Division of Research   August 1984
Graduate School of Business Administration
The University of Michigan

THE "MONEY-SUPPLY EQUATION" IN THE TEXTBOOK

Working Paper No. 389

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From our experience of teaching money and banking, we find that the following method of presenting the material of money-supply determination quite helpful to the students' understanding of the underlying determinants of this "fluctuating variable" (Bach [1]). Of course, every instructor realizes the following way of organizing the materials but possibly has not yet tried this method before. Thus, it now leaves to this paper to present the organization as a potential reminder. Besides, few money and banking textbooks have shown such organization[1]. Maybe this accounted for the finding (Cohen and Marsh [2] that: When it came to money supply process, students learned better by reading the Federal Reserve Bank Reviews than some other scholarly materials.

To begin with, the idea can be sketched simply as follows: First, we note that monetary base can be reexpressed (to be explained in the following) into the sum of Federal Reserve Notes outstanding and commercial banks' deposits in the Fed, both of which are Fed's liabilities. Therefore, by accounting identity, monetary base equals Fed's total assets minus Fed's other liabilities. Second, by the familiar relationship linking monetary base to money supply, we can thus tie the whole Fed's balance sheet to money supply.

Having sketched the general organization, we will now write it down briefly (abstracting some institutional details) but formally in simple notations in the following.

(1) Monetary Base MB = (by definition) Federal Reserve Notes held by the non-bank public N_p + commercial banks' reserves RS = N_p + (commercial banks' vault cash N_b + their deposits in Fed D_b) = $(N_p + N_b) + D_b$ = total Federal Reserve Notes outstanding $N + D_b$ = Fed's total assets (gold + commercial banks' borrowing + government bonds + float + other remaining assets) - Fed's other liabilities (government deposits + foreign deposits + other

remaining liabilities and net worth).

(2) Money Supply M = (MB - Excess Reserve RE) x (1 + the behavioral ratio of people's holding Federal Reserve Notes to demand deposits c)/(required reserves ratio of demand deposits r + c), which could be formally derived as follows:

M = (by definition) N_p + demand deposits DD = c·DD + DD = (1 + c)DD =

$(1 + c)(\frac{RS - RE}{r}) = (1 + c)(\frac{MB - N_p - RE}{r}) = (1 + c)(\frac{MB - c·DD - RE}{r})$.

Thus, in the above process of trying to express DD in terms of MB, we see that by visual comparison DD = $\frac{MB - c·DD - RE}{r}$, implying DD = $\frac{MB - RE}{r + c}$.

Now, substituting back the DD expression into the M equation, we have

$M = (\frac{1 + c}{r})(MB - c(\frac{MB - RE}{r + c}) - RE) = (1 + c)(\frac{MB - RE}{r + c}) = (MB - RE)(\frac{1 + c}{r + c})$.

(3) Finally, substituting the MB expression (as expressed by Fed's balance sheet) from (1) into the above (2), we could thus tie the whole Fed's balance sheet quantitatively to money supply. And students can thus appreciate better the quantitative impact of any change in the Fed's balance sheet on money supply.

Footnote

1. Usually, the money and banking textbooks treat the quantitative relationships in an incremental mode; furthermore, when discussing the monetary control by Fed, only the qualitative impact is noted .

References

[1] Bach, G.L., "Improving the Monetary Aggregates", Report of the Advisary Committee on Monetary Statistics, Federal Reserve Bulletin, May 1976.

[2] Cohen, J. and Marsh, G.M., "Testing for the Communicability of Economic Ideas via the FRB Reviews: A Learning Experiment," The Journal of Economic Education, Spring 1977.