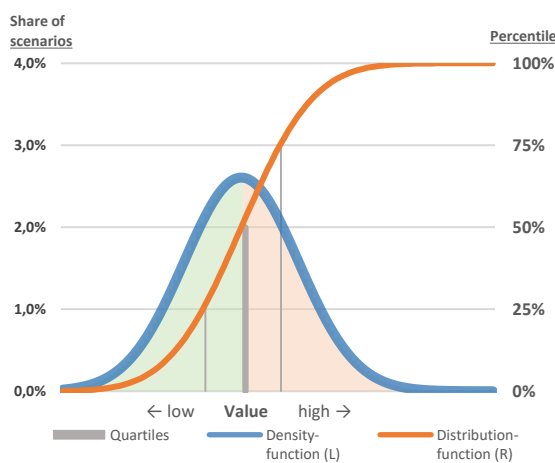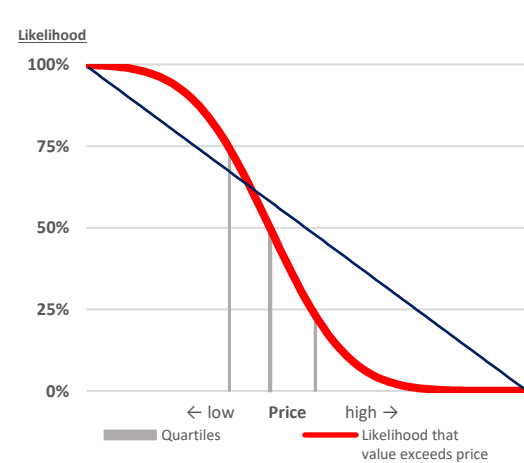### Exhibit 1. The sample space for value

Exhibit 2. Price relative to estimated value

The Z-curve is key to understanding how high or how low a price is relative to a valuation. There is a common tendency to evaluate consequences of changes linearly on a scale, but as Exhibit 2. very clearly shows, then according to the statistical sample space (the derived red Z-curve) the decline in the likelihood that the estimated value is higher than the price is much faster relative to a linear way of thinking (illustrated by the blue diagonal).

If you know the sample space for the value and the Z-curve, you can make active use of a company valuation. It then provides valuable information in deciding the price, which may be offered in the attempt to acquire a company; in evaluating an offer received in the course of selling a company; or in assessing whether a book value of a company is reasonably fair.

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[1] A normal distributed histogram and distribution function. In Exhibit 1., the bars of the histogram are shown as an area under the density function.

An example

Knowledge of the shape of the Z-curve can be crucial to avoid financial failure and destruction of value. One example is an investor who is about to submit a bid for a company. To find the right level of the bid, he thoroughly prepares a valuation based on a five-year business case.

In addition to the key figures making up the base case valuation, an assessment is made of the likely range and statistical distribution of each of the key parameters of the valuation. The assumptions are shown in the table below.

Parameter	Base case	Range	Distribution
Current normalized NOPLAT	550 mill.	+/÷ 5,0% of base case	Uniform
Short-term growth rate	3.0%	1.0% - 4.0%	Normal, σ = 25%
NOPLAT after five years	638 mill.	+/÷ 10% of base case	Normal, σ = 25%
Long-term growth rate	3.0%	2.0% - 4.0%	Normal, σ = 25%
WACC used to calculate the terminal value	7.2%	+/÷ 1%-point	Normal, σ = 25%
ROIC vs. WACC in calc. of the terminal value	+1.0%-point	÷1.0 - +3.0%-points	Triangular, (C) = 50%

Based on this, the base case value of the company is EUR 10.9bn. After subtracting net debt of EUR 2.5bn and dividing the equity value amongst 40,000 shares, the value per share is EUR 210.

The statistical sample space is found by performing 10,000 recalculations of the value using randomly chosen parameters from their likely ranges and distribution. The result is a sample space for the value per share and a Z-curve as shown in Exhibit 3.

Exhibit 3. Sample space for the value per share and the resulting Z-curve
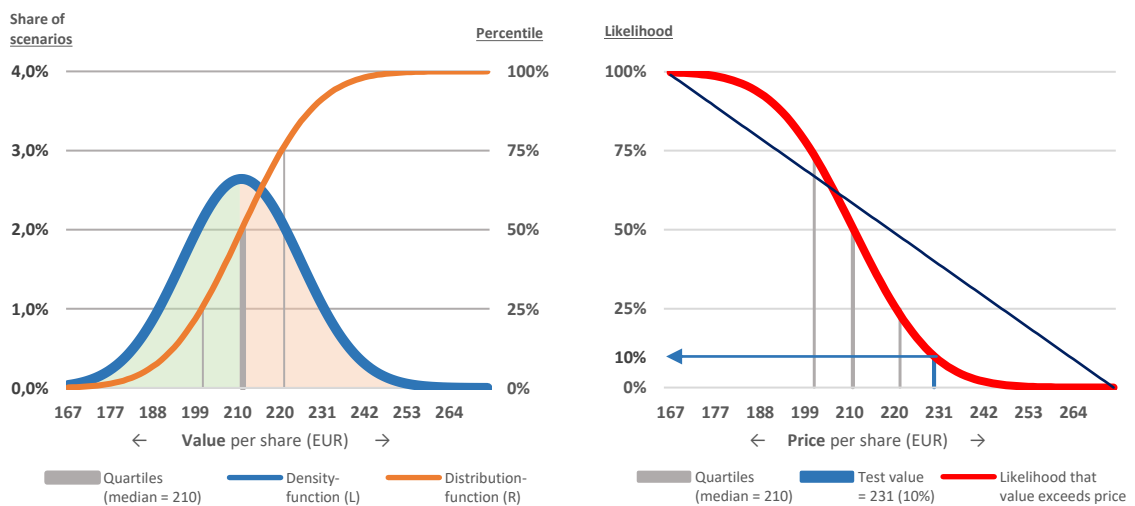
The analysis shows i.a. that the value per share with a 50% probability is within the range of EUR 200 – 220 (between the 1st and 3rd quartile), and with a 75% probability is less than EUR 220.

Initially, the investor was willing to offer a price, which was up to 10% higher than the base case value, i.e. EUR 231 per share. After consulting with the Z-curve, however, he realized that there was only a 10% chance that the expected value would exceed such offer and to lower the risk of financial failure by overpaying, the ceiling for the maximum offer was reduced.

Optimum Consulting in brief

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We assist business owners and managers in their dedicated efforts to maximize and capitalize the value of their company.

One of our key areas of expertise is reliable valuation of companies and other assets. We provide advice in the course of a transaction or provide a second opinion in the following situations –

- Merger, acquisition or sale of a company
- Buying or selling of share holdings
- Divestment of assets or activities
- Company recapitalization
- Valuation of Intellectual Property
- Impairment of long-lived assets.

Our advice and our opinions are unbiased and independent. This means that our only interest is for our customers to be successful in their endeavors.

Consulting based on comprehensive knowledge and experience

Jens Wrang, Managing partner, holds an MSc. in finance and business strategy supplemented with MBA-courses from INSEAD, France and Wharton, USA.

More than 25 years of experience as M&A analysis manager, corporate finance consultant and CFO with internationally operating companies within several industries has formed the basis for a realistic and professional approach.

Jens has accumulated a comprehensive knowledge of and practical experience within the fields of corporate finance and business valuation, and it is this knowledge and experience, which is the basis for the Integrated Value Analysis-approach to valuation and the concept of the Z-curve.

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