Irving Fisher and Intertemporal Choice

Keynes' absolute income hypothesis advocates that current consumption depends only on current income. However, Irving Fisher argues that current consumption depends on lifetime income. According to him, time of income is irrelevant as the consumer can borrow or lend between periods. On the basis of this argument, Irving Fisher developed a model to analyse how rational, forward-looking consumers make consumption choices over a period of time.

Fisher's model takes two important assumptions as:

1. Consumer is forward-looking and chooses consumption for the present and future to maximize lifetime satisfaction.

2. Consumer's choices are subject to an intertemporal budget constraint-a measure of the total resources available for present and future consumption.

Given the above assumptions, Fisher's model of intertemporal choice illustrates the following three things:

(1) The budget constraints faced by consumers.

(2) The preferences between current and future consumption.

(3) How constraints and preferences conjointly determine consumer's decision regarding optimal consumption and saving over an extended period of time.

The Intertemporal 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 like due to limited income called budget constraint. For the sake of simplicity let us assume that our representative consumer lives for two periods:

(a) Period-1 represents consumer's youth life

(b) Period -2 represents consumer's old age.

Consumer's income and consumption in the two periods are Y_1, and C_1 and Y_2 and C_2, respectively.

In the first period, saving (S) is the difference between income and consumption which is expressed as:

$$S = Y_1 - C_1 \; \dots \; (1)$$

In the second period consumption equals the accumulated saving (which includes the interest(r) earned on that saving), plus second-period income **which is expressed as**:

$$C_2 = (1 + r)S + Y_2 \; \dots \; (2)$$

Where;

r = real interest rate (i.e., nominal interest adjusted for inflation).

Since we do not consider the third period, the consumer is not required to save in the second period.

Deriving the Budget Constraint:

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

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

or, $(1 + r) C_1 + C_2 = (1 + r)Y_1 + Y_2$ [By rearranging the terms]………………. … (3)

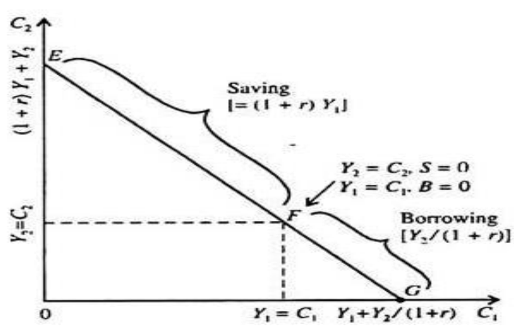
By dividing both sides of equation (3) by 1 + r we get:

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

Since equation (4) relates consumption in two periods to income in both the periods, it expresses the consumers' standard intertemporal budget constraint.

As shown in Equation (4), if $r = 0$, then $C_1 + C_2 = Y_1 + Y_2$, i.e., total consumption in the two periods equals total income in the two periods. But if $r > 0$, the future consumption- C_2 and future income- Y_2 are to be discounted by a factor $1 + r$ as $1/(1 + r)$. The discount factor $1/(1 + r)$ measures how much period-1 consumption has to be sacrificed in order to consume 1 unit in period-2.

Consumer's temporal budget constraint can be shown graphically as below:



The above figure shows the alternative combinations of period-1 and period-2 consumption the consumer can choose. It is clear from the above figure that:

1) If the consumer is at point F, he consumes his entire income in both the periods ($Y_1 = C_1$ and $Y_2 = C_2$, Saving(S) = 0, Borrowing (B) = 0)

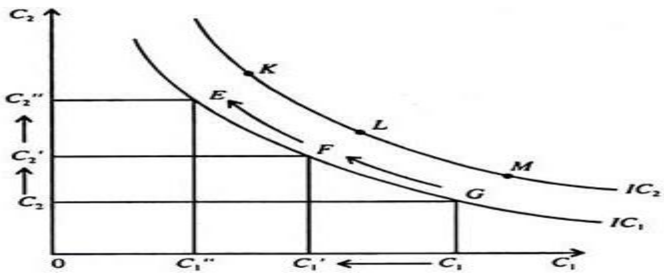
2) At point E, $C_1 = 0$ and $Y_1 = S$. Therefore $C_2 = (1 + r)Y_1 + Y_2$. Thus if he chooses points between E and F, he consumes less than his income in period-1 and saves the rest for period-2.

3) At point G, $C_2 = 0$. This means that the consumer borrows the maximum possible amount against Y_2. This means that C_1 is $Y_1 + Y_2/(1 + r)$. 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.

4) Various other points on the budget line EFG are attainable points.

Consumer's preferences:

The consumer's preferences regarding consumption in two periods can be represented by indifference curves. An indifference curve shows the combination of Period-1 and Period-2 consumption that make the consumer equally satisfied. The same argument can be shown with the following figure.

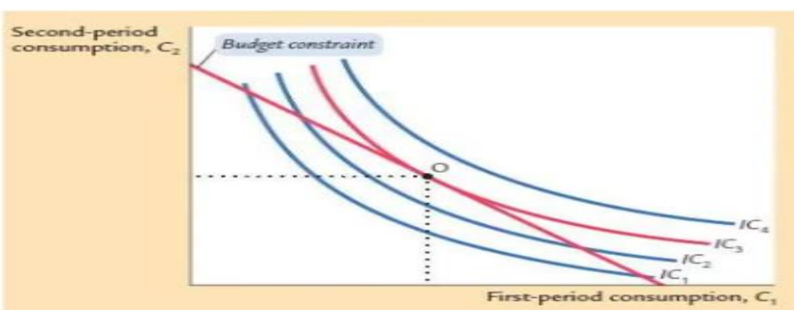


The figure shows that two indifference curves of the consumer — IC_1 and IC_2. The consumer is indifferent among points E, F and G, because they all lie on the same indifference curve. If the consumer moves from point G to F, C_1 falls to C'_1 So C_2 must increase to C'_2 to keep him equally satisfied. Otherwise, he cannot be indifferent between the two points G and F showing two different combinations of C_1 and C_2. If C_1 is reduced again from F to E, he requires a greater amount of extra C_2 as compensation. The slope of an indifference curve at any point indicates how much C_2 the consumer requires as compensation for sacrificing C_1 by 1 unit. So the slope is the marginal rate of substitution(MRS) between C_1 and C_2.

The figure also reflects that the consumer prefers points K, L and Mon indifference curve IC_2 to the points E, F and G on indifference curve IC_1.

Optimization:

The consumer would like to end up with the best possible combination of consumption in two periods which will be on the highest possible indifference curve. The highest possible indifference curve that the consumer can attain without violating the budget constraint is the indifferent curve that just barely touches that budget line which is IC3 as the one shown in below figure.



The point O is the optimal point which reflects the best combination of consumption in the two periods that the consumer can afford. At optimal point O, the slope of budget line and the slope of indifference curve IC3 is equal as they are tangent to each other.

To conclude, at Point O, MRS=1+r Where, MRS is the slope of Indifference curve and 1+r is the slope of budget line. This means that consumer chooses consumption in two periods such that MRS equals 1+r