ACCELERATION PRINCIPLE

Definition-

An induced consumption leading to an induced investment is known as principle of accelerator.

• When income or consumption increases, investment will increase by a multiple amount.

• The accelerator is the numerical value of the relation between the increase in investment resulting from an increase in income.

• The net induced investment will be positive if national income increases.

• Induced investment may fall to zero if the national income or output remains constant.
To produce a given amount of output, it requires a certain amount of capital. If $Y_t$ output is required to be produced in current period and $v$ is capital-output ratio i.e. $K/Y$, the required amount of capital to produce $Y_t$ output will be given by the following equation:

$$K_t = vY_t$$  \(\text{...(1)}\)

Where,

- $K_t$ stands for the current period stock of capital
- $Y_t$ for the level of output or income in current period, and
- $v$ for capital-output ratio i.e. $K/Y$

In the theory of accelerator this capital-output ratio is assumed to be constant.
If $Y_{t-1}$ output is required to be produced in $t-1$ period and $v$ is capital-output ratio i.e. $K/Y$, the required amount of capital to produce $Y_{t-1}$ output will be given by the following equation:

$$K_{t-1} = vY_{t-1} \quad \text{....(2)}$$

Hence, the increase in the stock of capital in period $t$ is given by the following equation:

$$K_t - K_{t-1} = vY_t - vY_{t-1} \quad \text{(From equation 1&2)} \quad \text{....(3)}$$
So,
\[ I_t = vY_t - vY_{t-1} (K_t - K_{t-1} = I_t) \]  
\[ ...(4) \]
Where,
It is investment in current period.

Equation 3 & 4 reveals that as a result of increase in income in any year \( t \) from a previous year \( t - 1 \), increase in investment will be \( v \) times more than the increase in income.

Hence, it is \( v \) i.e., capital-output ratio which represents the magnitude of the accelerator.
Working of the Accelerator

It thus follows that investment is a function of change in income.

If $Y_t$ is greater than $Y_{t-1}$ then investment will be positive.

If $Y_t$ is less $Y_{t-1}$ then disinvestment will take place.

And if $Y_t = Y_{t-1}$ the investment will be equal to zero.
We have made the following assumptions in making this table:

(i) Capital-output ratio remains constant and is equal to 3.

(ii) The depreciation that takes place in the stock of capital is equal to one-fifth of the stock existing in the previous year. Therefore, one-fifth of the stock of capital is to be replaced every year.
## Working of the Accelerator

<table>
<thead>
<tr>
<th>Period</th>
<th>Output (income)</th>
<th>Required Stock of</th>
<th>Capital Replacement</th>
<th>Net Investment</th>
<th>Gross Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>t - 1</td>
<td>500</td>
<td>1,500</td>
<td>300</td>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>t</td>
<td>510</td>
<td>1,530</td>
<td>300</td>
<td>30</td>
<td>330</td>
</tr>
<tr>
<td>t + 1</td>
<td>525</td>
<td>1,575</td>
<td>306</td>
<td>45</td>
<td>351</td>
</tr>
<tr>
<td>t + 2</td>
<td>550</td>
<td>1,650</td>
<td>315</td>
<td>75</td>
<td>390</td>
</tr>
<tr>
<td>t + 3</td>
<td>575</td>
<td>1,725</td>
<td>330</td>
<td>75</td>
<td>405</td>
</tr>
<tr>
<td>t + 4</td>
<td>575</td>
<td>1,725</td>
<td>345</td>
<td>0</td>
<td>345</td>
</tr>
<tr>
<td>t + 5</td>
<td>560</td>
<td>1,680</td>
<td>345</td>
<td>-45</td>
<td>300</td>
</tr>
<tr>
<td>t + 6</td>
<td>550</td>
<td>1,650</td>
<td>336</td>
<td>-30</td>
<td>306</td>
</tr>
<tr>
<td>t + 7</td>
<td>500</td>
<td>1,500</td>
<td>330</td>
<td>-150</td>
<td>180</td>
</tr>
<tr>
<td>t + 8</td>
<td>400</td>
<td>1,200</td>
<td>300</td>
<td>-300</td>
<td>0</td>
</tr>
<tr>
<td>t + 9</td>
<td>400</td>
<td>1,200</td>
<td>240</td>
<td>0</td>
<td>240</td>
</tr>
</tbody>
</table>
A glance at columns 2, 5 and 6 will show that with a change in output, investment will increase by a multiple of it. This shows that acceleration principle is a powerful destabilizing force working in the economy.
Limitations of the principle

• Capital-output ratio may not remain constant.

• If there is excess capacity, new investment will not take place.

• Change in the demand for the consumer goods should be permanent, otherwise entrepreneurs will not invest in additional capital goods.

• Funds should be easily available for induced investment.

• No time lag between the demand for the consumer goods and the demand for the capital goods.