A Study of Short-run Consumption Function and its Modification with Some Special Assumptions

Md. Rostam Ali[1], Md. Mostafizur Rahman[2]

[1](Department of Business Administration, Mawlana Bhashani Science and Technology University, Bangladesh)
[2](Department of Management, Hajee Mohammad Danesh Science and Technology University, Bangladesh)

Abstract : *Consumption function shows the relationship between a nation's income and consumption and it is imperative in macroeconomics. The present study is causal in nature. The study is based on secondary data sources especially absolute income theory of consumption under the Keynes's short-run consumption function and psychological law of consumption. This paper is an endeavor to study the Keynes's short-run consumption function (SCF_k) with some special assumptions that SCF_k is misleading to formulate the macroeconomic policies. This study has developed a modified short-run consumption function (SCF_m) with some special assumptions. The SCF_m shows that total consumption is lower than the total consumption by SCF_k. So, the saving derived from SCF_m is higher than the saving derived from SCF_k. This study constructs that under some special assumption, SCF_m helps to calculate the exact amount of consumption, saving, investment to formulate macroeconomic policy (policies) properly which has great impact in macroeconomics.*
Keywords: *Autonomous Consumption, Consumption, Consumption Function, Income, Saving, Short-run*

I.   Introduction

Consumption is an act of human beings by which they finish the utility of goods and services to satisfy their wants. On the other hand consumption function shows the relationship between a nation's aggregate income and consumption. Basically consumption depends on income and propensity to consume. Propensity to consume means a nation's tendency to consume form its income. In short- run the factors (price level, interest rate, willingness to save) affecting propensity consume remain constant. So, in short- run consumption depends on income. Again, Keynes (1936) argues that the amount of aggregate consumption depends mainly on the amount of aggregate income. That's why, consumption increases or decreases as income increases or decreases. So, consumption is a function of income in short-run. Thus,

$$C = f(Y)$$

Since Keynes was concerned with the short-run consumption function. The Keynesian consumption function is written as:

$$C = a + bY$$

Where C is consumption, a is interception term (autonomous consumption), b is slope of consumption function (marginal propensity to consume) and Y is disposable income. Short-run consumption is classified into two types. One is autonomous consumption (a) which is independent from income or the level of consumption if income (Y) is zero.

Another one is induced consumption (bY) directly depends on income. Consumption function is important both in theoretically and practically to formulate the macroeconomic policies (investment, saving, unemployment, policies to control the economic fluctuation). Therefore Prof. A. H. Hansen has remarked that consumption function is epoch making contribution of Keynes to economic theory. The definition of Say's Law of market 'supply creates its own demand' occurs in General Theory of Employment, Interest and Money (Keynes 1936). Therefore overproduction and unemployment in the economy is not possible. But according to the Keynesian consumption function, when income increases, consumption increases less than the increase in income. So, a gap between income and consumption is created and this is called saving. This gap implies that all output produced may not be sold and deficiency of demand may be occurred. Actually every supply or production creates income equal to the output produced. But all income is not consumed and there is no guarantee that investment is equal to the saving. At full-employment level of income, if investment is less than saving gap then deficiency of effective demand is occurred. As a result overproduction and unemployment arises in a capitalist economy. Thus say's law is proved invalid by the study of the consumption function.

To determine the certain level of income and employment, the concept of propensity to consume is very important. Gap between income and consumption must be fulfilled by the investment expenditure to maintain a certain level of income and employment; otherwise it is not possible to maintain that level of income and employment due to the deficiency of the effective demand. As short-run consumption function is stable, the economic fluctuation is occurred due to the fluctuation of investment demand in capitalist economy.

The theory of multiplier has great importance to formulate the macroeconomic policies and Keynes's investment or income multiplier is derived from the concept of propensity to consume. Actually the magnitude of this multiplier is equal to the reciprocal of one minus marginal propensity to consume (MPC). Thus,

$$K = \frac{1}{1-MPC} = \frac{1}{MPS}$$

Where K is multiplier, MPC is marginal propensity to consume and MPS is marginal propensity to save. Under this concept of multiplier, if investment increases, income, output and employment increase by the multiple amounts, according to the size of multiplier. But, Stonier and Hague (1972) assert that when MPC is equal to one i.e. the whole of the increment in income is consumed and nothing is saved. In this case, the size of multiplier will be equal to infinity. The level of investment is greatly affected by the marginal efficiency of capital (MEC) in short-run. But MEC is nothing but the expected rate of profit on investment in future which depends on the future consumption demand. When income increases, consumption does not increase proportionately. So, aggregate demand becomes deficient and MEC decline due to the nature of consumption function. Business cycle is also explained by the consumption function. As MPC is less than one and average propensity to consume (APC) declines with increasing the income. So consumption demand does not increase as much as the increase in income and output. Due to the deficiency of aggregate demand, investment adversely affected. As a result economic growth swings down from the peak. Besides, Duesenberry's (1949) ratchet effect hypothesis asserts that when income of a nation falls, their consumption expenditure does not fall much. This is because, the people try to maintain their consumption at the highest level attained earlier. This effect ultimately induces investment for replacement of capital goods wear out over a period of business cycle. Again with the working of Keynesian investment multiplier recovery from recession is occurred. Though according to the life cycle theory (Ando, A., Modigliani, Franco, 1963), the consumption in any period is not the function of current income of that period but of the whole lifetime expected income. Again, Milton Friedman's (1957) permanent income hypothesis asserts that consumption is determined by long-term expected income rather than current level of income. But consumption function has great importance to formulate the macroeconomic policies. Due to some special assumptions which may be exist in a country; a certain model of consumption function may be misleading to use to formulate the macroeconomic policies. So in this study, it has been tried to modify the short consumption function with some special assumptions which may exist in a country.

II. Objective of the study

The main objectives of this study are to study the SCF_k and justify it with some special assumptions and to develop SCF_m by considering some special assumptions.

III. Methodology of the study

The study is causal in nature. The study is based on secondary data sources especially absolute income theory of consumption (1936) in the book named general theory of employment, interest and money. Under this theory the Keynes's short-run consumption function i.e. C = a + b and psychological law of consumption have been used for this study. The study has been developed to critically contrast the Keynes's short-run consumption function with modified short-run consumption function under some specific assumptions.

IV. Discussion and analysis

4.1 Study of Short-run Consumption Function: Consumption function plays very important role in macroeconomics. The following Keynes's consumption is short- run consumption function (SCF_k).

C = a + bY .... ………………………….. (1)
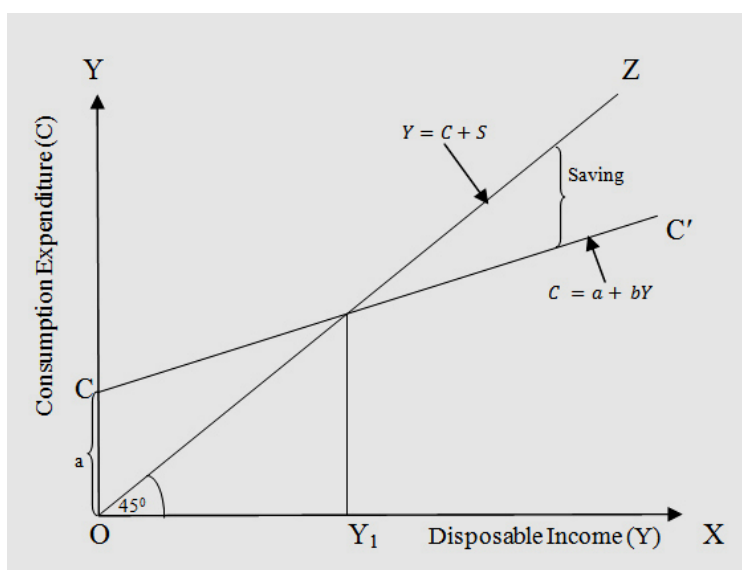
Here,   C = Consumption expenditure,   a = Autonomous consumption (Intercept term)
          b = Marginal propensity to consume (MPC)   and   Y = Disposable income

The table -1 is made for various level of income from the SCF_k. Where, a = 200   and   b =.75

Table -1: Consumption at various level of income

Disposable income (Y)	Consumption expenditure (C)	Average propensity to consume (APC)	Marginal propensity to consume (MPC)	Saving (S)
0	200	-	-	-200
100	275	2.75	.75	-175
200	350	1.75	.75	-150
300	425	1.417	.75	-125
400	500	1.25	.75	-100
500	575	1.15	.75	-75
600	650	1.083	.75	-50
700	725	1.036	.75	-25
800	800	1.00	.75	0
900	875	.972	.75	25
1000	950	.95	.75	50

The SCF_k is represented by the following graph in Figure 1.

Figure.1: Keynes's short-run consumption function (SCF_k).

In the Fig. 1 X-axis represents the disposable income and Y-axis represents the consumption expenditure. Here CC′ curve is consumption function curve. In this figure a line OZ is made 45^0 angle with the X-axis or Y-axis. So, every point on this OZ line is equidistant from the both X-axis and Y-axis. If the consumption function curve coincides with the OZ line, it indicates that the amount of consumption is equal to the income (Y = C) at any level of income. In this case consumption is increased by the same amount as income increases. But Keynes's (1936) Psychological law of consumption illustrates that the fundamental psychological law, upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from (the detailed facts of experience is that men and women, too) are disposed, as a rule and on an average to increase their consumption as their income increases, but not by as much as the increase in their income.

So, according to the Psychological law of consumption that as income increases, consumption increases but not as much as the increase in income. That's why, in this figure the consumption function curve CC′ deviates from the OZ line. At lower level of income consumption function curve CC′ lies above the OZ line. At this lower level of income, consumption is higher than the income. In this case a nation may use its previous saving or borrow the money to maintain its consumption expenditure. As income increases, consumption also increases but at income level OY_1, consumption is equal to income and saving at this point is zero. After that consumption increases as income increases but less than the increase in income. As a result consumption function curves CC′ lies below the OZ line beyond OY_1. Beyond the level of income OY_1, the gap between income and consumption is widening. This gap represents savings. As income increases saving gap also widens and this has a significant implication in macroeconomics.

4.2 Characteristics of the SCF_k:

4.2.1 Short-run consumption is determined by the level of income. An increase or decrease in consumption is causes by an increase or decrease in income. There are many subjective factors (willingness to save) and objective factors (price level, interest rate, and income distribution) which can influence the consumption but these factors do not change in short–run. Therefore, consumption functions remain stable in short–run.

4.2.2 The SCF_k is $C = a + bY$. The equation has two parts, a and bY. Here, a means autonomous consumption, which is independent from income. This is the minimum level of consumption that a nation has to consume even its income is zero. Such as food, rent, electricity because these expenditures are unavoidable whether one has money or not. If one's income is zero, still he/she has to eat and need a place to live; in this case one may use the previous saving or borrow money to pay for these expenses which is known as autonomous consumption. bY means induced consumption which depends on income. Increase or decrease in income causes an increase or decrease in induced consumption.

So, total consumption = Autonomous consumption + Induced consumption.

4.2.3 The main characteristic of SCF_k is that, it is linear. So if it is explained by graph, we will get a straight line.

4.2.4 Another important thing of SCF_k is marginal propensity to consumption (MPC). According to Keynes' psychological low of consumption:

$$0 < \text{MPC} < 1$$

Consumption increases as income increases but not as much as increase in income.

4.2.5 Average propensity to consumption (APC) $= \dfrac{C}{Y}$

From (i) we get

$$C = a + bY$$

So, APC $= \dfrac{a + bY}{Y} = \dfrac{a}{Y} + b$

So, APC decreases as income increases.

Again, APC $= \dfrac{a}{y} + b$ and $b = \text{MPC}$

So, APC > MPC.

4.2.6 It is known, that

$$\text{MPC} = \frac{dC}{dY} = \frac{d}{Y}(a+b) = b$$

$$\text{Again, } \frac{d}{dY}(MPC) = \frac{d}{dY}(b) = 0$$

So, MPC (b) remains constant even income increases.

4.2.7 The elasticity of SCF_k (E_k) is less than one. For SCF_k, consumption is inelastic with respect to income. The elasticity of SCF_k is-

$$E_k = \frac{dC}{dY} \cdot \frac{Y}{C}$$

$$= \frac{d}{dY}(a+bY) \cdot \frac{Y}{C}$$

$$= b \cdot \frac{Y}{C}$$

$$= \frac{bY}{a+bY}$$

But, $bY < (a + bY)$

So, $E_k < 1$

4.3 Deriving Saving Function From SCF_k Denoted by SF_k: As disposable income is either consumed or saved. So, saving is a part of income which is not consumed. Thus,

$$Y = C + S \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Here, Y = Disposable income, C = Consumption expenditure and S = Saving

Thus, the following equation is derived from (2):

$$S = Y - C \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

By substituting equation (1) in (2) we have-

$$S = Y - (a + bY)$$

$$= Y - a - bY$$

$$= -a + (1- b)Y \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Equation (4) represents the saving function derived from SCF_k. Here, b is marginal propensity to consume (MPC) and (1- b) is marginal propensity to save (MPS).
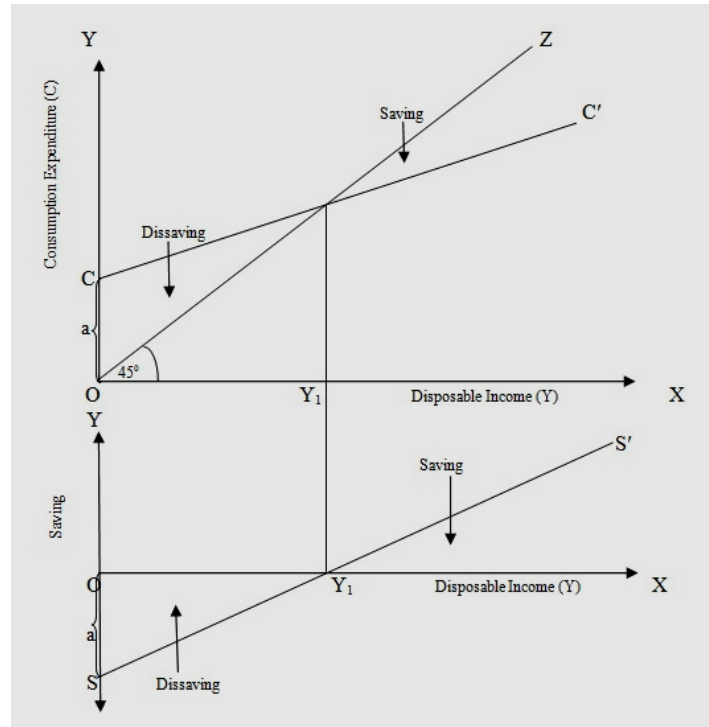
If   a = 200 and b = .75 then by substituting these value in (4) we get-

$$S = -200 + (1 - .75)Y$$
$$= -200 + .25Y$$

Here .25 is marginal propensity to save. Marginal propensity to consume (MPC) plus marginal propensity to save is one. Thus, MPC + MPS = 1.

Figure 2. represents SF_k derived from SCF_k

Fig.2. Saving function (SF_k) derived from SCF_k

In the Fig. 2 In the upper panel X-axis represents the disposable income and Y-axis represents the consumption expenditure. In the bottom panel X-axis represents the disposable income and Y-axis represents the saving. Saving curve SS′ is drawn in the panel at the bottom. The gap between CC′ curve and OZ curve in the upper panel is shown by SS′ curve. Consumption exceeds income upto the income level OY_1, that is, there is dissaving up to the income level OY_1. At income level OY_1, consumption is equal to income, that is, saving is zero. There is positive saving beyond the income level OY_1. In the upper panel average propensity to consume (APC) falls as income increases, that is, average propensity to save (APS) increases as income increases. So, in Fig. 2 not only absolute amount of saving increases but also average propensity to save (APS) increases as income increases.

4.4 Modified Short-run Consumption Function with Some Special Assumptions: The study has derived a modified short-run consumption function (SCF_m) with some special assumptions. These assumptions are:
1.4.1   The economic condition remain normal (there are no hyperinflation, war and other abnormal conditions)
1.4.2   Autonomous consumption is financed by borrowing.
1.4.3   When income (Y) starts to increase from zero, then at first the income is used to repay the borrowing for autonomous consumption after that the additional income (Y – a) is used for induced consumption.
1.4.4   Keynes Psychological law of consumption (0 < MPC < 1) is applicable when Y > a.
1.4.5   Income (Y) is greater than autonomous consumption. So, Y > a.

From the above assumptions the study has derived the following modified short-run consumption function (SCF_m).

$$C = a + b\,(Y - a) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$
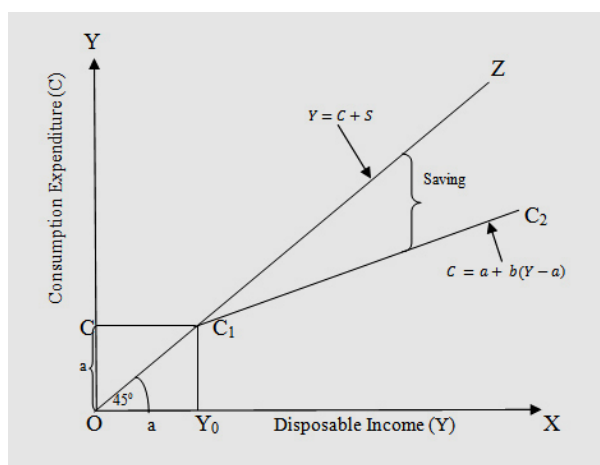
Here,   C = Consumption expenditure, a = Autonomous consumption (intercept term)
b = Marginal propensity to consumption (MPC), and   Y = Disposable income.

The table-2 is made for various level of income from the SCF_m. Where, a = 200, and b = .75

Table-2: Consumption at various level of income

Disposable income (Y)	Consumption expenditure (C)	Average propensity consumption (APC)	Marginal propensity to consume (MPC)	Saving (S)
0	200 (Borrowing)	-	-	-200
100 (Repaying)	200	2.000	0	-100
200 (Repaying)	200	1.000	0	0
300	275	0.917	.75	25
400	350	0.875	.75	50
500	425	0.850	.75	75
600	500	0.833	.75	100
700	575	0.821	.75	125
800	650	0.813	.75	150
900	725	0.806	.75	175
1000	800	0.800	.75	200

This SCF_m is represented by the following graph in Figure 3.

Figure.3: Modified short-run consumption function (SCF_m).

In the Fig. 3 X-axis represents the disposable income and Y-axis represents the consumption expenditure. Here CC_1C_2 curve is SCF_m curve and $OY_0 = a$. In this figure a line OZ is made 45^0 angle with the X-axis or Y-axis. So, every point on this OZ line is equidistant from the both X-axis and Y-axis. If the consumption function curve coincides with the OZ line, it indicates that the consumption is equal to the income (Y = C) at any level of income. In this case consumption is increased by the same amount as income increases. According to the assumption (3), b = 0 when $Y \leq a$. And according to the assumption (4), Keynes Psychological law of consumption (0 < MPC < 1) is applicable when Y > a. So, in this figure SCF_m curve CC_1C_2 deviates from the OZ line. Up to the income level OY_0, SCF_m curve CC_1C_2 lies above the OZ line. It indicates consumption is higher than the income up to the income level OY_0. In this case a nation's borrowing is used to maintain its consumption expenses. At income level OY_0, consumption is equal to income and saving at this point is zero. After that consumption increases as income increases but less than the increase in income. As a result C_1C_2 line part of the SCF_m curve CC_1C_2 lies below the OZ line beyond OY_0. Beyond the level of income OY_0, the gap between income and consumption is widening. This gap represents saving. After the level of income OY_0 as income increases saving gap also widens and this has a significant implication in macroeconomics.

4.5 Characteristics of the SCF_m:
4.5.1   According to SCF_m, consumption is determined by the level of income. An increase or decrease in consumption is causes by an increase or decrease in income. There are many subjective factors (willingness to save) and objective factors (price level, interest rate, and income distribution) which can influence the consumption but these factors do not change in short-run. Therefore, SCF_m remain stable in short-run.
4.5.2   Total consumption equal to autonomous consumption plus induced consumption. The SCF_m is C = a + b(Y − a). It has two parts, a and b(Y − a). Here, a means autonomous consumption, which is independent from income. This is the minimum level of consumption that a nation has to consume even its income is zero. Such as

food, rent, electricity because these expenditures can't be avoided whether one has money or not. If one's income is zero, still he/she has to eat and need a place to live. In this case one borrows money to pay for these expenses which is known as autonomous consumption. $b(Y - a)$ means induced consumption which depends on income after satisfying the autonomous consumption.

4.5.3 As income is used to repay the borrowing for autonomous consumption first, consumption does not increase up to the level of income to autonomous consumption $(Y \leq a)$. If income increases beyond the level of autonomous consumption then consumption increases as income increases but not as much as increase in income. So,

$$b \text{ (MPC)} = 0, \qquad \text{(when } Y \leq a)$$
$$\text{But} \quad 0 < b < 1 \qquad \text{(when } Y > a)$$

4.5.4 Average propensity to consumption (APC) $= \dfrac{C}{Y}$

From Equation (5) we get

$$C = a + b(Y - a)$$

$$\text{So, APC} = \frac{a + b(Y - a)}{Y} = \frac{a}{Y} + b - \frac{ab}{Y}$$

Again, $\dfrac{a}{Y}$ must be greater than $\dfrac{ab}{Y}$ means $\dfrac{a}{Y} > \dfrac{ab}{Y}$

So, APC > MPC

4.5.5 From Equation (5) we get

$$C = a + b(Y - a) = a + bY - ab$$

$$\text{MPC} = \frac{dC}{dY} = \frac{d}{Y}(a + bY - ab) = b$$

$$\text{Again,} \frac{d}{dY}(MPC) = \frac{d}{dY}(b) = 0$$

So, MPC (b) remains constant even income increases.

4.5.6 The elasticity of SCF_m (E_m) is zero (perfectly inelastic) upto the income level equal to autonomous consumption $(Y \leq a)$ but the elasticity of SCF_m (E_m) is less than one (inelastic) beyond the income level equal to autonomous consumption $(Y > a)$. The elasticity of SCF_m is-

$$E_m = \frac{dC}{dY} \cdot \frac{Y}{C}$$

$$= \frac{d}{dY}(a + bY - ab) \cdot \frac{Y}{C}$$

$$= b \cdot \frac{Y}{C}$$

$$= \frac{bY}{a + bY - ab}$$

According to the assumption (1.4.3), $b = 0$ when $Y \leq a$. In this case, $E_m = \dfrac{bY}{a + bY - ab} = 0$.

According to the assumption (1.4.4), $0 < b < 1$ when $Y > a$. In this case,

$$E_m = \frac{bY}{a + bY - ab}$$

Here, $a > ab$

Again, $bY < (a + bY - ab)$. So, $E_k < 1$.

4.6 Deriving Saving Function From SCF_m Denoted by SF_m: As disposable income is either consumed or saved. So, saving is a part of income which is not consumed. From Equation (2) we get

$$Y = C + S$$

Here, Y = Disposable income, C = Consumption expenditure and S = Saving

From Equation (3) we get $\qquad S = Y - C$

By substituting Equation (5) for value C in the above equation we get-

$$S = Y - \{a + b(Y - a)\}$$
$$= Y - a - b(Y - a)$$
$$= Y - a - bY + ab$$
$$= Y - bY - a + ab$$
$$= Y(1 - b) - a(1 - b)$$
$$= (1 - b)(Y - a) \ldots\ldots\ldots\ldots\ldots (6)$$

$$\text{As} \qquad b = 0, \qquad \text{(when, } Y \leq a)$$

So, $S = -a + Y \ldots \ldots \ldots \ldots \ldots \ldots .(7)$ (when, $Y \leq a$)

So, $-a$ is the intercept term of the modified saving function (SF_m) which is same as Keynes's saving function (SF_k). The above equation (6) and (7) represents the saving function (SF_m) derived from SCF_m which is represented in the figure.4.
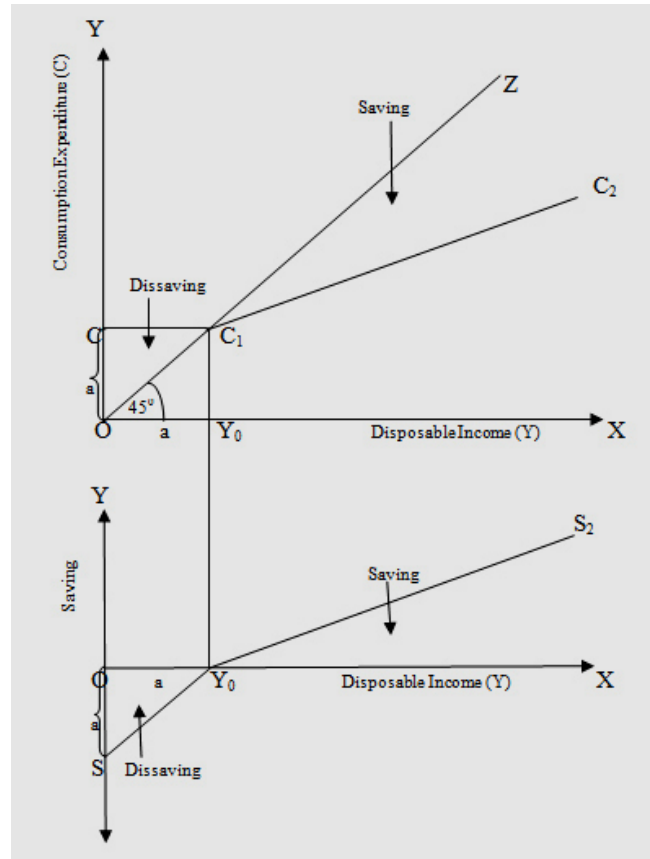
Figure.4: Modified saving function (SF_m) derived from SCF_m

In the Fig. 4 in the upper panel X-axis represents the disposable income and Y-axis represents the consumption expenditure. In the bottom panel X-axis represents the disposable income and Y-axis represents the saving. In the both panel income level OY_0 equal to autonomous consumption (a). Saving curve SY_0S_2 is drawn in the panel at the bottom. The gap between SCF_m curve CC_1C_2 and income curve OZ in the upper panel is shown by SY_0S_2 curve. Consumption exceeds income up to the income level OY_0, that is, there is dissaving upto the income level OY_0. At income level OY_0, consumption is equal to income, that is, saving is zero. There is positive saving beyond the income level OY_0. In the upper panel average propensity to consume (APC) falls as income increases, that is, average propensity to save (APS) increases as income increases. So, in Fig.4: not only absolute amount of saving increases but also increase average propensity to save (APS) as income increases.

4.7 Comparative analysis of SCF_k and SCF_m: From equation (1) we get SCF_k, that is:-

$$C = a + bY$$

From equation (5) we get SCF_m, that is:-

$$C = a + b(Y - a)$$

If we denote consumption for SCF_k by C_k and consumption for SCF_m by C_m then-

   $C_k = a + bY$
   $C_m = a + b(Y - a)$

Here, C_k = Consumption expenditure for SCF_k
      C_m = Consumption expenditure for SCF_m
       a = Autonomous consumption
       b = Marginal propensity to consumption (MPC)
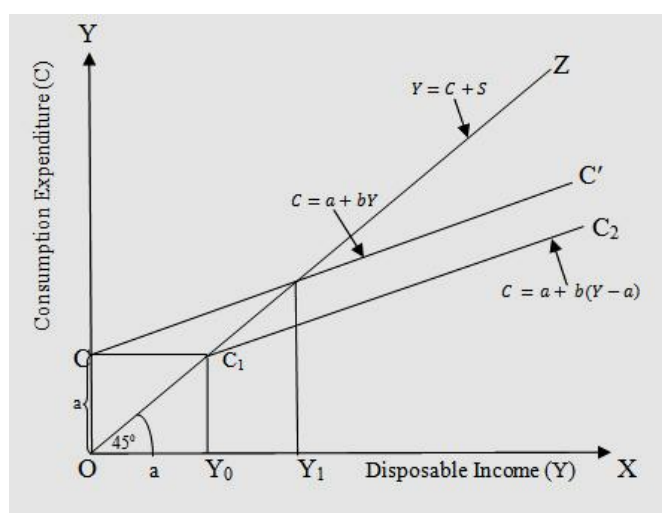   Y = Disposable income.

If $a = 200$, $b = .75$ then consumption for both SCF_k and SCF_m at various level of income is shown in table-3.

Table-3: Consumption for both SCF_k and SCF_m at various level of income

Disposable income (Y)	Keynes's Consumption expenditure (C_k)	Modified Consumption expenditure (C_m)	Keynes's Average propensity to consume (APC_k)	Modified Average propensity to consume (APC_m)	Keynes's Marginal propensity to consume (MPC_k)	Modified Marginal propensity to consume (MPC_m)	Keynes's Saving (S_k)	Modified Saving (S_m)
0	200	200	--	--	--	--	-200	-200
100	275	200	2.75	2.000	.75	0	-175	-100
200	350	200	1.75	1.000	.75	0	-150	0
300	425	275	1.417	0.917	.75	.75	-125	25
400	500	350	1.25	0.875	.75	.75	-100	50
500	575	425	1.15	0.850	.75	.75	-75	75
600	650	500	1.083	0.833	.75	.75	-50	100
700	725	575	1.036	0.821	.75	.75	-25	125
800	800	650	1.00	0.813	.75	.75	0	150
900	875	725	.972	0.806	.75	.75	25	175
1000	950	800	.95	0.800	.75	.75	50	200

Both SCF_k and SCF_m are represented in the following Figure 5.

Figure.5: SCF_k and SCF_m

In the Fig. 5 X-axis represents the disposable income and Y-axis represents the consumption expenditure. Here CC′ curve is SCF_k curve and CC_1C_2 curve is SCF_m and CC_1C_2 lies below the CC′. In this figure a line OZ is made 45^0 angle with the X-axis or Y-axis. So, every point on this OZ line is equidistant from the both X-axis and Y-axis. If the consumption function curve coincides with the OZ line, it indicates that the amount of consumption is equal to the income (Y = C) at any level of income. In this case consumption is increased by the same amount as income increases. According to the assumption (1.4.3), b = 0 when Y ≤ a and according to the Keynes Psychological law of consumption (0 < MPC < 1) "as income increases, consumption increases but not as much as the increase in income." So, in this figure the consumption function curves deviate from the OZ line. Upto the income level OY_0, SCF_m curve CC_1C_2 and upto the income level OY_1, SCF_k curve CC′ lie above the OZ line. Upto the income level OY_0 modified consumption is higher than the income and upto the income level OY_1 Keynes's consumption is higher than the income. At income level OY_0 modified saving (S_m) is zero and at income level OY_1 Keynes's saving (S_k) is zero. After the income level OY_0 and OY_1 modified consumption and Keynes's consumption increases respectively as income increases but less than the increase in income. As a result SCF_m curve CC_1C_2 and SCF_k curve CC′ lie below the OZ line beyond the income level OY_0 and OY_1 respectively. Beyond the level of income OY_0, the gap between income and modified consumption and beyond the level of income OY_1, the gap between income and Keynes consumption are widening. These gaps represent savings.

4.8 Comparative analysis between saving function derived from SCF_k (S_k) and saving function derived from SCF_m (S_m): SF_k is derived in equation (4) and SF_m is derived in equation (6). So,

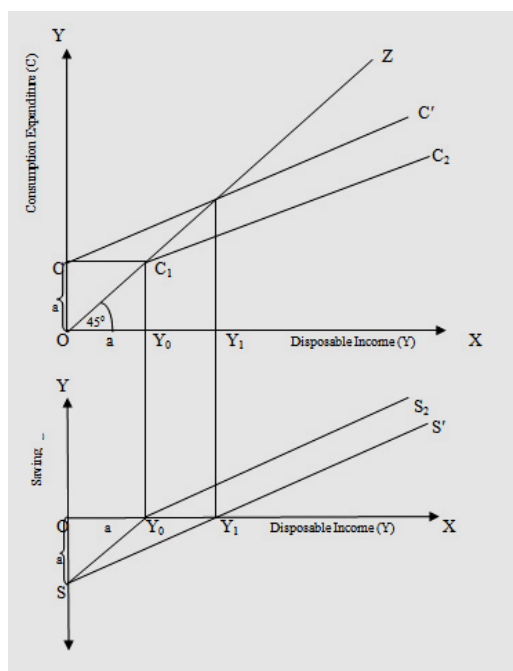$S = - a + (1 - b) Y$ [Saving Function derived from SCF_k]

$S = (1 - b) (Y - a)$ [Saving Function derived from SCF_m]

If we denote saving for SCF_k by S_k and saving for SCF_m by S_m then:

$S_k = - a + (1 - b)Y$

$S_m = (1 - b) (Y - a)$

Both the saving functions SF_k and SF_m derived from the both consumption functions SCF_k and SCF_m respectively are represented in the following Figure 6.

Figure 6: SF_k and SF_m derived from SCF_k and SCF_m respectively

     In the Fig. 6 in the upper panel X-axis represents the disposable income and Y-axis represents the consumption expenditure. In the bottom panel X-axis represents the disposable income and Y-axis represents the saving. In the upper panel CC_1C_2 is SCF_m curve and CC' is SCF_k curve. In the bottom panel SY_0S_2 is SF_m curve derived from SCF_m curve CC_1C_2 and SS' is SF_k curve derived from SCF_k curve CC'. In the upper panel CC' curve is on the above of CC_1C_2 curve. It indicates that consumption of SCF_k is higher than the consumption of SCF_m at any level of income. In the bottom panel SY_0S_2 curve is on the above of SS' curve. It indicates that saving of SF_m is higher than the saving of SF_k at any level of income. Break even income (BEI) is the level of income where total income is equal to total consumption (Y = C) and saving is equal to zero. Here, BEI for SCF_m is OY_0 which is equal to autonomous consumption (a) and BEI for SCF_k is OY_1. Saving is negative (dissaving) as consumption exceeds the income upto the break even income level. Saving is positive after the break even income level. For the SF_m the amount of dissaving is OY_0S and for the SF_k the amount of dissaving is OY_1S. Here the dissaving of SF_k is higher than the dissaving of SF_m by SY_0Y_1.

4.9 Key differences between SCF_k and SCF_m: The study has found the following key differences between SCF_k and SCF_m.

4.9.1   Though the autonomous consumption for both consumption functions is same but the induced consumption is not same. Induced consumption of SCF_k (IC_k) is higher than the induced consumption of SCF_m (IC_m). So, $IC_k > IC_m$. As a result total consumption of SCF_k is higher than the total consumption of SCF_m. So, CC' curve is on the above of CC_1C_2 curve.

4.9.2   MPC for SCF_k (b_k) is constant for any level of income but MPC for SCF_m (b_m) is zero upto the income level equal to autonomous consumption and after that b_m is same as b_k. So,

          $b_m = 0$ [When, $Y \le a$]

but $b_m = b_k$ [When, $Y > a$]

4.9.3   APC for SCF_k (APC_k) $= \dfrac{a}{Y} + b$

and   APC for SCF_m (APC_m) $= \dfrac{a}{Y} + b - \dfrac{ab}{Y}$

      So, $APC_k > APC_m$

4.9.4   According the SCF_k a nation borrow or use previous saving even its income is higher than the autonomous consumption ($Y > a$). But according the SCF_m a nation does not borrow or use previous saving when its income is higher than the autonomous consumption ($Y > a$). So,

Saving for SCF_m (S_m) > Saving for SCF_k (S_k)

4.9.5   Break even income (BEI) is the amount of income which is equal to the consumption ($Y = C$) and saving is zero. BEI for SCF_m (BEI_m) is equal to autonomous consumption and BEI for SCF_k (BEI_k) is higher than autonomous consumption. So,

$$BEI_m = a$$
And $$BEI_k > a$$
So, $$BEI_k > BEI_m$$

V.   Conclusion

Consumption function shows the relationship between a nation's income and consumption which is very significant and has great impact in macroeconomics. This study has modified SCF_k with some special assumptions and developed a new short-run consumption function named modified short-run consumption (SCF_m). According to SCF_m consumption does not increase and MPC is zero up to the level of income to autonomous consumption ($Y \leq a$) and consumption increases as income increases beyond the level of income of autonomous consumption ($Y > a$). But according to SCF_k consumption starts to increases as income increases. Again, APC for SCF_k is higher than the APC for SCF_m. The SCF_m shows that the total consumption is lower than the total consumption by SCF_k. As a result saving derived from SCF_m is higher than the saving derived from SCF_k. So, if the above mention assumptions exist in a country then SCF_k is misleading to make economic plan and policy. Under these assumptions the SCF_m is helpful to calculate the exact amount of consumption, saving, investment to formulate and implement the economic plan and policy which have great impact in macroeconomics.

References

[1].   Ando, A., Modigliani, F., (March 1963), The Life Cycle Hypothesis of Saving: Aggregate implications and Tests, American Economic Review, Vol: 53, No: 1, pp. 55-84.
[2].   J. S. Duesenberry, (1949), Income, Saving and the Theory of Consumer Behavior. Cambridge: Harvard University Press.
[3].   Keynes, J. M. (1936), General Theory of Employment, Interest and Money, (New York: Harcourt, Brace and Co.), First Edition, p. 18-96.
[4].   Modigliani, (June 1966), The Life Cycle Hypothesis of Saving and the Demand of Wealth and Supply of capital, Social Research, Vol: 3, pp. 160-217.
[5].   Stonier, A.W. and Hague, D.C., (1972). A Textbook of Economic Theory, 4th Edition, Prentice Hall Press.
[6].   Friedman, M., (1957), A Theory of Consumption Function, National bureau economic research general series, Princeton University Press, Vol: 63, pp. 243-245.