Chapter Six
A MODEL OF MUTUAL INTERDEPENDENCE BETWEEN SMALL AND LARGER INDUSTRIES

Small Scale industries play an important role in fulfilling some social objectives like employment expansion, backward area development, optimal utilisation of local area resources, reduction of income inequality and poverty eradication. Keeping this in mind Government of India sought to protect them during the pre liberalized period from the competition of large scale industries by formulating policies like licensing, reservation, tax concessions, cheap credit facilities, supply of capital and other inputs at subsidised rate etc. But after 1991 in the name of new economic policy Government has introduced a package of policies like delicensing and dereservation in a phased manner, removal of all types of subsidies, withdrawal of cheap credit facilities by accepting profit as an important criterion in the matter of distribution of credit etc. In this situation small scale industries are unlikely to survive by competing with the large scale industries enjoying economies of scale. Now for the survival of the small scale industries the relationship between the small and the large should be of mutual interdependence in nature instead of being competitive. In this paper an attempt has been made to formulate the role of the Government in the matter of financing the ancillarisation programme i.e. the programme of mutual interdependence between small and large. We have tried to analyse the post 1991 policies relating to small scale industries from this angle.

Mutual interdependence relationship between small and large scale industries can be established in two ways.

a) Firstly, the small scale industries can produce the complementary goods of the large scale industries.

b) Secondly, the small scale industries can produce the intermediate goods used for production in the large scale industries.
Let us consider the first case first where the small scale industries are producing the complementary goods of large scale products.

Let $X_1$ denote large scale output, $X_2$ denote the small scale output and both the products are consumer durables. Again let $x_1$ be the amount of large scale output ($X_1$) demanded where longevity per unit of $X_1$ is $n_1$ and let $x_2$ be the amount of complementary good ($X_2$) demanded where longevity per unit of $X_2$ is $n_2$. Also let us assume that 'a' is the amount of $X_2$ required for consumption along with the consumption of 1 unit $X_1$.

Now, for supporting 1 unit $X_1$ for the time period $n_1$, 'a' unit of $X_2$ is required. Hence for supporting $x_1$ unit of $X_1$ for the time period $n_1$,

$$\left( a \frac{n_1}{n_2} x_1 \right) \text{ amount of } X_2 \text{ is required}$$

Thus $x_2 = \left( a \frac{n_1}{n_2} x_1 \right)$

where $a$, $n_1$, and $n_2$ are determined by the technological factors. Through technological upgradations $a$, $n_1$, $n_2$ will change, and through technological upgradation large scale industries will want to improve the quality of their product. Quality improvement is possible by lowering 'a' and increasing $n_1$. The producers of complementary goods will also want to improve the quality of the product by increasing $n_2$ through technological upgradation.

Now let us consider the equation $x_2 = a \frac{n_1}{n_2} x_1$ and then think about the following cases.

CASE - 1 First, consider the case, where "a" is falling, $n_1$ and $n_2$ both are increasing but increase of $n_2$ is greater than that of $n_1$. In this case $\left( a \frac{n_1}{n_2} \right)$ will fall. Now if fall in $\left( a \frac{n_1}{n_2} \right)$ is greater than the increase in $x_1$ then for an increase in the demand for $X_1$, demand for $X_2$ will not increase.

Here even in the presence of complementary relationship, after technological upgradation demand for $X_2$ will not increase with increase in the demand for $X_1$. 
CASE - II - Next, consider the case where 'a' is falling and both are increasing but increase of \( n_1 \) is greater than that of \( n_2 \). In this case, \( \frac{n_1}{n_2} \) will increase. Now if increase in \( \frac{n_1}{n_2} \) is lower than the fall of 'a' then also for the increase in demand of \( X_1 \) demand for \( X_2 \) will not increase. Thus in this case also technological upgradation will not benefit the producers of complementary goods.

Thus from the above two cases we can easily understand that producers of complementary goods will be benefited after technological upgradation either if increase of \( \frac{n_1}{n_2} \) is greater than the fall of 'a' or increase of \( x_1 \) is greater than fall of \( \frac{n_1}{n_2} - a \). Now \( n_1 \) and 'a' are determined by the producer of \( X_1 \) and \( n_2 \) is determined by the producer of \( X_2 \). Thus to get a positive effect of the complementary relationship producers of complementary goods will have to depend on the decision of large scale producers regarding survival period which depends on technology. So in his own interest the producer of complementary good should undertake the technological upgradation programme in collaboration with the large scale producer.

Now the question is to what extent the cost of the technological upgradation programme should be borne by the large scale producer and to what extent by the producer of the complementary good and what should be Government's role in this regard.
Suppose, now, that due to technological upgradation the survival period of per unit $X_l$ increases from $m$ to $n$. Here we assume that price and survival period per unit do not change for the competitors of $X_l$. Now the question is how much price the consumers will be ready to pay for $X_l$ for the extra survival period $(n' - n)$. Since for $n$ period of survival, 1 unit of the product of the competitor of $X_l$ is required, for $(n' - n)$ period of survival, $(n' - n)$ unit of the product of the competitor of $X_l$ will be required. Total expenditure to borne for that extra $(n' - n)$ unit is $P_l (\frac{n' - n}{n'})$ where $P_l$ is per unit price of both $X_l$ and the competitor of $X_l$. Thus for improvement of quality through technological upgradation, the increased price of $X_l$ will be:

$$P_l \leq P_l^* + P_l^* \left( \frac{n' - n}{n'} \right)$$

$$P_l \leq P_l^* \left( \frac{n' + n - n}{n'} \right)$$

$$P_l \leq P_l \frac{n - n}{n}$$

Hence following technological upgradation producers of $X_l$ can increase price of $X_l$ up to a maximum of $P_l \frac{n' - n}{n'}$.

Now if the price is fixed at the maximum level $P_l \frac{n' - n}{n'}$ the consumer will prefer the competitive commodity bundle, because in that case he does not pay full price at one time. He pays this in "m" instalments $(m = \frac{n - n}{n})$ where the time difference between each instalment is $n$. So to attract consumers by the new bundle the producers should reduce the price from the maximum level by the amount which the consumer is loosing for paying at one time. The consumer is losing the interest of $P_l(n - n)$ amount of rupee (i.e. the amount of increase of price) and so the price should be reduced by this amount from the maximum level.

Now total interest earned by $P_l$ amount of rupee =

$$\frac{P_l m \cdot n \cdot r}{100} + \frac{P_l (m-1) \cdot n \cdot r}{100} + \ldots + \frac{P_l \cdot n \cdot r}{100}$$

$$= \frac{P_l \cdot n \cdot r}{100} \left[ m + (m-1) + \ldots + 1 \right]$$

$$= \left( \frac{P_l \cdot n \cdot r}{100} \right) \left( \frac{m (m+1)}{2} \right)$$
where \( r \) is the rate of interest.

Hence the increase in price \( (P'_1') = P_1 \) \( m \) \( P_1 m \times n_1 n_1 r(m+1) \)

\[
\frac{P'_1}{P_1} = \frac{P_1 - P_1}{200} \quad (2m+1) = 0
\]

Thus to increase the price of \( X \), up to the maximum possible level the producers of \( X \) will set the new increased survival period at \( 200 + r n \). Following the same analysis we get \( n = \frac{200 + r n_1}{2r} \) the newly set increased survival period of \( X \) at the maximum level.

\[
\text{Now,} \quad \frac{n'_1}{n_1} = \frac{200 + r n_1}{200 + r n_2}
\]
\[ \frac{n'_1}{n'_2} - \frac{n_1}{n_2} = \frac{200 + r n_1}{200 + r n_2} - \frac{n_1}{n_2} \]

\[ = \frac{200 n_2 + r n_1 n_2 - 200 n_1 - r n_1 n_2}{(200 + r n_2) n_2} \]

\[ = \frac{200 (n_2 - n_1)}{(200 + r n_2) n_2} \]

Here \( \frac{n'_1}{n'_2} > \frac{n_1}{n_2} \) if \( n_2 > n_1 \)

In this case to have a complementary relationship between \( X_1 \) and \( X_2 \) the condition required is that increase of \( \frac{n_1}{n_2} X_1 \) > fall of 'a' (shown before)

or, fall of 'a' < (increase of \( \frac{n_1}{n_2} \)) + Expected output increase of \( X_1 \)

i.e. fall of 'a' < \( \frac{200 (n_2 - n_1)}{(200 + r n_2) n_2} \) + Expected output increase of \( X_1 \)

Again \( \frac{n'_1}{n'_2} < \frac{n_1}{n_2} \) if \( n_1 > n_2 \)

In this case to obtain complementary relationship between \( X_1 \) and \( X_2 \) condition required is that increase of \( X_1 \) > fall of \( \frac{n_1}{n_2} a \) (shown before)

i.e. increase of \( X_1 \) > fall of \( \frac{n_1}{n_2} \) + fall of 'a'

or, fall of 'a' < (expected output increase of \( X_1 \)) - fall of \( \frac{n_1}{n_2} \)

\[ \therefore \text{fall of 'a'} < \left( \text{expected output increase of } X_1 \right) - \frac{200 (n_2 - n_1)}{(200 + r n_2) n_2} \]

Thus to get the maximum price for the products and to keep the complementary relationship unaltered after technological upgradation the survival periods and the per unit requirement of the complementary good should be determined in the manner discussed above.
Now consider the other aspect of the problem viz, how the cost of technological upgradation should be shared by the two type of producers and what should be the Government's role in this regard.

For the commodity $X_i$ the amount of increased price.

\[
= p_i \ m \ \{ 1 - \frac{mr (m+1)}{200} \}
\]

\[
= p_i \ \left\{ \frac{200 - nr}{2nr} \right\} \left[ 1 - \frac{nr}{200} \left( \frac{200 - nr + r}{2nr} \right) \right]
\]

\[
= p_i \ \left\{ \frac{200 - nr}{2nr} \right\} \left( 1 - \frac{200 + nr}{400} \right)
\]

\[
= \frac{p_i (200 - nr)^2}{800nr}
\]

Thus the maximum limit of the newly settled price for Commodity $X_i$ i.e. $p_i' = p_i + \frac{P_i (200 - nr)^2}{800nr}$

\[
= p_i \left[ \frac{800nr + (200 - nr)^2}{800nr} \right]
\]

\[
= p_i \left[ \frac{(200 + nr)^2}{800nr} \right]
\]

Following the same analysis we will get the maximum limit of newly settled price for commodity $X_2$

\[
i.e. \ p_2' = p_2 \left[ \frac{(200 + nr)^2}{800nr} \right]
\]
Now if per unit cost after technological upgradation i.e. \( c^* \) is greater than \( P'_1 \) or \( P'_2 \) then the difference ( \( c - P'_1 \) ) or ( \( c - P'_2 \) ) will be given by the Government as subsidy per unit output to the respective producers. This subsidy will be considered as an incentive for technological upgradation. With the passing of time producers will be able to use the new technique more effectively so that the difference between average cost and price decreases and so also the amount of subsidy given by Government per unit output.

Thus we see that for the establishment of complementary relationship Government play its role by helping financially through subsidy for technological upgradation. In that case small producers will be able to compete with others efficiently while producing complementary goods if they are helped by the government in the matter of technological upgradation. Following technological upgradation plant size of the small scale industries will increase. So in the new industrial policy the prescribed fixed investment limit for the small scale industries has been increased. Besides this, to facilitate joint venture in the field of Research and Development by both small and large scope for investment in small scale industries by large scale producers has been provided in the form of "Equity Participation Principle" and "Limited Partnership Act" in the new '91 policy. What is lacking in the new policy is acknowledging the role of government subsidy for the development of complementary relationship through technological upgradation. Government subsidy can play a productive role in this regard and the amount of subsidy will decrease with time as we have shown in our analysis.
Next, consider the case where the intermediate goods of the large scale products are produced by other industries. In this case local small scale industries will be well suited because large scale industries are unlikely to enjoy the economies of scale in this case and so they are not generally interested in the production of these goods. Except this, in the case of production of intermediate goods one will also not have to face competition from the goods imported from developed countries because developed countries do not generally export intermediate goods. So in this type of mutual interdependence between small and large small scale industries are well suited. Now in this situation what measures Government can take?

In the new liberalised regime products of large scale industries are facing competition from better quality imported goods. So they are trying at present to improve the quality of their product. Improvement in the quality of the final product will be possible if the quality of intermediate product also improves. Now for quality improvement of the intermediate product technological upgradation is required in the small scale industries producing the intermediate good. For this technological upgradation fixed investment in the small scale industry should increase and for their own sake large scale industries should want to join the technological upgradation programme by sharing a part of investment. So in the new policy fixed investment limit of the small scale industries has been increased and the scope for investment by large scale industries has been enlarged in the small scale industries in the form of Limited Partnership Act and 'Equity participation Principle'. Large scale industries can also use small scale industries for different services including service related to marketing.
To enlarge this possibility Government has brought the service sector of certain prescribed fixed investment limit under "Small Scale Enterprise" and has announced its' Small Scale Enterprise Policy.

But these measures are not sufficient. Everything cannot be done by private initiative. Like the previous case here also government should help the small scale industries in their technological upgradation programme by giving subsidy. Some portion of the cost of technological upgradation will be met by the small scale producers by increasing price for improved quality and the rest amount will be borne by the Government. In this case also gradually the average cost of production will decrease because overtime the efficiency of the small scale producers in the matter of using the new improved technique will increase. As average cost decreases the difference between average cost and price will decrease and so the amount of subsidy will also decrease. Besides this owing to quality improvement of the intermediate good, quality of the final good will improve and so demand for final good will increase. As the demand for final good increases, the demand for intermediate good will also increase. Consequent upto the increase in the demand for intermediate good the small scale producer will be able to use the enlarged plant size (due to technological upgradation) more efficiently and so average cost of production will decrease further, and the amount of subsidy will decrease correspondingly. In this way government subsidy can play a productive role which has been ignored in the new policy.
Another factor which affects the mutual interdependence programme is the outstanding dues of the large scale industries to the small scale producers. If large scale producers do not pay in time for the intermediate goods bought from small scale industries then the problem of overdues will arise. This is not a healthy situation and Government should take measures to solve this problem.

Conclusion

Thus we can see that a mutual interdependent relationship between small and large industries is highly important for the survival of the small scale industries in the new liberalised regime. Since 1991 Government of India has taken certain measures for the small and large scale industries. These include enlargement of fixed investment limit of small scale industries, measures for enlarging the scope of investment of large scale producers in small scale industries, framing a small scale enterprise policy etc. But these measures are not sufficient. Government should consider seriously the question of giving subsidy to small scale industries and should try to solve the problem of overdues which is adversely affecting the mutual interdependent relationship. The mutual interdependent relationship hinges on technological upgradation. For successful implementation of the technological upgradation programme credit needs of the small scale industries would increase. But the new reform process of the financial sector has made viability of the individual bank an important performance criterion. Owing to this small scale industries are facing problems to obtain loan from banks. This is one important aspect which has to be attended to for a successful implementation of the mutual interdependence programme.