M.A. ECONOMICS: SEM-2

CC-8, MODULE 1

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1. **BAUMOL – TOBIN MODEL OF TRANSACTION DEMAND FOR MONEY.**

   William Baumol (1952) and James Tobin(1958) independently developed similar demand for money model , which demonstrate that even money held for transaction purposes are sensitive to the level of interest rates (a criticsm to Keynes' transaction motive). Baumol used Business Inventory Approach in his model and applied the use of inventory , being the stock of money the individual or the business firm decide to keep for transaction since the receipt of income of an individual or business firm does not coincide exactly with expenditure there must be an inventory of cash in hand. Therefore his model is also known as—Inventory Theoretic Approach.

   ASSUMPTION OF THE MODEL:
   1. An Individual receive income of T_0 at the beginning of the every period .
   2. An individual spends his income at a constant rate,so at the end of the period, all the income T_0 has been spent.
   3. There are only two assets—cash and bonds. Cash earns a nominal return of zero, and bond earn an interest rate i.
   4. Every time an individual buys or sells bond to raise cash, a fixed brokerage fee of b is incurred.

So Baumol has included 2 types of operational cost :

a) Brokerage fee-the cost of bond transaction e.g. telephone expenses, cost of travelling to the bank etc.

b) Loss of interest when bonds are converted into cash.
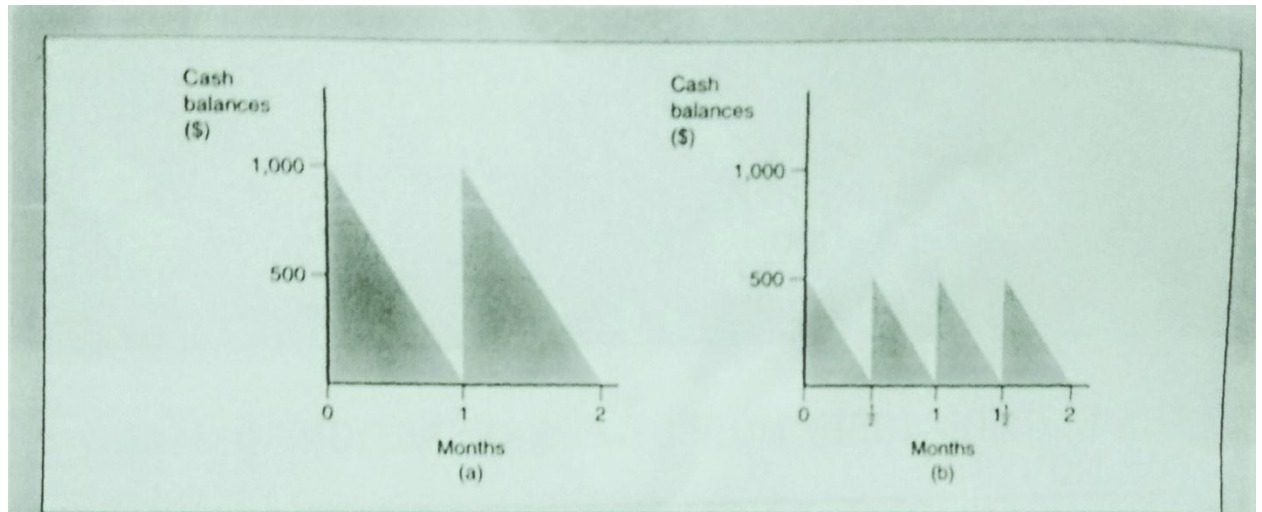
Panel (a) indicates $ 1000 as payment in the beginning of the month ,is entirely held as cash and spent at a constant rate until it is exhausted b the end of the month. Panel (b) indicates half of the monthly payment is put into cash and other half into bonds .At the middle of the month, cash balance reaches zero and bonds must be sold to bring balances up to $500. By the end of the month , cash again dwindle to zero.

On the basis of these assumptions, suppose an individual holds all his income in bonds, he will have to reacquire his total income (Y) over a period of one year through a no. of bonds sales. If he sell his bond through a broker , he will have to incur non – interest cost or brokerage fee or transaction cost each time(C_t) given by:

$$C_1 = b(Y/M_t)$$

Here M_t=value of a bond turned into cash for meeting the transaction demand for money.

Let us suppose that an equal value(M_t) are converted into cash on a regular interval say 1st of each month. When he converts bond into cash, he losses interest on an increasing cash balance which he acquire by selling his bond. On an average he loses interest on half of his income i.e. Y/2. The interest cost (C_2) is expressed as

$$C_2 = i\,(Y/2)$$

Thus the Total Operational cost is:

$$C = C_1 + C_2$$

$$C = b(Y/M_t) + i(Y/2) \quad ----(A)$$

So, this operational cost suggest –if individual hold large cash balance , then transaction cost will be definitely low but the opportunity cost of interest forgone will be large. On the otherhand if attempts are made to reduce the opportunity cost then this will increase the transaction cost.

Now the problem arises what should be the optimal cash amount an individual will hold. In other words, this can be seen as the problem of minimizing the transaction cost of financing transactions. Thus, Baumol evolved a formula to determine the size of the cash withdrawal (conversion of bond to money) which would minimizes the total cost of keeping an inventory of optimal cash balances large enough to meet transaction demand, called---The Square Root Rule.

By taking 1st derivative of eqn (A)

$$dc/dM_t = -bY/M_t + i/2 = 0$$

$$\text{or,} \quad i/2 = bY/M_t^2$$

or, $iM_t^2 = 2bY$

$M_t = \sqrt{2bY/i}$

$M_t/2 = \sqrt{2by/i}$

since money demand M_t is the average desired holding of cash i.e, $M_t/2$

$M_t/2 = \sqrt{by/2i}$

So, this Square –Root Rule suggest—

1. Transaction demand for money is negatively related to the interest rate(i).

2. Transaction demand for money is positively related to income, but there are economies in holding money i.e. demand for money rises less than proportionally with income .e.g. if income increases 4 times , demand for money increases only by 2 times (square root of 4)

3. A lowering of brokerage fee(b),would decrease demand for money.

4. There is no money illusion in Baumol in demand for money.