DISCUSSION

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Professors Martin and Yohai are to be complimented for their topical, thoughtful paper. In the paper they have emphasized population aspects of the material. In my discussion I will emphasize the data side. The two sides are both complementary and intersecting.

There is a circle of interrelated ideas: influence, sensitivity, deletion, resistance, leverage, robustness, and jackknifing. Work appears to progress on all of these fronts more or less simultaneously with algorithmic and computing advances often providing exogenous impetus. I will present a data analysis made possible by some contemporary time series methodology and easy availability of minicomputers.

The concern of Professors Martin and Yohai is to extend the concepts and methods of "influence" to the time series case. They proceed by examining the effects of contaminating the data, by studying for example gross-error sensitivity. In the i.i.d. case an immediate way to study the influence of a possibly incorrect data point is to delete it and to carry through the inference procedure for both the full and depleted data sets. Because of the invariance of the structure under permutations of the data, in the i.i.d. case ways forward are clear; however, as Professors Martin and Yohai emphasize, the permutation invariance is not generally present in the time series case. There is, however, a way to retain the full time series structure and still do deletion/jackknife type studies.

A long time ago (Brillinger, 1966), I suggested that a way to develop jackknife procedures for complex situations was to apply a missing-value technique. Briefly, on deleting the observation one is to act as if the data then consist of what it is but that that observation is missing. Luckily, nowadays we have many conceptual and methodological means for handling data with missing values. A way forward for studying the influence of individual observations in a variety of time series situations is now clear. In that connection it may be remarked that the procedure is a form of sensitivity analysis. Namely one is studying the effect of altering an observation to its "best" estimate based on the remaining data in some sense.

Resulting from the work of Ansley and Kohn (1984), Harvey and McKenzie (1984), Jones (1984), and Shumway (1984) there are a variety of methods to fit finite parameter (ARMA) models to discrete time series data having some missing values. In the calculations to be presented, the method of Jones (1980) was employed. Figure 1 is a graph of the logarithm of the Mackenzie River series of annual Canadian lynx trappings for the years 1821–1934. These data are studied, and much discussed, in Campbell and Walker (1977) and Tong (1977) for

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