Federal Reserve Bank of Minneapolis

Quarterly Review

Fall 1984

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Above-Average National Growth in 1985 and 1986 Robert B. Litterman *(p. 3)*

More Growth Ahead for Ninth District States Hossain Amirizadeh, Richard M. Todd *(p. 8)*

Improving Economic Forecasting With Bayesian Vector Autoregression Richard M. Todd *(p. 18)*

Forecasting and Policy Analysis With Bayesian Vector Autoregression Models Robert B. Litterman *(p. 30)*

Federal Reserve Bank of Minneapolis
Quarterly Review Vol. 8, No. 4 ISSN 0271-5287

This publication primarily presents economic research aimed at improving policymaking by the Federal Reserve System and other governmental authorities.

Produced in the Research Department. Edited by Preston J. Miller, Kathleen S. Rolfe, and Inga Velde.
Graphic design by Phil Swenson and typesetting by Barbara Cahlander and Terri Desormey, Graphic Services Department.

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In This Issue . . .

Supporting a Promising Forecasting Technique

The Minneapolis Federal Reserve Bank has supported research to develop a sophisticated statistical forecasting technique known as *Bayesian vector autoregression* (BVAR). Much of the pioneering work on this technique has been done by Thomas Doan, formerly a research assistant at the Bank and currently assistant professor of economics at Northwestern University; Robert B. Litterman, senior economist at the Bank; and Christopher A. Sims, formerly an adviser at the Bank and currently professor of economics at the University of Minnesota. Building on their pioneering work, Litterman has constructed a model of the U.S. economy, and other researchers at the Bank—economist Richard M. Todd and research associate Hossain Amirizadeh—have constructed models of the economies of states in the Ninth Federal Reserve District. The articles in this issue of the *Quarterly Review* describe the BVAR technique in general and the national and regional models in particular. The articles also demonstrate some uses of the models.

The Minneapolis Fed has encouraged and supported research on BVAR modeling in the hope that it will lead to better economic forecasts and provide other information useful to policymakers. It seeks in this issue to share some of the fruits of that research with the public. The forecasts and policy analyses described here, however, do not represent the official views of this Bank. Rather, they represent objective sources of information which help form official views about economic prospects and policy options.

The 1985–86 Forecast

A primary use of BVAR models is for *unconditional* forecasting—that is, forecasting the most likely outcomes of economic variables without taking as given the future paths of any of them. In "Above-Average National Growth in 1985 and 1986" (p.3), Litterman discusses the unconditional outlook for the national economy. His national BVAR model predicts that real growth in 1985 and 1986—fueled by healthy advances in interest-sensitive spending—will exceed the post–World War II average. And it predicts low inflation in the two years. Although there is much uncertainty about these forecasts, the model is fairly confident that a recession will not occur in 1985 and 1986 and that the chance of a notable acceleration in inflation during these years is very slight.

In "More Growth Ahead for Ninth District States" (p.8), Todd and Amirizadeh discuss the unconditional outlook for nonagricultural activity in Minnesota, Montana, North Dakota, South Dakota, and Wisconsin based on their new BVAR models for these states and on Litterman's U.S. model. Given the strength Litterman's model predicts for the national economy, it is not surprising that Todd

and Amirizadeh's models predict considerable strength for the region. What is somewhat surprising, however, is the dispersion of growth rates across states; nonfarm employment growth in 1985 and 1986 is predicted to range from an average of about 1.5 percent in Montana and South Dakota to over 3.5 percent in Minnesota.

The Forecasting Technique and How It Can Help Policymakers

In "Improving Economic Forecasting With Bayesian Vector Autoregression" (p.18), Todd describes the BVAR modeling technique and the accuracy of its forecasts. He first explains how forecasting models generally blend a modeler's prior knowledge with data to estimate the relationships among a model's variables. After arguing that BVAR models allow the modeler's knowledge to be represented in the most flexible and accurate way, he illustrates how they do that by describing the steps involved in constructing one kind of BVAR model. He concludes the article with some evidence that the accuracy of BVAR model forecasts compares favorably with that of forecasts generated by other methods, even when those other methods include the judgment of the modelers.

In "Forecasting and Policy Analysis With Bayesian Vector Autoregression Models" (p.30), Litterman argues that BVAR models can be useful in generating forecasts that are conditional on alternative policies. These *conditional* forecasts can help monetary policymaking as it is currently formulated. Monetary policy decisions usually are made by considering (among other things) answers to two types of questions:

1. What is the economic outlook if policy is unchanged?
2. How will the outlook change under alternative policies?

Given answers to such questions, the policymaker chooses the best policy by selecting the one associated with the most favorable outlook. In the first three articles in this issue, the authors argue that BVAR models are useful in answering the first type of question. In this article, Litterman argues that they can also be useful in answering the second.

(Documentation of the national and state BVAR models will be available in technical appendixes prepared by Litterman, Todd, Amirizadeh, and Susan J. Mendesh, research associate. Please direct requests for these appendixes to the Research Department of the Minneapolis Fed.)