Testing EOM Modeling Frameworks and Models

Scientifically testing the effectiveness of EOM models requires different methods than testing the more familiar predictive data models (e.g., regression models). In predictive models, extra complexity often only captures noise and actually reduces the predictive capability of a model. Simpler is usually better, and the ultimate test of these models is whether their predictions are found to be accurate along some measure against actual results. There will undoubtedly continue to be improvements in predictive data models in certain areas as our knowledge base increases, although there is an inherent limitation in predicting, whether data is present or not. After all, the future will always be uncertain to us and our knowledge limited (i.e., no predictive data model will help predict the outcome of a fair coin flip). An EOM model is built to synthesize and weigh predictions, whether or not those predictions are generated by predictive data models. EOM models are dynamic, with uncertainties resolving over time and various choices along the way.

Attempting to test the effectiveness of an EOM model against future results is troublesome. We have trouble even determining a consistent measure of results. For example, choosing total cash flow by the end of the model as the measure is unsatisfactory. First, there may not be an obvious end to the model. Second, cash flow occurs at different times, though one possible solution would be to hypothetically invest (or borrow) all cash flows into a risk-free bond until the end of the model. Third, cash flows occur under various Economic Market conditions and scenarios. We don't have a way to properly adjust for Market Risk in hindsight, and with many models containing millions or billions of possibilities, we will rarely be able to repeat a test and long-term averages will be overwhelmed by noise. Fourth, an EOM model is greatly at the mercy of the predictions contained within.

Fortunately, we have been able to develop a series of five tests that we have been able to successfully apply to any EOM modeling framework. The first three tests are either true or false and determine whether the framework is accurate. For an accurate framework, the fourth test determines the RAEV that the effort of building a particular model has added to an enterprise. The fifth test helps qualitatively determine how much value an accurate framework will be able to contribute to an enterprise over time.

Test #1 – Removal of Arbitrage Opportunities

For options that satisfy Wall Street's restrictive information requirements, do option values match Wall Street valuations?

The simplest and quickest test of any EOM modeling framework is to enter the exact information that Black-Scholes uses and see whether the valuation matches. The assumptions that Black-Scholes formula makes are restrictive, but given that information, the solution is known to be correct. Removing all arbitrage opportunities is a requirement of any consistent, accurate EOM modeling framework, but is not sufficient for valuation and decision making outside of Wall Street. Almost all strategic decisions have uncertainties that are non-replicable, i.e., uncertainties for which there are no market-traded

assets that a trader could buy or sell to get an equivalent ownership. Therefore, calculating RAEV is essential.

Test #2 – Calculation of Risk-Adjusted Economic Value

Is the RAEV of the options probabilistically-weighted and adjusted for the uncertainty in the Economic Markets (i.e., Market Risk)?

RAEV automatically removes all arbitrage opportunities and thus satisfies Test #1.

Test #3 – Representation and Precise Matching of All Relevant Information

Is all relevant information of the original business problem represented and matched precisely, both what is known and not known?

Decisions have to be made and EOM models built even when there are zero data. Each choice can be valued precisely whether there is great uncertainty or none (e.g., a financial option's Black-Scholes volatility parameter).

Imagine a typical business situation: creating a dynamic pricing (or product development) strategy that will maximize RAEV when there are uncertain sales for a new product. There may be no data, some data, or a ton. There will almost always be the judgment of the experts, who have imperfect and incomplete information about future sales. Both the challenge and the test for EOM models are to model all of this information without loss or addition. For example, if an EOM model only contains one possibility for a fair coin toss, say tails, and later the coin is flipped and turns out to be tails, that model is still horrible. Likewise, if a model only contains one possibility for future sales, that model could stand for some improvement.

The best EOM modeling frameworks will incorporate all types of relevant information properly. This implies that a decision maker will not be forced to translate their information or to enter information they don't have, and that no other information will be added that doesn't exist, whether explicitly or not. Information comes in many forms, including human experience and knowledge as well as computer data and analysis.

To ensure the best information is available, the predictions for a model should come from calibrated human experts whenever possible. Within the limitations of computing power, model elements should be decomposed for clarity and more accurate estimations.

Test #4 – The Value of a Particular EOM Model

If an EOM modeling framework passes test #2 and test #3, then any model built using that framework is likely to add a great deal of RAEV to the enterprise using it. This value can be calculated by comparing the optimal strategy to the pre-model strategy within the model.

Test #5 – Usable, Transparent, Consistent, and Flexible

The best EOM modeling frameworks have a great deal of usability (simplicity, speed, flexibility), transparency (communications), and will work consistently across broad enterprise, application, and

industrial domains. It will also work for strategic, operational, and tactical options. Since computing power is limited and approximations will have to be made, these approximations should be “last second” to the maximum extent for maximum transparency.