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EDITORIAL

WE are grateful to more than one correspondent for pointing out that, in the February issue, the apology to Director De Shetler (Red Face p. 8) was somewhat marred by further misspellings. One correspondent kindly suggested that this must be a subtle form of (Scottish) humor. Another wanted to know more about the verb "to pell." A third cited the record of the Edinburgh professors who attempted to publish a work which was to be a perfect specimen of typographical accuracy. (This sounds like an oblique reference to the Editor's background). The attempt failed and the first error was found in the first line of the first page.

We have it on classical authority (Horace, to be precise) that
"Sometimes even good old Homer nods"

and the Editor takes refuge in this admirable example.

Nobody suggested that *The Actuary* might be trying to reintroduce simplified spelling, which is not new in the actuarial world. Dr. T. B. Sprague, that formidable proponent of Graphic Graduation, was an enthusiast for simplified phonetic spelling. At one time his contributions to the Institute of Actuaries were written in this phonetic spelling. The Council of the Institute did not share Dr. Sprague's enthusiasm but had no choice since the author apparently issued an ultimatum to the effect that there would be no paper for the Journal unless it were printed as spelled. (Budding authors should not hold a similar threat over the heads of the Society's Committee on Papers).

Perhaps today's students might be grateful that they do not have to struggle with the spelling as well as with the contents of a paper. Here is Dr. Sprague (J.I.A. XVIII)

> "Mere speculativ essays in works or periodicals devoted to fonetical or orthografical subjects, will never influence in the least the opinion or practice of the public at large. It appears to me, therefore, that persons holding the views exprest abov, shoud no longer leav the spelling of their works to be settld by the printers, but shoud consider on what principls English spelling may best be reformd, and uze their utmost endeavors to carry those principls into practice in their publisht ritings."

We do not guarantee future orthography in *The Actuary* and we will continue to accept corrections with good grace, taking comfort in the words of Belloc:

"His sins were scarlet, but his books were read"

A.C.W.

TO BE CONTINUED

Editor's Note: This is another in the series of articles from the Committee on Continuing Education. The rule is one article to one subject to give the non-specialist in that subject up-to-date general information and to encourage further research in the subject if the reader is so minded. Comments will be welcomed by the Committee and by the Editor.

Econometric Forecasting

*by Dr. J. Robert Ferrari, A.C.A.S.**

The modern-day forecaster has come a long way since pointy-hatted diviners supplemented their judgmental prophesies with insights from chicken entrails. Now his tools of the trade are mathematical statistics, models, and computers. In economics the name of this game is econometrics. Its practitioners — called econometricians, of course — attempt to forecast by setting and solving a series of equations that simulate the economic process. Since the economy is so complex, early models of this type were fairly primitive and had a spotty forecasting record. Nevertheless, these efforts represent a serious attempt to advance forecasting from an art to a science.

Econometricians had at least a moment of glory on Oct. 27, 1969 when the first Nobel Prize in economics was awarded jointly to Jan Tinberge of the Netherlands and Ragnar Frisch of Norway, both pioneers in the field of econometrics. The *New York Times* described their work, which to a layman must appear to be as esoteric as actuarial science, by stating somewhat simplistically that these men "see the essence of economics in systems of equations, not in the verbal formulations of a Smith or Marx."

But the importance of econometrics goes beyond mere recognition. In the last few years there has been an explosive growth in the use of econometric forecasting models by academicians, business economists, consultants, and high-level government policy makers including the Federal Reserve Board, Council of Economic Advisors, and Department of Commerce. Some of thes models are now quite sophisticated and

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incorporate hundreds of equations and identities that are solved sequentially or simultaneously in grinding out forecasts.

The mathematical statistics underlying econometric work would scare off the uninitiated but, for the most part, present no mystery to the actuary. Such terms as least squares, correlation matrix, regression, coefficient of determination, standard error, and t-statistic have long been part of the actuary's thesaurus. And, like the actuary, the econometrician owes a great deal to the computer that makes practical the thousands of calculations in model simulations.

Furthermore, sophisticated and mathematically precise models, whether economic or insurance, depend on large quantities of data, but because the econometrician is tackling a more complex system his intellectual debt to data collectors is many times greater than the actuary's.

For example, a major building block of econometric models is the Federal Statistical System. Built up over the past 80 years, a wealth of official statistics is now prepared and reported expeditiously by the Bureau of the Census, Bureau of Labor Statistics, the Office of Business Economics, and the Federal Reserve System. The difficulty and cost of maintaining these data by a single user have led to the private development of central data banks accessible to many users.

The advancement of on-line time sharing technology has made it practical to provide not only data bank services but also a variety of software for manipulating the data and linking the analyses of the economy as a whole to specialized information for particular industries or companies. A number of large insurance companies are now making use of such services for economic and investment analysis.

Several of the major econometric models of the U.S. economy and their accompanying data bases are available for customer access and/or simulation on a time sharing basis. These include the models of Data Resources, Inc. (Lexington, Mass.), Economic Forecasting Associates (Wharton School, University of Pennsylvania), Chase Econometrics Associates (New York), and General Electric—Mapcast (New York).

Econometrics Selected Bibliography

Evans, Michael K., *Macroeconomic Activity* (New York: Harper & Row, 1969).

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Yamane, Taro, *Statistics, an Introductory Analysis* (New York: Harper & Row, 1967).

Despite all this hoopla, even the dedicated econometrician, if he is honest, will admit that for responsible forecasting one must be an economist first and a model builder second. Indeed, it has been said that there is no such thing as an econometric forecast since a liberal dose of *judgment* must go into specifying equations, building the model, introducing "exogenous" values for key economic policy variables, and interpreting the solution in the light of reality. Competent assessment of these matters has little to do with mathematics or computers and instead requires an economist's insights into the behavioral and structural patterns of the economy. If the model is used too mechanically or with too much sanctity, the forecast results may be dangerously misleading.

Naturally, econometric forecasting carries its own risks and limitations. In contrast to physical laws, economic "laws" are by no means precise and are variable over time, as flexible as human behavior. A serious concern, therefore, is the inability of a model based essentially on historical relationships to capture sudden shifts in economic psychology, structure, or policy. Indeed, the model needs constant restyling to keep up with changing relationships and to avoid what one wag has termed "hardening of the equations."

Nevertheless, policy makers need forecasts and econometric models are important tools in the hands of a competent economist. On the whole, an economist should get better forecasts with an econometric model than without one. The model-building discipline of quantifying assumptions and specifying functional relationships improves the economist's understanding of economic phenomena and allows him to test alternative theories. The model itself assures a certain consistency among sectors and over time that often eludes the wholly judgmental forecaster.

For example, the pre-econometrician just did not have the tools to analyze properly all of the so-called "lag" effects of many economic processes. And the judgmental forecaster is hard put to reconstruct and evaluate *ex post facto* all of the variables and relationships that went into his earlier forecasts. Most importantly, a model, through simulation and sensitivity analysis, is virtually indispensable in assessing the impacts of alternative economic policy measures and providing a range of plausible outcomes under different assumptions.

Recent events underscore the fact that the best laid plans of politicians, corporate managers, and investors can fall victim to unanticipated changes in the overall economic environment. Responsible planning and policy-making require projections of national economic and financial conditions and econometrics a giant leap forward in the forecasting art (science?) employed to make these excursions into the future. □

Social Security Note

Robert J. Myers. *Summary of the Provisions of the Old-Age, Survivors, and Disability Insurance System, The Hospital Insurance System, and the Supplementary Medical Insurance System.* Mimeograph, 14 pages, August 1971.

This booklet gives a concise but quite comprehensive description of the OASDHI system as it stood immediately after the March 1971 amendments. The material is organized by topic rather than by legislative sequence, a feature which facilitates the finding of an answer to a particular question. Among the topics discussed in the OASDI part are the computation of the average monthly wage (AMW), the formula underlying the amounts in the benefit table (PIA's), illustrative benefit amounts, coverage and eligibility provisions, and the financing provisions. Similar descriptions (with special emphasis on services covered and not covered) are given for both parts of the Medicare program.

Free copies of the booklet may be obtained by writing to Mr. Myers at 9610 *Wire Avenue, Silver Spring, Md.* 20901.