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The Best Model Doesn't Win

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Actuaries love models. Without models it would be much harder for science to substitute facts for appearances as suggested by John Ruskin. But it is easy to fall prey to ever more complex models, borrowing truths from physics to approximate the underpinnings of the financial world and assuming that past results provide the best information to predict the future.

This essay will argue that models have ceased to be the primary differentiators when discounting contingent events, the lifeblood of the actuary's work. Models provide the elixir that there is one correct answer, where today value is very much in the eye of the beholder. A good modeler can adjust assumptions to generate nearly any result. This raises the importance of an independent peer review.

Efficient market theory (EMT) proponents claim it provides the answer, but in reality it is only a preliminary figure later manipulated by herding, cognitive bias and challenges to the assumption that financial returns are normally distributed. While providing important information, EMT does not define the journey.

Qualitative Analysis and Goals

Models are only the first step. Qualitative analysis is the new driver of value determination. Assumption nuances, competitive advantages, margins of safety and emerging risks are all important in an environment that is complex, uncertain and ambiguous. Seeking out favorable imbalances can reduce risk while increasing returns. Experience matters.

Financial analysis starts by defining risk. Volatility is thought by many to be the primary risk metric. Easy to calculate and comparable between opportunities, mathematicians and traders prefer this type of metric. Portfolio managers working for third parties find it hard to explain. Investment professionals prefer to start with goals, objectives and constraints. While also quantitative, this approach quickly leads to telling a story about what is hoped to be achieved and what restrictions are necessary.

Goals are set based on specific time horizons. So are constraints. Someone might want to maximize savings after 30 years while not going insolvent in the meantime. When using EMT, practitioners tend to forget about the constraints because they are inconvenient. Focusing on constraints can lead you to adopt a slow and steady approach, avoiding leverage and saving more. Is this really a bad thing? Aiming for higher than a modeled "number" provides built-in conservatism in case the markets decide not to cooperate with your goals. This requires an early start and consistent funding of objectives. Defined benefit pension plans would perform better in the long run with this approach, front ending the funding rather than trying to make it up later. An investment strategy should consider the underlying lifecycle of the entity that funds it. An individual must invest during their working lifetime unless they are lucky enough to win the lottery or receive an inheritance. The same is true of a defined benefit pension plan. The plan's lifetime can go many years beyond when the firm funding the plan is active, making it surprising that DB plans are not required to conservatively pre-fund. Those with long time horizons can utilize time arbitrage to profit from those with shorter constraints.

This is not to say that models are not important, just that a recommendation should be arrived at from numerous approaches. There is so much information available in today's environment that it is hard to argue that a model, by itself, provides a comparative advantage. Today we have high government debt and investor leverage, unbalanced trade and sustainability issues unlike any seen previously. How can assumptions developed in stable times be thought to be predictive? Stress tests are much more useful in this type of regime.

A trade implies both a buyer and a seller at a single price. Understanding how your model differs from someone you might trade with/against can be important as you learn and understand your mental biases. Geographic location or access to information and rumors may hurt results rather than aid them. Many have found that turning off the Bloomberg terminal and moving to Omaha leads to improved results!

Models have not proven effective in accurately representing interactions between risks and events. Generally a model does well when the relationship is direct, or linear. It may even do a pretty good job when incorporating second order effects like convexity. When the phase, or regime, changes to reflect higher tail correlations, models unfortunately have a very poor track record. You may be able to show high correlations within a range of outcomes, but predictive timing is no better than rolling dice.

Efficient market theory has driven actuarial models for many years, assuming independent results and a bell-shaped, or normal, distribution. Studies in extreme financial events, and pragmatic experience, tells us that neither is always true. Value at Risk calculations are used extensively by banks, but fall prey to both of these assumption fallacies. For example, a 95% VaR ignores the worst 5% of results and effectively avoids all tail events. Risks are considered as silos or with independence assumed between them. This single metric was more valuable prior to it being used by regulators. Now companies design their product mix around it, leaving the firm susceptible to slightly different risks that are invisible to the metric. When using a single metric, this allows models to be designed backwards, knowing the end result and solving for the assumptions to get the answer you want. While Tail VaR, or CTE, performs better, regulators who seek transparency should ask for the underlying data and run it through multiple metrics to learn where the risks really lie. Another tool that is underused currently is to simply graph the underlying data. This makes it easy to pick out the scenarios that need to be reviewed.

A Better Option

A better option is to develop a range of potential outcomes driven by common sense, using both quantitative and qualitative analysis. Stress scenarios can be built starting with a severe result and reverse engineering the parameters. What outcomes are unacceptable? Can I design hedges to offset those results that meet my other goals and objectives? Can this hedge be designed into a product or do I need to find an external source to reduce this risk? Exposures should be reviewed on a gross basis, prior to any reinsurance or hedging, as a tail event might weaken or eliminate these tools.

For making decisions, cultural theory provides some useful approaches to creating teams. Not everyone thinks about risk in the same way. Being aware of this can help teams work together more effectively. These differences in thought process can be due to background or experience, and leads to unique solutions. This encourages groups, such as boards, to enlist a variety of approaches to decision making. How to implement this is a bit unclear, as multiple viewpoints could lead to paralysis or poor timing decisions as leadership rotation could lag results, but a natural tension between parties can produce better decisions.

While efficient market theory would say that timing does not matter, in reality the decision of when to buy or sell makes a big difference. Goals are not set relative to benchmarks. When I want to retire I don't care if I outperformed an index fund. I care if I have enough money to stop working. This leads to the obvious conclusion that, without saving, nothing else matters. Most investors, individual and institutional alike, would be better off investing to their benchmarks and minimizing expenses rather than trying to add alpha, beta or any other kind of excess returns. You get most of the way to your goals this way without most of the downside. An opportunity cost approach can lower risk and avoid many cognitive biases.

Historical accounting practices can also get in the way of good decision making. At life insurance companies, for example, assets are treated separately from liabilities on financial statements. This is not how these portfolios are managed, and a better method would be to define a portfolio as being asset only, liability only or a combination of assets and liabilities. This would allow asset-liability management to be reflected in financial statements for these product lines. ALM is a preferred term to liability driven investing, which implies that liabilities are fixed and only investors have levers to improve results.

Conclusion

Decision making is improved when models are transparent and peer reviewed by experts. It is easy in today's uncertain environment for management to hide behind complex models. Regulators accept these models rather than hiring their own experts to peer review them. A checklist review does not add value, whether attempting to identify minimal or best practices.

As Albert Einstein said, "Make everything as simple as possible, but not simpler." Modelers need to concentrate on telling a story rather than building additional layers of complexity. It will ultimately lead to better resiliency and decision making, which was our goal all along. People, and their experience, matter.

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