Irving Fisher and Inter-Temporal Choice:

When people decide how much to consume and save, they must consider both the present and the future. The more consumption they enjoy today, the less they will be able to enjoy tomorrow. In making this tradeoff, households must look ahead of their expected future income and to the consumption of goods and services they could afford.

Fisher developed the model with which economists analyze how rational, forward-looking consumers make inter-temporal choices — that is, choices involving different periods of time as Fig. 12.5 shows. Fisher's model shows the constraints consumers face and how they choose consumption and saving.

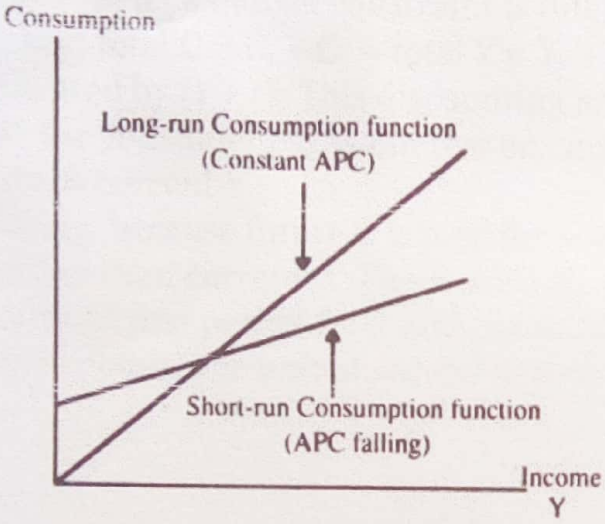

Fig. 12.5 Short-run and Long-run Consumption Function

The Inter-Temporal Budget Constraint:

Everyone would prefer to increase the quantity of goods they consume. The reason they consume less than they desire is that their consumption is constrained by their income, which is called budget constraint. When they are deciding how much to consume today and how much to consume tomorrow, they face an inter-temporal budget constraint. To understand how people decide their level of consumption, we need to examine this constraint.

We examine the decision facing a consumer who lives for two periods. Period one represents the consumer's youth and period two represents the consumer's old age. The consumer earns income of Y_1 and consume C_1 in period one, and earns income of Y_2 and consumes C_2 in period two. Because the consumer has the opportunity to borrow and save, C in any one period can be either greater or less than Y in that period. Consider how the consumer's Y in the two period's constraints C in the two periods.

In period 1, $S_1 = Y_1 - C_1$, where S is saving. In period 2, C equals the accumulated S, including the interest earned on the S, plus period II's Y. That is, $C_2 = (1 + r) S + Y_2$ where r is the interest rate. For example, if r = 5%, then for every pound of 5 in period 1, the consumer enjoys an extra £1.05 of consumption in period 2. In this two period model, the consumer does not save in the second period.

Two equations still apply if the consumer is borrowing rather than saving in period 1. S represents both S and borrowing. If first period $C_1 < Y_1$, the consumer is saving, and $S > 0$. If $C_1 > Y_1$, the consumer is borrowing, and $S < 0$. let us assume that the interest rate for borrowing is the same as the interest rate for saving.
To derive the consumer's budget constraint, combine the equations. Substituting the first equation for S 'into the second equation we obtain

$C_2 = (1 + r)(Y_1 - C_1) + Y_2$
Rearranging the terms we get: $(1 + r) C_1 + C_2 = (1 + r) Y_1 + Y_2$.
Now, divide the both sides by $(1 + r)$ we get: $C_1 + C_2/(1 + r) = Y_1 + Y_2(1 + r)$.
This equation relates C in the two periods to Y in the two periods.

The consumer's budget constraint is interpreted easily. If $r = 0$, the budget constraint says that total $C = C_1 + C_2 =$ total $Y = Y_1 + Y_2$. If $r > 0$, future C and future Y are discounted by $(1 + r)$. This discounting arises from the interest earned on savings. Since the consumer earns interest on current Y that is saved, the future Y is worth less than current Y.
Similarly, because future C is paid for out of S that have earned interest, future C costs less than current C. The factor $1/(1 + r)$ is the price of second period C measured in terms of first period C : it is the amount of first period C that the consumer must forgo to obtain one unit of second period C.