

Practitioner's Section

Managing the effects of the business cycle in the chemical industry

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Companies in many segments of the chemical industry – particularly in the more commoditized segments – are highly exposed to the business cycle. In other words, their businesses tend to be quite profitable at the peak but margins are low or even negative in downturns of the business cycle. Throughout the article, this phenomenon will be referred to as cyclicity.

In general cyclicity on its own does not give an indication of the overall amount of profit throughout the cycle. If the profit margin at the peak of the cycle is sufficiently high, the average profitability throughout the business cycle may still be very satisfactory despite low profitability at the downturn. In fact, average profitability may well be higher than that of a non-cyclic business which has neither the very high peak profitability nor the low profitability of the downturn periods.

Why then, if average profitability is not necessarily affected by cyclicity, do many chemical companies still try to move into less cyclical segments of the chemical industry, as indicated by the following statements?

- “The purchase and sale of businesses have afforded us greater cyclical resilience ... [For 2008 we intend to focus] all our concentration and energies on making BASF even more profitable and cyclically resilient” (BASF Letter from the Chairman 2007)
- “Expanding business with low exposure to cyclical fluctuations is another way of minimizing [our] risk” (Degussa Annual Report 2007)
- “DSM’s Vision 2010 aims at further redu-

cing the cyclical element” (DSM Annual Report 2007)

- “With this acquisition, we would expand the contribution of our life sciences business to total sales by our subgroups from 60 percent at present to around 70 percent, thus significantly reducing our dependence on cyclical economic developments” (Bayer statement on announcing the Schering acquisition)
- From a practitioner’s point of view, there are a number of reasons why huge variations of profitability throughout the business cycle are undesirable:
- Fluctuations of cash flows do not always allow cyclical companies to time their investment decisions optimally – they may be forced to follow “boom and bust” cycles for simple cash flow reasons. For example, for cash flow reasons they may not be able to take over a competitor in a downturn even though strategically this may be the right move
 - Despite long-term experience regarding the average profitability over the business cycle, there is never an absolute guarantee that profitability will return to previous levels

after a downturn. This leads to a high level of insecurity (similar to the situation after a bust at the stock market)

- Making business owners understand the fluctuations of the cycle takes up management resources and requires substantial communication skills
- The motivation of employees suffers in downturns, when e.g., promising business trips are cancelled due to cost cutting measures
- Finally, low cash flows in downturns may even threaten the existence of the whole company.

One additional clarification must be made before discussing the individual aspects of cyclicalities and the ways companies can limit their exposure to them. Obviously any way a company can increase profits in general also helps it to survive a downturn. Or to put it differently: a company that is already in a weak position will also be more affected by a cyclical downturn. However, in this paper we will only look at those phenomena and measures that are directly related to cyclicalities, i.e., any measure that is recommendable whether a business is cyclic or not (e.g., a reduction in production cost or increasing competitiveness via innovative new products) is not examined any further. This does not mean companies should not put efforts into those activities, but rather that the scope of this paper is limited to a more narrow definition of cyclicalities.

And a final – probably somewhat trivial – remark also needs to be made. The basic assumption here is that measures to reduce cyclicalities are on average a zero-sum game, that is, the expected average wins from higher profitability in the downturns are compensated by corresponding lower profitability in the market peaks. Measures to reduce cyclicalities are thus to be seen as an insurance to smoothen the business cycle, not as a tool to earn additional profit within the cycle. However, in reality there may be ways to profit from cyclicalities depending on management capability and market structure, e.g., if increasing raw materials prices are passed on to the customers very quickly while lower prices are not passed on, or only after substantial pressure from customers.

Reasons for cyclicalities

As other businesses, chemical companies acquire raw materials and other input factors on the market, subject these input factors to some transformations and finally sell the output on the market again. A number of factors result from this formal process that determine the extent to which a specific chemical company is exposed to cyclicalities:

- Variations in input costs (low variations = low cyclicalities)
- Variations in demand and subsequently in output prices (low variations = low cyclicalities)
- Link between input costs and output prices (strong link = low cyclicalities)
- Ratio of value creation within the company to input costs (high value creation = low cyclicalities).

Let us look at these factors in detail and examine what kind of measures may be taken to reduce cyclicalities with regard to each of them.

Input cost variations

Obviously if the prices of key raw materials are volatile, this exposes chemical companies, particularly commodity producers for which raw materials account for a large share of overall costs, to substantial cyclicalities. Exposure to oil prices is a classic example. However, a number of measures are available to reduce these effects:

- Long-term purchasing contracts stabilize input prices at a given level and thus give chemical companies some security with regard to cost planning. For commodities that are particularly exposed to cyclical variations, often long-term contracts are used in which prices are determined based on certain key indicators such as oil prices etc. This protects both supplier and customer in case of huge variations
- Hedging with futures contracts in particular is a financial tool to reduce the effects of fluctuating raw materials. However, for the chemical industry hedging offers only limited opportunities as futures contracts are only traded for a small number of relatively basic raw materials

Figure 1: Input cost variations and exposure to cyclicality

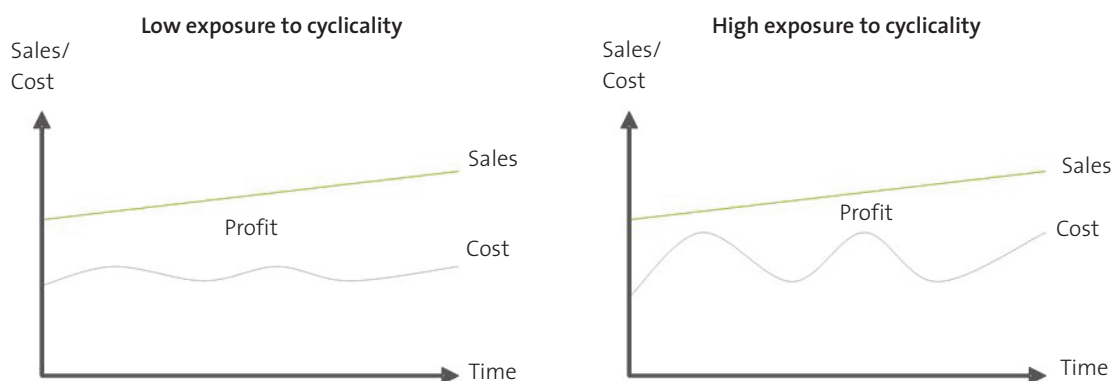


Figure 2: Output price variations and exposure to cyclicality



- Another way to reduce variations in input costs is to create vertically integrated chemical companies. Businesses whose activities thus extend over a number of value chain steps – thus practically producing their own raw materials – are less dependent on fluctuations of raw materials market prices
- Finally, flexibility in raw materials can help a company to avoid the price peaks of specific raw materials. Of course, the higher flexibility in raw materials does itself come at a cost which has to be lower than the predicted savings.

Variations in demand and in output prices

Similar to variations in input costs, variations in demand for the products of a chemical company also expose it to cyclicality, most likely via variations in the prices achieved for the output of the company. Fortunately, there are a number of ways chemical companies can smooth demand variations and the likely resulting price variations both on the level of individual customers and throughout their overall customer and product portfolio:

- Long-term sales contracts with individual customers may stabilize demand and/ or prices over an extended period of time.

However, often the counterparty expects to get some additional benefit for the long duration of the contract (e.g., lower prices)

- Demand fluctuations may also be reduced by focusing on customer industries with low volatility of demand, such as consumer goods, food or pharmaceuticals
- Any broadening of the portfolio, whether by products, regions, or customers, lowers the dependence on demand for individual products or customers
- From a company-internal point of view, this may require flexible production. For example, plants employing batch production tend to be more flexible than plants with continuous production, so production can be shifted to other products more easily in case of low demand. However, specific production costs tend to be higher, and in the production of many pure commodity chemicals batch production therefore is no alternative to continuous production
- Shifting fixed costs to variable costs (e.g., by outsourcing of non-core functions such as logistics and maintenance based on variable fees) allows cost-efficient production at relatively low capacity utilization. This may allow chemical companies to keep prices stable despite lower demand as it limits the pressure on them to achieve high capacity utilization at all times (“price before margin”).

Link between input costs and output prices

Particularly if the value added by a chemical company is quite small compared to input prices, the company runs a relatively high risk of losing money in case of bigger price fluctuations. However, this can be avoided if – in the perception of the market – there is a strong link between input costs and output prices. If such a strong link exists, any changes in input costs simultaneously affect output prices while leaving the margins of the chemical company in the middle untouched, as the following example shows:

A company making platinum catalysts may base its catalyst prices on the current platinum market prices plus a premium for the additional chemical steps carried out. Thus, it can achieve a relatively stable margin independent of cyclical fluctuations of the platinum market, as any platinum price changes affect both input costs and output prices simultaneously and in a way that is transparent to the customer. In practical terms, the sales price is calculated first without the cost of the expensive raw material, and this cost is then added at current market rates

If this idea is pursued to its full extent, the chemical company is effectively offering toll manufacturing. Instead of selling a product at a volatile price, a service is performed at a fixed fee (e.g., the service of cracking naphtha, the service of synthesizing a specific fine chemical) while the raw materials prices are only passed through.

Figure 3: Link between input costs, output prices and exposure to cyclicity

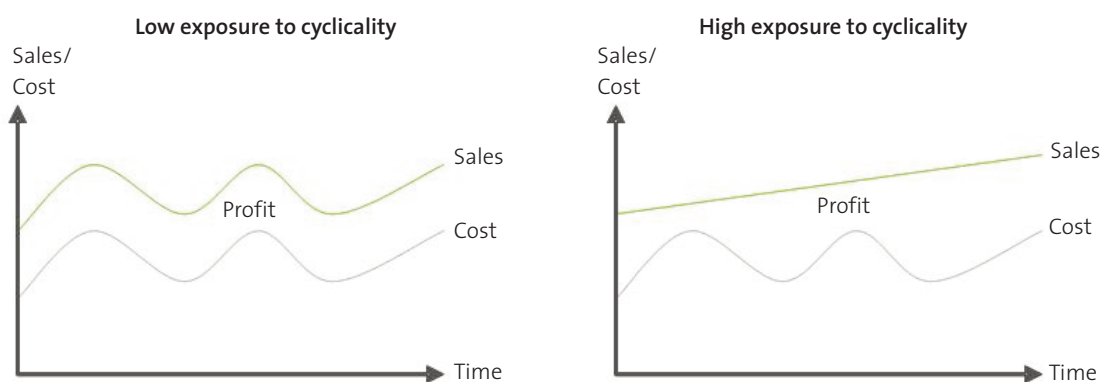
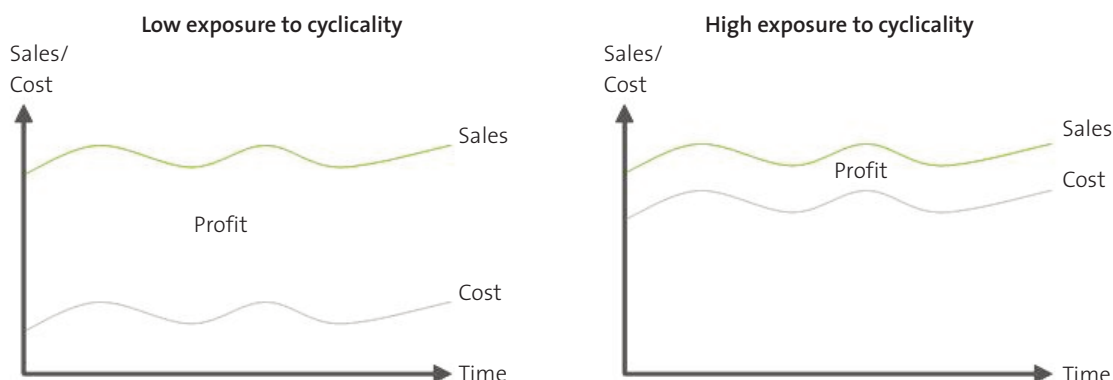


Figure 4: Ratio of input costs to value creation and exposure to cyclicity



Ratio of input costs to value creation

Finally, higher value creation increases the buffer zone to compensate for changes in cost or demand. Thus, any increase in value creation also potentially lowers the impact of cyclicity. There are a number of ways chemical companies can increase their value creation. These include:

- Widening of the value chain participation – as a company participates in more steps of the value chain, its value creation increases. For example, a company may cover a larger number of production steps (e.g., fully integrated production of LDPE versus process from ethylene only). Integration does not have to include the acquisition of physical assets; virtual integration, e.g., by partnering may also be employed to reduce cyclicity
- Introduction of value pricing. In this pricing method, prices for different customer segments are based on their different specific payment reserves. While a great method in theory, the implementation of value pricing is not always straightforward, and value pricing may not be very suitable for products that are easily interchangeable with products from other suppliers
- Shifting the portfolio towards more differentiated products or specialty chemicals. Differentiated products have a higher value for their customers, reducing their price sensitivity. However, this will require permanent active

portfolio management as without such management, portfolios tend to commoditize. To avoid this, new specialties have to be introduced permanently

- Forward integration towards segments closer to the end customer. This includes the extension of service offerings (an extended portfolio of services related to current products increases the value these products can create for the customers).

Conclusion

The ideas outlined in this paper allow a substantial reduction of the effects of the business cycle on the profits of chemical companies. The basic concept is to reduce risk by a combination of measures regarding the individual business (e.g., hedging, long-term contracts, flexibilization of production etc.) and measures effective by widening the overall business or customer portfolio (move towards services, broadening of customer base etc. – this seems to be the preferred approach of the companies quoted at the beginning of this paper).

However, it should be mentioned that there are limits to sensible risk reduction.

There is an inherent risk of any chemical company with a clear strategy. This risk does exist, however, it is not a risk to be eliminated, but one to be appreciated as an opportunity by the investor.