Fisher's Theory of optimal Interlemporal Choice

I. Fisher developed the theory of Interlemporal choice in his book Theory of Interest (1930). Fisher's model showed how rational forward looking consumers choose consumption for the present and future to maximise their lifetime satisfaction. Fisher developed the model to analyse how rational, forward-looking consumers make consumption choices over a period of time. Fisher's model of Interlemporal choice illustrates three things :-

(1) the budget constraints faced by consumers.

(2) their preferences between current and future consumption.

(3) how these two conjointly determine households decision regarding optimal consumption and savings over an extended period of time.

Modern economist have included borrowing constraints also while analysing consumption choice over time.

Interlemporal Budget constraint :-

Rational individuals always prefer to increase the quantity or quality of the goods and services they consume. However, most people cannot

consume as much as they as they like due to limited income. In other words, people face a budget constraint, which sets a limit on how much they can spend. Since consumption decisions are taken over a period of time, consumers face inter temporal budget constraint, which shows how much income is available for consumption now and in the future. This constraint reflects a consumers decision on how much to consume today and how much to save for the future.

For the sake of simplicity let us assume that one representative consumer lives for two periods — period 1 is his youth and period 2 is his old age. His income and consumption in the two periods are Y_1 and C_1 and Y_2 and C_2 respectively. Here we ignore price level changes.

Since the consumer can borrow and save, consumption in any period need not necessarily be equal to his current income;

$$Y_1 \neq C_1, \text{ and } Y_2 \neq C_2$$

Consumption in two periods is constrained by income in two periods.

In the first period saving is the difference

between income and consumption:-

$$S = Y_1 - C_1 \quad \text{——— (1)}$$

In the second period consumption equals the accumulated saving (which includes the interest earned on that saving) plus second period income.

$$C_2 = (1+r)S + Y_2 \quad \longrightarrow (2)$$

where r is the real interest rate (i.e, nominal interest adjusted for inflation).

The variable S may represent either saving or borrowing. Equations (1) and (2) hold in both cases. If $C_1 < Y_1$, $S > 0$. If $C_1 > Y_1$, $S < 0$; i.e the consumer is borrowing. We assume that the interest rate for saving and borrowing are the same.

Deriving the Budget Constraints:

We can now derive the consumer's budget constraint by combining equation (1) and (2). If we substitute the equation (1) for S into the (2) equation, we get

$$C_2 = (1+r)(Y_1 - C_1) + Y_2 \quad \longrightarrow (3)$$

or $(1+r)C_1 + C_2 = (1+r)Y_1 + Y_2$

Dividing both sides of equation (3) by $(1+r)$, we get:

$$C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2}{1+r} \longrightarrow (4)$$

Since this equation relates consumption in two periods to income in both the periods it expresses the consumers' inter temporal constraint.

Interpretation:-

If $r = 0$, equation (4) shows that $C_1 + C_2 = Y_1 + Y_2$ i.e total consumption in the two periods equals total income in the two periods. But in the real world in which $r > 0$, C_2 and Y_2 are to be discounted by a factor $(1+r)$. Since, it is possible to earn interest by saving this discount factor has to be used while making interdemporal choice between consumption and saving.

Since $r > 0$, $Y_2 < Y_1$. This means that since a consumer earns interest on saving, future income is less than the same amount of current income. In a like manner, since future consumption expenditure is made from accumulated saving, the cost of future consumption is less than that of current consumption. The discount factor $\frac{1}{(1+r)}$ measures how much

period 1 consumption has to be sacrificed in order to consume 1 unit in period 2.

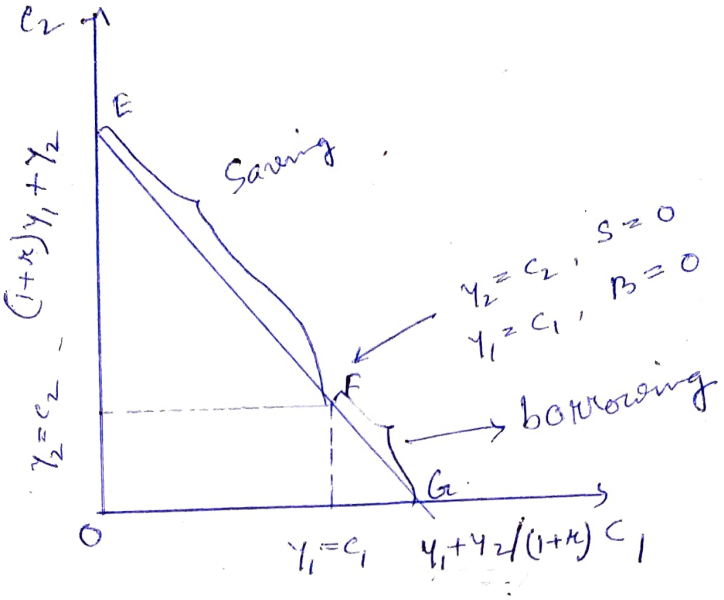

fig-① Inter temporal Budget line

At point G, $C_2 = 0$, this means that the consumer borrows the maximum possible amount against Y_2. This means that $C_1 = Y_1 + Y_2/(1+r)$. Thus if he chooses any point between F and G, he consumes more than his income in period 1 and borrows to make-up the difference. Various other points on the budget line E F G are attainable points.

Therefore, $C_2 = (1+r)Y_1 + Y_2$. Thus if he chooses points between E and F, he consumes less than his income in period 1 and saves the rest for the period 2. At point G, $C_2 = 0$, this means that the consumer borrows the maximum possible amount against Y_2. This means that $C_1 = Y_1 + Y_2/(1+r)$. Thus if he chooses any point between F and G, he consumes more than his income in period 1 and borrows to make-up the difference, Various other points on the budget line E F G are attainable points