Volume Title: A Theoretical Framework for Monetary Analysis

Volume Author/Editor: Milton Friedman

Volume Publisher: UMI

Volume ISBN: 0-87014-233-X

Volume URL: http://www.nber.org/books/frie71-1

Publication Date: 1971

Chapter Title: Correspondence of the Monetary Theory of Nominal Income with Experience

Chapter Author: Milton Friedman

Chapter URL: http://www.nber.org/chapters/c0921

Chapter pages in book: (p. 46 - 48)

respect of the third approach is that it does not make any assertion about this division as both the others do. It is, as it were, orthogonal to that issue and can therefore be more easily linked to alternative theories about that division.

11. Correspondence of the Monetary Theory of Nominal Income with Experience

I have not before this written down explicitly the particular simplification I have labelled the monetary theory of nominal income—though Meltzer has referred to the theory underlying our *Monetary History* as a "theory of nominal income" (Meltzer 1965, p. 414).[28] But once written down, it rings the bell, and seems to me to correspond to the broadest framework implicit in much of the work that I and others have done in analyzing monetary experience. It seems also to be consistent with many of our findings. I do not propose here to attempt a full catalogue, but wish to suggest a number, and, more important, to indicate the chief defect that I find in the framework.

One finding that we have observed is that the relation between changes in the nominal quantity of money and changes in nominal income is almost always closer and more dependable than the relation between changes in real income and the real quantity of money or between changes in the quantity of money per unit of output and changes in prices.[29] This result has always seemed to me puzzling, since a stable demand function for money with an income elasticity different from unity led us to expect the opposite. Yet the actual finding would be generated by the monetary approach outlined in this paper, with the division between prices and quantities determined by variables not explicitly contained in it.

Another broad finding is the procyclical pattern of velocity, which can be rationalized either by the distinction between permanent and measured income or, as in the monetary approach, by the effect of changes in the anticipated rate of change in prices.

[28] However, he referred to it as a "long-run theory of nominal income," whereas the theory outlined in section 8 above is intended to be a short-run theory. We accept much of what Meltzer says about the theory underlying our *Monetary History*, but also disagree with much of it; in particular, the way he introduces real income and changes in real income into the analysis. This is strictly *ad hoc* and renders the asserted theory a logically open and underdetermined theory.

[29] However, Walters reports a different result for Britain for the period since the end of World War I—a closer relation with prices in the interwar period and with real output in the post-World War II period (Walters, 1970, p. 52).

On still another level, the approach is consistent with much of the work that Fisher did on interest rates, and also the more recent work by Anna Schwartz and myself, Gibson, Kaufman, Cagan, and others. In particular, the approach provides an interpretation of the empirical generalization that high interest rates mean that money has been easy, in the sense of increasing rapidly, and low interest rates, that money has been tight, in the sense of increasing slowly, rather than the reverse.

Again, the approach is consistent with the importance we have been led to attach to *rates of change* in money rather than levels, and, in particular, to changes in the rate of change in explaining short-term fluctuations.

The approach is consistent also with the success of the equations constructed by Andersen and Jordan at St. Louis relating changes in nominal income to current and past changes in the quantity of money (Andersen and Jordan 1968).

The chief defect of the approach is that it does not give a satisfactory explanation of the lags in the reaction of velocity and interest rates at turning points in monetary rates of change.[30] These lags are significant for cyclical analysis. They are less relevant for a study of monetary trends. Because of this defect, the movements of velocity and interest rates in the first nine months or so after a distinct change in the rate of

[30] We know, for example, that when the rate of growth of the quantity of money declines, the rate of change of income will not show any appreciable effect for something like six to nine months (for the United States) on the average. During this interval, interest rates typically continue to rise, indeed generally at an accelerated pace. After the interval, both velocity and interest rates start to decline.

This result is not necessarily inconsistent with the monetary approach outlined here. Suppose that prior to the decline in the rate of monetary growth the system was not in full equilibrium, so that the actual rate of growth of nominal income $(1/Y)(dY/dt)$ was higher than the anticipated rate of growth $[(1/Y)(dY/dt)]^*$. Then, even the new rate of monetary growth could be higher than the anticipated rate, implying from equation (41) a further rise in velocity, from equation (40), a larger actual than anticipated rise in nominal income, from equation (39), a further rise in the anticipated rate, and from equation (31), a further rise in the nominal interest rate. These would continue until the anticipated rate had risen to equality with the new rate of monetary growth.

However, this reaction would imply a slower rate of rise in velocity and interest rates than prior to the monetary turning point, whereas our impression is that the opposite often occurs. More important, even if the system is not in full equilibrium prior to a decline in the rate of monetary growth, the decline in monetary growth, if large enough, will make the new rate of monetary growth less than $[(1/Y)(dY/dt)]^*$. In that case, equations (41), (40), (39), and (31) would produce a decline in velocity and in interest rates contemporaneous with the decline in the rate of monetary growth. Yet the lag in reaction is highly consistent and, in particular, seems to be independent of the size of the change in the rate of monetary growth.

monetary growth cannot be satisfactorily explained by the monetary theory of nominal income. If these periods were cut out of the historical record, my impression is that the model would fit the rest of the record very well—not of course without error but with errors that are on the modest side as aggregate economic hypotheses go.

Periods just after turning points can, I believe, be explained best by incorporating two elements so far omitted. The first is a revision of equation (14) to allow for a difference between actual and desired money balances, as in equation (48), below. The second is a weakening of equation (25) to permit a stronger liquidity effect on interest rates.

12. The Adjustment Process

The key need to remedy the defects common to all the models I have sketched is a theory that will explain (*a*) the short-run division of a change in nominal income between prices and output, (*b*) the short-run adjustment of nominal income to a change in autonomous variables, and (*c*) the transition between this short-run situation and a long-run equilibrium.[31]

In the rest of this paper, the central idea I shall use in sketching the direction in which such a theory might be developed is the distinction between actual and anticipated magnitudes or, to use a terminology that need not be identical but that I shall treat for this purpose as if it is, between measured and permanent magnitudes. At a long-run equilibrium position, all anticipations are realized, so that actual and anticipated magnitudes, or measured and permanent magnitudes, are equal.[32]

I shall regard long-run equilibrium as determined by the earlier quantity-theory model plus the Walrasian equations of general equilibrium. In a full statement, the earlier model should be expanded by including wealth in the consumption and liquidity-preference functions,

[31] Still other parts of the theoretical framework are developed more fully in the course of the empirical analysis of some of the issues raised in the other chapters of the book from which this paper is abstracted.

[32] Note that the equality of actual and anticipated magnitudes is a necessary but not a sufficient condition for a long-run equilibrium position. In principle, actual and anticipated magnitudes could be equal along an adjustment path between one equilibrium position and another. The corresponding proposition is more complicated for measured and permanent magnitudes and depends on the precise definition of these terms. However, since we shall be considering a special case in which the stated condition is treated as both necessary and sufficient for long-run equilibrium, these complications can be bypassed.