The Cambridge Equations: The Cash Balances Approach:

As an alternative to Fisher's quantity theory of money, Cambridge economists Marshall, Pigou, Robertson and Keynes formulated the cash balances approach. Like value theory, they regarded the determination of value of money in terms of supply and demand.

Robertson wrote in this connection: "Money is only one of the many economic things. Its value, therefore, is primarily determined by exactly the same two factors as determine the value of any other thing, namely, the conditions of demand for it, and the quantity of it available."

The supply of money is exogenously determined at a point of time by the banking system. Therefore, the concept of velocity of circulation is altogether discarded in the cash balances approach because it 'obscures the motives and decisions of people behind it'.

On the other hand, the concept of demand for money plays the major role in determining the value of money. The demand for money is the demand to hold cash balances for transactions and precautionary motives.

Thus the cash balances approach considers the demand for money not as a medium of exchange but as a store of value. Robertson expressed this distinction as money "on the wings" and money "sitting". It is "money sitting" that reflects the demand for money in the Cambridge equations.

The Cambridge equations show that given the supply of money at a point of time, the value of money is determined by the demand for cash balances. When the demand for money increases, people will reduce their expenditures on goods and services in order to have larger cash holdings. Reduced demand for goods and services will bring down the price level and raise the value of money. On the contrary, fall in the demand for money will raise the price level and lower the value of money.

The Cambridge cash balances equations of Marshall, Pigou, Robertson and Keynes are discussed as under:

Marshall's Equation:

Marshall did not put his theory in equation form and it was for his followers to explain it algebraically. Friedman has explained Marshall's views thus: "As a first approximation, we may suppose that the amount one wants to hold bears some relation to one's income, since that determines the volume of purchases and sales in which one is engaged. We then add up the cash balances held by all holders of money in the community and express the total as a fraction of their total income."

Thus we can write:

$M = kPY$

where M stands for the exogenously determined supply of money, k is the fraction of the real money income (PY) which people wish to hold in cash and demand deposits, P is the price level, and Y is the aggregate real income of the community. Thus the price level $P = M/kY$ or the value of money (the reciprocal of price level) is

$$1/P = kY/M$$

Pigou's Equation:

Pigou was the first Cambridge economist to express the cash balances approach in the form of an equation:

$$P = kR/M$$

where P is the purchasing power of money or the value of money (the reciprocal of the price level), k is the proportion of total real resources or income (R) which people wish to hold in the form of titles to legal tender, R is the total resources (expressed in terms of wheat), or real income, and M refers to the number of actual units of legal tender money.

The demand for money, according to Pigou, consists not only of legal money or cash but also bank notes and bank balances. In order to include bank notes and bank balances in the demand for money, Pigou modifies his equation as

$$P = kR/M \{c + h(1-c)\}$$

where c is the proportion of total real income actually held by people in legal tender including token coins, (1-c) is the proportion kept in bank notes and bank balances, and h is the proportion of actual legal tender that bankers keep against the notes and balances held by their customers.

Pigou points out that when k and R in the equation $P=kR/M$ and k, R, c and h are taken as constants then the two equations give the demand curve for legal tender as a rectangular hyperbola. This implies that the demand curve for money has a uniform unitary elasticity.
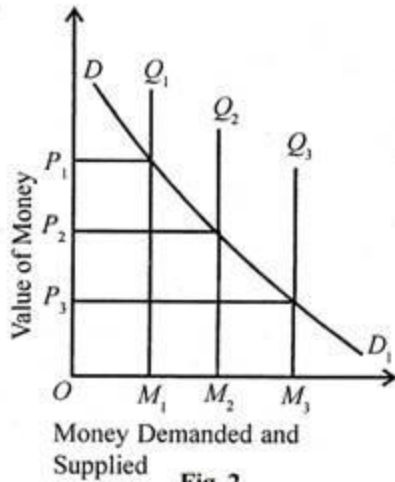
Money Demanded and Supplied Fig. 2.

This is shown in Figure 2 where DD_1 is the demand curve for money and Q_1M_1, Q_2M_2, and Q_3M_3 are the supply curves of money drawn on the assumption that the supply of money is fixed at a point of time. The value of money or Pigou's purchasing power of money P is taken on the vertical axis.

The figure shows that when the supply of money increases from OM_1 to OM_2, the value of money is reduced from OP_1 to OP_2. The fall in the value of money by P_1P_2 exactly equals the increase in the supply of money by M_1M_2. If the supply of money increases three times from OM_1 to OM_3 the value of money is reduced by exactly one-third from OP_1 to OP_3. Thus the demand curve for money DD_1 is a rectangular hyperbola because it shows changes in the value of money exactly in reverse proportion to the supply of money.

Robertson's Equation:

To determine the value of money or its reciprocal the price level, Robertson formulated an equation similar to that of Pigou. The only difference between the two being that instead of Pigou's total real resources R, Robertson gave the volume of total transactions T. The Robertsonian equation is $M = PkT$ or

$$P = M/kT$$

Where P is the price level, M is the total quantity of money, k is the proportion of the total amount of goods and services (T) which people wish to hold in the form of cash balances, and T is the total volume of goods and services purchased during a year by the community.

If we take P as the value of money instead of the price level as in Pigou's equation, then Robertson's equation exactly resembles Pigou's $P = kT/M$.

Keynes's Equation:

Keynes in his A Tract on Monetary Reform (1923) gave his Real Balances Quantity Equation as an improvement over the other Cambridge equations. According to him, people always want to have some purchasing power to finance their day to day transactions.

The amount of purchasing power (or demand for money) depends partly on their tastes and habits, and partly on their wealth. Given the tastes, habits, and wealth of the people, their desire to hold money is given. This demand for money is measured by consumption units. A consumption unit is expressed as a basket of standard articles of consumption or other objects of expenditure.

If k is the number of consumption units in the form of cash, n is the total currency in circulation, and p is the price for consumption unit, then the equation is

$$n = pk$$

If k is constant, a proportionate increase in n (quantity of money) will lead to a proportionate increase in p (price level).

This equation can be expanded by taking into account bank deposits. Let k' be the number of consumption units in the form of bank deposits, and r the cash reserve ratio of banks, then the expanded equation is

$$n = p(k + rk')$$

Again, if k, k' and r are constant, p will change in exact proportion to the change in n.

Keynes regards his equation superior to other cash balances equations. The other equations fail to point how the price level (p) can be regulated. Since the cash balances (k) held by the people are outside the control of the monetary authority, p can be regulated by controlling n and r. It is also possible to regulate bank deposits k' by appropriate changes in the bank rate. So p can be controlled by making appropriate changes in n, r and k' so as to offset changes in k.

Criticisms of the Cash Balance Approach:
The cash balances approach to the quantity theory of money has been criticised on the following counts:
1. Truisms:
Like the transactions equation, the cash balances equations are truisms. Take any Cambridge equation: Marshall's $P = M/kY$ or Pigou's $P = kR/M$ or Robertson's $P = M/kT$ or Keynes's $p = n/k$, it establishes a proportionate relation between quantity of money and price level.

2. Price Level does not Measure Purchasing Power:
Keynes in his A Treatise on Money (1930) criticised Pigou's cash balances equation and also his own real balances equation. He pointed out that measuring the price level in wheat, as Piogu did or in terms of consumption units, as Keynes himself did, was a serious defect.

The price level in both equations does not measure the purchasing power of money. Measuring the price level in consumption units implies that cash deposits are used only for expenditure on current consumption. But in fact they are held for "a vast multiplicity of business and personal purposes." By ignoring these aspects, the Cambridge economists have committed a serious mistake.

3. More Importance to Total Deposits:
Another defect of the Cambridge equation "lies in its applying to the total deposits considerations which are primarily relevant only to the income deposits." And the importance attached to k "is misleading when it is extended beyond the income deposits."

4. Neglects other Factors:
Further, the cash balances equation does not tell about changes in the price level due to changes in the proportions in which deposits are held for income, business and savings purposes.

5. Neglect of Saving-Investment Effect:
Moreover, it fails to analyse variations in the price level due to saving-investment inequality in the economy.

6. k and Y not Constant:
The Cambridge equation, like the transactions equation, assumes k and T (or R or T) as constant. This is unrealistic because it is not essential that the cash balances (k) and the income of the people (Y) should remain constant even during the short period.

7. Fails to Explain Dynamic Behaviour of Prices:
The theory argues that changes in the total quantity of money influence the general price level equi-proportionally. But the fact is that the quantity of money influences the price level in an essential erratic and unpredictable way. Further, it fails to point out the extent of change in the price level as a result of a given change in the quantity of money in the short period. Thus it fails to explain the dynamic behaviour of prices.

8. Neglects Interest Rate:
The cash balances approach is also weak in that it ignores other influences, such as the rate of interest which exerts a decisive and significant influence upon the price level. As pointed out by Keynes, the relation between quantity of money and price level is not direct but indirect via the rate of interest, investment, output, employment and income. This is what the Cambridge equation ignores and hence fails to integrate monetary theory with the theory of value and output.

9. Demand for Money not Interest Inelastic:
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The neglect of the rate of interest as a causative factor between the quantity of money and the price level led to the assumption that the demand for money is interest inelastic. It means that money performs only the function of medium of exchange and does not possess any utility of its own, such as store of value.

10. Neglect of Goods Market:

Further, the omission of the influence of the rate of interest in the cash balances approach led to the failure of neoclassical economists to recognise the interdependence between the commodity and money markets. According to Patinkin, "They laid an undue concentration on the money market a corresponding neglect of the commodity markets, and a resulting 'dehumanising' of the analysis of the effects of monetary changes."

11. Neglects Real Balance Effect:

Patinkin has criticised the Cambridge economists for their failure to integrate the goods market and the money market. This is borne out by the dichotomy which they maintain between the two markets. The dichotomisation implies that the absolute price level in the economy is determined by the demand and supply of money, and the relative price level is determined by the demand and supply of goods.

The cash balances approach keeps the two markets rigidly apart. For instance, this approach tells that an increase in the quantity of money leads to an increase in the absolute price level but exercises no influence on the market for goods.

This is because of the failure of Cambridge economists to recognise "the real balance effect." The real balance effect shows that a change in the absolute price level does influence the demand and supply of goods. The weakness of cash balances approach lies in ignoring this.

12. Elasticity of Demand for Money not Unity:

The cash balances theory establishes that the elasticity of demand for money is unity which implies that the increase in the demand for money leads to a proportionate decrease in the price level. Patinkin holds that "the Cambridge function does not imply uniform elasticity."

According to him, this is because of the failure of Cambridge economists to recognise the full implications of the "real balance effect". Patinkin argues that a change in the price level will cause a real balance effect. For instance, a fall in the price level will increase the real value of cash balances held by the people.

So when there is excess demand for money, the demand for goods and services is reduced. In this case, the real balance effect will not cause a proportionate but non-proportionate change in the demand for money. Thus the elasticity of demand for money will not be unity.

13. Neglects Speculative Demand for Money:

Another serious weakness of cash balances approach is its failure to consider the speculative demand for money. The neglect of the speculative demand for cash balances makes the demand for money exclusively dependent on money income thereby again neglecting the role of the rate of interest and the store of value function of money.

4. Transactions Approach Vs. Cash Balances Approach:

There are certain points of similarities between Fisher's transactions approach and the Cambridge cash balances approach. These are discussed as under:

1. Similarities:

The two approaches have the following similarities:

1. Same Conclusion:

The Fisherian and Cambridge versions lead to the same conclusion that there is a direct and proportional relationship between the quantity of money and the price level and an inverse proportionate relationship between the quantity of money and the value of money.

2. Similar Equations:

The two approaches use almost similar equations. Fisher's equation $P = MV/T$ is similar to Robertson's equation $P = M/kT$. However, the only difference is between the two symbols V and k which are reciprocal to each other.

Whereas $V = |1/k|$ $k = |1/V|$. Here V refers to the rate of spending and k the amount of money which people wish to hold in the form of cash balances or do not want to spend. As these two symbols are reciprocal to each other, the differences in the two equations can be reconciled by substituting $1/V$ for k in Robertson's equation and $1/k$ for V in Fisher's equation.

3. Money as the Same Phenomenon:

The different symbols given to the total quantity of money in the two approaches refer to the same phenomenon. As such MV+M'V of Fisher's equation, M of the equations of Pigou and Robertson, and n of Keynes' equation refer to the total quantity of money.

2. Dissimilarities:

Despite these similarities the two approaches have many dissimilarities:

1. Functions of Money:

The two versions emphasize on different functions of money. The Fisherian approach lays emphasis on the medium of exchange function while the Cambridge approach emphasises the store of value function of money.

2. Flow and Stock:

In Fisher's approach, money is a flow concept while in the Cambridge approach it is a stock concept. The former relates to a period of time and the latter to a point of time.

3. V and k Different:
The meaning given to the two symbols V and k in the two versions is different. In Fisher's equation V refers to the rate of spending and in Robertson's equation k refers to the cash balances which people wish to hold. The former emphasises the transactions velocity of circulation and the latter the income velocity.

4. Nature of Price Level:
In Fisher's equation, P refers to the average price level of all goods and services. But in the Cambridge equation P refers to the prices of final or consumer goods.

5. Nature of T:
In Fisher's version, T refers to the total amount of goods and services exchanged for money, whereas in the Cambridge version, it refers to the final or consumer goods exchanged for money.

6. Emphasis on Supply and Demand for Money:
Fisher's approach emphasises the supply of money, whereas the Cambridge approach emphasises both the demand for money and the supply of money.

7. Different in Nature:
The two approaches are different in nature. The Fisherian version is mechanistic because it does not explain how changes in V bring about changes in P. On the other hand, the Cambridge version is realistic because it studies the psychological factors which influence k.

It is on account of these differences that Hansen wrote: "It is not true as is often alleged that the cash balance equation is merely the quantity theory in new algebraic dress."

5. Superiority of Cash Balances Approach over Transactions Approach:

The Cambridge cash balances approach to the quantity theory of money is superior to Fisher's transaction approach in many respects.

They are discussed as under:
1. Basis of Liquidity Preference Theory of Interest:
The cash balances approach emphasises the importance of holding cash balances rather than the supply of money which is given at a point of time. It thus led Keynes to propound his theory of liquidity preference and of the rate of interest, and to the integration of monetary theory of value and output.

2. Complete Theory:

The cash balances version of quantity theory is superior to the transactions version because the former determines the value of money in terms of the demand and supply of money. Thus it is a complete theory. But in the transactions approach, the determination of value of money is artificially divorced from the theory of value.

3. Discards the Concept of Velocity of Circulation:
The cash balances approach is superior to the transactions approach because it discards the concept of the velocity of circulation of money which 'obscures the motives and decisions of people behind it.

4. Related to the Short Period:
Again the cash balances version is more realistic than the transactions version of the quantity theory, because it is related to the short period while the latter is related to the long period. As pointed out by Keynes, "In the long run we may all be dead." So the study of the relationship between quantity of money and price level during the long run is unrealistic.

5. Simple Equations:
In the cash balances equations, transactions relating to final goods only are included where P refers to the level of final goods. On the other hand, in the transactions equation P includes all types of transactions. This creates difficulties in determining the true price level. Thus the former equations are simpler and realistic than the latter.

6. New Formulation in Monetary Theory:
Further, the Cambridge equation regards the cash balances held by the people as a function of the level of income. The introduction of income (f or R or T) in this equation as against V (the velocity of circulation of money) in the transaction equation has made the cash balances equation realistic and led to new formulations in monetary theory. "It points out that changes in the level of money income can come about through changes in the price level, through changes in real output or through both at once."

7. Explains Trade Cycles:
Hansen regards k in the Cambridge equation superior to Fin Fisher's equation for understanding cyclical fluctuations. According to him, "Drastic and sudden shifts in the desire to hold money, reflected in a change in k, may produce large and quickly moving changes in the level of income and prices.

In the Cambridge analysis, a shift in k may start an upward or downward movement." For instance, when k (the fraction of total real income that people wish to hold in cash balances) increases because of low business expectations, the price level falls, and vice versa.

8. Study of Subjective Factors:
As a corollary to the above, V in Fisher's equation is mechanistic while k in the Cambridge equation is realistic. The subjective factors behind variations in k have led to the study of such factors as expectations,

uncertainty, motives for liquidity, and the rate of interest in modern monetary theory. In this sense, it can be justifiably said that, "the Cambridge equation moves us on from the tautology represented by the equation of exchange to a study of economic behaviour."

9. Applicable under All Circumstances:

Fisher's transactions approach holds true only under full employment. But the cash balances approach holds under all circumstances whether there is full employment or less than full employment.

10. Based on Micro Factors:

The Cambridge version is superior to the Fisherian version because it is based on micro factors like individual decisions and behaviours. On the other hand, the Fisherian version is based on macro factors like T, total velocity of circulation, etc.