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Monetary policy in a data-rich environment[☆]

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Abstract

Most empirical analyses of monetary policy have been confined to frameworks in which the Federal Reserve is implicitly assumed to exploit only a limited amount of information, despite the fact that the Fed actively monitors literally thousands of economic time series. This article explores the feasibility of incorporating richer information sets into the analysis, both positive and normative, of Fed policymaking. We employ a factor-model approach, developed by Stock, J.H., Watson, M.W., Diffusion Indices, *Journal of Business & Economic Statistics* 2002, 20 (2) 147, Forecasting Inflation, 1999, *Journal of Monetary Economics* 44 (2) 293, that permits the systematic information in large data sets to be summarized by relatively few estimated factors. With this framework, we reconfirm Stock and Watson's result that the use of large data sets can improve forecast accuracy, and we show that this result does not seem to depend on the use of finally revised (as opposed to "real-time") data. We estimate policy reaction functions for the Fed that take into account its data-rich environment and provide a test of the hypothesis that Fed actions are explained solely by its forecasts of inflation and real activity. Finally, we explore the possibility of developing an "expert system" that could aggregate diverse information and provide benchmark policy settings.

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1. Introduction

Monetary policy-makers are inundated by economic data. Research departments throughout the Federal Reserve System, as in other central banks, monitor and analyze literally thousands of data series from disparate sources, including data at a wide range of frequencies and levels of aggregation, with and without seasonal and other adjustments, and in preliminary, revised, and “finally revised” versions. Nor is exhaustive data analysis performed only by professionals employed in part for that purpose; observers of Alan Greenspan’s chairmanship, for example, have emphasized his own meticulous attention to a wide variety of data series (Beckner, 1996).

The very fact that central banks bear the costs of analyzing a wide range of data series suggests that policy-makers view these activities as relevant to their decisions. Indeed, recent econometric analyses have confirmed the longstanding view of professional forecasters, that the use of large number of data series may significantly improve forecasts of key macroeconomic variables (Stock and Watson, 1999, 2002; Watson, 2000). Central bankers’ reputations as data fiends may also reflect motivations other than minimizing average forecast errors, including multiple and shifting policy objectives, uncertainty about the correct model of the economy, and the central bank’s political need to demonstrate that it is taking all potentially relevant factors into account.¹

Despite this reality of central bank practice, most empirical analyses of monetary policy have been confined to frameworks in which the Fed is implicitly assumed to exploit only a limited amount of information. For example, the well-known vector autoregression (VAR) methodology, used in many recent attempts to characterize the determinants and effects of monetary policy, generally limits the analysis to eight macroeconomic time series or fewer.² Small models have many advantages, including most obviously simplicity and tractability. However, we believe that this divide between central bank practice and most formal models of the Fed reflects at least in part researchers’ difficulties in capturing the central banker’s approach to data analysis, which typically mixes the use of large macroeconomic models, smaller statistical models (such as VARs), heuristic and judgmental analyses, and informal weighting of information from diverse sources. This disconnect between central bank practice and academic analysis has, potentially, several costs: First, by ignoring an important dimension of central bank behavior and the policy environment, econometric modeling and evaluation of central bank policies may be less accurate and informative than it otherwise would be. Second, researchers may be foregoing the opportunity to help central bankers use their extensive data sets to

¹A related motivation, consistent with the approach of our paper, is that the Fed thinks of concepts like “economic activity” as being latent variables in a large system. Such a viewpoint would be consistent with classical Burns and Mitchell business cycle analysis. See also the latent variable approach to business cycle modeling of Stock and Watson (1989).

²See Christiano et al. (2000) for a survey of the monetary VAR literature. Leeper et al. (1996) are able to increase the number of variables analyzed through the use of Bayesian priors, but their VAR systems still typically contain fewer than 20 variables.

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