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★**Empirical vector autoregressive modeling. (English. English summary)**

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From the introduction: "In the second chapter we formally introduce the baseline version of the VAR model, which contains the basic statistical assumptions that we use in the sequel. One first has to check whether the variables one uses can be transformed to meet these assumptions. The first point is an analysis of the univariate characteristics of the series. The VAR model implies linear ARIMA models for the univariate series (Zellner and Palm (1974)). Important properties of these models can be examined in the sample: a bounded spectrum, the order of (seasonal) integration, linearity and normality after the appropriate transformation. The basic properties of univariate purely stochastic integer unit root integration are pointed out. Subsequently, these properties are contrasted with the properties of stochastic fractional integration. We suggest data-analytic tools to check the assumption of univariate unit root integration. In an appendix we give a detailed account of unit root tests for stochastic unit root nonstationarity versus deterministic nonstationarity at frequencies of interest.

"The third chapter starts with a few sections on local and global influence analysis, which should point out the observations with the most notable impact on the estimates of location and covariance parameters. The results from this analysis can be helpful in spotting the sources of possible problems with the baseline model. After the influence analysis we discuss the merits of various statistical diagnostic tests for the adequacy of the separate regression equations. After one has estimated the unrestricted VAR one should check some overall characteristics of the system. We present several suggestions on how to do this.

"The fourth chapter deals with common sources of misspecification stemming from problems with seasonality and seasonal adjustment in the multivariate model. We discuss a number of univariate unobserved component models for stochastic seasonality, giving additional insight into the properties of models with unit root nonstationarity. We also suggest a modification of a simple but quite robust seasonal adjustment procedure. Some new data-analytic tools are introduced to examine the seasonal component more closely. In Appendix A4.1 we discuss the limitations of deterministic modeling of seasonality. In Appendix A4.2 we discuss some aspects of backforecasting in models with nonstationarity in mean.

"In the fifth chapter we introduce outlier models. We develop a testing procedure to direct and evaluate the treatment of exceptional observations in the VAR. We illustrate its application on an artificial data set that contains important characteristics of macroeconomic time series. The effect of the outliers and the effectiveness of the testing procedure is also analyzed on a four-variate set of quarterly French data, which exhibits cointegration. We compare some ready-to-use outlier correction methods in the last section.

"The sixth chapter deals with restrictions on the VAR model. First we discuss a number of interesting reparameterizations of the VAR under unit root restrictions. The reparameterizations lead to different interpretations, which can help to assess the plausibility of empirical outcomes. We present some straightforward transformation formulae for a number of these parameterizations and show which assumptions are essential for the equivalence of these models. We illustrate this in simple numerical examples. Next we compare VAR based methods to estimate pushing trends and pulling equilibria in multivariate time series. The predictability approach of Box and Tiao receives special attention. Finally we discuss multivariate tests for unit roots.

"The seventh chapter is devoted to an application of methods described in the previous chapters to analyze gross fixed capital investment in the Netherlands from 1961 to 1988 in a six-variate system. We discuss a number of economic approaches to model macroeconomic investment series. We list a number of problems in empirical applications of these models. In §7.3 we present empirically relevant aspects of the measurement model for macroeconomic investment.

"In the next section we apply univariate techniques of Chapters 2, 3, 4 and 5 to the investment series and five other macroeconomic variables which can be expected to have a notable dynamic relationship with investment, viz. consumption, imports, exports, the terms of trade and German industrial production. The univariate analysis clearly shows the presence of nonstationary seasonal components in a number of the series. The model is extended with a structural break on the basis of results from the univariate analysis. The subsequent multivariate analysis confirms the need for a structural break in the model for the growth rates of the multivariate series. An empirically important equilibrium relation between investment, imports and exports is seen to remain stable over the entire sample period.

The partial correlation of deviations from this equilibrium and growth rates of investment is large and stable."

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