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TROLL/1: AN INTERACTIVE COMPUTER SYSTEM FOR ECONOMETRIC RESEARCH

BY MARK EISNER

Over the last two decades econometrics and simultaneous equation modelling have developed into primary tools of quantitative economists and other social scientists. The lack of widely accessible and powerful computer software has proven to be a serious impediment. The Econometrics Project at MIT under the direction of Professor Edwin Kuh has attempted to deal with the problem through the development of the TROLL system. Extensions of the system will be created at the new NBER Computer Research Center for Economics and Management Science (see the announcement, this issue).

Work on TROLL began in the fall of 1966. Its purpose was to bring interactive programming capabilities to applied econometrics. A prototype system, TROLL/0, which is used at MIT for thesis research, faculty research and for classroom support, has been running on the 7094 time-sharing system since June of 1968. In the fall of 1968 work was begun on a completely redesigned and much expanded system. This system, TROLL/1, is now programmed and operates on the IBM 360/67. It is available at a number of 360/67 installations including MIT. TROLL/1 can be accessed via telephone lines using any standard terminal.

TROLL/1 is an integrated, interactive system which provides an environment for applied econometric research. It contains a broad range of substantive capabilities:

1. Continuous simulation of systems which can be expressed as non-linear systems of simultaneous equations, the traditional form of econometric models. Models of up to one thousand equations can be solved by the system.
2. A regression facility to estimate parameters of equations and models including non-linear estimation, two and three stage least squares, polynomial distributed lags and autoregressive corrections for serial correlations. These techniques are packaged in modular units which allow an econometrician to apply that combination of these techniques which he feels will be most effective.
3. A data transformation capability providing an algebraic language and a large function library for more complicated procedural transformations and the analysis of data. These include such functions as seasonal adjustments, smoothing, extrapolation, removing of outliers, interpolation for missing data, other screening facilities and standard statistical tests.

The major intent of the programming has been to make an interactive environment "friendly" in the sense that it provides an interface that makes input, storage and display of information easy and flexible for the user. The basic operating system contains a sophisticated file system that allows file-sharing among users, a consistent command language, a complete on-line tutorial system and a graphics

and table capability which can produce output on numerous devices under user control. In addition, specialized capabilities are provided for entering and editing time series or cross-sectional data, parameters and constants, and symbolic equations or models.

We believe that TROLL/1 is a significant improvement in the level of computational techniques available for econometric research. In addition, it will be useful to other researchers whose work involves data analysis and continuous system modelling. The programs should be especially applicable to many areas in the social sciences, including the many modelling activities in management science.

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