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UNDERWRITING BETAS—THE SHADOWS OF GHOSTS

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Abstract

For fifteen years, academicians peering into insurance ratemaking have led us on a chase of underwriting betas, in pursuit of economic and normative notions of "equilibrium rates of return" and "fair rates of return." Underwriting betas, we were told, would elevate actuarial ratemaking to financial pricing—if only we could grasp hold of these will-o'-the-wisp emanations from modern portfolio theory. Now Tom Kozik tells us: "Leave the chase, for these betas are ghosts."

1. ACADEMICIANS AND PRACTITIONERS

Are we to be downcast—for we will never catch our prey? Or are we to be bemused—for underwriting betas were never more than academic diversions from marketplace pricing?

What exactly are underwriting betas? The Capital Asset Pricing Model (CAPM) says that the expected return on an asset is a linear function of that asset's risk. The risk to be considered, however, is only systematic risk, or non-diversifiable risk. This is the price volatility that all assets have in common, and it is measured by the covariance of the asset's return with the market return. Unique risks, or risks specific to an individual asset, are not relevant for forecasting expected returns. Investors, says the CAPM, are not rewarded for risks that can be eliminated by portfolio diversification.

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Those are market betas; what about underwriting betas? Financial analysts have extended modern portfolio theory from investment securities to corporate operations. The expected return on any project, we are told, depends on the project's beta, or the systematic risk of the project. Thus, the return on underwriting operations depends on the systematic risk of underwriting, or the covariance of underwriting returns with the general market returns.

Herewith began the search for underwriting betas. Academicians led the effort, with studies of accounting betas and inferred betas, annual betas and quarterly betas, positive betas, negative betas, and null betas.

Practitioners, however, use a simple rule of thumb: New concepts are not accepted solely on the basis of obscure mathematical formulas. Rather, they must also make intuitive sense. Consider underwriting betas. How is the profitability of insurance operations related to market returns? Well, in prosperous years people drive more and take more vacations, so perhaps auto liability claims increase. Also, in prosperous years, firms hire many inexperienced employees, so perhaps workers compensation claims increase. But during recessions, thefts become more frequent, so perhaps auto comprehensive claims increase. And during recessions, injured employees stay longer on disability (since there are fewer jobs to return to), so perhaps workers compensation claim severity increases.

The intuition is muddled. There are no convincing arguments to support either a strongly positive or a strongly negative correlation between underwriting returns and market returns. And the empirical studies? The empirical studies are equally lame, showing only insignificant relationships between underwriting returns and economic conditions.

Insurance regulation, of course, is rarely hindered by mundane facts. In 1976, James Stone, the Insurance Commissioner of Massachusetts, mandated that premium rates be set on the basis

of modern portfolio theory. Fairley's work [6], whose formula for underwriting profit margins rested on his estimates of underwriting betas, became the basis of Massachusetts automobile and workers compensation ratemaking. In 1982, Fairley's formula was replaced by that of Stewart Myers and Richard Cohn [10], whose discounted cash flow model remains the lynchpin of Massachusetts bureau pricing to this day.

Myers and Cohn, both of whom are "efficient market theorists," used Fairley's estimates of underwriting betas to develop the appropriate discount rate for insurance losses. Their paper makes no attempt to advance the theory of underwriting betas. In fact, they note explicitly that their pricing model is entirely distinct from the choice of the discount rate. They used Fairley's estimate of the appropriate discount rate simply because it was already accepted by the Massachusetts Insurance Department.

Nevertheless, many actuaries associate underwriting betas with the Myers–Cohn discounted cash flow pricing model. And in fact, the annual Massachusetts hearings on automobile and workers compensation rates are replete with testimony on underwriting betas, market risk premiums, and risk-free rates.

Tom Kozik writes: "…these estimates [of underwriting betas] are increasingly being used to determine premium levels…." Not quite. They are used only in Massachusetts, one of the last bastions of rigid rate regulation, by the auto and workers compensation rating bureaus, to whose rates all companies must adhere. Actuaries in private firms have little regard anymore for underwriting betas, and even many academicians now find the use of underwriting betas to be unproductive (see especially [4]).

In fact, the workers compensation ratemaking bureau in Massachusetts, after a thorough investigation of underwriting betas, has reached a conclusion similar to Mr. Kozik's. One can

get almost any estimate one wants of underwriting betas, so pronouncements on their true values are unconvincing. Indeed, the Massachusetts bureau is now looking into replacing the Myers–Cohn pricing model with other actuarial techniques, such as the internal rate of return pricing model—assuming the Commonwealth allows it to do so.

2. ACTUARIAL RISK LOADS

The underwriting beta theorists tell us that expected returns depend on systematic risk; no reward is provided for diversifiable risk. These actuaries, then, who dismiss the theory of underwriting betas—do they believe that there is no risk in insurance operations, and that companies need no reward to compensate them for underwriting risk?

Quite the contrary. Actuarial risk theory has been aligned with the practitioners—has followed the observed practices of insurance firms. Insurers are loath to accept large risks with great uncertainty, regardless of whether this uncertainty is correlated with market returns.

What is the actuary's task here? Insurers are risk averse, no less so than other economic entities. Insurers will enter into insurance contracts with highly uncertain payoffs if they are appropriately compensated for doing so. Only the most naive of intellectuals would say to them: "You insurers are all misbehaving. Underwriting betas are insignificant, so you should accept these contracts with nothing but a risk-free return."

The practicing actuary muses: "The economic reality is that insurers demand a return even for uncertainty that is not correlated with market returns. But insurance company managements take crude guesses at the size of the needed returns. Sometimes they are too high, and they can't sell the policy; sometimes they are too low, and they lose money on the policies that they do sell. So let us quantify the needed risk loads. We will provide

formulas and estimates. The ultimate test, however, remains the marketplace."[1]

Actuarial risk load theory has stayed away from underwriting betas, from Robert Miccolis's 1977 *Proceedings* paper on increased limits, through Robert Butsic's 1988 discussion paper on loss reserve discounting, Rodney Kreps's 1990 *Proceedings* paper on reinsurer risk loads, Sholom Feldblum's 1990 *Proceedings* paper on risk loads for insurers, and Stephen Philbrick's 1994 *Forum* paper on accounting for risk margins, as well as his discussion of the Feldblum paper [2, 7, 8, 9, 11, 12, 13].

3. UNDERLYING PRINCIPLES

Critics of actuarial risk theory argue that the papers listed above use divergent measures of risk—standard deviations, variances, and analogues of the CAPM beta—with no systematic principles underlying them. Instead of an actuarial theory of risk loads, there are bits and pieces of disjointed actuarial insights.

How timely it is, then, that the CAS is publishing Todd Bault's discussion of "Risk Loads for Insurers" [1] alongside Mr. Kozik's paper on "Underwriting Betas." Mr. Bault's masterful synthesis of the risk load papers shows that the disparate measures used by these actuaries are all variations on a theme, with the choice of measure dependent upon the correlation of a new risk's variability with that of the insurer's existing portfolio.

Devotees of underwriting betas are pursuing a theory long since refuted by reality. The developers of actuarial risk loads are laying a solid foundation for insurance pricing.

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[1]Particularly telling is D'Arcy and Garven's [5] discovery that, of the pricing models which they examined, the Myers–Cohn model—whether used with negative underwriting betas or null underwriting betas—was the *least* successful in predicting actual underwriting results.

4. THE REGULATOR'S PERSPECTIVE

"Wait," say the critics. "The actuarial risk load measures take the viewpoint of insurers. Insurers seek higher profit margins for all their contracts, regardless of the risks for which a reward is truly deserved. But insurance regulators are faced with a normative question. They must determine 'fair premiums,' which—as Mr. Kozik says—'meet the standards of fair returns that have been enunciated by the United States Supreme Court.'"

What, then, is the regulator's task? And what measure of risk is most relevant for the insurance regulator? The micromanagement of premium rates should not be the purview of the regulator. In the U.S. economy, markets are the arbiters of prices. When competition is robust, this price arbitration is efficient. And if one values the efficient and voluntary transfer of goods among economic entities, then the market's price arbitration is more "equitable" than the machinations of insurance regulators.

Should the regulator take no interest in risk loads? On the contrary: the regulator's primary responsibility is to mitigate the adverse consequences of insurance failures. Robert Butsic, in "Solvency Measurement for Property-Liability Risk Based Capital Applications," argues that capital requirements should be related to "expected policyholder deficit ratios" [3]. The capital requirements, it turns out, depend upon the variability of the insurer's operations, not upon the covariance of underwriting returns with market returns.[2]

5. CONCLUSION

Tom Kozik tells us to abandon the race, for we are chasing after ghosts. His advice is sound, but perhaps unneeded, for he is the solitary runner.

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[2]Myers and Cohn [10] note explicitly that their model is incomplete in that it does not consider the risk of insolvency.

But risk is becoming an increasingly important element in the casualty actuary's world: for premium determination, for loss reserve setting, and for capital requirements. Actuaries have pursued this subject along different paths, some convergent and some divergent, but never intersecting with underwriting betas. Five years ago, this subject was seen as the province of the pure actuary. Now, the quantification of risk is the practitioner's task: "What risk load is needed for discounted reserves? How should capital requirements relate to underwriting risk? How should risk loads differ between ground-up and large deductible policies?" These questions demand living answers, not ghosts.

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