

Graph Inference on Timeseries Data

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1 Understanding the Limitations of Vector Autoregression

In Stock 2001, the authors point out, "The Taylor [rule] is "backward looking" in the sense that the Fed reacts to past information..., and several researchers have argued that Fed behavior is more appropriately described by forward looking behavior." Though not addressing autoregression directly, this makes an interesting point about how autoregression, and most models are "backward looking" while real world processes involve anticipating the future. The authors go on to explain that the Taylor rule was updated to respond to the autoregressive prediction of what inflation would be in the near future. It is interesting to note that while this new model does incorporate a notion of predicting the future, mathematically, it is still completely backward looking. Later, the authors mention the following issues:

1. "The standard methods of statistical inference (such as computing standard errors for impulse responses) may give misleading results if some of the variables are highly persistent [8]. Another limitation is that, without modification, standard VARs miss nonlinearities, conditional heteroskedasticity, and drifts or breaks in parameters."
2. "While useful as a benchmark, small VARs of two or three variables are often unstable and thus poor predictors of the future (Stock and Watson [1996])."
3. "However, adding variables to the VAR creates complications, because the number of VAR parameters increases as the square of the number of variables: a ninevariable, four-lag VAR has 333 unknown coefficients (including the intercepts). Unfortunately, macroeconomic time series data cannot provide reliable estimates of all these coefficients without further restrictions."
4. "a common assumption made in structural VARs is that variables like output and inflation are sticky and do respond "within the period" to monetary policy shocks. This seems plausible over the period of a single day, but becomes less plausible over a month or quarter."