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(d) Full and instantaneous adjustment of the amount of money demanded to the amount supplied.

These elements are borrowed mostly from Irving Fisher and John Maynard Keynes. Together they yield a simple two-equation system that determines the time path of nominal income but has nothing to say directly about the division of changes in nominal income between prices and quantity.

This simple model for analyzing short-term economic fluctuations seems to me more satisfactory than either the simple quantity theory which takes real output as determined outside the system and regards economic fluctuations as a mirror image of changes in the quantity of money or the simple Keynesian income-expenditure theory which takes prices as determined outside the system and regards economic fluctuations as a mirror image of changes in autonomous expenditures.

10. Comparison of the Three Approaches

None of the three simple theories—the simple quantity theory, the simple income-expenditure theory, the simple monetary theory of nominal income—professes to be a complete, fully worked out analysis of short-term fluctuations in aggregate economic magnitudes. All are to be interpreted rather as frameworks for such analyses, establishing the broad categories within which further elaborations will proceed.

The simple quantity theory puts in center stage the relation at each point in time between a particular flow—the flow of spending or income—and a particular stock—the quantity of money. The simple income-expenditure theory emphasizes the relation at each point in time between two components of the flow of income—autonomous and induced spending. The simple monetary theory of nominal income emphasizes the relation between the flow of income at each point in time and the past history of the quantity of money.

The simple quantity theory and the simple income-expenditure theory have six common elements, in addition to sharing the same six-equation model, that deserve emphasis because they indicate what are the main unresolved problems.

1. Both analyze short-run adjustments in terms of shifts from one static equilibrium position to another.

2. Both implicitly regard each equilibrium position as characterized by a stable *level* of prices or output. Neither explicitly introduces changing prices or changing output into the formal theoretical analysis.

The recent proliferation of formal growth models and the even more recent introduction of monetary change into them are attempts to fill this gap.[25]

3. Both regard interest rates as adjusting instantaneously to a new equilibrium level—in the quantity theory, to equate saving and investment; in the income-expenditure theory, to equate quantity of money demanded and supplied. This is a retrogression from Irving Fisher's earlier work.

4. Neither model gives any explicit role to anticipations about economic magnitudes. The income-expenditure theory comes closer to doing so in terms of the role that Keynes assigned to expectations about long-term interest rates, which could be incorporated in equation (12), as we did in equation (8). Here again, there has been much recent work directed at filling this gap.[26]

5. Both fill in the missing equation by an assumption that is not part of the basic theoretical analysis. This is less blatant, in one sense, for the quantity theory, since at least there is a well-developed economic theory, summarized in the Walrasian equations of general equilibrium, that explains what determines the level of output, so that the equations chosen for analysis can be regarded as a subset of a complete system. That is why, as agreement has been reached on the fallaciousness of Keynes's proposition (1), essentially all economic theorists, whatever model they prefer for short-run analysis, accept the quantity-theory model, completed by the Walrasian equations, as valid for long-run equilibrium.[27] The rigid price assumption of Keynes is, in this sense, much more arbitrary. It is entirely a *deus ex machina* with no underpinning in economic theory. Moreover, given that the price level in the long run is determined by the quantity-theory model, there is no theoretical link between the short-run model and the long-run model, no way of connecting the one to the other.

6. One aspect of the preceding point is so important that it deserves to be stated explicitly and separately. Neither theoretical model has anything to say about the factors that determine the proportions in which a change in nominal income will, in the short run, be divided between price change and output change. One theory *asserts* that the change in nominal income will all be absorbed by price change; the other, that it

[25] Some of the more important items are Solow (1956), Mundell (1965), Tobin (1965), Johnson (1967*a*, 1967*b*), Uzawa (1966), Sidrauski (1967*a*, 1967*b*), Levhari and Patinkin (1968), and Friedman (1969, chap. 1).

[26] Some of the more important items are Koyck (1954), Cagan (1956), Friedman (1957), Nerlove (1958), Muth (1960), Solow (1960), Allais (1966).

[27] See, for example, the model in Bailey (1962, pp. 33–36, 40–42).

will all be absorbed by quantity change. In my opinion, this is the central common defect of the two approaches as theories of short-run change.

The third approach differs significantly in regard to the elements that are common to the simple quantity theory and simple income-expenditure theory.

1. It does not, as they do, analyze short-run adjustments in terms of shifts from one static equilibrium position to another. It embodies a dynamic adjustment process.

2. It does not, as they do, regard each equilibrium position as characterized by a stable *level* of prices or output. It encompasses steady growth in prices or output as long-run equilibrium positions.

3. It does not regard interest rates as adjusting instantaneously to a new equilibrium level because it allows for a change in interest rates along with a change in the anticipated rate of change of prices. However, it does neglect the effect of other factors on interest rates (the saving-investment process stressed by the quantity theory; the effect of changes in the nominal quantity of money stressed by the income expenditure theory) except as they affect the course of nominal income and, in consequence, the anticipated rate of change of prices.

4. It does, unlike the other approaches, give an explicit role to anticipations about economic magnitudes. The differences between anticipated and actual magnitudes are the motive force behind the short-run fluctuations.

5. Like the others, it fills in the missing equation by an assumption that is not part of the basic theoretical analysis. The assumption (that speculators determine the interest rate in accord with firmly held anticipations, and that the difference between the permanent real interest rate and the secular growth of output can be taken as a constant for short period fluctuations) is intermediate between the others in its link to economic theory. It is not as clearly linked to a well-developed body of theory as the simple quantity approach is to the Walrasian equations of general equilibrium, yet it has more of a link to theory than does the rigid price assumption of Keynes. Further, like the quantity approach and unlike the income-expenditure approach, there is a theoretical link between the short-run model and the long-run model.

6. The chief defect that this model shares in common with the other two is that none of the three has anything to say about the factors that determine the proportions in which a change in nominal income will, in the short run, be divided between price change and output change—the topic with which section 12 below deals. The one advantage in this

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).