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More than a crystal ball

The credibility of market forecasts: The Lehman Wave waved till 2012

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Where there is a valuable market, there will also be a variety of analysts, who do not only look into the past but also give their projections about the future development in different market segments. It is a rare opportunity to be provided with a closer look at the extent to which the forecasts have become true, which is the point of this article.

Based on insight around the Lehman Wave and the model-based forecasting it developed with Eindhoven University of technology (TU/e), DSM Coating Resins had a remarkable crisis management during the financial crisis.

Getting out of a crisis stronger

The name Lehman Wave refers to the dynamics observed in late 2008/early 2009: A strong dip in sales, followed by a peak and a new dip. The Lehman Wave was caused in part by de-stocking due to the financial panic that followed the bankruptcy of Lehman Brothers in September 2008. This insight was published by the TU/e in a much quoted working paper (Peels 2009) and in two articles in this Journal (ECJ 2010 and ECJ 2011), where it was shown that the model forecast, that included the Lehman Wave, accurately depicted the sales development in a certain segment of DSM Coating Resins almost two years into the future. DSM Coating Resins used this insight for an exceptional crisis management, including opening new capacity in the middle of the crisis, retaining crucial people where needed, continuing to innovate, timely stock building and securing security of supply of raw materials

> "Long lead times, combined with an underestimation of the pipeline, cause oscillation as a response to external shocks",
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Figure 1: Actual resin sales (red), resin sales as forecasted in 2009 (blue), and end market construction as assumed in 2009 (dotted line).

at the low point of the tide. Recently this exceptional crisis management was acknowledged in a crisis review article in the SCMR (2013). As a result of its approach, DSM managed to get out of the crisis stronger, with increased MS and higher turnover.

This market segment continued to oscillate strongly over a period of in total more than four years, dampened only about 40% per year. Review showed that the Model forecast from 2009 was accurate until 2012, longer than expected (fig 1). The forecast only started to deviate when the construction end market went down much deeper than the branch had expected back in 2009. Since the forecasted sales curve is a combination of the pull from the end market, inventory fluctuations in the chain and the Lehman Wave, a different end market will change the whole shape of the curve. Comparison with other segments revealed that most resin segments saw the Lehman Wave, but in most segments the damping is stronger so oscillation was subdued earlier.

DSM asked Robert Peels of Flostock, consultancy spin-off from the cooperation with TU/e, to review the last five years in an updated model. Earlier in 2013 Maximiliano Udenio, who built the original model and is now doing a PhD on this subject at the TU/e, shows in a working paper (Udenio 2013) that long lead times, combined with an underestimation of the pipeline, cause oscillation as a response to external shocks. Although the parameter settings in the original model were based on experts' best knowledge about the industry, the good match in 2010/11 was to a certain extent heuristics and serendipity. So Flostock created a new model, entered the actual construction end market, adapted the parameter settings slightly based on the theory developed in the Udenio paper and found that the sales pattern of the full period from 2008 -2013 can be reproduced closely (fig 2, last months not shown). The strong oscillation in this market segment is most probably caused by the long lead times for ordering made-to-measure painted parts. DSM has been able to follow the complete demand roller coaster because it was prepared.

Conclusions

The first conclusion is that modeling a supply chain to analyze a business and to forecast demand is possible. The second conclusion, based on the exceptional fit between model and reality, is that the oscillation indeed is caused by a long lead-time in combination with a strong under-estimation of what already has been ordered. As a result of these behavioral issues this market segment is so sensitive for shocks that the de-stocking after the Lehman bankruptcy caused the Lehman Wave to continue over a period of four years. The third conclusion is that this market will continue to be volatile when ex-
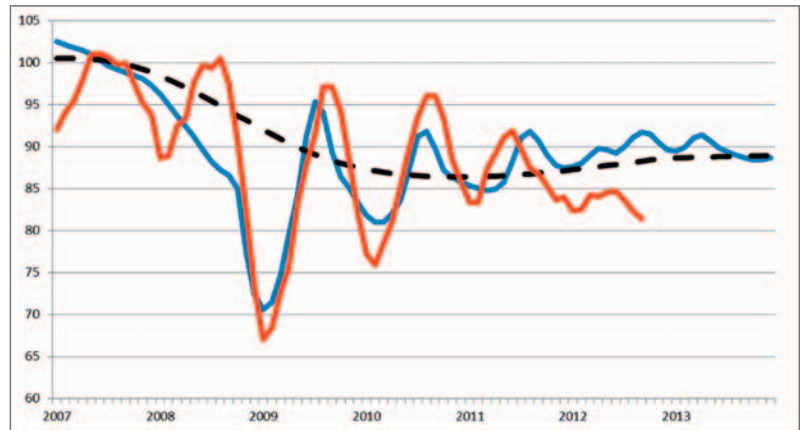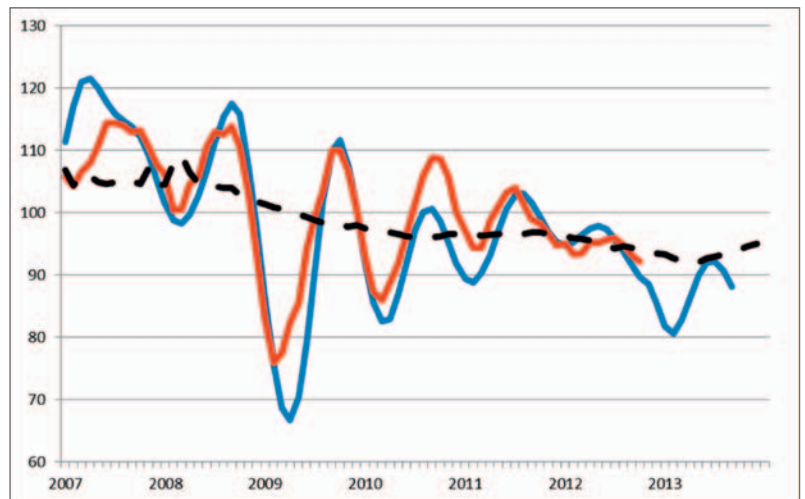

Figure 2: Actual resins sales (red), Model resins sales (blue) and end market Construction (dotted line). This graph was made in 2013.

posed to shocks like the current recovery of the European construction market. Unfortunately we are not allowed to publish any forward looking graphs: so if you want to know your future, you have to call Flostock. ◄

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