

Risk analysis

Science and sentience

David Rowe issues a caveat to those tempted to follow a purely scientific approach to risk estimation

Various forms of positive analysis – as distinct from normative analysis – can be defined as falling somewhere on a spectrum characterised by two extremes. At one extreme is the approach that economist Kenneth Boulding playfully referred to as OTSOGERY, an acronym for “On The Shoulders Of Giants”. In essence, this is the modern scientific approach which has been employed by mathematicians and the physical sciences for over 400 years. It consists of developing and verifying an accepted body of knowledge which forms the basis for further research. As such, it is the source of immense efficiency improvements in the creation of knowledge.

This efficiency stems from the difference between the act of learning and the dramatically more difficult act of discovery. By building on established discoveries of the past (ie, by standing on the shoulders of giants), each new generation of investigators can learn its way to the frontier of knowledge. Only then are researchers required to perform the much more difficult task of discovery.

In effect, a top-of-the-class college maths major today probably knows more calculus than Isaac Newton did. This is not because today's college student is more intelligent than Newton; it is simply that the college student is able to learn what Newton (and Leibnitz) had to discover.

Intuition

At the other end of the spectrum is an approach that Karl Jung would have classified as intuitive. It is more commonly referred to as a purely judgmental approach. In the fields of economic forecasting and market analysis, it typically involves dedicating many years to reading the financial and business media, becoming intimately familiar with detailed time series and how they behave over the business cycle, and learning to gauge subtle psychological overtones and shifts in public attitudes and public confidence.

It also requires the accumulation of a detailed knowledge of institutional, legal and political factors which impinge on people's behaviour. Finally, it requires the development of a delicate but reliable sense of the shifting importance of these various considerations as they impact the economy and financial markets at any given time.

If this all sounds vague and unstructured, that's because it is. This lack of structure should not mislead us, however, into dismissing the approach as insubstantial. Even such a convinced proponent of formal scientific analysis in the



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social sciences as Lawrence Klein has pointed out that some individuals “have consistently made accurate (economic) predictions over and over again. He goes on, however, to point out the difficulty of building on these achievements of the past. “Unfortunately, the accomplishments at foresight of the gifted individuals have not been passed on to future generations in the form of systematic techniques that could be assimilated and applied by others. Until recently (ie, the early 1970s), economic prediction has been artistic, subjective and personal.”

Certainly, 30 years ago, much the same thing could have been said about risk estimation. Financial institutions did set limits and procedural controls on trading activities. They also tried to maintain risk-mitigating diversification in their loan portfolios. Rarely, however, were the risk implications of these decisions quantified in a consistent statistical expression. With the advent of modern option theory, this began to change.

One key insight of option theory was a remarkable parallel between the physical and financial worlds. Physicists had developed elaborate mathematical models for how heat diffuses through conductive materials over time. Option pricing theory recognised the fact that

diffusion of the probability of market variables through time could be modelled very effectively with the same analytical techniques.

One consequence of this was that significant numbers of highly trained mathematicians and physicists entered the field of quantitative finance and risk management. They brought with them a tradition of strictly technical analysis and replicable results. The common assumption was that stable relationships exist, and, once isolated, would provide reliable predictive results.

The Dostoevsky effect

The reality of social systems is that stable relationships, if they exist at all, are far deeper and more complex than those of physical systems. I like to call this the “Dostoevsky Effect”, based on an early section in his short work entitled *Notes From Underground*.

In this piece, the central character undertakes a typically Dostoevskian monologue in which he rants and raves about systemisers and mathematisers of social behavior. Man will be free, he contends, and freedom does not mean free to react in precise conformity to a fixed utility function as mapped out in advance.

The bottom line, he argues, is that just when the social scientist has a model working perfectly and predicting precisely, someone will discover this and act counter-rationally out of no other motive than to screw up the model and thereby demonstrate unfettered freedom.

The practical interpretation of this somewhat poetic perspective is that people and societies react to many complex motives. They are driven by nationalism, ideology, an abstract notion of justice, love of family, thirst for fame, class and racial cohesion and conflict, and as demonstrated in the Middle East, the Balkans and Northern Ireland, by religious fervor. Actions stemming from such motives can frequently swamp analysis based on internally consistent and rational economic considerations.

Implications

Eighteen years ago I argued that economic prediction had only moved 20 to 25% from the purely judgmental approach toward a purely “scientific” approach. Clearly, risk estimation today is closer to the scientific mode than that. If forced to pick a point on the spectrum, I would say risk estimation is more like 70 to 75% scientific.

It is a serious mistake, however, to allow the impressive scientific advances in risk management techniques to seduce us into a purely mechanical approach. Only careful and consistent attention to the subjective factors that lie beyond the reach of easy quantification can result in a best practice approach to risk management. ■