Of Oracles, Foxes and Hedgehogs

The allure of oracles and future tellers is ingrained in the psyche of our specie. From the social influence of the Oracle of Greek mythology to the popularity of its modern version, the Oracle of the successful movie franchise "The Matrix," both figures represent the fulfillment of fundamental roles in our never ending attempt at interpreting our surroundings.

Human beings must reorganize chaos to manage their social structures and at a more personal level they need to manage uncertainty and channel such insecurity into predictable models.

Over the centuries, however, the task of forecasting has turned out to be an effort of the highest order. Predictability of outcomes in socially related matters has proven most elusive. Interestingly, in the specific realm of finance and investing, a huge yet often contradictory machine dedicated to forecasting economic outcomes has grown more and more powerful even after significant failures.

The breakdown of models during the 2008 Great Financial Crisis is still a scar in most investors' memories as much as the year 2000 Tech debacle was a traumatic event for earlier generations of traders and investors. Yet Wall Street continues to feed us, on a daily basis, countless forecasts based on market efficiency and rationality.

And so one has to wonder if those recurrent forecasting debacles were truly the failure of the act of forecasting and therefore an indication that perhaps we should terminate such efforts or if the failures were the direct result of mishandling the models. In the latter case, a better understanding of our limitations and of the consequent weaknesses of the models we build, should go a long way toward making us better investors.

The biggest issues with forecasting models usually rest on two factors: overconfidence, or our innate belief that we can discern patterns much better than we actually do and too much emphasis on rational behavior of economic agents. Nassim Taleb, well known derivative trader and academic figure, has written extensively on the subject and stressed that randomness is a much more predominant factor in the fabric of our reality.

From a trading perspective, the acceptance of such an idea, requires an investor or a speculator to give more attention to the possibility of outliers. This translates into better diversification of portfolios and

possibly the inclusion of tail risk hedging programs to account for the higher chance of those outliers occurring.

However, the issue with proper modeling construction is not confined just to the outlier problem but with the whole dynamic that leads us to the final forecasting process. Historically, the greatest obstacle to improvements in socio-economic modeling has been the fascination of analysts with adopting forecasting techniques that were successful in the physical world and utilize them in a socio-economic universe. This process required analysts to make generally unrealistic assumptions and forced them to treat data points such as investment returns or economic statistics as independent numbers. If you have spent some serious time trading, you know perfectly well that markets work on a large degree of reflexivity and that economic decisions and asset price action never occur in a vacuum but coexist in a mutually influencing dynamic. George Soros wrote passionately on the Theory of Reflexivity since the 1980s starting with his iconic book "The Alchemy of Finance."

This critique of modeling, however, is not meant to be a complete rejection of models but rather to shed some light on better and more flexible forecasting processes and on better handling of models results. On such topic, Philip Tetlock and Dan Gardner contemplated interesting points of view in their 2015 book "Superforecasting." Tetlock is not new to the subject having researched and published for more than a decade on forecasting techniques.

In the new work, Tetlock refers to two major approaches to forecasting and modeling: the Hedgehog and the Fox. The Hedgehog model is based on the idea that we have a firm assumption which is clear and accepted and we build mechanisms around it to discover facts that can help us improve and refine our view. In essence, this is the structure of empirical processes and the backbone of most traditional models.

Conversely, the Fox approach is based on limited knowledge in many initial inputs, flexibility in treating data as it comes, no major commitment to one grand idea and constant feedback/refinement. Unsurprisingly, a comprehensive study done by Tetlock and Gardner has proven that the analysts using the Fox approach were significantly better at predicting socio-economic events than the Hedgehog group. From an investor's perspective, the trick is translating the Fox approach into a practical model.

Recently, David Rapach of Saint Louis University has provided some research on how to adapt a "fox mentality" to model construction. The most significant problem in building multi-factor models is the issue of overfitting. In an honest attempt to incorporate as many variable as possible to make a prediction, an analyst often ends up with excellent back-testing results but very disappointing outcomes once the model goes live. As a solution to this pervasive weakness, Rapach suggests to utilize "forecast combination" and "diffusion indexes" in an attempt to reduce model's response to noise.

Simplistically, forecasting combination calculates a simple average of the forecasts of other models irrelevant of their correlations. Optimal combinations should be based on a set of models driven by different information sets and possibly different modeling approaches. On the other hand, diffusion indexes tend to rely on principal components to weed out much of the data noise coming from the individual predictors.

Ultimately, the key to better modeling and forecasting rests on Tetlock's four pillars: keep an open mind, update your data regularly, be aware of your biases and how you deal with them, and embrace flexibility.

Being able to retain modeling frameworks that respect the above mentioned four pillars will become increasingly important and yet increasingly difficult as the role of Big Data in decision making becomes more relevant. Increasing levels of technical inputs will tend to favor modeling frameworks based on rigid assumptions and correlations dynamics. The successful forecaster will be able to avoid rigidity and expert bias or that tendency to trust rigid models only because based on a lot of highly technical information. The "Fox" approach will force the forecaster to *deal* with model outputs rather than being *subjugated* by them.

A proper sequence should follow three steps:

- Collection of data. In this phase an analyst must create a set of common sense rules that will avoid sample bias and will provide meaningful inputs.
- Organization of collected information. This step is concerned with the creation of the model.
- Explanation of results. Here is where the analyst interprets the results or forecasts rather than merely accepting them.

As investors and traders we must realize that models are useful simplifications of reality which provide us with guidelines for future events but our investing success will depend on our flexibility in building them and in interpreting their results within the proper current context.

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