

Dealing with volatility

Using optimisation techniques in situations like now will enable CEOs to respond and adapt to the situation, as well as improve the company's competitiveness, say **Harsha Kapoor** (practice head, analytics solutions), **Milind Desai** and **Sachin Somaiya** of Tata Strategic Management Group

When crude oil touched the \$140 level in July 2008, it showed a 50 per cent increase in price as compared to the beginning of the year. At the time, there were reports that it would stay at that level till the end of the year. Along with crude, prices of coal and other industrial inputs also went up significantly. However, by middle of September 2008, the price of crude was down to \$100.

This price volatility with its sharp increases and drops has brought in a state of uncertainty over how prices of these key input materials are going to behave in the future (see Fig 1).

We have also seen volatile price movements for other raw materials such as wheat, corn, palm oil, rubber and aluminium (see Figs 2 and 3). This has impacted companies in sectors ranging from FMCG and steel to cement and chemicals. For instance, FMCG companies registered a 16-18 per cent rise in their cost of raw material in the three months ending March 2008. Fuel prices also increased by 1-5 per cent over the same period, further adding to the rise in input costs.

The impact of volatility

The rise in input costs has shrunk margins and reduced a large part of the earnings of most companies, and impacted EBITDA (earnings before interest, taxes, depreciation and amortisation) margins. In an article in the 20 May 2008 issue of *Business Line*, ACC managing director Sumit Banerjee is quoted as saying, "Our company is facing an erosion of 1 per cent EBITDA (operating profit) margin every month due to rising input cost."

The impact of rising input costs is severe for those companies that are constrained from increasing selling prices due to competitive forces, consumer preferences and government regulations. According to an article in the 20 August 2008 issue of *Financial Express*, PK Ruia, chairman of Dunlop Tyres says, "With rubber prices going up from Rs90 per tonne to Rs140 per tonne and

other input costs also escalating, production cost has gone up by more than 60 per cent in the last four months. How many times can you go to the market and revise prices?"

A complex problem

Given this situation and the associated constraints, traditional methods of planning and budgeting are becoming irrelevant. The situation gets compounded when manufacturing activity is spread across multiple plant locations and has multiple product mixes, different quality parameters and several sourcing options. Further complexities arise when trade-offs between costs, quality and defined process parameters need to be addressed simultaneously.

CEOs face a Catch-22 situation where they have no control over volatility in costs but have to bear the consequences of it. They need to deal with several critical issues simultaneously:

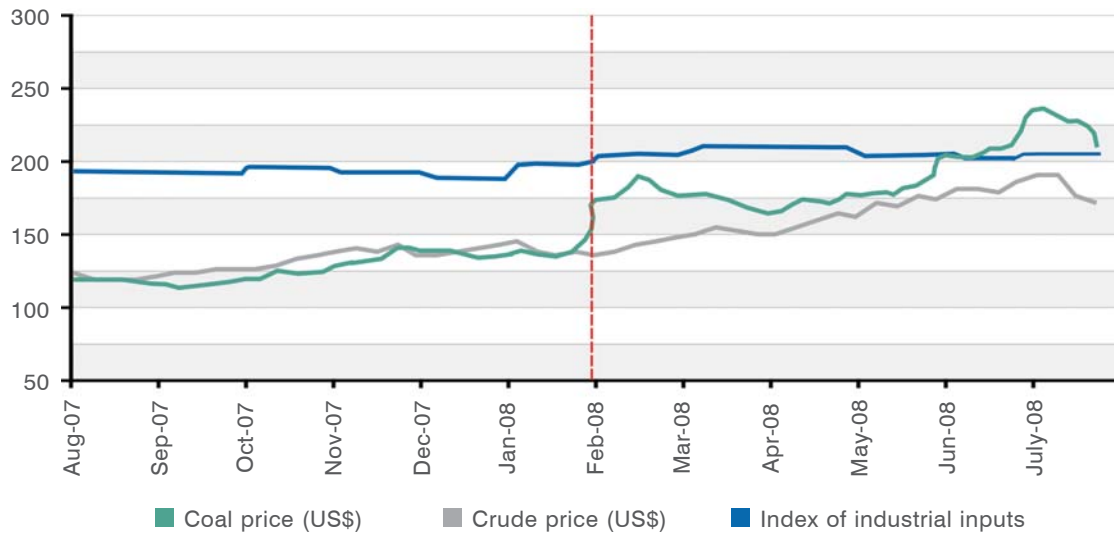
- ▶ What raw materials to procure and at what cost.
- ▶ What should be the optimal raw material mix.
- ▶ How to ensure consistent quality and quantity of production.
- ▶ How to maximise gross profit.

What should the CEO do?

The CEO needs a solution that enables smart and quick decision making, notwithstanding the complexities. In an economic situation where prices fluctuate steeply, agility becomes the key to remaining competitive. In this context, generation of multiple scenarios and their quick evaluation becomes critical. Also, the solution has to be practical, feasible and at the same time, should provide an opportunity to learn and adapt with continuous changes.

In other words, CEOs need to respond and adapt to the changing business environments and evaluate scenarios and sensitivities dynamically. Has this been done? The

Fig 1: Price trend — coal, crude and industrial inputs



answer is yes. A few companies have actually done this to manage their costs and remain competitive.

Evaluating scenarios: Reacting and adapting faster in order to optimise profits

A structured optimisation approach enables production departments to minimise variation and identify optimal input combinations. Multiple scenarios can be evaluated to react and adapt faster to dynamic market conditions.

A large South Asian cement manufacturer producing over 10 million tonnes per annum (mtpa) of cement across multiple plants was struggling to deal with the recent price increases in coal and other inputs that had led to a reduction in the company's EBITDA margins. The manufacturer could not increase the price of cement due to regulatory constraints. At the same time, the production team was constrained by stringent quality norms and the need to maintain existing levels of throughput.

The management initiated an exercise to optimise EBITDA margins. The chemistry of the cement manufacturing process was captured through a rigorous data collection process. Complexities due to distinct properties of inputs and coal grades were quantified using mathematical models. This enabled determination of an optimal production scenario and the material mix needed to maximise operating margins under current market conditions.

This exercise resulted in an input cost saving of 5-15 per cent across multiple plants / kilns and was achieved without any additional capital expenditure.

Managing shock: Optimising costs by process integration

Identification of right levers for optimisation and

improving existing frameworks provides the potential of lowering input costs. Use of structured techniques enables faster decision making and synchronisation of production, procurement and planning departments.

A large global steel manufacturer that produced about 6mtpa of steel at one of its plants faced a similar situation during the coal crisis in 2003-04. The manufacturing site had to react to significant coal price variations and adapt as quickly as possible to select the coal required for the targeted steel quality. The company already had some tools to calculate the raw material mix required for production; however, these tools did not take an integrated approach into consideration. As a result, there was a conflict of interest between the procurement department (wanting to source the cheapest raw material) and the production department (aiming to maintain high quality and throughput).

In this case, the solution called for creating an integrated view and optimising the entire process, taking interrelationships between dependent departments into consideration. This exercise helped the company to respond quickly to changes in market conditions or raw material/ fuel shortages and variations in price.

Preliminary estimates showed a saving of 2 euros per tonne of steel. The optimisation exercise also enhanced information exchange between departments and enabled integration of production processes.

The need for a structured approach

Companies need to use a structured approach to develop a company-specific decision support system, using the following steps:

Fig 2: Prices of key agricultural commodities

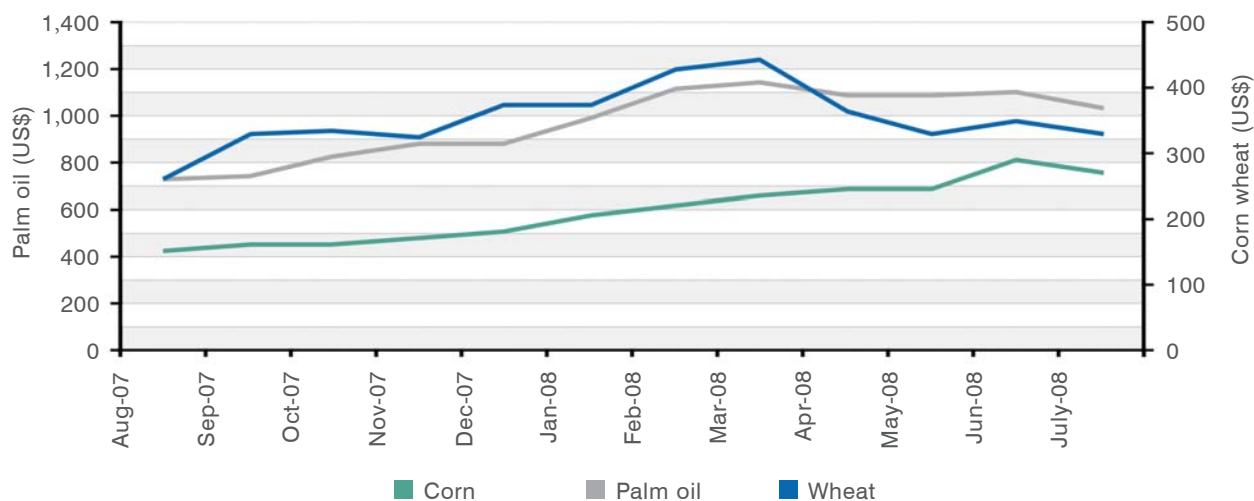
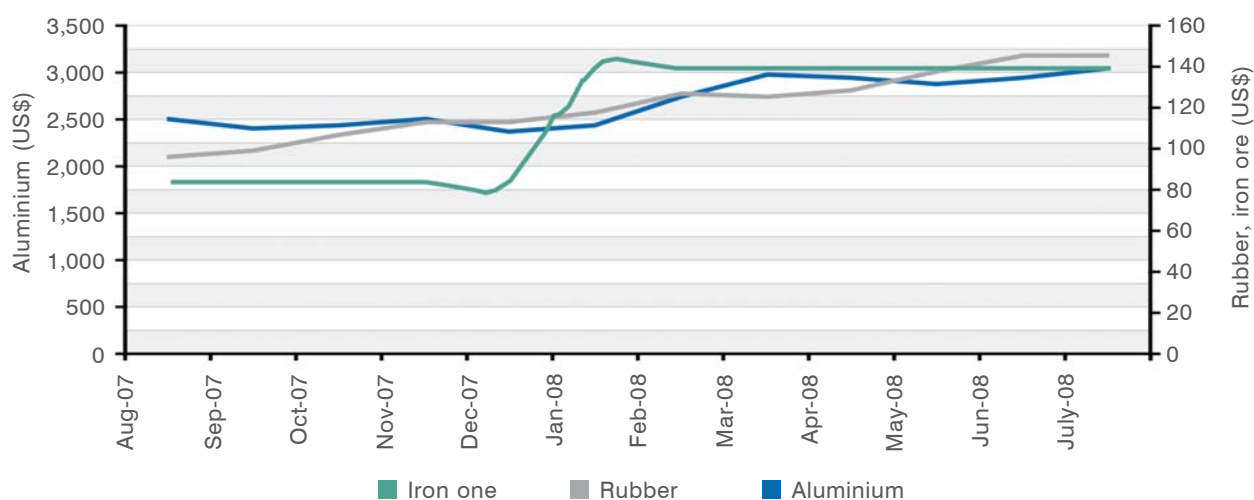


Fig 3: Prices of key industrial inputs



Get the right data: Start with a detailed analysis of the delivered cost, quality parameters, technical requirements and formulas. Every plant or site is different; therefore, empirical formulas resulting from years of experience should also be captured. The data collection and analysis should be unbiased and preferably done by a third party.

Model and optimise: This stage involves conversion of relationships among variables into mathematical models. Technical and financial parameters are combined to define the constraints. To get better results companies should consider the entire chain of production related activities, right from sourcing of inputs to production and dispatch of output. Also, constraints inherent to each production unit / phase should be evaluated simultaneously.

Generate scenarios: Companies should generate multiple production scenarios based on different assumptions, parameters and constraints. Each of these scenarios has to be evaluated for impact on gross

margins. The best scenario should be chosen based on current market conditions.

The scenario analysis will help companies to:

- ▶ Maximise operating margins.
- ▶ Target best prices for raw materials for the negotiating / bidding process.
- ▶ Simulate new production scenarios 'anytime' (daily, weekly, monthly).
- ▶ Identify key bottlenecks / constraints in the production process that impact operating margins.

A caveat: the best scenario today may not remain the best tomorrow. The process needs to be run regularly to keep generating the best result for changing market conditions. The solution has to be dynamic and real-time in order to realise benefits on a sustained basis.

Those who move fast to adapt and respond to changes in the market situation will not only remain competitive but also be able to sprint ahead of their competitors. ●