Forecast Design in Monetary Capital Stock Measurement

William A. Barnett University of Kansas
Unja Chae Intel Corporation
and John W. Keating University of Kansas

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ABSTRACT

We design a procedure for measuring the United States capital stock of money implied by the Divisia monetary aggregate service flow, in a manner consistent with the present-value model of economic capital stock. We permit non-martingale expectations and time varying discount rates. Based on Barnett‟s (1991) definition of the economic stock of money, we compute the U.S. economic stock of money by discounting to present value the flow of expected expenditure on the services of monetary assets, where expenditure on monetary services is evaluated at the user costs of the monetary components. As a theoretically consistent measure of money stock, our economic stock of money nests Rotemberg, Driscoll, and Poterba‟s (1995) currency equivalent index as a special case, under the assumption of martingale expectations. To compute the economic stock of money without imposing martingale expectations, we define a procedure for producing the necessary forecasts based on an asymmetric vector autoregressive model and a Bayesian vector autoregressive model. In the and a companion paper (Barnett, Chae, and Keating (2006)), we find the resulting capital-stock growth-rate index to be surprisingly robust to the modeling of expectations. The primary conclusions regard robustness. It is not our intention to advocate any particular approach to modeling future expectations.

We believe that further experiments with other forecasting models would confirm our robustness conclusion. Different forecasting models can produce substantial differences in forecasts into the distant future. But since the distant future is heavily discounted in our stock formula, and since alternative forecasting formulas rarely produce dramatic differences in short term forecasts, we believe that our robustness result obviates prior concerns about the dependence of theoretical monetary-capital-stock computations upon forecasts of future expected flows. Even the simple martingale forecast, which has no unknown parameters and is easily computed with current period data, produces a discounted stock measure that is adequate for most purposes. Determining an extended index, which can remove the small bias that we identify under the martingale forecast, remains a subject for our future research.

At the time that Milton Friedman (1969) was at the University of Chicago, the “Chicago School” view on the monetary transmission mechanism was based upon the wealth effect, called the “real balance effect” or “Pigou (1943) effect,” of open market operations. Our research identifies very large errors in the wealth effects computed from the conventional simple sum monetary aggregates and makes substantial progress in the direction of accurate measurement of monetary-policy wealth effects. Prior experience with monetary policy errors produced from monetary-aggregate-measurement errors suggests possible formidable policy relevance.

Keywords: Monetary aggregation, Divisia money aggregate, economic stock of money, user cost of money, currency equivalent index, Bayesian vector autoregression, asymmetric vector autoregression.

JEL Classifications: E4, E5, C43, G12