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...because timing matters

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Commodity risk management II – fundamental analysis

How can you predict the price development of commodities? How can you analyze whether the prices are going up or down? This article will show a practical example of an analytical model.

In the previous article we talked about the fluctuations of raw material prices, and we noted how increasing raw material prices can erode the earnings of the company despite a satisfactory turnover. We also asserted that there are tools capable of predicting these price fluctuations. In this article we will open the tool box and show the tool called fundamental analysis.

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Fundamental analysis

In short, this analytical method is about investigating all the 'fundamental' aspects that affect the price of a given raw material. Since Adam Smith in 1776, it has been a principle that prices are determined by supply and demand. So we can use supply and demand to investigate the price of aluminium (our commodity example from previous article). That is easy to say, but quite a bit harder to do in practice. There are different reasons for this:

- We cannot investigate supply and demand for one country only. We have to apply the macro perspective and look at the world supply and demand. One country alone will not make any sense due to the international trade.
- We cannot just look at the circumstance of today. We also have to look at the expectations of the future development if we are to get a picture of the future price.

To my knowledge there is not a single set of well defined tools that constitutes a 'fundamental analysis'. So the model described below is an attempt to translate theory into a practical tool. Also, the example of aluminium should not be taken as authoritative – which would require a much longer article and added source material – but merely as a practical example to illustrate the theory.

Supply

Supply of aluminium is being created

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every day by factories around the world. Here it is necessary to investigate the tonnage that these factories are producing every year. Then it is necessary to investigate the increase in tonnage. The increase is due to expansions of factories (called brownfield) and when new factories are being built (called greenfield). It takes some years to build a factory, and it is quite a big investment, so it possible to know, in advance, when the factory is expected to be ready, and what tonnage it can produce. With these data it is possible – with some degree of certainty – to extrapolate the supply of aluminium in the years to come.

It is not only factories that has an effect on supply. The mining operation can also have an impact. As an example the percentage of copper in copper mines are falling, and this means that more work has to be done in order to get the same amount of copper out of the mine. In the farming sector it is not only the number of acres that decide the yield. The weather is an important factor that is influencing the yield. So every sector has their own factors that can affect supply.

In our aluminium example we can see that there is a large growth of factory capacity. The high prices has made aluminium a very good business, and so capacity is growing, both brownfield and greenfield. Various experts are predicting a growth of output of 9% in 2007. This could in theory, without looking at other factors, lead to falling prices.

Demand

Demand for aluminium is not determined by big factories, but ultimately by the individual consumer. For this reason, demand is not so simple to predict. How much will the individual consumer want aluminium products now and in the future? It is possible to make some substantiated reflections about this, but it is not possible to make very exact calculations. But we can start by dividing aluminium into different demand categories, and then examine each category in turn.

For aluminium the three biggest consumer sectors are the following:

- Automobile sector (cars, lorries etc.)
- Food industry (cans for beer and soft drinks)
- Construction industry (aluminium windows etc.)

It is then necessary to examine each sector in turn. Here we can limit ourselves into looking at the automobile sector, where cars are using around 24% of the world aluminium production. That is a very high percentage. In a report by Ducker Worldwide, aluminium has in 2006 overtaken iron as the second most used raw material in cars, only surpassed by steel. That means that cars are containing an increasing percentage of aluminium. Naturally this will increase the demand for aluminium. Then we have to look at car sales in general. Last year showed a big drop in car sales in the US, which meant that some of the big factories had to cut down or close factories. On the other hand, in some European countries the car sales has been record high. This makes some believe that a top has been reached, and that 2007 will see stagnating or falling car sales.

These reflections are not made in order to start a long debate. These reflections are merely shown in order to show how complex the picture is getting when we examine the demand for aluminium. Cars are containing an increasing amount of aluminium, and car sales are going down in some countries, but increasing in other countries. This picture has to be quantified and substantiated by statistics. Airplanes also belong to the 'transportation' sector, but they have a very different demand structure than cars. So once the whole sector is examined, we then have to investigate the food industry and the construction industry.

Experts do not totally agree on the total demand for aluminium. Some believe that demand will fall 5.9% in 2007, compared to 2006, whereas others are predicting a small increase in demand.

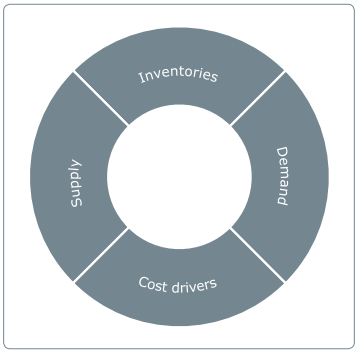
If we, for the sake of argument, accept these claims as correct, then we are faced with a worldwide supply that is increasing around 9%, whereas the demand is either falling or only increasing very little. This means that there is more supply than demand, and in theory this will lead to falling prices.

Other factors

As mentioned in the beginning, fundamental analysis is about investigating all the 'fundamental' aspects that affect the price of a given raw material. Supply and demand is a very good starting point. But there are other factors that affect the price. Figure 1 shows a crude model that divide fundamental analysis into four parts:

Inventory

Inventories are a function of supply and demand, and so it also has an effect on price. If supply produces more aluminium than demand is buying, then inventories will increase. Not all raw materials have available inventory levels, but for aluminium this is being monitored on a worldwide basis by London Metal Ex-



Figur 1. Fundamental analysis. *Source: own make*

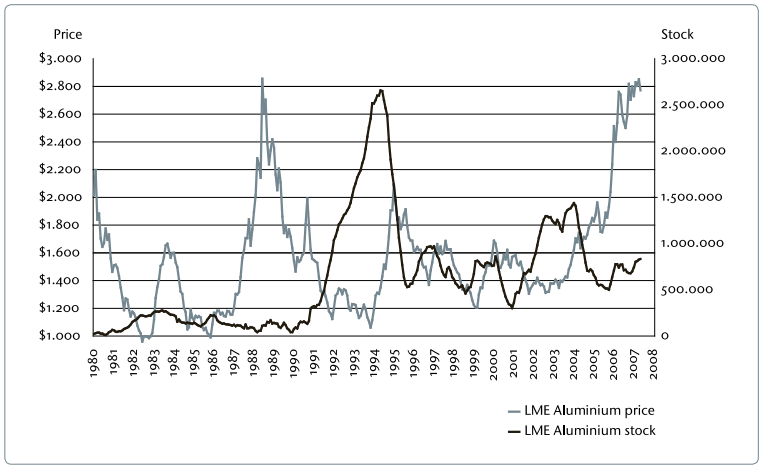


Figure 2. Aluminium price vs. stock *Source: London Metal Exchange*

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change. Figure 2 shows the correlation between aluminium prices and world inventories of aluminium.

It is evident that low inventories are driving prices upwards, whereas high inventories are depressing prices. There are clear exceptions to this rule, but the basic correlation is evident.

In the graph we can see how inventories were falling from 2004 to 2006, which drove prices up. Today the aluminium inventories are not very high, but the trend has been upwards ever since 2006. If this trend continues, then it will most likely lead to falling prices.

Cost-drivers

We also have to look at the cost of producing aluminium. The balance between supply and demand might point to falling prices, but if the cost, for some reason, is escalating wildly, then the factories would not be very willing to lower their sales prices. The closer selling prices are to production costs, the harder it will be to achieve lower prices, regardless of supply and demand.

Without getting into details about how to get an overview of the general cost structure of a commodity sector, we can in this article work with the following cost structure of aluminium:

- Alumina: 35-38% (the raw material in aluminium)
- Electricity: 27-29% (The manufacturing process is extremely energy consuming)
- Wages: 10-12%
- Other costs: 12-14%
- Carbon: 10-12%

If we want to examine the most prominent costs in the production, we would have to look into alumina and electricity. Figure 3 shows how alumina prices are moving compared to the official LME aluminium prices (prices are shown in their separate Y-axis). Normally there is a high correlation between these two, but in 2006 the alumina prices fell dramatically, whereas aluminium has continued its uptrend. This means that producers of aluminium are receiving higher and higher sales prices for their goods, but at the same time their raw material cost is falling. This abnormal high earning could contribute to a pressure on the sales prices. After this we also have to examine the cost of electricity. Finally it is not sufficient to look at the development until today. We also have to assess the possible, future development of the costs. All in all a pretty complex task.

Conclusion

When the above work has been finalized, we must make a conclusion of all these inputs. In a simplified way, the conclusion regarding aluminium could look like this:

Supply is increasing, indicating falling prices
Demand is flat or falling, indicating falling prices
Inventories are increasing, indicating falling prices
Cost-drivers are falling, indicating falling prices

If all four factors are pointing to the same conclusion, the conditions are more clear and favorable than if some of the factors are conflicting.

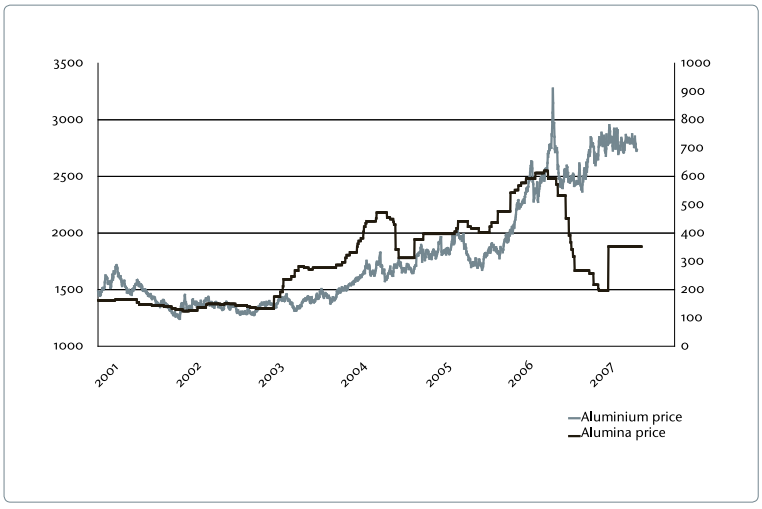

Figure 3. Alumina vs. aluminium Source: London Metal Exchange and Aluminiumviews / Harbor Intelligence

Facts: Bauxite comes from the ground and is first being refined into alumina, which is then reduced into aluminium in an electrolytic process.

However, clear the conclusion, it is always important to be critical in the analytical work and to know the weakness of the model. Weaknesses in the fundamental analysis could be:

It will never be possible to find all the fundamental aspects (current and future). That would require full insight into all factories in the world, as well as full insight into the demand of all consumer sectors.

- The weighting of the four fundamental aspects is not mathematically precise and will always be a subjective estimate
- The analysis is not showing the timing aspect, that is, when will the foreseen change in price occur?

Despite this criticism the model is still valid. The alternative is to deny any insight into the fundamental aspects of the industry, which of course is not a sensible option. The model shows the deeper fundamental aspects of a certain raw material, and that will always be a good starting point in the assessment of prices. We do not seek the 'perfect' model. On the contrary, we are seeking a practical tool that can give us rational and proven signals, so that we can buy our raw materials in the best way possible. We are trying to create an alternative to making our decisions based on gut feeling, newspaper headlines and the advice of the supplier.

As with all analytical methods, it is important that you do not base everything on one model alone. It is necessary that we use several analytical models at the same time to see if they concur. That is why the next article will look into the tool box called technical analysis, which is providing a vital contrast to the fundamental analysis. /

Recommended reading

Philip Gotthelf "Technofundamental trading".