Comments on Chitre and Gramlich

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Analyses of the reasons for holding money and of the determinants of the quantity of money held have a long history. The problem that Chitre solved is related to that literature, but the relation is not a close one. "Speculative balances" are separated from cash balances at the start of his paper and are, neglected thereafter, so that the solution that Chitre obtains cannot be regarded as operational until he derives the total demand for money or tells us how to separate money into "motivational" components. His paper can best be described as an attempt to reopen the problem discussed in Baumol's earlier study of the transactions demand for cash. But I hesitate to call this paper an extension of Baumol's work for reasons that will become apparent in a moment. Before comparing the Baumol and Chitre solutions, let me describe the problem that Chitre analyzed.

Chitre starts with a decision-maker — household or firm — who knows the total amount of payments to be made during the period in which there are no receipts on income account. He divides the period into equal intervals, e.g. days. At the start of each day, the decision-maker knows the size of his cash balance, but he is uncertain about the net amount of cash that will have to be spent during the day. He wants to schedule the amount of cash to be kept on hand during the day so as to minimize the cost of holding cash. His only option is to buy or sell consols in the morning and receive a constant return, \( r \) dollars per dollar per day. But each transaction involves a cost that is proportional to the amount transacted.
There are two positions, or return lines, to which the decision maker adjusts his cash balance. These lines depend on transaction costs, interest rates, the cost of running out of cash, etc. The point on the return line to which the decision maker goes on a particular day depends on the total amount of payments that remain to be made, since the probability of a payment of any given size and the amount of cash that is available decline as payments are made. At the start of the day, the decision maker computes the amount of payments remaining for the entire period and the size of his beginning cash balance. If for that volume of payments, his cash balance is above the upper return line, he buys some (fixed yield) consols; if he is below the lower return line, he sells; if he is between the two lines, he does nothing.

Once these decisions have been made for the day, additional cash can be acquired only by paying a penalty equal to the loss of interest receipts for the day, plus the standard transaction cost, plus an additional transaction cost. Thus, there is a penalty for underestimating the amount of cash to be held if the household or firm runs out of cash, and, of course, income is lost if the desired cash balance is overestimated in the morning.

This brief description does not do justice to the rigor with which Chitre develops his conclusions. But it does permit me to contrast Chitre's model with the much simpler Baumol model and to describe the individuals who are making decisions in the two models. I will call these individuals Baumol-man and Chitre-man.

Baumol-man starts out as a sophisticated innocent. He knows that he can buy bonds, and he wants to minimize the cost of holding cash. Initially,
he thinks that he is going to pay out cash at a steady rate, and he wants to be sure that he will get rid of his last dollar just before his cash balance is replenished by receipts from past sales. But Baumol-man loses some of his innocence and recognizes that, if everyone is paying cash, someone must receive it. He, therefore, expands his model to deal with the fact that he will receive payments for his past sales. He learns to divide the sales receipts between cash and bonds, so that the cost of holding cash is minimized during the periods in which there are both receipts and payments, as well as during periods in which there are only payments.

However, Baumol-man always maintains the same, fixed payments schedule and never learns that bonds are not the only alternative to holding cash. Baumol-man never thinks about varying the rate at which he pays for his past purchases, and it never occurs to him that determining an optimal payments schedule is part of the problem of minimizing the cost of holding cash.

Where Baumol-man is a creature of habit, Chitré-man is rigid, single-minded and purposeful. Buffeted by fate and uncertain about the amount of payments he must make on a given day, he prefers to pay the penalty cost rather than delay payment of his bills for a single day. It never occurs to him that he can avoid the penalty costs, often at zero marginal cost, by changing his payments schedule. He refuses to buy insurance, by opening a line of credit with his banker, and although he keeps perfect records of the amount (\$ P ) that is to be paid during the remainder of the period, he never knows until the last day how much he will spend on any given day in the interval between receipts from sales.
In addition, Chitre-man is myopic. His time horizon is no longer than the period between receipts on income account. For most individuals, this period is no more than two weeks, and for most business firms, it is even shorter. Moreover, Chitre-man doesn't borrow in anticipation of future income, or, if he does, the borrowing does not affect the amount of cash and consols held.

In short, Chitre-man is not a very exciting fellow. He is both far more sophisticated and much more innocent than Baumol-man. He is more sophisticated because he recognizes his uncertainty and uses bold, new techniques to deal with it. But, alas, he never recognizes that if everyone behaves as he behaves, no one would receive the cash that everyone is paying. Perhaps his technical proficiency will turn out to be extremely useful, but at present, Chitre-man appears to choose a problem on which he can use his tools rather than choosing the tools that will solve one of his more important problems. Someday Chitre-man and Baumol-man may recognize that determining an optimal payments schedule is part of the problem of optimizing the composition of their portfolios. Whether or not the solution will come through the use of dynamic programming remains to be seen.

Gramlich's paper deals with an important unresolved problem — measurement of the appropriate indicator of the current direction of fiscal policy. In a world of incomplete information and inexact knowledge about parameter values, about the form of various equations, and about the relative
merits of alternative macro hypotheses, it is not an easy task to choose the appropriate variables and the correct weights so that we can conclude that fiscal (or monetary) policy has become more or less expansive. Yet the statement that policy is more or less expansive depends on these and other factors, as Brunner and I attempted to show in a recent paper. ¹/₁

Some indication of the current state of economics as science is revealed by the fact that we have only started to ask: How do we decide whether fiscal or monetary policy has moved to a more or less expansive position? How do we measure the current contribution of fiscal or monetary policy to full employment? How do we choose, from the many indicators that are proposed, those indicators that are the most reliable measures of the relative size of policy actions? Gramlich's paper reveals that there is much to be gained from recognizing (1) that we do not have good answers to these questions, (2) that the answers we give may not even be useful approximations, and (3) that we will improve our answers by deriving indicators from alternative theories and by comparing the alternative theories.

Attempting to construct indicators forces reexamination of conclusions that are widely held. Many of us have taught our students, at one time or another, that the size of the stimulus to employment provided by government, increases with the size of the budget deficit. We may have gone further and taught that when taxes and government expenditures increase by the same amount, output and employment expand by an amount equal to the increased spending — the so-called "balanced budget theorem."

¹/₁ "The Meaning of Monetary Indicators" presented at the American Bankers Association Conference of University Professors, Purdue University, August 1965 and soon to be published in the proceedings of the conference.
Gramlich's results suggest that neither of these propositions is correct as stated and that it is useless to search for a constant value of the multiplier. What matters is the composition of spending and the sources of tax revenues. Small budget deficits may have larger multipliers than large budget deficits. A budget surplus may raise income by more than a budget deficit, since tax reduction is a more potent fiscal weapon than some types of expenditure. And, it is very likely that this conclusion would be reinforced by further disaggregation of expenditures.

Of course, it is possible to dismiss Gramlich's results as "peculiar." But this conclusion has a high cost. The principal difference between Gramlich's model and the models that have been used to make recommendations about fiscal policy in the recent past is that Gramlich has estimated the size of the various multipliers. Let me, therefore, state some conclusions that emerge from his results to indicate some of the effects of fiscal changes suggested by his model. I confine my remarks to the two cases in which corporate investment is treated as an endogenous variable.

First, the absolute values of all of the multipliers are greater than unity, so the marginal effect of an additional dollar of government deficit is greater than the marginal increase in the deficit. But the multiplier may be as low as 1.1 or as high as 5.7.

Second, the multiplier of a balanced budget may be negative. An equal increase of $1 billion in taxes and government expenditures can have an effect on income that varies between $1.4 billion and $4.6 billion depending on the taxes and expenditures that are changed. A billion dollars of additional purchases from business will add only $300 million to GNP if
financed by personal income taxes, but it will reduce income by as much as $1.5 billion if the expenditure is financed by the corporate income tax and the corporate income tax is shifted.

Third, changing the corporate tax rate is the most powerful of the nine fiscal instruments that Gramlich investigated. This conclusion is in sharp contrast to the arguments of a decade ago which minimized the effect of the 1954 tax cut and described the cut as an application of the "trickle down" theory. Moreover, the conclusion suggest that reductions in corporate tax rates are a useful alternative to "poverty programs."

Fourth, grants-in-aid to states appear to be as powerful a weapon on the expenditure side as any other expenditure and more powerful than most. If correct, this result suggests that strengthening the federal system of government may be advantageous even if argued solely on economic grounds.

In short, even if one works with an income-expenditure model in which there is no effect of interest rate or monetary changes on aggregate demand, "the multiplier" is not a constant. Those who are skeptical about this or the other conclusions suggested by Gramlich's work may decide that the crux of the problem lies in the model, and that by denying any influence on GNP or the size of the multipliers to changes in the stock of money, Gramlich has produced some strange results. In either case, Gramlich's paper is a challenge to widely accepted views and a welcome beginning to the study of the effect of fiscal policy. He is to be congratulated on his excellent beginning.