CHAPTER - II

SIMPLE THEORETICAL ANALYSIS OF PRICE STABILIZATION

I. SOME ISSUES OF PRICE STABILIZATION

The Agricultural Price Commission in its report on price policy for 1979-80 crop of rapeseed and mustard notes: "given the sensitive and intensely speculative nature of oilseed market and high variability in oilseed production, prices of oilseeds and edible oils display great erraticity, even within the same season." In such situations, not only farmer's income will be reduced in the short run but also his enthusiasm to invest in farm enterprise to increase future production will be dampened. Kahlon and Tyagi also hold similar opinion. In this context, stabilization or moderation in variations of prices of oils and oilseeds assumes paramount importance, since this would reduce price uncertainties to the farmers as well as to the consumers. Before specifying the model about the functioning of oils and oilseeds economy, an attempt is made to discuss the guidelines which economic theory can provide in relation to the following:

1. What are the implications of price stabilization to farmers?

2. Who are the beneficiaries of such stabilization?

3. Under what conditions collusive action of traders/oil millers would jack up market prices?

The issue of price stability has long been discussed in the past by many economists in the context of agricultural commodities where random fluctuations can occur in both demand and supply. Waugh\(^3\) developed a proposition to show that consumers having a downward sloping demand curve and facing random price due to stochastic fluctuations in supply, are better off than if these prices were stabilized at their arithmetic means. Some years later, Oi\(^4\) analysed the behaviour of competitive firms faced with uncertain demand and concluded that firms having a given upward sloping supply curve and facing random-selling prices will lose if prices are stabilized at their means. In these approaches, the welfare of only one group was considered ignoring the effects of price stabilization on the other.

Massel\(^5\) integrated these two analyses within the


framework of linear model and arrived at a number of interesting conclusions, namely:

(i) Price stabilization benefits one group or another, depending upon the sources of random fluctuations. For example, if random price is due to fluctuations in supply, then producers will benefit from price stabilization.

(ii) When producers and consumers are considered simultaneously, the price stabilization will always improve total welfare and hence overall price stabilization is to be preferred.

More recently, following Waugh, Oi and Massel, the welfare gains to producers and consumers are evaluated by Turnovsky in terms of the expected value of producers' surplus and the expected value of consumers' surplus, on the basis of expected prices. Whether or not the producers facing an uncertain demand will gain or lose from price stabilization is shown by him to depend crucially on:

1) the autoregressive properties of the random disturbances;

ii) The length of the lag in the formation of expectation and

iii) relative slopes of the demand and supply schedules.

Turnovsky concluded from his analysis that there would be positive gains to producers from stabilizing the supply fluctuations.

Recently, Behrman has clarified the issues of price stabilization by analysing international commodity proposals for the UNCTAD (United Nations Committee on Trade and Development) ten core commodities and basic foodgrains. His analysis is concerned with the immediate objectives of most international commodity agreements and of the UNCTAD, namely, (i) the stabilization of the relevant international commodity markets and (ii) the improvement in the real income that developing countries receive from commodity exports. His model for international commodity market consists of four relations: a world supply function, a world demand function for current use, the world market clearance relation and the price private inventory relation. These four relations used to determine four variables vis., world supply, world demand for current use, world private inventory additions (withdrawals) and

the world price. The parameters of these relations were estimated by using ordinary least squares method based on historical data covering the period 1956-1972. These estimates indicate fairly limited price responses for most of these commodities. This led to the conclusion that producers may gain from increased revenues and less variability in these revenues if price stabilization is introduced in those commodities in which supply shifts dominate. In the light of Behrman's analysis, the subsequent discussion in the present chapter attempts to analyse the implications of price stabilization for oils and oilseeds economy.

II. IMPLICATIONS OF PRICE STABILIZATION FOR FARMERS

Considering the average supply and demand curves for a purely competitive commodity market as shown by solid straight lines in Figure 1, the average supply curve (SS) gives the average quantity supplied for relevant range of prices and the average demand curve (DD) provides the average quantity demanded for corresponding prices.

The assumption of pure competition implies that the total market supply is the sum of the quantities supplied by large number of farmers whose production is so small that the individual farmer cannot change the market price by altering his supply schedule. Similarly,
on demand side, there are large number of consumers and an individual consumer cannot influence market price. \( P_o \) is the average equilibrium price at which average quantity supplied equals average quantity demanded (both equal \( Q_o \)).

Suppose there are shifts in the demand alone, farmers receive \( P_o Q_o \) when we stabilize the price at \( P_o \) whether demand curve shifts up or down. This indicates that price stabilization means stabilization of farmer's revenue. But this is accomplished at the cost of reduction in his revenue. Consider now the shifts in supply alone as shown in Figure 2.
Without price stabilization, producer's average revenue is \( \frac{P_2 Q_2 + P_3 Q_3}{2} \).
With price stabilization, it is \( \frac{P_0 (Q_1 + Q_2)}{2} \). In this case, price stabilization increased producer's revenue as can be seen by comparing the sizes of the relevant rectangles.

Consider now mixed cases in which both demand and supply curves shift. The net result depends on the size of the two shifts and size of the price elasticities.

Suppose the shifts in supply curve are dominant (as is the case with oilseeds supply) and the underlying curves are sufficiently price inelastic as shown in Figure 3.
In this case, comparison of the relevant rectangles shows that the farmer's revenue is increased and at the same time fluctuations in the revenue are reduced.

This suggests that price stabilization may lead not only to an increase in farmer's revenue but also to a greater stability in the same because of the dominance of supply shifts and low price elasticities. This will lead to substantial benefit to the farmers.

III. WHO GAINS FROM PRICE STABILIZATION?

Now consider implications of price stabilization from consumer's angle. This has been analysed here under the following assumptions that ignore (i) risk aversion
(ii) the question of distributional effects among consumers or among producers (iii) storage and transaction costs for State Trading Corporation (STC) for maintaining stock.

The benefits/losses to farmers are measured by the additional revenue they receive and the benefits/losses to consumers are measured by the additional/lessened consumer surplus they receive.

Fig. 4. Gains and Losses from Price Stabilization
(Shifts in inelastic supply curves only)

Considering the case as shown in Figure 4 in which completely price inelastic supply curve SS is shown. The curve SS equally likely to be at Q₁ or Q₂. So on an average it is at Q₀. Assume that the demand curve is fairly fixed so that the only source of instability is shifts in the supply curve. P₀ is the average price.
When supply curve shifts to $Q_1$, the State Trading Corporation of India (STC) can purchase $(Q_1 - Q_0)$ units in order to prevent fall of prices below $P_o$. For instance, when the price of groundnut oil had come down in April 1976 to Rs.37/- per 10 Kg, the STC bought 5000 tonnes of groundnut oil. As a result the market price rose to Rs.47/- per 10 Kg. The change in consumer surplus due to paying $P_o$ instead of the price $P_1$, which would have prevailed without STC's intervention, is negative and is given by ($-A-B-C$).

The producer's revenue gain due to higher price is positive and is represented by $(A+B+C+D)$. The cost of STC's purchasing $(Q_1-Q_0)$ units is $(-C-D-E)$. Hence the total benefit is $(-C-E)$.

When the supply curve shifts to $Q_2$, $(Q_o - Q_2)$ units are sold by STC at prices $P_o$. This prevents the prices from rising to $P_2$.

The benefit to consumer is positive and is given by $F+G$ due to lower prices. The benefit to the farmers is negative $-F$ since they receive lower prices for their $Q_2$ units.

The financial inflow to STC is $B+H$. The total
benefit is the sum of three components:

\[(F+G) + (-F) + (B+H)\]

\[= B + G + H.\]

If the sequencing over time of the supply shifts is ignored, total benefits to each of these three groups is the sum of those obtained from S.T.C's operation with supply at Q₁ and Q₂. The net gains to respective groups and the overall benefits are as under:

Consumers  = F + G - S - B - C.

Producers (Farmers) = A + B + C + D - F.

S.T.C. = B + H - C - D - E.

Overall Benefits = Sum of Individual Benefits = B + H + G - C - E.

Following the assumptions stated in the beginning of this section, it is safe to contend that over a period of time S.T.C's net benefit from its operations is zero and that overall benefits are positive. This leads respectively to the following:

\[B + H = C + D + E\] and \[B + H + G > C + E.\]

However, the determination of the exact quantum of benefit is basically an empirical issue and depends on the exact shape of the curves.
IV. COLLUSIVE ACTION BY TRADERS/OIL MILLERS

Under the conditions discussed above, price stabilization may lead to increased revenues to the farmers, particularly when supply shifts are dominant. If the market demand curves are price inelastic, successful price raising is rewarded by greater revenues.

Consideration of the interdependence of the various trader's/oil miller's actions leads into oligopoly formation behaviour. An oligopoly is the market organisation or an industry in which there are few sellers of a commodity. Each member of an oligopoly can perceive that not only his own output decisions affect the market price, but also the output decisions of all his fellow oligopolists affect the market price. This interdependency creates a rivalry among the oligopolists in regard to the division of the existing market. If the oligopolists are able to agree on how to divide the market shares, they can maximise their joint profits by acting as a monopolist.

However, this is a very static view. If the oligopolists collude to raise prices, new traders/oil millers may be induced to enter into the industry or new substitutes may be developed to compete with the

produce of the industry. This results in the possibility of limit pricing to discourage entry. In Figure 5, the collusive, short-run static profit maximising price is $PM_1$. Any price above $PM_2$, would induce new entrants. The effective long-run demand curve for the current colluding oligopolists has a horizontal segment at $PM_2$.

Fig.5. Market Behaviour of a Monopoly

V. CONCLUSIONS

The foregoing analysis has price stabilization will lead to the overall benefit of producers and consumers particularly so in the case of oils and oilseeds sector where the supply shifts in oilseeds production are dominant. Hence building up of a buffer stock in oils
and oilseeds to ensure regular supply is preferred to maintain prices at reasonable level which helps both the farmer and consumer. However, the issue is basically an empirical one and empirical estimates of supply and demand will be dealt with in Chapters III, VI and VII.