Title: Some Econometric Problems Arising from Regressions with Constructed State Variables

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Abstract:
Phenomena such as business cycles, hot and cold IPO markets, bull and bear stock markets and economic crises are often represented with a constructed binary variable S_t that takes the value 1 in the "good" state and 0 in the "bad" state. For example, the NBER reference cycle takes the value 1 when the economy is judged to be in expansion and 0 when in contraction. The process of construction varies, for he NBER it is a committee in other cases an algorithm is used.

Once the states are obtained they are generally used either as regressors or regressands in order to estimate parameters that are the inputs into a study of some issue e.g the ability to predict recessions. Typically, this literature does not pay a great deal of attention to the nature of S_t. In particular it does not recognize their constructed nature and it often uses models borrowed from micro-econmetrics to produce parameter estimates in which the central assumption is that the binary variable has been directly observed rather than constructed. Thus in most instances it is implicitly assumed that S_t is independently distributed and the favoured method of using S_t is as the dependent variable in a probit model.

In this paper we advance three propositions about econometric analysis performed with constructed 0/1 state variables, and argue that appropriate allowance has to be made for he fact that the S_t are entities constructed from a set of “primitive series”. Our first contention is that to obtain valid inference when such variables are used as regressands, it is necessary to take into account both the nature of the primitive series and the types of rules that are used to construct S_t from them. Second, the quality of the statistical inference about model parameters will depend on how well the assumed method for constructing S_t matches the actual method. Finally, the quality of probabilistic statements about events such as recessions depends upon the quality of the same approximation.

Key words: Business cycles; probit model; zero-one indicator variables

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