IS ECONOMETRIC MODELING OBSOLETE?

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Mr. Van Slyke's paper presents a discussion of econometric modeling in a fairly general way. I would have preferred to see more on possible specific applications to insurance pricing, especially with regard to the more sophisticated techniques of systems dynamics and catastrophe theory.

But one can hardly disagree with Mr. Van Slyke's conclusions; namely:

1. Econometrics is not obsolete.

2. The more sophisticated models of systems dynamics or catastrophe theory may be better than econometric models.

3. Models are just tools, to be used to enhance the forecasting process, not to replace it.

I would like to discuss these conclusions one at a time.

ECONOMETRIC MODELS

Mr. Van Slyke's definition of an econometric model is "a mathematical representation of economic relationships using linear equations." This is accurate and the equation he cites relating wages and medical costs to Bodily Injury Claim Costs is a good example of such a model.

However, later he refers to an example where the independent variable is related only to a measure of time. This, which we might recognize to be historical trend data fitted to a least-squares line, is too simple an example and I believe would not be considered by an econometrician to be an econometric model. The key element that is missing is an economic independent variable. Time is often a parameter of the equation because we hope to use the model to forecast a value for a certain time period, but time cannot stand alone as the economic independent variable.

Mr. Van Slyke cites several advantages to the use of econometric models, but neglects to cite disadvantages. His sub-heading "Disadvantages" should really be termed "Shortcomings of Econometric Modeling Techniques." Perhaps there are no real disadvantages, but I would hope one day an analysis could be

performed to determine if the benefits derived from econometric models have been worth the cost and/or whether the laymen really finds a model to be a more understandable explanation for why his insurance rates are increased.

Mr. Van Slyke appropriately lists the reasons why models can produce poor forecasts - bad forecasts of independent variables, the index-number problem, wrong variables included, wrong equations assumed. There is no question that errors can and will occur; hopefully, by continually updating data and testing models, these errors can be minimized.

I can't resist relating what the defenders of the Consumer Price Index have said on the index-number problem. It is not a problem with the index for the index is exactly what it purports to be. It measures changes in cost of a fixed market basket of goods. Rather, it is a problem with those (actuaries, econometricians, etc.) who choose to misinterpret the index.

While the tone of Mr. Van Slyke's remarks seems to imply that he is going to conclude that econometric modeling is obsolete, he does not and cites it as a valuable tool. I am not surprised by this conclusion, nor do I disagree with it, but almost wish he had rendered it obsolete to see what reaction this would have generated within the Casualty Actuarial Society.

Mr. Van Slyke concludes that these techniques may be better than econometric models. I can agree with this conclusion but put strong emphasis on the word "may."

The description of situations that lend themselves to the application of catastrophe theory was clearer to me than that given for systems dynamics. However, in neither case was I convinced that there is a real property/casualty pricing problem that can be solved through these techniques. Perhaps the reader can provide examples.

Also, I wonder if the dividing line between econometric modeling and systems dynamics is a clear one. Econometricians who are making predictions of underwriting results are generally starting with given loss and expense ratios and making various assumptions on the future changes in losses, expenses and premiums. However, the econometrician may use a statistical model of rate level changes based upon the loss and expense ratios of prior years. As a result, an interactive system is developed; underwriting ratios are used to predict rate level changes which are used to predict underwriting ratios, etc.

This interactive set of models is common in large econometric models. Would Mr. Van Slyke consider these types of models econometrics or systems dynamics?

Does the econometrician give any recognition to more or less restrictive underwriting patterns in his assumptions on loss changes? Does he include any consideration of a changing regulatory environment in his assumptions on price changes? Perhaps he does so more in a judgemental manner and less in a systematic manner than Mr. Van Slyke would want in order to call this systems dynamics. Nevertheless, I do not find the two techniques to be mutually exclusive.

It would be a worthwhile exercise to check the advantages Mr. Van Slyke listed for econometric models against systems dynamics and catastrophe theory to see if they still apply. Credibility to the laymen seems to be a tougher one to justify. Otherwise, we are forced to accept Mr. Van Slyke's conclusion on faith alone. I am willing to accept the surface area configurations on Exhibit IV, but have not accepted that there exists a property/casualty insurance product that looks like figure IV-C.

A TOOL TO ENHANCE FORECASTING PROCESS

I am in complete agreement with Mr. Van Slyke in this area.

He hopes that whatever models are used, they be instructive as well as predictive in nature. At times, plugging different assumptions into our equations tells us something new. The range of predictions can often reveal how sensitive our dependent variable is to a particular independent variable, of course assuming that our model itself is reasonably accurate.

But as Mr. Van Slyke notes, the model itself often must be adjusted. This is not to say the model is bad, but rather that it is an imperfect tool. In an econometric model ISO developed, the number of small cars on the road was used to reflect the magnitude of a collision. The first measure of this we adopted was an imported car ratio. However, as the number of small domestic cars increased, this measure became inappropriate and we switched to a measure of compact cars. This measure, too, was eventually discarded as the definition of compact cars changed.

The fact that models must be adjusted is not a reason for rejecting modeling techniques. Rather, it points out the need for careful construction of models and monitoring of their effectiveness. No one is suggesting that the model be used without the application of judgement.

CONCLUSION

In conclusion, I enjoyed reading Mr. Van Slyke's paper and recommend it to anyone wanting a description of econometric modeling techniques. His contribution to the CAS literature should motivate readers to delve into specific pricing applications.