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

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**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\textsubscript{2}) with some special assumptions that SCF\textsubscript{2} is misleading to formulate the macroeconomic policies. This study has developed a modified short-run consumption function (SCF\textsubscript{m}) with some special assumptions. The SCF\textsubscript{m} shows that total consumption is lower than the total consumption by SCF\textsubscript{2}. So, the saving derived from SCF\textsubscript{m} is higher than the saving derived from SCF\textsubscript{2}. This study constructs that under some special assumption, SCF\textsubscript{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.
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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 macromechanics. 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 \( b = .75 \)
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Table 1: Consumption at various level of income

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

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

![Figure 1: Keynes’s short-run consumption function (SCFₜ).](image)

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° 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 OY₁, 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 OY₁. Beyond the level of income OY₁, 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

4.2.1 Short-run consumption is determined by the level of income. An increase or decrease in consumption is caused 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 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 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 is marginal propensity to consumption (MPC). According to Keynes’ psychological law 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) = \[
\frac{C}{Y} \]

From (i) we get

$C = a + bY$

So, APC = \[
\frac{a + bY}{Y} = \frac{a}{Y} + b
\]

So, APC decreases as income increases.

Again, APC = \[
\frac{a}{Y} + b \text{ and } b = \text{MPC}
\]

So, APC > MPC.

4.2.6 It is known, that

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

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

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

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

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

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

$= \frac{bY}{C}$

But, $bY < (a + bY)$

So, $E_k < 1$

4.3 Deriving Saving Function From SCF, Denoted by SF

As disposable income is either consumed or saved. So, saving is a part of income which is not consumed. Thus,

$Y = C + S$ ................................................................. (2)

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

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

$S = Y - C$ ................................................................. (3)

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

$S = Y - (a + bY)$

$= Y - a - bY$

$= - a + (1- b)Y$ ................................................................. (4)

Equation (4) represents the saving function derived from SCF. 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 $SCF_k$.

![Figure 2: Saving function ($SF_k$) derived from $SCF_k$](image)

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 up to 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 ($SCF_m$).

$$C = a + b(Y - a) \quad \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots (5)$$

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

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$_1$C$_2$ 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$_1$C$_2$ deviates from the OZ line. Up to the income level $OY_0$, SCF$_m$ curve CC$_1$C$_2$ 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$_1$C$_2$ line part of the SCF$_m$ curve CC$_1$C$_2$ 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
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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,

\[
b (MPC) = 0, \quad \text{(when } Y \leq a \text{)}
\]

But \( 0 < b < 1 \) \( \text{(when } Y > a \text{)} \)

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

From Equation (5) we get

\[
C = a + b(Y - a)
\]

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

Again, \( \frac{a}{Y} \) must be greater than \( \frac{ab}{Y} \) means \( \frac{a}{Y} > \frac{ab}{Y} \)

So, APC > MPC

4.5.5 From Equation (5) we get

\[
C = a + b(Y - a) = a + bY - ab
\]

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

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) up to 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:

\[
E_m = \frac{bY}{a + bY - ab}
\]

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

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, \( E_m < 1 \).

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

\[
S = Y - C
\]

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

\[
S = Y - \{a + b(Y - a)\}
\]

\[
= Y - a - b(Y - a)
\]

\[
= Y - a - bY + ab
\]

\[
= Y - bY - a + ab
\]

\[
= Y(1 - b) - a(1 - b)
\]

\[
= (1 - b)(Y - a) \text{ . . . . . . . . . . . . . . . . . . (6)}
\]

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

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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\(_m\)](image)

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\(_0\)S\(_2\) is drawn in the panel at the bottom. The gap between SCF\(_m\) curve CC\(_1\)C\(_2\) and income curve OZ in the upper panel is shown by SY\(_0\)S\(_2\) 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.
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Table 3: Consumption for both SCF<sub>k</sub> and SCF<sub>m</sub> at various level of income

<table>
<thead>
<tr>
<th>Disposable income (Y)</th>
<th>Keynes's Consumption expenditure (C&lt;sub&gt;k&lt;/sub&gt;)</th>
<th>Modified Consumption expenditure (C&lt;sub&gt;m&lt;/sub&gt;)</th>
<th>Keynes's Average propensity to consume (APC&lt;sub&gt;k&lt;/sub&gt;)</th>
<th>Modified Average propensity to consume (APC&lt;sub&gt;m&lt;/sub&gt;)</th>
<th>Keynes's Marginal propensity to consume (MPC&lt;sub&gt;k&lt;/sub&gt;)</th>
<th>Modified Marginal propensity to consume (MPC&lt;sub&gt;m&lt;/sub&gt;)</th>
<th>Keynes's Saving (S&lt;sub&gt;k&lt;/sub&gt;)</th>
<th>Modified Saving (S&lt;sub&gt;m&lt;/sub&gt;)</th>
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Both SCF<sub>k</sub> and SCF<sub>m</sub> are represented in the following Figure 5.

Figure 5: SCF<sub>k</sub> and SCF<sub>m</sub>

In the Fig. 5 X-axis represents the disposable income and Y-axis represents the consumption expenditure. Here CC’ curve is SCF<sub>k</sub> curve and CC<sub>C1</sub>C<sub>2</sub> curve is SCF<sub>m</sub> and CC<sub>C1</sub>C<sub>2</sub> lies below the CC’. In this figure a line OZ is made 45° 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<sub>0</sub>, SCF<sub>k</sub> curve CC<sub>C1</sub>C<sub>2</sub> and upto the income level OY<sub>1</sub>, SCF<sub>m</sub> curve CC’ lie above the OZ line. Upto the income level OY<sub>0</sub> modified consumption is higher than the income and upto the income level OY<sub>1</sub>, Keynes’s consumption is higher than the income. At income level OY<sub>0</sub> modified saving (S<sub>m</sub>) is zero and at income level OY<sub>1</sub>, Keynes’s saving (S<sub>k</sub>) is zero. After the income level OY<sub>0</sub> and OY<sub>1</sub> modified consumption and Keynes’s consumption increases respectively as income increases but less than the increase in income. As a result SCF<sub>k</sub> curve CC<sub>C1</sub>C<sub>2</sub> and SCF<sub>m</sub> curve CC’ lie below the OZ line beyond the income level OY<sub>0</sub> and OY<sub>1</sub> respectively. Beyond the level of income OY<sub>0</sub> the gap between income and modified consumption and beyond the level of income OY<sub>1</sub> the gap between income and Keynes consumption are widening. These gaps represent savings.

4.8 Comparative analysis between saving function derived from SCF<sub>k</sub> (S<sub>k</sub>) and saving function derived from SCF<sub>m</sub> (S<sub>m</sub>): SF<sub>k</sub> is derived in equation (4) and SF<sub>m</sub> is derived in equation (6). So,
A Study of Short-run Consumption Function and its Modification with Some Special Assumptions

\[ S = -a + (1 - b) Y \quad \text{[Saving Function derived from SCF}_k \text{]} \]
\[ S = (1 - b) (Y - a) \quad \text{[Saving Function derived from SCF}_m \text{]} \]

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](image)

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\_1, C\_2 is SCF\_m curve and CC\_1 is SCF\_k curve. In the bottom panel Y\_S, S\_2 is SF\_m curve derived from SCF\_m curve CC\_1, CC\_2 and SS\_1 is SF\_k curve derived from SCF\_k curve CC\_1. In the upper panel CC\_1 is on the above of CC\_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 Y\_S, S\_2 curve is on the above of SS\_1 curve. It indicates that saving of SF\_k is higher than the saving of SF\_m 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 up to 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:

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\_1 curve is on the above of CC\_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 up to the income level equal to autonomous consumption and after that b\_m is same as b\_k. So,
\[ b_m = 0 \quad \text{[When, } Y \leq a \text{]} \]
\[ b_m = b_k \quad \text{[When, } Y > a \text{]} \]

4.9.3 APC for SCF\_k (APC\_k) = \( \frac{a}{Y} + b \)
and APC for SCF\_m (APC\_m) = \( \frac{a}{Y} + b - \frac{ab}{Y} \)

So,
\[ \text{APC}_k > \text{APC}_m \]
4.9.4 According the SCF\textsubscript{k} a nation borrow or use previous saving even its income is higher than the autonomous consumption (Y > a). But according the SCF\textsubscript{m} a nation does not borrow or use previous saving when its income is higher than the autonomous consumption (Y > a). So,
\[
\text{Saving for SCF}_{m} (S_{m}) > \text{Saving for SCF}_{k} (S_{k})
\]

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\textsubscript{m} (BEI\textsubscript{m}) is equal to autonomous consumption and BEI for SCF\textsubscript{k} (BEI\textsubscript{k}) is higher than autonomous consumption. So,
\[
\text{BEI}_{m} = a
\]
And \[
\text{BEI}_{k} > a
\]
So, \[
\text{BEI}_{k} > \text{BEI}_{m}
\]

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\textsubscript{k} with some special assumptions and developed a new short-run consumption function named modified short-run consumption (SCF\textsubscript{m}). According to SCF\textsubscript{m} consumption does not increase and MPC is zero up to the level of income to autonomous consumption (Y ≤ a) and consumption increases as income increases beyond the level of income of autonomous consumption (Y > a). But according to SCF\textsubscript{k} consumption starts to increases as income increases. Again, APC for SCF\textsubscript{k} is higher than the APC for SCF\textsubscript{m}. The SCF\textsubscript{m} shows that the total consumption is lower than the total consumption by SCF\textsubscript{k}. As a result saving derived from SCF\textsubscript{m} is higher than the saving derived from SCF\textsubscript{k}. So, if the above mention assumptions exist in a country then SCF\textsubscript{k} is misleading to make economic plan and policy. Under these assumptions the SCF\textsubscript{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