Société de Calcul Mathématique SA
(Mathematical Modelling Company, Corp.)
Tools for decision help
since 1995

Construction of prospective indicators

using robust probabilistic methods

A "prospective indicator" is used, by definition, to anticipate some event: it may be for instance the increase or decrease of the sales of some good, a significant variation in the rate of exchange of a currency or in some markets. The interest of a prospective view is obvious: if the price of real estate is going to decrease, we will wait before buying, if we are buyers, and we are going to sell as soon as possible, if we are sellers. Similarly, if the price of some good is going to decrease, we will avoid making stocks. If we identify that the sales of some devices are going to stagnate, the factories which build the components will have considerable stocks if they did not anticipate this stagnation.

The anticipation period which is requested is usually between one month and one year: beyond that, reliable anticipation is difficult.

The methods which are usually employed to build prospective indicators are very diverse, and, in a vast majority of cases, they are not satisfactory. People try to understand in depth the phenomenon under study, and, among the large number of parameters which may influence it, they try to guess how the most important ones will behave. For instance, people will say: "Car sales depend on the level of credit, on governmental help and on the price of gas". Very well, this is correct (except that many other parameters may come in); but how does it help, since the anticipation of each of these three parameters is by no means easier?

Our Company, starting in 2006, progressively designed completely different methods, to build prospective indicators. They rely entirely upon probabilistic methods and require absolutely no understanding (financial, physical, or commercial) of the phenomenon itself. The principle goes as follows:

Let I_0 be an indicator, of which we want to anticipate the changes, say on a six-month period. We have at our disposal a large database (Bloomberg style) which contains the values of this indicator and of many others, on a long period (ten years, twenty years).

We are going to screen our database, and detect the triples of indicators (I_1, I_2, I_3), for which the variations $(\pm, \pm, \pm)$ are best correlated with the variations of I_0, during the whole available period, with a six month shift. This correlation is itself evaluated by probabilistic means, by studying a conditional variance (we do not compute a linear correlation).

This is done automatically, using a procedure written in VBA on Excel. After that, we know that the triple which is chosen is the one which is best linked with the evolution of I_0, with a six-month shift. We do not know why this is so, and we do not care. Usually, after the work is done by us, the specialists find a very good reason. The choice of a triple, rather than a couple, is due to the fact that, with three, there is always a majority. If we took only two, there would be ambiguous cases.

After the triple has been chosen on probabilistic criteria, people may want to understand it, on a financial or economical basis. They usually succeed, but only afterwards. We have an example where our method gave results which were opposite to what the experts predicted, in the company (sales of cars, worldwide). It turned out that our method was right, and the experts finally changed their minds.

Our method is simple to use, it is robust and requires no understanding of the underlying phenomenon, as we already said.

One point perhaps deserves more explanation: the method only says if, after a given period (say six months), the indicator will be lower or higher than now. It does not say what precise values it will have in the meantime. In other words, the result is "plus" or "minus", not precise values.

We already used this method in the following cases:

- Anticipation of the variations of prices for real estate, for "Espaces Ferroviaires" (a branch of SNCF, French Railways), 2006.

- Anticipation of corn prices, for a company in the food business, 2007-2008.

- Anticipation of world-wide sales of cars, for a large company in the chemistry business, 2009-2010, and updates of our software in 2012 and 2014.

- Anticipation of variations of nickel prices and level of stocks, for the International Stainless-Steel Forum, 2011-2012.

In each case, we built a software tool (VBA on Excel), which allows the users to perform the anticipations by themselves. The tool receives new data each month and performs the anticipation. After some time, we may compare the results with what occurred.

Using the tool is immediate and requires no specific knowledge, either in mathematics or in computer science. The tool may be adapted after some years because the triple which was most accurate in 2022 might not remain so 5 years later.