PART V

Price Theory, Firm, and Market Structure:

Monopoly, Imperfect Competition, and Oligopoly

CHAPTER 19

MONOPOLY AND PRICE THEORY

Introduction

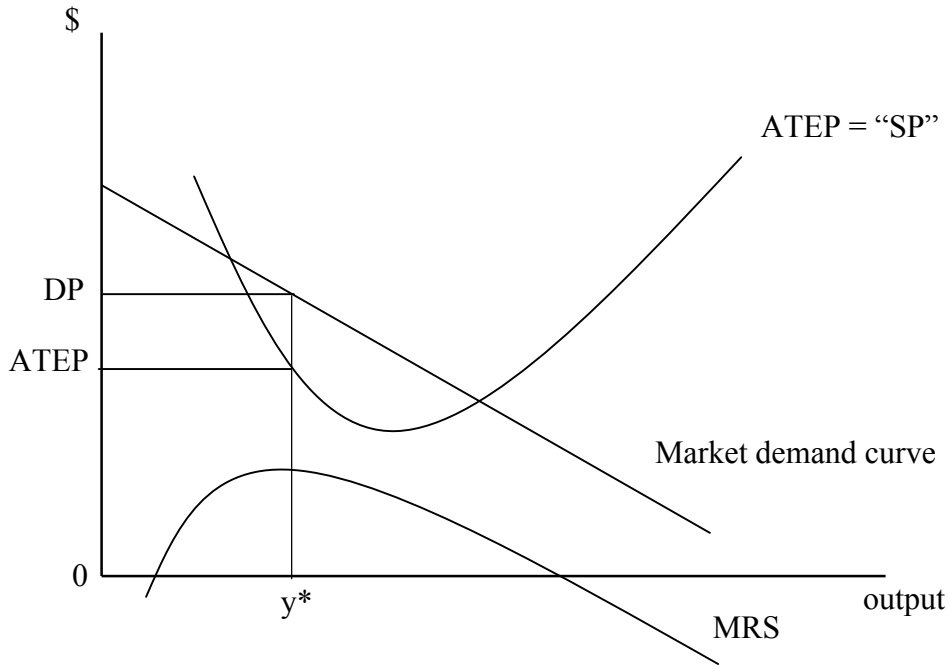
[NEED MATERIAL]

Marshall's Analysis of Monopoly

Although Marshall spent most of his effort on developing a competitive theory of prices, he did deal with monopoly. Under monopoly, he argued, the monopolist faced a market demand curve that is the same as in a competitive market. The "supply" schedule represented the average total expenses of production both in the short and long period.[1] Finally, Marshall introduced the concept of the *monopoly revenue schedule*, which was defined as the difference between the demand price and the "supply price" (average total expenses of production). To complete the analysis, Marshall assumed that the monopolist would maximize its *aggregate net revenue* which was defined as y[P – "SP" (ATEP)]. This can be shown in the following figure:

[1] Marshall acknowledged that an ATEP-supply curve was not the same as the supply curve of the representative firm under free competition. The fact there is no supply curve outside of perfect competition was not established until the 1930s will be shown below.

Figure 19.1



where y* is the equilibrium output;

y*(DP – ATEP = "SP") is the maximum aggregate net revenue;

MRS is the monopoly revenue schedule; and

DP is the demand price and the market price.

Marshall proved his argument in the following manner:

Let DP = $f_1(y)$ and "SP" = $f_2(y)$ then

$$\frac{d}{dy}\left[f_1(y)y - yf_2(y)\right] = f_1(y) + y\frac{d\,f_1(y)}{dy} - \frac{dTEP}{dy} = 0$$

That is, the monopolist will be maximizing its aggregate net revenue when equating marginal expenses of production (marginal costs) to marginal revenue. However, Marshall did not identify the term $f_1(y) + y\,d\,f_1(y)/dy$, as marginal revenue; that would have to wait for Roy Harrod and Joan Robinson.[2]

[2] In a mathematical note concerning the distribution of resources in the economy based on an example of the building trade, Marshall does derive marginal revenue, but he called it the "net produce we are seeking (Marshall 1972: 698).

Assumptions

The conventional neoclassical analysis of monopoly is based on the following assumptions. First, the monopolist is a profit maximizer. Second, the market consists of a single producer of a good for which there are no perfect substitutes. Third buyers take prices as given while the single producer takes input prices as give. Fourth, there is no cost of exchange. And lastly all buyers and the single producer process perfect information concerning prices, availability, and physical characteristics of goods.

Monopolist Demand Curve

The essential characteristic of a monopolistic market is that the demand curve for the monopolist is the entire market demand curve. This means that the firm's equilibrium quantity of output is not independent of the equilibrium price. That is the dependent variable, output in the Walrasian approach and the price in the Marshallian approach, is a function of the independent variable. This can be seen in the way the monopolist's demand curve is formulated. To write a market demand curve, let us consider the following:

$y_{md}^{e} = f_m(p_1, p_2, \ldots, p_{y-1}, p_y, M)$

where y_{md}^{e} is the market demand curve for good y;

$p_1, p_2, \ldots, p_{y-1}$, are the demand price for goods one through y-1;

p_y is the demand price for good y;

M is aggregate money income; and

$\partial\, y_{md}^{e}/\partial p_y, < 0$ (this is assumed since the Giffen good problem needs to be eliminated; also it is assumed that there is no aggregation problem so that the market demand curve can in fact be drawn as a functional relationship).

Because $p_1, p_2, \ldots, p_{y-1}$ and M are assumed to be given, the market demand curve can be rewritten as $y_{md}^{e} = f_m^{*}(p_y)$. This form of the market demand curve can be denoted as Walrasian since p_y is the parameter

and y_{md}^e is the dependent variable. To get a Marshallian market demand curve, $y_{md}^e = f_m^*(p_y)$ is simply inverted so that we have $p_y^e = g_m^*(y_{md}^e)$ where $g_m^* = (f_m^e)^{-1}$ and $\partial p_y^e/\partial y < 0$.[3]

Monopolist and Profit Maximization

Short Period

Given the market demand curve, the monopolist chooses either price or quantity to maximize profits. Since the Walrasian and Marshallian approaches produce the same profit maximizing quantities and price (the only difference in the approaches is that the former chooses price as a parameter to be varied while the later chooses output as a parameter to be varied), we shall utilized the Marshallian approach while the Walrasian approach will be detailed in the Appendix. In the Marshallian approach quantity is the independent variable. Setting up the profit maximizing equation, we have

$$\max \pi = p_y y - TC.$$

Since profit maximization takes place in equilibrium, we can substitute $g^*(y_{md}^e)$ for p_y and $TC^*(\mathbf{p},y) = TC = p_1x_1^e + \ldots + p_nx_n^F$ for the total costs. Therefore, we have the following:

$$\max\pi = g^*(y_{md}^e)y - TC^*(\mathbf{p},y)$$

Taking the first order conditions, we get (as with Marshall)

$$\partial\pi/\partial y = g^*(y_{md}^e) + y\partial g^*(y_{md}^e)/\partial y - \partial TC^*(\mathbf{p},y)/\partial y \text{ or}$$

$$g^*(y_{md}^e) + y\partial g^*(y_{md}^e)/\partial y = \partial TC^*(\mathbf{p},y)/\partial y \text{ or}$$

$$\text{marginal revenue} = g^*(y_{md}^e) + y\partial g^*(y_{md}^e)/\partial y = p_y + y\partial p_{y/}\partial y$$

$$\text{marginal cost} = \partial TC^*(\mathbf{p},y)/\partial y.$$

Taking second order condition to see if we have maximum, we get

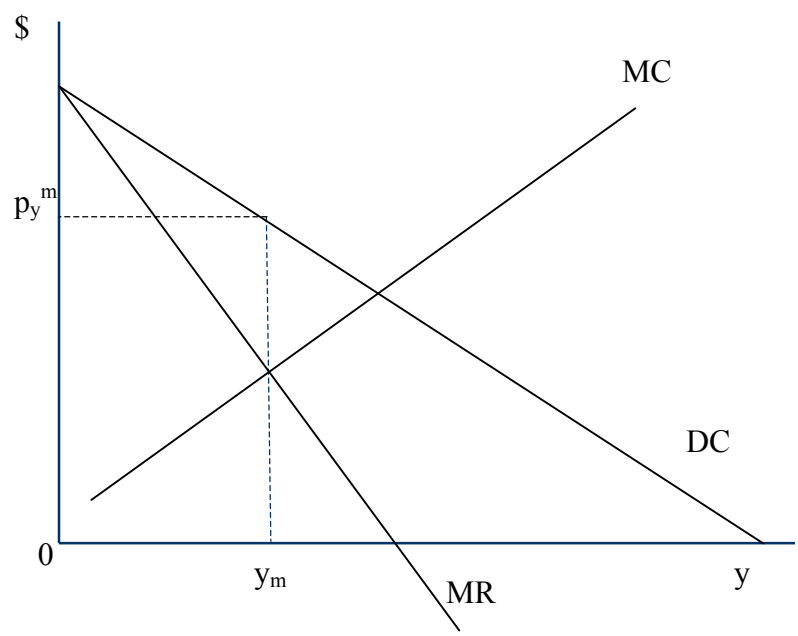
$$2\partial g^*(y_{md}^e)/\partial y + y\partial^2 g^*(y_{md}^e)/\partial y^2 - \partial^2 TC^*(\mathbf{p},y)/\partial y^2 < 0 \text{ or}$$

$$\partial MR/\partial y < \partial MC/\partial y.$$

[3] See Chiang (1974), pp.181-183.

Thus profit maximization requires that marginal revenue equals marginal cost and that the rate of change of marginal cost with respect to output must be greater than the rate of change of marginal revenue with respect to output. Note that the second order condition is satisfied if marginal cost is rising with respect to output and marginal revenue is falling. Inspecting the equilibrium condition above, we find that the profit maximizing price occurs at the point on the demand curve where the quantity supplied (as represented by marginal costs) equals the quantity demanded (as represented by marginal revenue). Thus it would appear that in the case of monopoly, the profit maximizing price is greater than $\partial TC^*(\mathbf{p},y)/\partial y$ by the factor of $y\partial g^*(y_{md}^e)/\partial y$ and output is less than where $MC = g^*(y_{md}^e)$.

Figure 19.2



where $DC = p_y = g^*(y_{md}^e)$;

$MR = p_y + y\partial p_y/\partial y$;

$MC = \partial TC^*(\mathbf{p},y)/\partial y$;

p_y^m = the profit maximizing monopolist price; and

y_m = the profit maximizing monopolist quantity.

Long Period

Because the monopolist faces the "same" market demand curve in the long period as it does in the short period[4] and because its marginal cost curve retains the same functional form, the profit maximizing procedures used to analyze the monopolist in the short period can be used in the long period. First we set up the profit maximizing function:

$$\max \pi = p_y g_m^*(p_y) - TC^*(\mathbf{p}, y) \text{ where } TC^*(\mathbf{p}, y) = p_1 x_1^e + \ldots + p_n x_n^e.$$

Now taking first order conditions, we get

$$\partial\pi/\partial y = g^*(y_{md}^e) + y\partial g^*(y_{md}^e)/\partial y - \partial TC^*(\mathbf{p}, y)/\partial y = 0 \text{ or}$$

$$MR = MC.$$

We know from above that the second order condition for a maximum is fulfilled. From the first order conditions we derive the profit maximizing price and quantity for the monopolist.

Profits

In the short period, the monopolist will make zero or positive economic profits if $p_y^m - ATC \geq 0$ or make economic losses if $p_y^m - ATC < 0$, economic profits (EP) is defined as $EP = y_m(p_y^m - ATC)$. However, the monopolist will produce in the short period as long as $p_y^m - AVC \geq 0$. In the long period, the monopolist can only make zero or positive economic profits; therefore $p_y^m - ATC \geq 0$. Consequently, if $p_y^m - ATC < 0$, the monopolist will not produce. If positive economic profits do exist in the long period, then it is generally argued that barriers to entry exist.

Topics

Monopoly and Price Discrimination

[4] Comment on this.

Monopoly and Taxation

Regulation of Monopoly

Comparison of Perfect Competition and Monopoly

1. Using the monopoly pricing model: $p = MC/(1 - 1/e_d)$

   a. if $e_d = \infty$, then $MC = P$ perfect competition;

   b. if $e_d < \infty$, then $MC < P$ monopoly/imperfect competition;

c. assuming that marginal costs are the same, then $p_m > p_c$ and $q_m < q_c$.

2. More formal analysis:

   DC: $p = 50 - 10y$

   TC: $TC = 52 - 2y + 3y^2$

   a. monopoly

   (1) $TR = py = 50y - 10y^2$ $MR = 50 - 20y$

   (2) $TC = 52 - 2y + 3y^2$ $MC = -2 + 6y$

   (3) Equating MR = MC we get $y = 2$, $p = 30$, $EP = 0$

   b. Perfect competition

   (1) $TR = py = 50y - 10y^2$ $p = 50 - 10y$

   (2) $TC = 52 - 2y + 3y^2$ $MC = -2 + 6y$

   (3) equating p = MC we get:

   $50 - 10y = -2 + 6y \rightarrow 52 = 16y \rightarrow y = 3.25, p = 17.5$

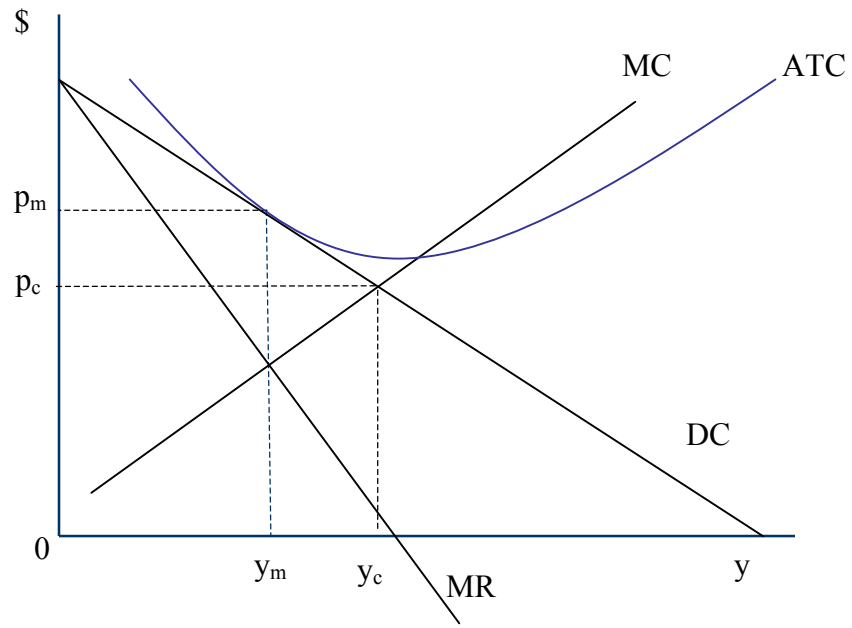
   $EP = 56.875 - (52 - 6.5 + 31.6875) = 56.875 - 77.1875 = -20.3125$

   c. comparison:

	monopoly	perfect competition
price	30	17.5

quantity	2	3.25
EP	0	-20.3125

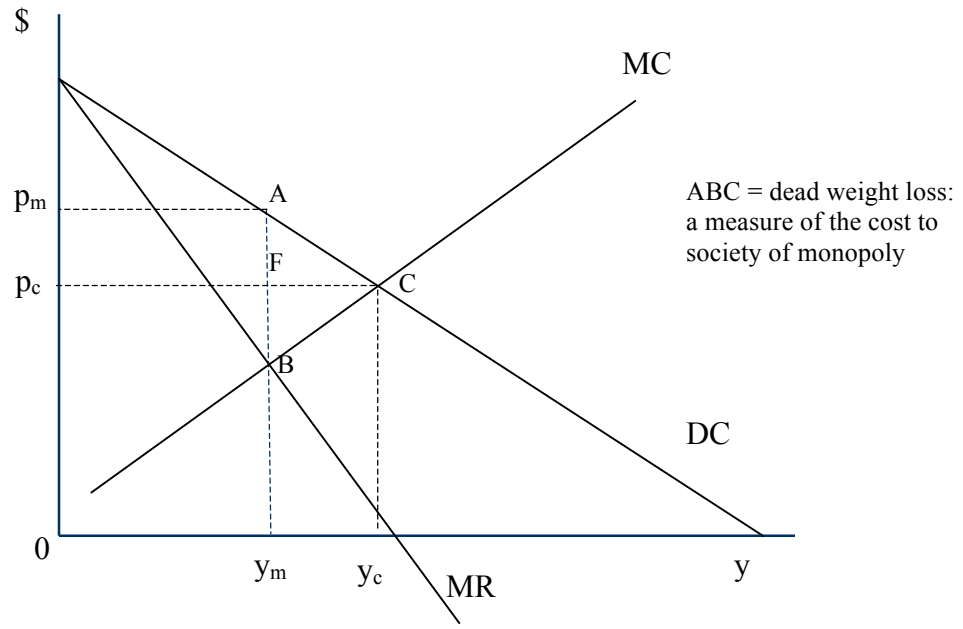
Figure 19.3



3. Losses Due to Monopoly

a. notion of dead weight loss

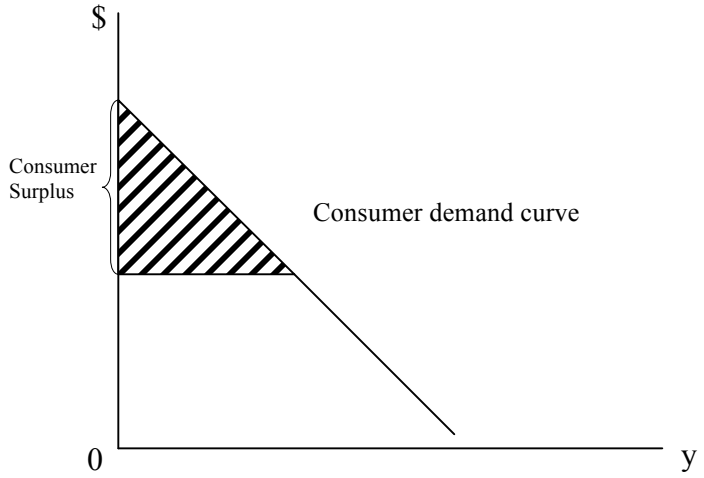
Figure 19.4



(1) ideas underlying dead weight loss – consumer surplus

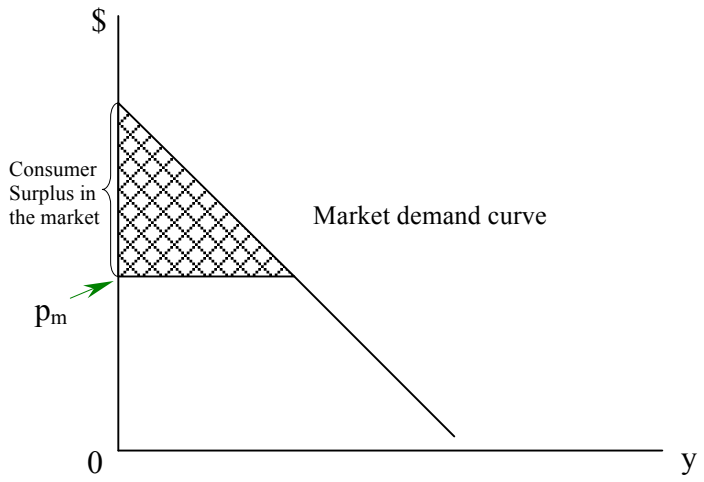
(a) consumer surplus defined – it is the difference between what the consumer would be willing to pay and what the consumer actually has to pay.

Figure 19.5



(b) it is assumed that the market demand curve has the same property, thus

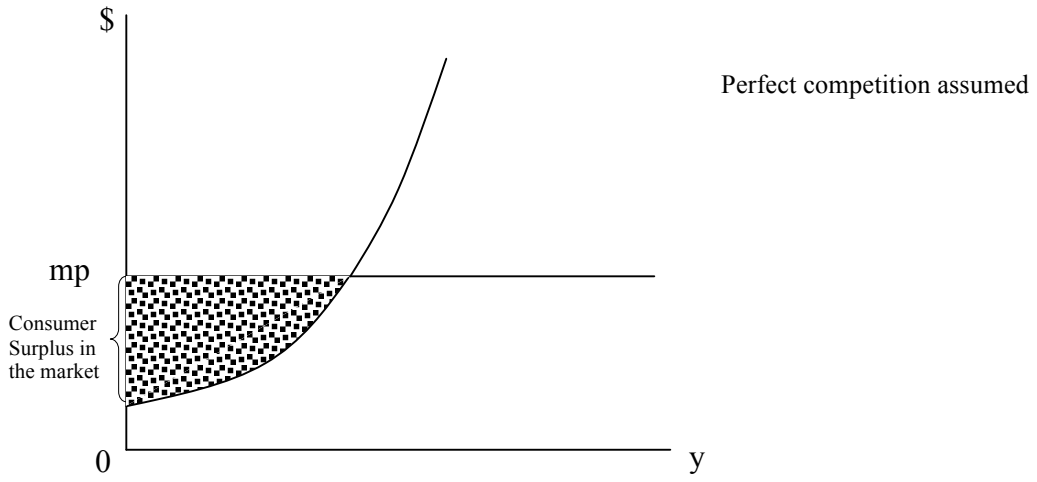
Figure 19.6



(2) ideas underlying dead weight loss – producer surplus

producer surplus defined – it is the difference between marginal costs and the price (once fixed costs are taken of)

Figure 19.7



(3) under perfect competition: consumer surplus = DCp_c

producer surplus = OCp_c

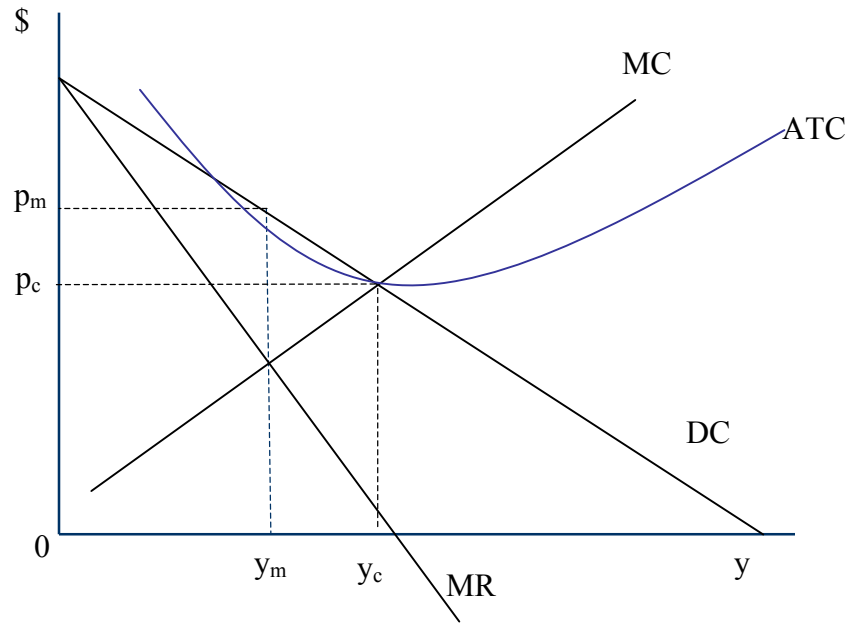
under monopoly: consumer surplus = DAp_m

producer surplus = $OBAp_m$

Thus under monopoly part of the consumer surplus is transferred to the monopolist - p_mAFp_c. However, also under monopoly we find that AFC amount of consumer surplus has disappeared; we also find that FBC amount of producer surplus has disappeared; thus ABC represents the dead weight loss to society.

b. Another way of looking at the loss via monopoly is through costs and excess capacity

Figure 19.8



(1) this long period analysis

(2) under monopoly $p_m > p_c$ and $y_m < y_c$, but also

(3) $ATC_m > ATC_c$

(4) now economists define min ATC as full capacity; however under monopoly $ATC_m >$ min ATC, thus the monopolist is carrying capacity beyond what it needs – this extra capacity is called excess capacity.

Appendix

In the Walrasian approach, price is the independent variable. Starting with the short period, let us first set up the profit maximizing equation in which the monopolist maximizes the difference between total revenue and total costs: max $\pi = p_y y - TC$. Since profit maximization takes place in equilibrium

we can substitute $y_{md}^{e} = f_m^*(p_y)$ for y and $TC^*(\mathbf{p}, p_y) = p_1x_1^p + \ldots + p_nx_n^F$ for total costs. Therefore we have the following:

$$\max \pi = p_y f_m^*(p_y) - TC^*(\mathbf{p}, p_y).$$

Taking the first order conditions we get

$$\partial\pi/\partial p_y = f_m^*(p_y) + p_y \partial f_m^*(p_y)/\partial p_y - \partial TC^*(\mathbf{p}, p_y)/\partial p_y = 0 \text{ or}$$

$$f_m^*(p_y) + p_y \partial f_m^*(p_y)/ \partial p_y = \partial TC^*(\mathbf{p}, p_y)/\partial y.$$

Solving the first order conditions the profit maximizing price and quantity can be derived. Now taking the second order conditions to see if we truly have a maximum, we get

$$\partial f_m^*(p_y)/\partial p_y + p_y \partial^2 f_m^*(p_y)/\partial p_y - \partial^2 TC(\mathbf{p}, p_y)/\partial p_y^2 < 0$$

since $\partial f_m^*(p_y)/\partial p_y < 0$, $\partial^2 f_m^*(p_y)/\partial p_y < 0$, and $-\partial^2 TC^*(\mathbf{p}, p_y)/\partial p_y^2 < 0$. Thus we have maximization. Turning to the long period, we have the profit maximizing function:

$$\max \pi = p_y f_m^*(p_y) - TC^*(\mathbf{p}, p_y) \text{ where } TC^*(\mathbf{p}, p_y) = p_1x_1^p + \ldots + p_nx_n^p.$$

Taking first order conditions, we get

$$\partial\pi/\partial p_y = f_m^*(p_y) + p_y \partial\, f_m^*(p_y)/\partial y - \partial TC^*(\mathbf{p}, p_y)/\partial p_y = 0 \text{ or}$$

$$f_m^*(p_y) + p_y \partial\, f_m^*(p_y)/\partial p_y = \partial TC^*(\mathbf{p}, p_y)/\partial p_y.$$

Solving the first order conditions the profit maximizing price and quantity can be derived. We know from above that the second order condition for a maximum is fulfilled

CHAPTER 20

IMPERFECT COMPETITION, THE FIRM, AND PRICES

Introduction

Once perfect competition and monopoly are left behind, we are left with the analysis of the firm with regard to prices, quantities, and other factors that affect them 'imperfectly' competitive situations. The hallmark of these situations are interdependent relationships. That is, in imperfectly competitive situations, firms have to take 'strategic' account of its competitors, buyers, and suppliers. The principle issues that emerge here are whether the 'equilibrium' outcomes are efficient and optimum with regard to competitive outcomes (which are based on methodological individuals); whether the main features of neoclassical economics, such as relative scarcity, prices as scarcity indexes, supply curves, maximizing utility, profits or something else, and methodological individualism, remain coherent. Although not a very popular area of research in the early part of the 20th Century it has grown in popularity since the 1960s, especially as the interest in general equilibrium declines in part because of its failure to produce the results it promised [more on this in Book VII]. What the rest of the chapters in this Book intend to do is to provide an historical overview of "competition among the few" to use William Fellner's (1965) delightful phrase leading up to the current popularity of game theory as applied to markets and an historical understanding of the process. And in the process of telling this story, the problematical nature of neoclassical theory in this context is revealed. Thus, this chapter deals with imperfect or monopolistic competition, while chapter 3 deals with oligopoly from joint-profit maximization and price leadership to behavioral and managerial theories of the firm, chapter 4 deals with market structure and performance, chapter 5 deals with game theory applied to oligopolistic markets, and chapter 6 deals with controversy and criticisms.

The body of theory known as imperfect competition or monopolistic competition originated in the works of Edward Chamberlin, Roy Harrod, and Joan Robinson. In the latter case, Harrod and Robinson (and Richard Kahn) drew on Sraffa's destructive criticism of Marshall's long period theory of prices to develop a new "logically consistent" long period of prices that would include both decreasing and increasing supply and market prices. In the former case, Chamberlin did not draw on Sraffa's critique for his work. Rather due to an early interest in the no-man's land between competition and monopoly, Chamberlin drew upon the Taussig-Pigou[5] controversy over railway rate differentials, literature on advertising, and other business literature to write his dissertation on "The Theory of Monopolistic Competition (1927)". In the dissertation, he introduced his famous large group analysis of long period prices which included both competition and monopoly elements; in addition, he attempted to retain some semblance of a supply curve in his analysis by calling the firm's average total cost curve its supply curve. By 1933 Chamberlin had refined his thesis to the point where it was published as *The Theory of Monopolistic Competition*. In the book, the notion of supply curve was dropped (except for the case of perfect competition); moreover he put forth his large group analysis of long period prices. Thus both Chamberlin and Robinson (and Harrod) simultaneously in 1933 introduced a novel long period theory of prices that occurred in the intermediate zone between competition and monopoly.[6] It should be noted, however, that neither Chamberlin nor Robinson spent much time on developing a short period theory of prices (although they did refer to the short period in their work). The formalization of the imperfectly competitive short period theory of prices came after 1933. The following discussion will be arranged as follows: first section deals with a historical survey of models of competition among a few firms that leads up to imperfect-monopolistic competition in the 1930s. This is flowed by sections on assumptions and the firm demand curve, on short period theory of prices, on long period theory of

[5] NEED REFERENCES--DISCUSSION

prices, on the existence of the supply curve, on the properties of the theory of prices; and on extensions of the theory to advertising, product differentiation, and product quality.

Historical Background: Early Models of Competition Among a Few Firms

The first explicit analysis of prices with respect to the firm in a market structure that has interdependent relationships among the firms was by Augustus Cournot in 1838. His analysis was then promptly forgotten until 1883 when it was criticized, and developed by the French mathematician J. Bertrand. Within the next 15 years the economic profession was presented with another analysis of prices from the viewpoint of the 'interdependent' firm by Francis. Y. Edgeworth in 1897.[7] To trace out this background to the firm under imperfectly competitive conditions in which interdependent relationships exist, I will first concentrate on the works of Cournot, Bertrand, and Edgeworth.

A. Cournot

Cournot begins his analysis of the firm and price determination with a discussion of demand. That is, he starts his analysis by stating demand and sales are synonymous and that sales have an inverse relationship with price: $p_y = f(y_s)$ and $\partial p_y/\partial y_s < 0$, where y_s is sales. In particular, he assumed that the price (p_y) is an average price for the year and the sales curve which is represented by the function $f(y_s)$ is also an average of all curves which would represent the function at different times of the year. Thus, the sales curve is essentially a statistical relationship,[8] which implies that the problem of interdependent behavior among firms in the neoclassical sense does not exist. That is since the sales curve for the market exists objectively and since firms are not assumed to have their own firm demand curve, the problem of firm interdependency as exhibited in the instability of their own demand curves does not

---

[6] (Differences between their respective theories will be dealt with below)
[7] Marshall did not deal with this kind of situation because of his use of the representative firm—MORE.
[8] Because the market sales curve is essentially an empirical relationship, it cannot be a neoclassical demand curve unless the problem of integrability is assumed away—see Book III, chapter 4.

exist.[9] With the sales curve fixed, Cournot begins his analysis of prices with a monopoly model. Assuming costs to be zero, he argued that all the firm had to do was to determine which quantity of output would maximize total revenue. This was accomplished by the monopolist bringing *y* amount of output to the market and charging a set of prices until it was all sold. This would be repeated with different amounts of output and corresponding prices until a price and quantity was found which maximized total revenue. When an aggregate average of all trials are obtained, the sales curve will have the shape of $p_y = f(y_s)$. Consequently, the price the monopolist finally settled on would be the same price and output that maximizes total revenue. This can be shown using the economics profits function:

π = total revenue – total costs = $p_y\, y_s - 0 = f(y_s)\, y_s$;

to maximize we differentiate and get $f(y_s) + y_s\, [\partial f(y_s)/\partial y_s]$ which is marginal revenue;

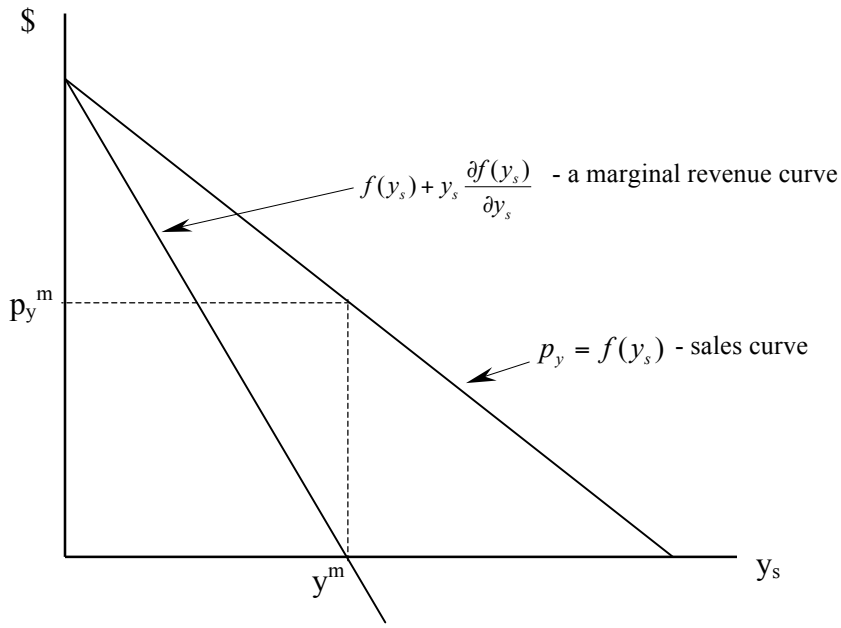
setting equal to zero we get $y_{sm}{}^{m} = \underline{f(y_s)}/\, [\partial f(y_s)/\partial y_s]$ which is the profit maximizing output for the monopolist; and

given $y_{sm}{}^{m}$, the profit maximizing price is derived by substituting it back into the sales function, that is $p_{ym}{}^{m} = f(y_{sm}{}^{m})$.

Graphically, the above results can be shown as follows:

[9] What this means is that the use of reaction curves to analyze Cournot is illegitimate since its *ex ante*

Figure 20.1



At this point Cournot begins to add firms, under the assumption that they would *not collude*, in order to see the effects on price and sales. He begins the argument by assuming two identical firms (or duopoly) with springs that supply water to the same market, which means the price charged by the two firms must be identical. If both firms charged the monopoly price and both had the same output then the total revenue would be the same for both firms. Now if firm A increased output and lowered its price slightly (with firm B being forced to match the price), firm A total revenue would increase as long as firm B cannot match output. This one-up-man-ship behavior continues until the two firms reach a lower price and larger volume of output that will not induce them to carry on this behavior any more. At this point the profit maximizing output for each firm (or the ith firm, i = A, B) would be $y_{si}^m = f(y_s)/[2\partial f(y_s)/\partial y_s]$ which is ½ of total market sales and the profit maximizing price would be $p_y^m =$

---

foundation does not exist—MORE ON THIS. NEED TO IMPROVE WORK ON COURNOT.

$f(2y_{si}^{m})$. Thus, with the emergence of duopoly or two-firm competition, the market price is lower and total sales greater, although the sales of each individual firm is less than the sales of the monopolist.[10]

To reach this conclusion, Cournot *assumed* that a time lag existed between when one firm made its move to increase its total revenue, and when the other firm could follow. This quest for temporary profit is the propelling engine in Cournot's model. He stated the assumption in the following manner:

> after asking why firm A in the duopoly situation did not accept the monopoly price and produce accordingly, he answers that since firm B having fixed its production at the point where the market price is p_{ym}^{m} and its sales is ½ y_{sm}^{m} which is one-half of the market sales, firm A has the freedom to fix its own production at a slightly higher rate (and a slightly lower price) and thus obtain a temporary benefit. To be sure, firm A will soon be punished for its action because it will force firm B to adopt a new scale of production which will react unfavorably on firm A itself.[11]

Cournot expanded his duopoly to n number of firms and arrived at the conclusion that as $n \rightarrow \infty$ the market price tends towards zero and the market sales of the individual firms would become infinitely small:

> given n firms the profit maximizing price will be $p_{yn}^{m} = f(ny_{sn}^{m})$
>
> profit maximizing output for each of the firms will be $y_{sn}^{m} = f(y_s)/[n\partial f(y_s)/\partial y_s]$.

Cournot augmented his analysis of prices with the introduction of costs. That is, each firm is now assumed to maximize the difference between total revenue and total costs – that is to maximize profits. Cournot quickly realized, however, that the introduction of costs did not change the essence of his analysis – that is the larger the number of firms, the lower the market price and the greater the market

---

[10] Work on this.

[11] Thus Cournot did not, as it is assumed by most economists, imbue his firms with the behavioral trait of assuming that the output of the rival firm was fixed; rather he imbued his firms with the trait of maximizing total revenue (profits) whenever possible and introduced the additional specification that firms can only respond to actions of competitors after a period of time.

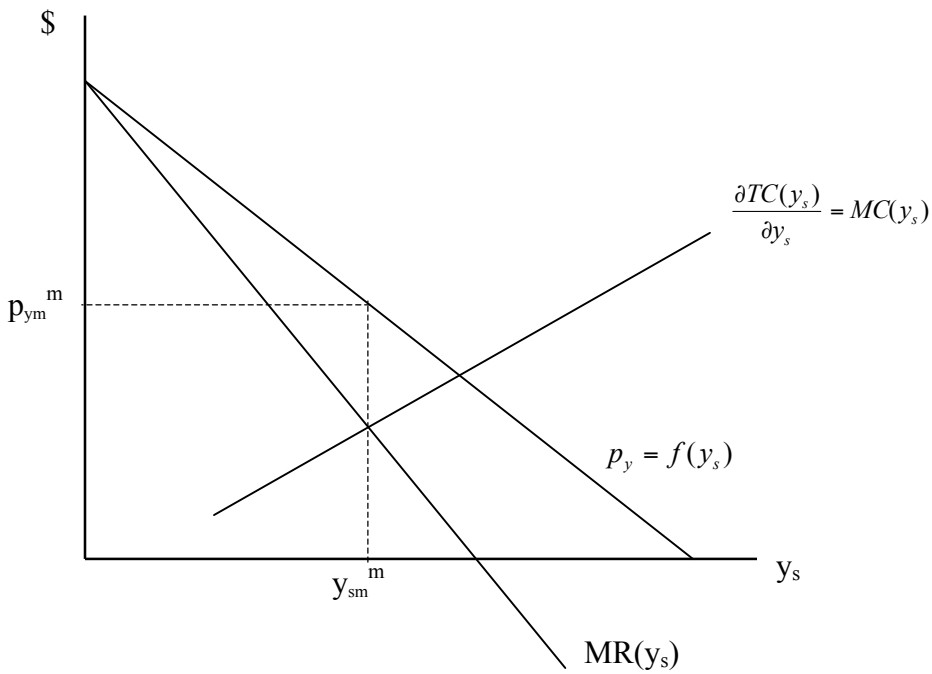
sales. In the case of monopoly, the profit-maximizing output is obtained by differentiating $p_y y_s$ – TC or $f(y_s)\ y_s$ – TC (y_s):

differentiating we get $f(y_s) + y_s[\partial f(y_s)/\partial y_s] - \partial TC(y_s)/\partial/y_s$;

setting equal to zero, we solve for y_{sm}^m by equating MR and MC; and

given y_s^m, the profit maximizing price can be derived: $p_{ym}^m = f(y_{sm}^m)$.

Figure 20.2



In the case when the number of firms is very large, the profit maximizing price and output for the firm is:

$p_{yn}^m = \partial TC(y_s)_{(n+h)}/\partial y_s$ or $p_{yn}^m = MC(y_s)_{(n+h)}$; and

$y_{s(n+h)}^m = 1/n[f^*(p_{yn}^m)]$ where f* is the inverse function of $f(y_{sm}^m)$.

With the introduction of costs, Cournot noted that under the conditions of unlimited (free) competition (that is when n is very large), if a single firm had a marginal cost curve that declined, it would not be

possible to prevent the conditions of monopoly from reasserting themselves again (although actual monopoly may not come into existence again). Marshall was concerned about this--MORE

J. Bertrand

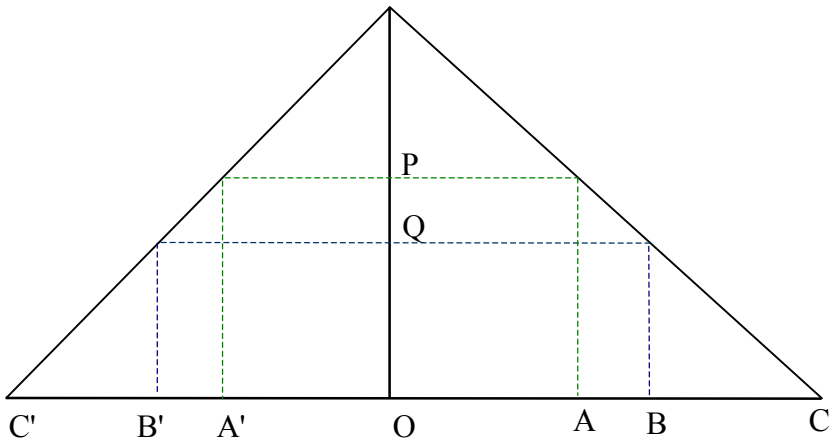
During the first 45 years of its life, Cournot's work received no attention. In 1883 it was reviewed in the Journal des Savants by the French mathematician Joseph Bertrand who objected to Cournot's output lag assumption. Rather, he felt that it would make more sense to assume that a price-lag existed. More specifically, Bertrand suggested that each duopolist assumes that the other will keep its price unchanged. He then pointed out that on this assumption, prices will actually be reduced to the zero-profit level. Each producer will undercut his rival by a very small margin because, on the assumption he makes about his rival, he will obtain maximum profits by undercutting.

F. Y. Edgeworth

The importance of Bertrand analysis is that it prompted Edgeworth to try his hand at analyzing prices in the context of the firm. He assumes in his duopoly model that each firm faces constant ATC up to full capacity and that each firm knows the other costs. Furthermore, the total capacity of the two firms is less than total market demand at a market price that equals ATC. Working with the following diagram, Edgeworth's model can be discussed in the following manner. Figure 3 shows the entire market divided evenly between the two sellers, RC and RC' are the two demand lines for their products, and OB and OB' the maximum possible output of each. OP is the price which would be set if they combined and OQ is the price which will dispose of the entire output BB'. Now producer I, dealing with half of the buyers, will set a price of OP, since this makes his profit a maximum. It will then be to the advantage of II, rather than to set the same price and sell the amount OA', to set a price slightly less than OP, secure a part of I's customers, and sell his entire output. Producer I, upon seeing his customers deserting him, will lower his price, and the process will continue until OQ is reached. As far as

Edgeworth has just reproduced Bertrand's argument; but Edgeworth went on to argue that such a price is not stable. He argued that "at this point it might seem that equilibrium would have been reached. Certainly it is not the interest of either duopolist to lower the price still further. But it is the interest of each to raise it. At the price OQ set by one of the duopolist he is able to serve N customers out of the total number 2N. The remaining N will be glad to be served at any price (short of OR). The other duopolist may therefore serve the remainder at the price most advantageous to himself, namely OP. He need not fear the competition of his rival, since that rival has already done his worst by putting his whole supply on the market. The best that the rival can now do in his own interest is to follow the example set him and raise his price to OP. And so we return to the position from which we started and are ready to begin a new cycle. The significance of Edgeworth's model was that the market price was indeterminate if conditions other than free competition or monopoly held; in fact his conclusion quickly became the standard of duopoly theory until 1930 when the modern theory of the firm began to emerge.

Figure 20.3



Further discussion on duopoly

Further discussion into the 1920s

Assumptions and the Firm Demand Curve

Under perfect competition, the individual firm faced a horizontal firm demand curve because it is too small with respect to the market that its own actions could not affect the market price and therefore had to take the market price as given. However, if firms are not perfectly competitive, then it is necessary to delineate the conditions that generate non-perfectly competitive firms and affect their prices. One way is to alter the assumptions of perfect competition so that the firm is relatively big compared to the market and hence to other firms in the market. Such a situation exists when there is one firm in the market as in the case of monopoly; another case exists when there are a few large firms in the market, such as in the case of oligopoly which is discussed in the following chapter. Another way to alter the market condition of perfect competition is for each firm to differentiate its good in the eyes of the consumer. That is, a firm could differentiate the good it produces from the goods produced by the other competing firms in the market by advertising or branding it. In either case, the identical good assumption of perfect competition is violated. This kind of market situation is called imperfect competition or monopolistic competition. More specifically, a market is said to operate under conditions of monopolistic competition if it satisfies five conditions, three of which are the same as under perfect competition: (i) many buyers, all of which are small and many sellers, all of which are small; (ii) perfect information; and (iii) freedom of entry and exit in the long period. The two other assumptions are (i) that each firm produces a unique product; and (ii) buyers are not identical from the perspective of the firm.

Firm Demand Curve

The salient feature of imperfect (monopolistic) competition is that the individual firm's demand curve slopes downward. Its basis lies in the economic forces and preference structure of consumers that break up the general market – such as spatial dispersion of firms and consumers, transportation costs,

large size firms which permit consumers to identify and thus become partial to its product, advertising, and product differentiation. As a result, each firm in the 'general 'market obtains a particular segment of it that is made up of consumers partial to its product, given the price it is changing.[12] In imperfect (monopolistic) competition, however, it is argued that differential prices in the 'general' market exist in the short and long period demand curve. But in trying to substantiate this theoretical claim, Harrod, Robinson, and Chamberlin encounter the problem of interdependency. First, in the long period, as well as the short period, firms can incur selling costs that affect their demand; thus each point on the marginal cost curve becomes associated with a particular level of demand. Hence not only is the firm demand curve not 'given' to the analysis, the firm's costs cannot be determined independently of demand – that is costs and demand are interdependent. Secondly, in a market that consists of many sub-markets each of which is identified by a very substitutable good, the "problem of the interaction of the price and output policy of rival producers and the dependence of each producer's equilibrium on his own anticipation of this interaction" (Kaldor, 1934, p.335) arises. Consequently, the construction of a firm demand curve either for the long or short period might not be possible. To deal with the first problem of interdependency, it is *assumed* that costs and demand are independent of each other. As for the second problem, three approaches are taken—one for the short period and two for the long period.

Short Period Firm Demand Curve

Because entry and exit into the firm's own 'sub-market' via product alteration and advertising cannot occur in the short period, each firm has its own monopoly sub-market. Moreover, in the short period, the prices of all other goods are given and entry and exit into and from the general market cannot occur. Thus the firm can vary its price alone to determine the quantity it wants to produce in order to

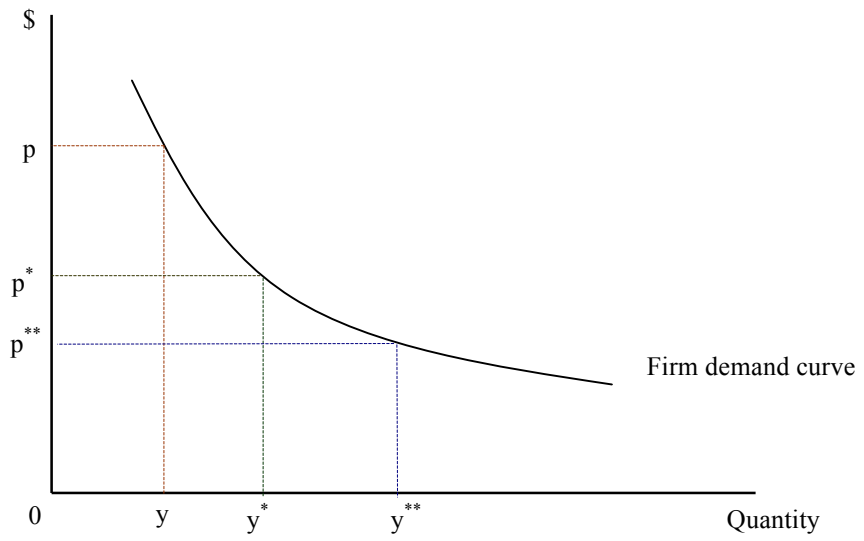
[12] In Marshall's world, the splitting up of the general market was due to goodwill and would not, in the long period, permit the existence of differential prices. As a result, Marshall implied that firms would not set differential prices in the short period. NEED REFERENCES

maximize its profits without having to worry what its competitors will do or whether new competitors will enter the general market. Given the above, we can now derive the firm's short period demand curve in the following manner:

> Let the initial price of the firm's good be p* and prices of all the other firms' goods in the general market be represented by p. Given p, the initial quantity demanded of the firm's good when its price is p* is y*. Now let us lower the price p* to p**; the response will be that the firm's quantity demanded will increase to y**. The reason that the firm's good has become relatively cheaper with respect to all the other goods in the market; thus some of the consumers who originally preferred the other firms' goods switched their allegiance to the firm's good. If we continue this process of lowering p*, the quantity demanded y* will become greater; conversely, if p* is increased above its initial position, with p given, then y* will decline. Thus, if we plot the price-quantity relation of p* and y*, we get the firm's short period demand curve: see Figure 1.[13]

[13] NEED REFERENCES FOR THIS

Figure 20.4



Thus we can conclude that the firm's short period demand curve slopes downward.

Interdependency and the Long Period Firm Demand Curve

The Joan Robinson approach to the interdependency problem in the long period was simply to ignore it and assume that the firm demand curve sloped downward:

> In an industry which is conducted in conditions of imperfect competition, a certain difficulty arises from the fact that the individual demand curve for the product of each of the firms composing it will depend to some extent upon the price policy of the others. Thus if one raises its price the demand curves for the others will be raised. This may cause them to raise their prices also, and the rise in their price will react upon the demand for the commodity of the first firm. In drawing up the demand curve for any one firm, however, it is possible to take this effect into account. The demand curve for the individual firm may be conceived to show the full effect upon the sales of that firm which results from any change in the price which it charges, whether it causes a change in the prices charged by the others or not. It is not our purpose to consider this question in detail. Once the demand curve for the firm has been drawn, the technique of analysis

can be brought into play, whatever the assumptions on which the demand curve was draw up. [Robinson 1938: 21]

Chamberlin developed a second approach to with the problem. It involved not drawing a firm demand curve per se. Rather two particular firm demand curves are constructed: one he denoted as the substitution demand curve or the dd curve which is based on the quality and prices of all other goods in the sub-markets being held constant and the second he denoted as the market share demand curve or the DD curve which is based on the quality being held constant but the prices are uniform in all markets—see Figure 5. It is through the interaction these two curves that Chamberlin developed a long period theory of prices.[14]

Short Period Theory of Prices

Because entry and exit from the market as whole cannot occur, and variations in good quality are prohibited, each firm has its own monopoly sub-market. Thus, each firm faces its own demand curve based either on Robinson's assumption or on Chamberlin's assumption that all other sub-market prices are give. Therefore, the short period theory of prices reduces to a 'monopoly' theory of price for the individual firm in each of the sub-market. The short period firm demand curve can be denoted in two ways:

Robinsonian demand curve – $y_i^e = f_i^r (p_{yi})$ or $p_{yi}^e = g^r (y_i)$ and $\partial y_i^e / \partial p_{yi} < 0$ or $\partial p_{yi}^e / \partial y_i < 0$; and

Chamberlian 'substitution' demand curve – $y_i^e = f_i (p_{y1}, \ldots, p_{yn}, M)$ or since $p_{y1}, \ldots,$ p_{yn} are given while p_{yi} can change, we can rewrite it as $y_i^e = f_i^c (p_{yi})$ or $p_{yi}^e = g_i^c (y_i)$ and $\partial y_i^e / \partial p_{yi} < 0$ or $\partial p_{yi}^e / \partial y_i < 0$

[14] The efficacy of the two approaches to overcome the problem of interdependency and, simultaneously, to provide a basis for a long and short period theory of prices has been questioned. It will be argued later that neither of these approaches can be used to develop a theory of prices.

Since both the Robinsonian and Chamberlinian short period firm demand curve have the same form, I will simplify the subsequent discussion by considering only the Chamberlinian demand curve.

Given the firm's demand curve, the firm chooses either price or quantity to maximize its profits. Keeping with the practices of the previous chapters, the Marshallian approach shall be used and the Walrasian approach delineated in the appendix to the chapter. Setting up the profit maximizing equation, we have max $\pi = g_i^c(y_i)y_i - TC^*(\mathbf{p}, y_i)$ where $TC^*(\mathbf{p}, y_i) = p_1x_1^e + \ldots + p_nx_n^F$. Taking the first order conditions we get:

$$\partial\pi/\partial y = g_i^c(y_i) + y_i\partial g_i^c(y_{i,})/\partial y_i - \partial TC^*(\mathbf{p}, y_i)/\partial y_i = 0 \text{ or}$$

$$g_i^c(y_i) + y_i\partial g_i^c(y_{i,})/\partial y_i = \partial TC^*(\mathbf{p}, y_i)/\partial y_i \text{ or}$$

$$MR = MC.$$

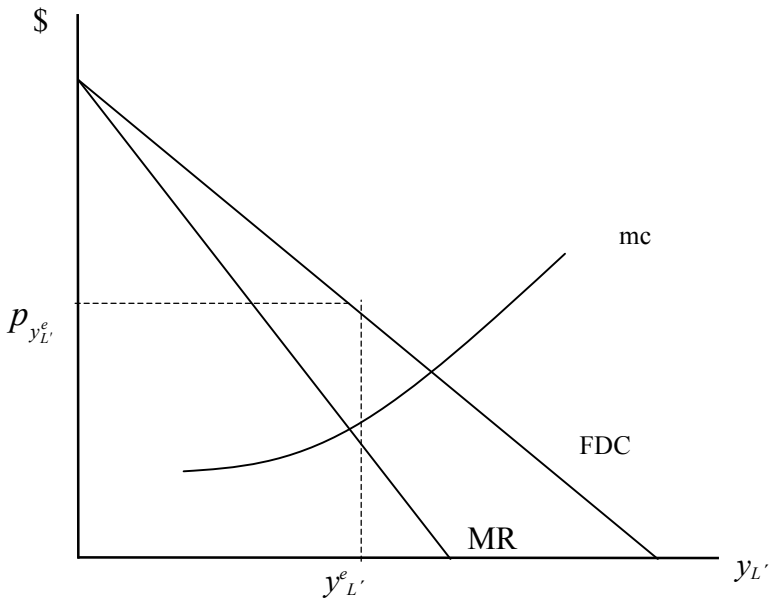
Taking the second order conditions we get

$$2\partial g_i^c(y_i)/\partial y_i + y_i\partial^2 g_i^c(y_{i,})/\partial y_i^2 - \partial^2 TC^*(\mathbf{p}, y_i)/\partial y_i < 0 \text{ or}$$

$$\partial MR/\partial y_i < \partial MC/\partial y_i \text{ so we have a maximum.}$$

Graphically we have

Figure 20.5



Using the above results from the Marshallian approach a relationship between the firm's demand price, marginal revenue, and the price elasticity of demand can be deduced. Defining total revenue as $TR = p_{yi}^e y_i = g_i^c(y_i)y_i$ then marginal revenue can be denoted as:

$MR = g_i^c(y_i) + y_i \partial g_i^c(y_{i,})/\partial y_i$ or with substitution

$= p_{yi} + y_I(\partial p_{yi}/\partial y_I)$ or

$= p_{yi}[1 + (y_i \partial p_{yi}/\partial y_i p_{yi})]$

$= p_{yi}(1 - 1/e_d)$ where e_d is the price elasticity of demand and is negative.

Since in equilibrium, MR = MC a relationship between p_{yi}^e, MC, and e_d can be restated as:

$p_{yi}^e = MC/(1 - 1/e_d) = MC[e_d/(e_d - 1)]$.

Let us now consider the effects of a shift in the firm's short period demand curve would have on y_i^e and p_{yi}^e. Working with $p_{yi} = MC/(1 - 1/e_d)$ where $\partial MC/\partial y_i > 0$, a rightward shift in demand would be associated with an increase in marginal costs. Working with the price elasticity of demand, the following possible price changes can occur:

if $y_{i2}^e > y_{i1}^e$ hence $MC_2 > MC_1$, then $p_{yi2}^e > p_{yi1}^e$ if $MC_2/MC_1 > (1-1/e_{d2})/(1-1/e_{d1})$;

if $y_{i2}^e > y_{i1}^e$ hence $MC_2 > MC_1$, then $p_{yi2}^e < p_{yi1}^e$ if $MC_2/MC_1 < (1-1/e_{d2})/(1-1/e_{d1})$; or

if $y_{i2}^e > y_{i1}^e$ hence $MC_2 > MC_1$, then $p_{yi2}^e = p_{yi1}^e$ if $MC_2/MC_1 = (1-1/e_{d2})/(1-1/e_{d1})$.

Thus a positive shift in demand can result in price *increases*, *decreases*, or *stability* even if the marginal costs curve is increasing. In addition, a decrease in demand can be associated with price stability or price increases, contrary to perfect competition. This contradicts the conclusions of Marshall's free competition and of perfect competition.[15]

Long Period Theory of Prices

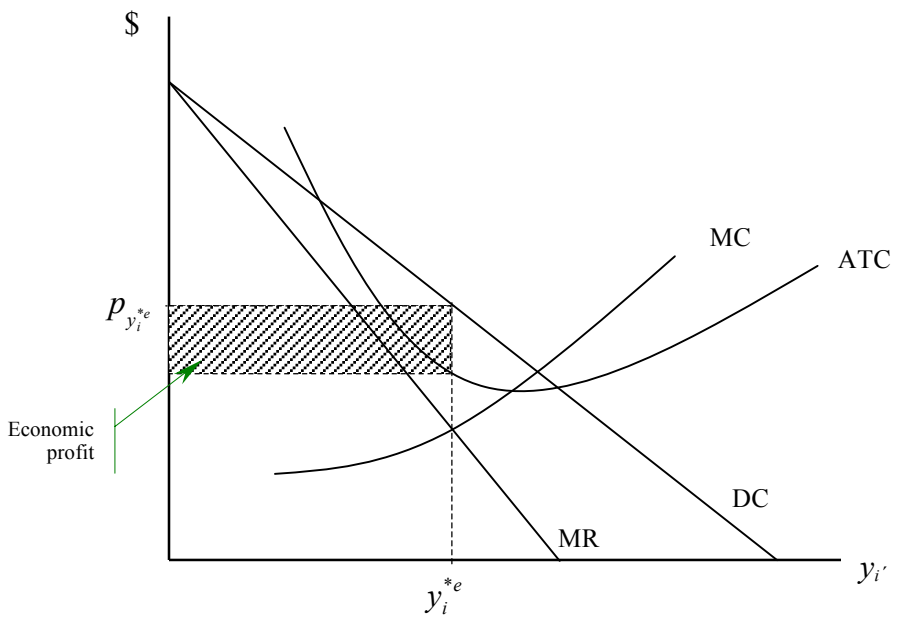
In the long period, a firm is faced with the problem of economic profits and the entry and exit of firms into the market as whole (as opposed to its particular sub-market). That is, in the long period, the firm will arrive at its equilibrium price and quantity by equating marginal costs with marginal revenue. However, if the equilibrium position generates economic profit for the firm, entry will occur in the market at large thus shifting the firm's long period demand curve until economic profits cease to exist when average total costs equals price. Thus the firm's long period equilibrium and the long period theory of prices is tied up in the manner in which overall market equilibrium is achieved. It can be depicted in the following two ways: The Robinsonian and Chamberlinian approaches.

Robinsonian Approach

Working with Robinson's long period demand curve, a firm will achieve equilibrium by equating marginal revenue with marginal costs:

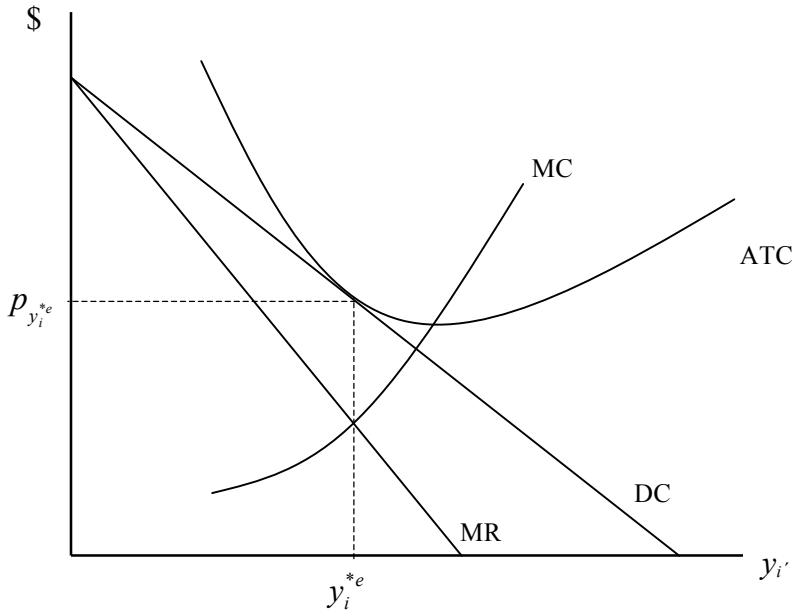
[15] These results are also the same for monopoly.

Figure 20.6



However if economic profits occur, then the firm will not actually produce there or be in equilibrium because of the entry of firms into the general market will shift its demand curve to the left. Market hence firm equilibrium will occur when zero economic occurs for each firm in the market:

Figure 20.7



Since p_{yi}^e equals ATC at y_i^e, the firm is making zero economic profits. If all firms in the general market are in such a position, then the general market is in long period equilibrium and p_{yi}^e and y_i^e are the firm's long period equilibrium price and output. The actual process to the market equilibrium is left unstated, but Robinson assumes that all firms are the same—like the representative firm—needs more work.

Chamberlinian Approach

The second approach was developed by Chamberlin (and A.C. Pigou [need reference]) and involved the manipulation of the two different firm demand curves mentioned above: the Chamberlinian substitution demand curve $y_i^e = f_i^c(p_{yi})$ and the market share demand curve can be written as $y_i^e = (1/n)F(p_y)$ where n is the number of firms in the general market. The substitution demand curve represents the quantity demanded of y_i^e when only its price is varied, while $F(p_y)$ represents the general market demand for the 'good' when all firms in the general market charged the same price, and $y_i^e = (1/n)F(p_y)$ represents the firm's demand curve when all firms charge the same price. To simplify the discussion, let us first stipulate the conditions under which the isolated individual firm is in long period

equilibrium. Working with the substitution demand curve, the firm's equilibrium position can derived in the following manner:

$$\max\pi = p_{yi} f_i(p_{yi}) - TC(p_{yi})$$

$$\partial\pi/\partial p_{yi} = f_i^c(y_i) + p_{yi}\partial f_i(p_{yi})/\partial y_i - \partial TC(p_{yi})/\partial p_{yi} = 0 \text{ or}$$

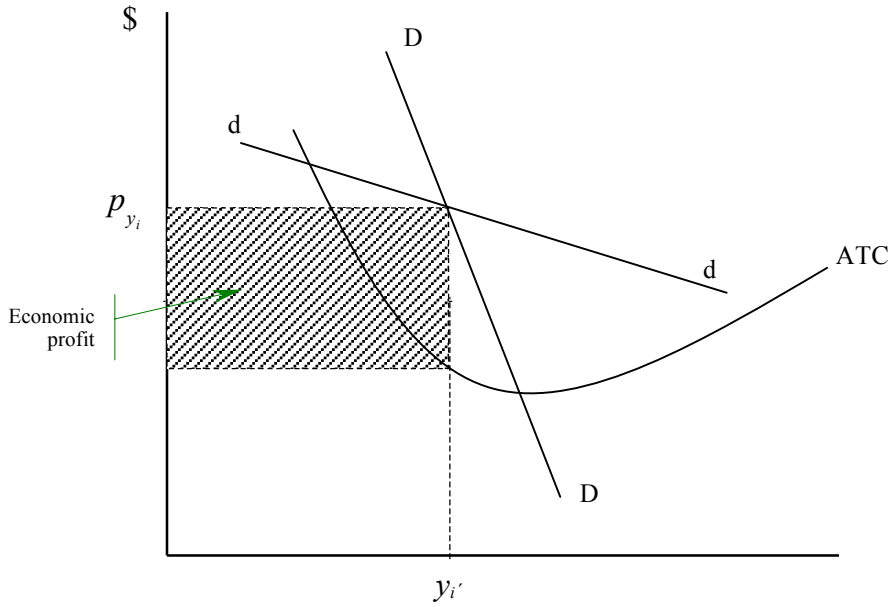
$$MR(p_{yi}) = MC(p_{yi})$$

In this equilibrium position $p_{yi}^e - ATC \geq 0$ that is economic profits can exist—see Figure 3.

The above analysis shows that in the long period the 'isolated' monopolist can be in equilibrium and still be getting positive economic profits. However in imperfect (monopolistic) competition, the isolated monopolist is not acceptable in the long period; rather given the freedom of exit and entry into the general market seeking the positive economic profits, the isolated monopolist equilibrium position can not be sustained. To handle this problem of interdependency of firms in the general market, Chamberlin assumed that the demand and cost curves for all the firms (products) are uniform throughout the general market.[16] Therefore, the equilibrium position of the individual firm in the general market (hence the equilibrium position of all firms in the general market) can be analyzed in terms of the two demand curves described above. Assume a firm in a position depicted in the Figure 5 below; not only would it be making economic profit, all the firms in the market would be making it. However, because

[16] This is Chamberlin's famous heroic assumption, Chamberlin (1962: 82). This is simply a representative firm assumption—more work needed here.

Figure 20.8

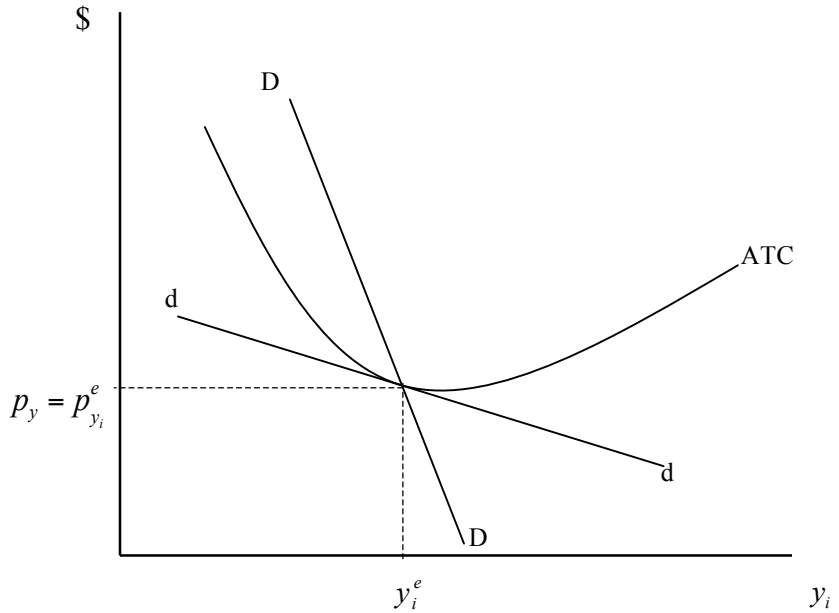


dd - $y_i^e = f_i^c\ (p_{yi})$ – the substitution demand curve.

DD - $y_i^e = 1/n\ F(p_y)$ – the market share demand curve.

dd is extremely "elastic", the firm could lower its price, providing that no one else followed, and increase its economic profits. But if one firm does it then all firms do, with the result that dd 'slides' down DD until it becomes tangent to ATC, since any further action is discouraged by expected losses. If DD is to the right of the tangent position, the firm(s) will be making economic losses and to the left economic losses. Consequently exit will occur from the general market, shifting DD in the appropriate direction until it intersects the tangency position, thus eliminating economic profits. Hence the market and the firm will be in long period equilibrium and at that position the firm will be equating MC to MR:

Figure 20.9



To show this in a more rigorous manner, in long period equilibrium quantity demanded equals quantity supplied, or $(1/n)F(p_y) = y_i^s(p_y)$ where $(1/n)F(p_y)$ is quantity demanded and y_i^s is quantity supplied. In addition dd is tangent to ATC or $\partial f_i^c(p_{yi})/\partial p_{yi} = \partial ATC/\partial p_{yi} = \partial[TC/y_i]/\partial p_{yi}$. Thus with two equations and two unknowns – price (p_{yi}) and quantity (y_i), a determinant solution can be found.

<u>Shift in Demand</u>

Now let us consider a shift in demand to see what effects it has on the firm's price. Working with Robinson, we find the following discussion:

> Now, starting from a position in which the industry is in equilibrium, suppose that the total demand for the commodity is increased. The individual demand curves will then be raised, and since all firms are assumed to be always alike in respect of conditions of demand, all the demand curves will be raised in the same way. The output of each firm will then increase. The price of the commodity may rise, fall or remain constant, but in any case the firms will receive a surplus profit in excess of the normal profit which is included in average cost. New firms will

> now be attracted into the industry, and, in the conditions postulated, these new firms will have the same costs as the old. The total output of the commodity will be further increased, and the competition of the new firms will lower the individual demand curves of the old firms. A new position of long-period equilibrium will be tangential to the average cost curves.
>
> In the new position, will the price of the commodity be greater or less than before? Clearly the answer depends upon the manner in which the demand curves move as they fall back towards an equilibrium position. If the individual demand curve does not alter its slope it will fall back to exactly the same position as before. The output of each firm will be the same in the new position as in the old, and the increase in the number of firms will be in proportion to the increase in the total output. Since the output of the individual firm is unchanged, its average cost and the price of the commodity will be unchanged. If the individual demand curve is less elastic in the new situation it will reach equilibrium with its point of contact with the average cost curve to the left of its old position. The output of each firm in the new situation will be smaller than in the old situation. The increase in the number of firms will therefore be more than in proportion to the increase in output. Since the output of the individual firm has decreased, its average costs will be raised, and the price of the commodity will be raised.
>
> Conversely, if the individual demand curve is more elastic in the new situation the price of the commodity will be lowered….From this analysis we can obtain the answer that, in the conditions postulated, an increase in the total demand for the commodity may either raise or lower its price, or leave it unchanged. [Robinson, 1938, pp. 98-100]

To put Robinson's argument in a clearer light, let us consider the following situations. Assuming decreasing returns to scale as represented by a upward sloping marginal cost curve that is equal to or above average total costs, as in short period equilibrium, the relationship between the firm's market

price and its marginal costs can be represented as $p_{yi} = MC/(1 - 1/e_d)$. Therefore, working with the price elasticity of demand, the following possible price changes can occur:

if $y_{i2}^e > y_{i1}^e$ hence $MC_2 > MC_1$, then $p_{yi2}^e > p_{yi1}^e$ if $MC_2/MC_1 > (1-1/e_{d2})/(1-1/e_{d1})$;

if $y_{i2}^e > y_{i1}^e$ hence $MC_2 > MC_1$, then $p_{yi2}^e < p_{yi1}^e$ if $MC_2/MC_1 < (1-1/e_{d2})/(1-1/e_{d1})$; or

if $y_{i2}^e > y_{i1}^e$ hence $MC_2 > MC_1$, then $p_{yi2}^e = p_{yi1}^e$ if $MC_2/MC_1 = (1-1/e_{d2})/(1-1/e_{d1})$.

Thus a positive shift in demand can result in price <u>increases</u>, <u>decreases</u>, or <u>stability</u> even if the marginal costs curve is increasing. Using the same set of arguments, it can also be shown that constant returns to scale (as represented by a horizontal marginal cost curve) and increasing returns to scale (as represented by a marginal cost curve less than average total costs) can be associated with increasing, decreasing or stable prices with a rightward shift in demand.[17]

The implication of Robinson's analysis is that an increase in demand for the general market and the individual firm cannot be assumed to result in increased prices (as in the case of perfect competition) or decreased price (as in the case of Marshall) with the shape of the firm's long period marginal cost curve not withstanding. Thus the above analysis of the long period price under imperfect (monopolistic) competitive conditions indicates quite clearly that Robinson did produce a long period theory of prices that could replace Marshall's ill-fated attempt; that Chamberlin did produce a theory of prices that fell between competition and monopoly; and that the long period imperfectly competitive theory of prices is quite different from the long period perfectly competitive theory of prices.

Existence of the Supply Curve

As noted before, the firm's supply curve is solely a function of the market price, or in this case, of p_{yi}. However since p_{yi}^e is a function of the price elasticity of demand (e_d), the quantity supplied is also a partial function of e_d. Thus, supply is not completely independent of demand. True, given e_d a quasi

[17] This is the same for monopoly.

supply schedule can be generated.[18] For any given p_{yi}, however, e_d is *a priori* indeterminate; thus the supply function is non existent, *ex ante.* Under perfect competition, in contrast, e_d is *a priori* determinate, and the firm's supply curve may be derived with a knowledge of p_{yi} alone. Marginal revenue, therefore, makes it clear that, given an imperfect market, it is impossible to determine the firm's output (or supply) on the basis of price alone. The above argument can be shown in terms of the following examples. First, the same level of output can be produced at two different prices – $MC_2 = MC_1$ and $p_{yi2}^e > p_{yi1}^e$ if $(1-1/e_{d2})/(1-1/e_{d1}) < 1$. Secondly, the same price can be associated with two different levels of output (or quantity supplied) – if $MC_2 > MC_1$ and $p_{y1}^e = p_{y2}^e$ if $MC_2/MC_1 = (1-1/e_{d2})/(1-1/e_{d1})$. Thus, with the supply curve being indeterminate or nonexistent ex ante, p_{yi}^e and y_i are then not uniquely regulated by the law of supply and demand – which presupposes complete independence of the two functions. Hence outside of perfect competition whether in the short or long period the supply and demand theoretic approach and the price mechanism does not allocate resources and the prices of those resources and goods in general are not scarcity indexes. [more]

Properties of the Imperfectly Competitive Theory of Prices

Up to this point, the imperfectly competitive theory of prices has only been described; now it is necessary to see what properties it has or does not have. First, because the firm's market price can move in the opposite direction as marginal costs with respect to a positive shift in demand, it can not be seen as an index of scarcity. Secondly, in Marshall and in perfect competition, there is a unique relationship between price, cost, and output as represented by the supply curve. But with the advent of imperfect competition, the concept of the supply curve is swept away since output now depends on the price elasticity of demand as well as the demand price. However, this does not mean that the price – cost – output relationship is abandoned; rather it is maintained but in a rather peculiar manner. Given the

[18] It should be noted that since $e_d < \infty$, the marginal cost curve is not the supply curve since MC = MR <

technology of the firm, there exists a specific relationship between the different levels of output the firm could produce and the marginal costs of producing them. But the level of output the firm will actually produce will be determined by equation marginal costs to marginal revenue. Simultaneously, the firm's 'market' price will emerge at which all the output produced will be sold. Thus, for a given technology and 'preference structure', there will exist a specific relationship between output, costs and the firm's market price.

Thirdly, because the firm's market price will enable all the output to be sold, it can be seen as a 'market' clearing price and the 'market' can be seen as one that can be cleared. Hence the notions of market clearing and markets that clear that are in Marshall and perfect competition can also be found in imperfect competition.[19] Finally, in Marshall and perfect competition, the equilibrium market price is unique in that, given supply and demand, there will exist only once market clearing price for the output produced. If either of the givens change, a conceptually and nominally new market clearing price will come to exit. In imperfect competition, only the former property will hold. This can be seen in terms of following equation: $p_{yi} = MC/(1 - 1/e_d)$. If either MC or e_d changes because of a change in technology or in demand, then the firm's market price would conceptually alter, even though, as noted above, it could remain nominally unchanged.

Topics

<u>Advertising</u>

Theorem 1: a firm which can influence the demand for its product by advertising budget from a one dollar increase in advertising is equal to the price elasticity of demand for the firm's product. By

---

p_y.

[19] Need to talk about price stability and movement to equilibrium—Marshall felt it was in the economy, whereas in imperfect competition it is a property of the model and not of the real world. [more]

advertising, it is meant any expenditure which influences the shape or position of the firm's demand curve and which enters the firm's cost function as a 'quasi' fixed costs.

Theorem 2: if the price which a firm can charge is predetermined and if the firm can influence its demand curve by advertising, it will, in order to maximize its profits, choose that advertising budget and the resulting level of sales such that $MC = p(1 - 1/\mu)$ where μ is the marginal value product of advertising.

To prove these theorems, let us consider a imperfectly (monopolistically) competitive firm in the short period. The firm's demand function can be written as $y_i^e = f_i(p_{yi}, A)$ and its total cost function can be written as $TC = TC(p_{yi}) + A$ where A is the firm's advertising budget and a fixed cost. Dealing with the first theorem, let us first regard the quantity of output as fixed and specify the optimal price – advertising constellation for selling that predetermined quantity. The advantage of this is that cost considerations, other than the cost of advertising, do not enter into the analysis. Suppose p_{yi} changed by dp_{yi} and A changed by dA then the change in the total level of sales will be

$$dy_i^e = [\partial f_i(p_{yi}, A)/\partial p_{yi}]dp_{yi} + [\partial f_i(p_{yi}, A)/\partial A]dA$$

Since $dy_i^e = 0$, then

$$dp_{yi} = -[\partial f_i(p_{yi}, A)/\partial A]/[\partial f_i(p_{yi}, A)/\partial p_{yi}]dA$$

The result of these variations is to change gross revenue by the amount $y_i^e dp_{yi}$, change advertising expenditure by dA, and leave the volume of sales and $TC(p_{yi})$ unchanged. The 'net effect' on profit is:

$$y_i^e dp_{yi} = -[y_i^e[(\partial f_i(p_{yi}, A)/\partial A)/(\partial f_i(p_{yi}, A)/\partial p_{yi})] + 1]dA$$

This provides us the necessary condition for profit maximization at any level of output. Now working with the above we can make the following statements:

if $A > 0$ and $dA > 0$, then $[y_i^e(\partial f_i/\partial A)/(\partial f_i/\partial p_{yi})] + 1] = 0$, and

if $A = 0$ and $dA = 0$, then $y_i^e(\partial f_i/\partial A)/(\partial f_i/\partial p_{yi})] + 1] \geq 0$.

To make these statements in a different manner consider the following:

$\max\pi = p_{yi}y_i^e - C$ so totally differentiating we have (assuming y_i^e is fixed)

$d\pi = d\, p_{yi}y_i^e - dA = 0$

thus from (iii) above $[y_i^e(\partial f_i/\partial A)/ (\partial f_i/\partial p_{yi})] + 1]dA = 0$

meaning if $dA = 0$ the $[\ ] \geq 0$ or if dA and $A>0$ then $[\ ]=0$.

(i) defining price elasticity of demand as $e_d= -p_{yi}\partial f_i/ y_i^e\partial p_{yi}$ and the marginal value product of advertising as $\mu = p_{yi}\partial f_i/\partial A$ – which is simply the rate of increase of total revenue as advertising expenditures, price remaining constant. Substituting into [ ], we get $[-y_i^e(\mu/p_{yi})/(y_i^e/p_{yi})e_d]+1 = 0$ if $A > 0$

≥ 0 if $A = 0$

simplifying we get: $\mu = e_d$ if $A > 0$ or $\mu \leq 0$ if $A = 0$

This result proves theorem I above.

(ii) if a firm's position can be improved without changing its sales volume then, <u>a fortiori</u>, it can be improved if the possibility of changing sales volume is open to it. Therefore a condition which must be met if profit is to be maximized while holding volume constant must also be met if volume is permitted to change. So is $\mu < e_d$ then $A = 0$ and if $\mu = e_d$ then $A > 0$, assuming that μ crossed e_d from above.

(iii) However, it should be noted that the effect of increased A on e_d may work in either direction, leaving dy_i^e and p_{yi}^e with unknown signs. This will be discussed again below.

(a) dealing with the second theorem we have the following:

$\max\pi = p_{yi}{}^e y_i^e - C^*((y_i) - A(y_i))$

$\partial\pi/\partial y_i = p_{yi}^e - \partial C^*(y_i)/\partial y_i - \partial A(y_i)/\partial y_i = 0$ or

$\partial A(y_i)/\partial y_i = p_{yi}^e - MC$

since $\mu = p_{yi}\ \partial y_i / \partial A(y_i)$ the equilibrium condition can be rewritten as $p_{yi}/\mu = p_{yi}$ - MC or MC $= p_{yi}(1-1/\mu)$

Thus profits are maximized when the marginal revenue product of advertising equals the reciprocal of the mark- up on the marginal unit produced.

(1) <u>Let us now take a more comprehensive analysis of advertising</u>

(a) let us assume a single – product profit maximizing firm with demand and cost functions:

$p_{yi}^{e}=g_i(y_I, a)$ $C=C^*(y_i) +p_a a$

where p_a is the price of a unit of advertising; a is the quantity of advertising.

(b) $\underline{\max\pi=g_i(y_i, a) -C^*(y_i)-p_a a}$

(i) first order conditions

$\partial\pi/\partial y_i=g_i(y_i, a)+y_i\partial g_i(y_i, a)/\partial y_i -\partial C^*(y_i)/\partial y_i =0$

$\partial\pi/\partial a=y_i\partial g_i(y_i, a)/\partial a -p_a=0$

(ii) second order conditions

$\partial^2\pi/\partial y_i^2= 2\partial g_i(y_i, a)/\partial y_i^2+y_i\partial^2 g_i(y_i, a)/\partial y_i^2 -\partial^2 C^*(y_i)/\partial y_i^2$

$\partial^2\pi/\partial y_i\partial a = \partial g_i(y_i, a)/\partial a+y_i\partial^2 g_i(y_i, a)/\partial y_i\partial a$

$\partial^2\pi/\partial a\partial y_i= \partial g_i(y_i, a)/\partial a+y_i\partial^2 g_i(y_i, a)/\partial y_i\partial a$

$\partial^2\pi/\partial a^2= y_i\partial^2 g_i(y_i, a)/\partial a^2$

forming our Hessions

$$\left| \partial^2\pi/\partial y_i^2 \right| < 0 \quad \begin{vmatrix} \partial^2\pi/\partial y_i^2 & \partial^2\pi/\partial y_i\partial a \\ \partial^2\pi/\partial a\partial y_i & \partial^2\pi/\partial a^2 \end{vmatrix} > 0$$

if we are to have a maximum.

(iii) Let us look at $\partial g_i(y_i, a)/\partial y_i$ – its sign is negative.

(This can be seen by rearranging the first order conditions) Thus given a, increase in demand will increase total revenue. Now looking at $\partial g_i(y_i, a)/\partial a$ – its sign is positive. Thus given y_i, increase in a will increase prodits. Thus output and advertising may be treated as substitutable factors of revenue, and for any given outlay, which may be devoted to advertising and output in different combinations, there will be a revenue maximising combination.

(iv) solving the first order conditions for y_i, we get $y_I^*=z_i(p_a)$; solving for a, we get $a^*=z_a(p_a)$. Now substituting and differentiating with respect to p_a we get:

$$\partial g_i(y_i^*, a^*)/\partial y_i \; \partial y_i^*/\partial p_a + \partial y_i^*/\partial p_a \, \partial g_i(y_i^*, a^*)/\partial y_i + y_i^* \partial^2 g_i(y_i^*, a^*)/\partial y_i^2$$

$$\partial y_i^*/\partial p_a - \partial^2 C^*(y_i^*)/\partial y_i \, \partial y_i^*/\partial p_a + \partial g_i(y_i^*, a^*)/\partial a \; \partial a^*/\partial p_a + y_i^* \partial^2 g_i(y_i^*,$$

$$a^*)/\partial y_i \partial a \; \partial a^*/\partial p_a \equiv 0$$

$$\partial y_i^*/\partial p_a \, \partial g_i(y_i^*, a^*)/\partial a + + y_i^* \partial^2 g_i(y_i^*, a^*)/\partial a \partial y_i \; \partial y_i^*/\partial p_a + y_i^* \partial^2 g_i(y_i^*,$$

$$a^*)/\partial a^2 \; \partial a^*/\partial p_a - 1 \equiv 0$$

rearranging and substituting from (ii) above we get

$$\partial^2\pi/\partial y_i^2 \; \partial y_i^*/\partial p_a + \partial^2\pi/\partial y_i \partial a \; \partial a^*/\partial p_a \equiv 0$$

$$\partial^2\pi/\partial a \partial y_i \; \partial y_i^*/\partial p_a + \partial^2\pi/\partial a^2 \; \partial a^*/\partial p_a \equiv 1$$

putting in matrix form, we get

$$\begin{bmatrix} \partial^2\pi/\partial y_i^2 & \partial^2\pi/\partial y_i \partial a \\ \partial^2\pi/\partial a \partial y_i & \partial^2\pi/\partial a^2 \end{bmatrix} \begin{bmatrix} \partial y_i^*/\partial p_a \\ \partial a^*/\partial p_a \end{bmatrix} \equiv \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

using Cramer's rule we get

$\partial y_i^*/\partial p_a = -\partial^2\pi/\partial y_i \partial a \, /D >\leq 0$ i.e. if the price of advertising increase the change in output can be positive, negative or zero.

$\partial a^*/\partial p_a = \partial^2\pi/\partial y_i^2 \, /D < 0$ i.e. if p_a increases the quantity of

advertising decreases.

(c) Let us now extend the analysis by introducing a specific tax rate t, thus adding the term ty_i to costs. So se have $\max\pi = g_i(y_i, a) - C^*(y_i) - p_a a - ty_i$

(i) first order conditions

$\partial\pi/\partial y_i = g_i(y_i, a) + y_i \partial g_i(y_i, a)/\partial y_i - \partial C^*(y_i)/\partial y_i - t = 0$

$\partial\pi/\partial a = y_i \partial g_i(y_i, a)/\partial a - p_a = 0$

(ii) second order conditions

same as in (bii) above

(iii) solving the first order conditions for y_i and a, we get $y_i^* = z_i(p_a, t)$ and $a^* = z_a(p_a, t)$. Substituting back into the first order conditions and differentiating with respect to t, we get:

$$\partial g_i(y_i^*, a^*)/\partial y_i \; \partial y_i^*/\partial t + \partial g_i(y_i^*, a^*)/\partial a \; \partial a^*/\partial t + y_i^*/\partial t \; \partial g_i(y_i^*, a^*)/\partial y_I +$$

$$y_i^* \partial^2 g_i(y_i^*, a)/\partial y_i^2 \; \partial y_i^*/\partial t + y_i^* \partial^2 g_i(y_i^*, a^*)/\partial y_i \partial a \; \partial a^*/\partial t -$$

$$\partial^2 C^*(y_i^*)/\partial y_i^2 \; \partial y_i^*/\partial t - 1 \equiv 0$$

$$\partial y_i^*/\partial t \; \partial g_i(y_i^*, a^*)/\partial a + y_i^* \partial^2 g_i(y_i^*, a^*)/\partial y_i^2 \; \partial y^*/\partial t + y_i^* \partial^2 g_i(y_i^*, a^*)/\partial y_i \partial a \; \partial a^*/\partial t \equiv 0$$

(iv) rearranging and substituting from (bii) above we get

$\partial^2\pi/\partial y_i^2 \; \partial y_i^*/\partial t + \partial^2\pi/\partial y_i \partial a \; \partial a^*/\partial t \equiv 1$

$\partial^2\pi/\partial a \partial y_i \; \partial y_i^*/\partial t + \partial^2\pi/\partial a^2 \; \partial a^*/\partial t \equiv 0$

putting in matrix form, we get

$$\begin{bmatrix} \partial^2\pi/\partial y_i^2 & \partial^2\pi/\partial y_i \partial a \\ \partial^2\pi/\partial a \partial y_i & \partial^2\pi/\partial a^2 \end{bmatrix} \begin{bmatrix} \partial y_i^*/\partial t \\ \partial a^*/\partial t \end{bmatrix} \equiv \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

using Cramer's rule, we get

$\partial y_i^*/\partial t = \partial^2\pi/\partial a^2 / D < 0$ assuming diminishing marginal product of

advertising

$\partial a^*/\partial t = - \partial^2\pi/\partial a \partial y_i /D <\geq 0$

(d) it should be noticed that $\partial^2 y_i^*/\partial p_a$ and $\partial a/\partial t$ have indeterminant signs because it is impossible a priori to assign a sign to the cross partial $\partial^2 g_i(y_i, a)/\partial y_i \partial a$.

(e) following the point raised above a bit further, let us consider the signs of dp_{yi}^e/dp_a and dp_{yi}^e/dt.

(i) dp_{yi}^e can be obtained from totally differentiating

$p_{yi}^e = g_i(y_i, a) - dp_{yi}^e = \partial g_i(y_i, a)/\partial y_i \, dy_i + \partial g_i(y_i, a)/\partial a \, da$

(ii) therefore, with the appropriate substitutions dp_{yi}^e/dp_a can be written as

$dp_{yi}^e/dp_a = \partial g_i(y_i, a)/\partial y_i \; (-\partial^2\pi/\partial y_i \partial a)/D + \partial g_i(y_i, a)/\partial a$

$\partial^2\pi/\partial y_i^2/D > \leq 0$

that is a change in the price of advertising will have an indeterminant effect on p_{yi}^e primarily because the sign of the cross partial $\partial^2 g_i(y_i, a)/\partial y_i \partial a$ is unknown.

(iii) $dp_{yi}^e/dt = \partial g_i(y_i, a)/\partial y_i \; (\partial^2\pi/\partial a^2)/D + \partial g_i(y_i, a)/\partial a$

$(-\partial^2\pi/\partial y_i^2)/D > \leq 0$

again a change in the tax will have an indeterminant effect on p_{yi}^e primarily because the sign of the cross partial is unknown.

Product Quality

Product Differentiation

[NEEDS TO BE DONE]

Appendix

(1) Walrasian approach

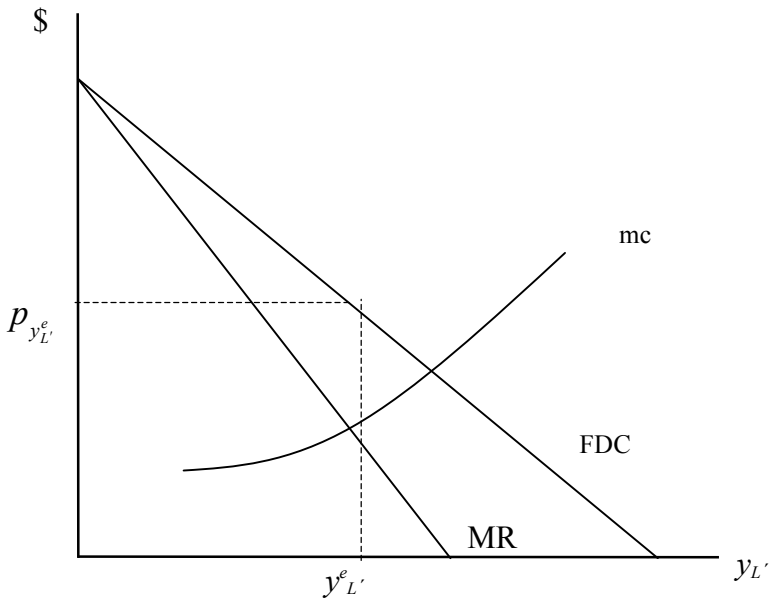
(a) working with total revenue and total costs, we have $\max\pi = p_{yi} f_i^c(p_{yi}) - C(p_{yi})$ where $C(p_{yi}) = p_1x_1^p + --- + p_nx_n^p$

(b) taking the first order conditions we get $\partial\pi/\partial p_{yi} = f_i^c(p_{yi}) + p_{yi}\partial f_i^c(p_{yi})/\partial p_{yi} - \partial C(p_{yi})/\partial p_{yi} = 0$ or $f_i^c(p_{yi}) + p_{yi}\partial f_i^c(p_{yi})/\partial p_{yi} = \partial C(p_{yi})/\partial p_{yi}$

(c) taking the second order conditions we get $2\partial f_i^c(p_{yi})/\partial p_{yi} + p_y\partial^2 f_i^c(p_{yi})/\partial p_{yi}^2 - \partial^2 C(p_{yi})/\partial y_i^2 < 0$ so we have a maximum.

(d) graphically we have

Figure 20.10



CHAPTER 21

OLIGOPOLY, THE FIRM, AND PRICE THEORY

In the duopoly models of Cournot, Bertrand and Edgeworth, the competing firms did not recognize their interdependence, that is, they did not recognize the fact that their own actions, such as changing their price, will force the other firm to alter the essential variable that they assumed to be given, such as the competitor altering its price. However, this approach was altered when, in 1929, Chamberlin offered a new model of duopoly in which the two firms recognized their interdependence. From this initial beginning arose a voluminous literature dealing with the problem of joint-maximization among competing oligopolists [check on this – perhaps history]. Chamberlin's work in the *Theory of Monopolistic Competition* offered two additional approaches of analyzing prices in oligopolistic situations. That is, by suggesting and showing that prices can be analyzed in market situations in which conditions of oligopoly prevails with the usual economist tools and coming up with determinant solutions, Chamberlin opened a vast new field for economists to explore. Out of this arose new ways of modeling oligopoly markets/situations: joint-profit maximization, price leadership, limit pricing models, behavioral theory of the firm, and managerial theories of the firm which are dealt with in this chapter; structure-conduct-performance approach which is dealt with in the next chapter; game theory and similar models are dealt with in chapter five; and the kinked demand curve model is dealt with in chapter six.

Need to define oligopoly

Need to say that when you get to oligopoly, you have to specify reactions; thus actual market serve as a guide to modeling

Oligopoly theory is about maximization-prices under specific conditions; maximization can be either profit or some other maximization

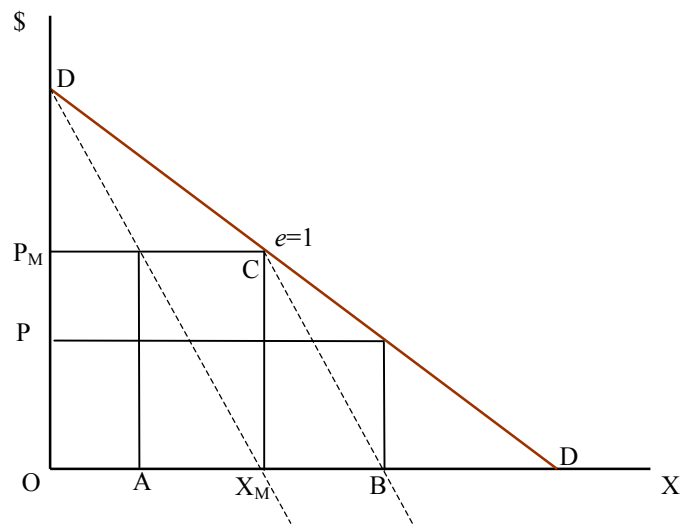
Joint-Profit Maximization

Chambelin's 1929 Model

Chamberlin's contribution to the theory of oligopoly consists of his suggestion that a stable equilibrium can be reached with the monopoly price being charged by all firms, if firms recognize their interdependence and act so as to maximize the industry profit (monopoly profit). Chamberlin accepts that if firms do not recognize their interdependence, the industry will reach either the Cournot equilibrium position or the Bertrand equilibrium position. Chamberlin, however, rejects the assumption of independent action by competitors. He says that the firms do in fact recognize their interdependence. Firms, when changing their price or output, recognize the direct and indirect effects of their decisions. The direct effects are those, which could occur if competitors were assumed to remain passive. The indirect effects are those, which result from the fact that rivals do not in fact remain passive but react to the decisions of the firm, which changes its price or output. The recognition of the full effects of a change in the firm's output (or price) results in a stable industry equilibrium with the monopoly price and monopoly output. Chamberlin assumes that the monopoly solution can be achieved without collusion: the firms are assumed to be intelligent enough to quickly recognize their interdependence, learn from their past mistakes and adopt the best (for all) position, which is charging the monopoly price. Chamberlin's model can best be understood if presented in a duopoly market. Initially Chamberlin's model is the same as Cournot's. The market demand is a straight line with negative slope, and production is assumed costless for simplicity (Figure 1). If firm A is the first to start production it will produce the profit-maximizing output $0X_M$ and sell it at the monopoly price P_M. Firm B, under the Cournot assumption that the rival A will retain his quantity unchanged, considers that its demand curve

is CD and will attempt to maximize its profit by producing on-half of this demand, that is, quantity $X_M B$ (at which B's MR = MC = 0). As a consequence the total industry output is 0B and the price falls to P. Now firms A realizes that its rival does in fact react to its actions, and taking that into account decides to reduce its output to 0A which is one-half of $0X_M$ and equal to B's output. The industry output is thus $0X_M$ and price rises to the monopoly level $0P_M$. Firm B realizes that this is the best for both of them and so will keep its output the same at $X_M B = AX_M$. Thus, by recognizing their interdependence the firms reach the monopoly solution. Under the assumption of our example of equal costs (that is, costs = 0) the market will be shared equally between A and B (clearly $0A = AX_M$).

Figure 21.1



Chamberlin's model is an advance over the previous models in that it assumes that the firms are sophisticated enough to realize their interdependence, and that it leads to a stable equilibrium, which is the monopoly solution. However, joint profit maximization via non-collusive action implies that firms have a good knowledge of the market-demand curve and that they soon realize their mistakes. That is,

they somehow acquire knowledge of the total-supply curve (that is of the individual costs of the rivals) and hence they define the (monopoly) price, which is best for the group as a whole.[20]

Further Work on Joint Profit Maximization: Fellner's Contribution

In this section we examine Fellner's (1965) theory of joint profit maximization and we will see the difficulties, which arise and which make it almost impossible to arrive at the monopoly solution even with collusion. Without collusion joint profit maximization is impossible unless all firms have identical costs and demands. MORE

A Special Form of Joint Profit Maximization: Cartels[21]

We saw that, in the absence of collusion, the monopoly solution in the industry (the solution at which the joint industry profit is maximized) can be achieved under the rare conditions that (a) each firm knows the monopoly price, that is, has a correct knowledge of the market demand and of the costs of all firms; (b) that each firm recognizes its interdependence with the others in the industry; (c) all firms have identical costs and identical demands. Cartels imply direct agreements among the competing oligopolists with the aim of reducing the uncertainty arising from their mutual interdependence. In this particular case the aim of the cartel is the maximization of the industry profit. [example of a cartel, but neoclassical cartel is quite different]

The firms in the industry appoint a central agency, to which they delegate the authority to decide not only the total quantity and the price at which it must be sold so as to attain maximum group profits, but also the allocation of production among the members of the cartel, and the distribution of the maximum joint profit among the participating members. The authority of the central cartel agency is

[20] Chamberlin's small group model suffers also from the defect of ignoring entry. It is a 'closed" model. If entry does occur it is not certain that the stable monopoly solution will ever be reached, unless special assumptions are made concerning the behavior of the old firms and the new entrant. WORK ON

complete. Clearly the central agency will have access to the cost figures of the individual firms. From the horizontal summation of the MC curves of individual firms the market MC curve is derived [issue of aggregation]. The central agency, acting as a multi-plant monopolist, will set the price defined by the intersection of the industry MR and MC curves. For simplicity assume that there are only two firms in the cartel. Their cost structure is shown in Figures 2 and 3. From the horizontal summation of the MC curves we obtain the market MC curve. This is implied by the profit-maximization goal of the cartel: each level of industry output should be produced at the least possible cost. Thus if we add the outputs of A and B that can be produced at the same MC, clearly the resulting total output is the output that can be produced at this common lowest cost. Thus if we add the outputs of A and B that can be produced at the same MC, clearly the resulting total output is the output that can be produced at this common lowest cost. Given the market demand DD (in Figure 4) the monopoly solution that maximizes joint profits, is determined by the intersection of MC and MR (point *e* in Figure 4). The total output is Y and it will be sold at price P. Now the central agency allocates the production among firm A and firm B as a monopolist would do, that is, by equating the MR to the individual MCs. Thus firm A will produce Y_1 and firm B will produce Y_2. Note that the firm with the lower costs produces a larger amount of output. However, this does not mean that A will also take the larger share of the attained joint profit. The total industry profit is the sum of the profits from the output of the two firms, denoted by the shaded areas of Figures 2 and 3. The distribution of profits is decided by the central agency of the cartel.

---

[21] NEED TO REWORK THE STUFF ON CARTELS—need to have an historical/empirical introduction.

Figure 21.2

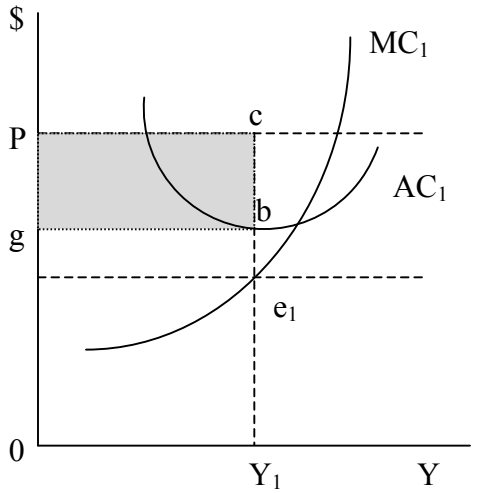


Figure 21.3

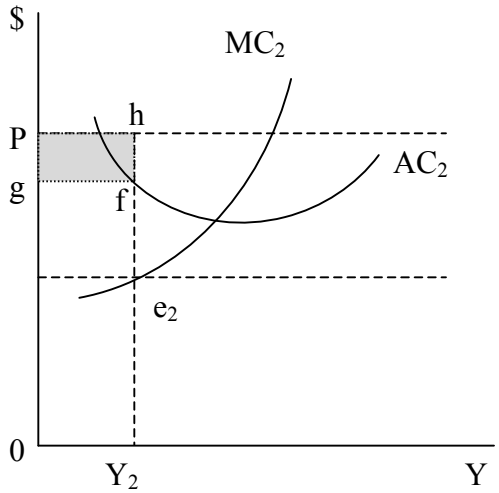
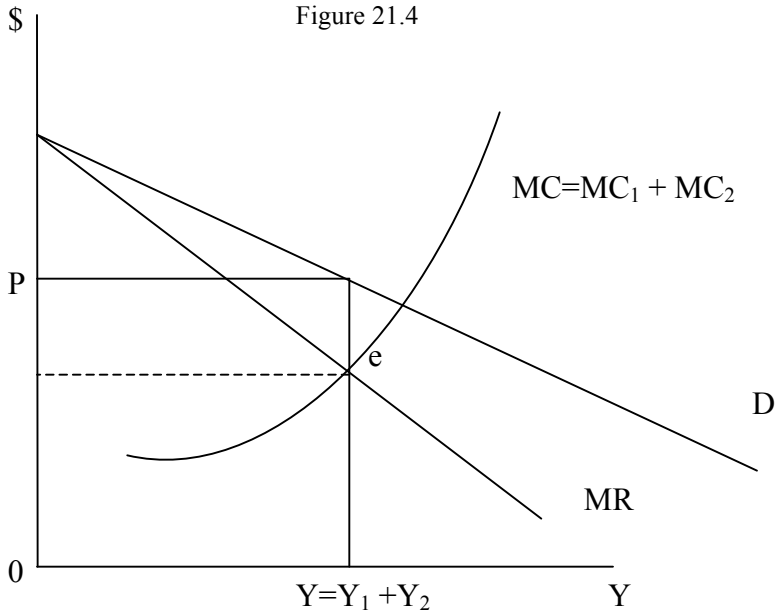


Figure 21.4



Although theoretically the monopoly solution is easy to derive, in practice cartels rarely achieve maximum joint profits. There are several reasons why industry profits cannot be maximized, even with direct cartel collusion. It should be obvious that equilibrium with joint profit maximization will be easier to attain and will be in general stable if firms have identical costs and identical demands,

conditions that are rarely met in practice. (However, even with identical costs cartels may still be unstable. See below.) Even in these conditions many factors may mitigate against achievement of the joint profit-maximization goal of the cartel. The main reasons why industry profits may not be maximized may be summarized as follows.[22]

First. Slow process of cartel negotiations. Cartel agreements take a long time to negotiate due to the differences in size, costs, and markets of the individual firms. During the negotiations each firm is bargaining in order to attain the greatest advantage form the cartel agreement. Thus, even if at the beginning of the negotiations costs and market demand were correctly estimate, by the time agreement is reached market conditions may have changed, thus rendering the initially defined monopoly price obsolete.

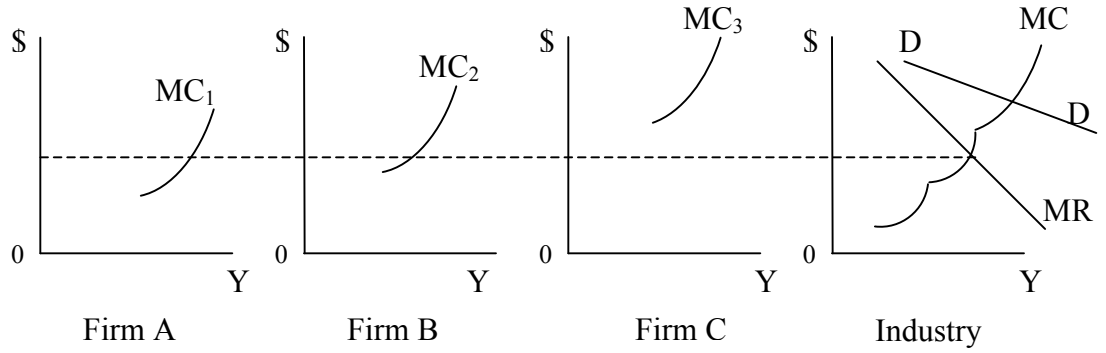
Second. "Stickiness" of the negotiated price. Once the agreement about price is reached. Its level tends to remain unchanged over long periods, even if market conditions are changing. This price inflexibility (stickiness) is due to the time-consuming process of cartel negotiations and the difficulties and uncertainties about the bargaining of cartel members.

Third. The existence of high-cost firms. If a firm is operating with a cost curve which is higher than the equilibrium MC, clearly this firm should close down if joint profits are to be maximized. (Firm C in Figure 4 should close down.) However, no firm would join the cartel if it had to close down, even if the other firms agree in allocating to it part of the total profits, because by closing down the firm loses all its customers, and if subsequently the cartel members decide to stop sharing their profits with this member, there is little that he can do about it, since he has to start from scratch in order to attract back his old customers.

---

[22] There is also a problem with the existence of cartels which be also be discussed.

Figure 21.5



Fourth. Fear of government interference. If the monopoly price yields too high profits the cartel members may decide not to charge it, for fear of government interference.

Fifth. The wish to have a good public image. Similarly the members of the cartel may decide not to charge the profit-maximizing price if profits are lucrative, if they wish to have the "good" reputation of charging a "fair price" and realizing "fair profits."

Sixth. Fear of entry. One major reason for not charging the profit-maximizing price if it yields too high profits is the fear of attracting new firms to the industry. Since there is great uncertainty regarding the behavior of the new firm, established firms prefer to sacrifice some of their profits in order to prevent entry.

Price Leadership

Price leadership models were initially developed around 1950 in response to the Tobacco decision (1946), the kinked demand curve, and the price setting research of the 1930s. It breaks down into the following forms – dominant firm price leadership, barometric price leadership, and collusive price leadership.

Dominant Firm Price Leadership Model

This occurs when a single firm dominates a market and is surrounded by a fringe of competitor, each too small to view itself as having a perceptible influence on the market price. The dominant firm sets a price that best serves its own objectives, taking into account the anticipated supply reactions of the fringe firms. The latter react as profit-maximizing pure competitors confronted with a parametric price. Consequently when the price leader charges its price, the lessor firms in the market will follow it. This short period argument can be depicted in the following manner. First, assume the market has *n* firms. If firm 1 is the dominant firm and sets a price p_y, then each following firm will decide its output y_i to satisfy $p_y = MC_i$ for i = 2, … *n*, and MC_i is the ith firm marginal costs, and $MC_i > 0$, and $\partial MC_i/\partial p_y > 0$. Presupposing this reaction of the following firms, the dominant firm's individual demand function is a residual demand function since it is determined after the price followers firms output are subtracted from the market output at each price:

$$y_i = f_m(p_y) - \sum_{i=2}^{n} MC_i(p_y)$$

where y_i is the dominant firm's individual demand function;

$f_m(p_y)$ is the market demand function and $\partial f_m(p_y)/\partial p_y < 0$; and

$MC_i(p_y) = y_i$ is the price-following firm's output where its marginal costs equals the market price.

On the basis of its individual demand function, the dominant firm maximizes its profits:

$$\pi^d = p_y y_1 - TC_1 = p\,[f_m(p_y) - \sum_{1=2}^{n} MC_i(p_y)] - TC_1$$

Differentiating with respect to p, we get:

$$\partial\pi^d/\partial p_y = y_1 + p_y\partial[f_m(p_y) - \sum_{1=2}^{n} MC_i(p_y)]/\partial p_y - MC_1 = 0$$

That is the profit maximizing output is equal to the amount of output that would occur under perfect competition if p_y was a parameter minus the amount, $p_y \partial f_m(p_y)/\partial p_y$, that would occur if a monopoly situation existed and minus the amount $p \sum_{i=2}^{n} \partial MC_i (p_y)/\partial p_y$ due to the existence of other firms in the market. This result could also be phrased in terms of marginal cost equals marginal revenue where marginal revenue is:

$$p + y_1 [\partial f_m(y) - \sum_{i=2}^{n} \partial MC_i (y_m)]/\partial p_y.$$

These results can be shown in the following graph:

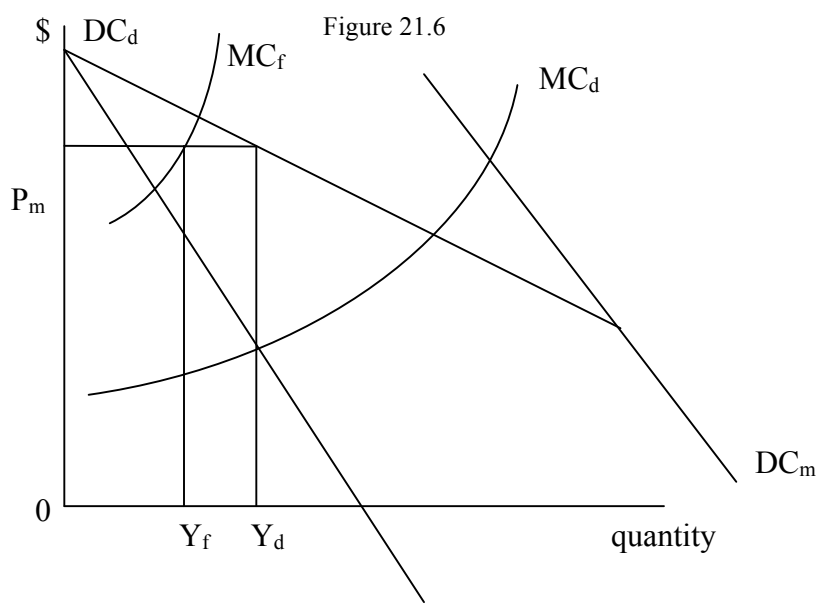


Figure 21.6

Given the above model, three points can be deduced. First, at the equilibrium price, the dominant firm will have significantly lower marginal costs than the price followers and therefore will have greater profits (assuming all marginal cost curves slope upward). Secondly, if the dominant firm has superior technology hence lower marginal costs over the entire range of feasible equilibrium prices, then its market share will be greater than any of the price-followers. This is the situation usually envisioned when discussing the dominant firm price leadership model. Lastly, if the dominant firm has lower

marginal costs over only part of the range of feasible equilibrium prices, then it is possible that its market share could be smaller than that of a price follower.

Barometric Price Leadership Model

As the name suggests, the price leader does no more than act as a barometer of market conditions, setting prices approximating those that would emerge in any event under competition. Distinguishing characteristics include occasional changes in the identity of the price leader, the absence of leadership power to coerce others into accepting its price; a tendency for the leader to formally validate price reductions that other sellers have already initiated through off-list concessions; upward leadership only when rising costs or demand warrant price hikes; and occasional lags in following, or outright rejection of, the leader's price initiatives.

Collusive Price Leadership Model

This comes in two forms – explicit collusion and implicit collusion. Explicit collusion is illegal cooperative activity between enterprises where they get together to engage in the joint maximization of profits. Implicit Collusion or conscious parallel action occurs when the firms are not in direct contact with each other, but because some of them are large enough to affect the market price, they take on a set of behavior which would not only benefit the individual firm, but all the firms in the market. The resulting behavior is exhibited as a single market price, which maintains its uniformity as it moves up or down – that is all the prices of the firms in the market move in a parallel fashion. Because the firms in the market are independent of each other, there must be certain market preconditions for parallel pricing to exist: firms must be few in number and each firm must be sufficiently large to be compelled to reckon with the indirect as well as the direct effects of its own price policy; entry must be restricted over the entire range of possible market prices – this precondition is fulfilled because we are operating in the short period; goods produced must be homogeneous – that is the firms must be in the same market; the

individual firm cost curves must be sufficiently similar so that some particular price allows all firm to operate at a satisfactory rate of output; and the market demand schedule must be slightly price elastic. If these conditions are fulfilled, then parallel pricing is possible. This can be shown if an additional assumption is made – that a firm's market share is the same for all equilibrium prices if all firms in the market charged the same price:

(1) the market demand curve is $y_m = f_m(p)$,

(2) the ith firm demand curve is $y_i = s_i y_m = s_i f_m(p)$, where s_i is the ith firm market share,

Now assuming that the ith firm sets its profit maximizing price by equating marginal cost and revenue, we have $MR_i = p\,[1 - s_i y_m dp/p s_i dy_m] = p\,[1 – 1/e_{dm}]$. Thus, in equilibrium we have $p = MC_i /[1 – 1/e_{dm}]$. From this the following conclusions can be derived. First, the market demand curve must be price-elastic in the neighborhood of the equilibrium price; however empirical evidence shows this not to be the case. Moreover, if all firms in the market set their prices independently, then a uniform market price (which, by the way, is needed to maintain the constancy of market shares) can only exist if the marginal cost of each firm is identical in equilibrium. While such an occurrence could occur by chance, this result implies that all firms are identical in technology and market share. Therefore, the notion of price leadership in this case has little meaning since a uniform market price could only occur by chance or if all firms were identical. Finally, if there exists one firm, which has the lowest profit-maximizing price, then a uniform market price, which maintains existing firm shares, can only exist if the price-following firms sell at non-profit maximizing and market clearing price.

CHAPTER 22

MARKET STRUCTURE AND PERFORMANCE OF INDUSTRY

Introduction

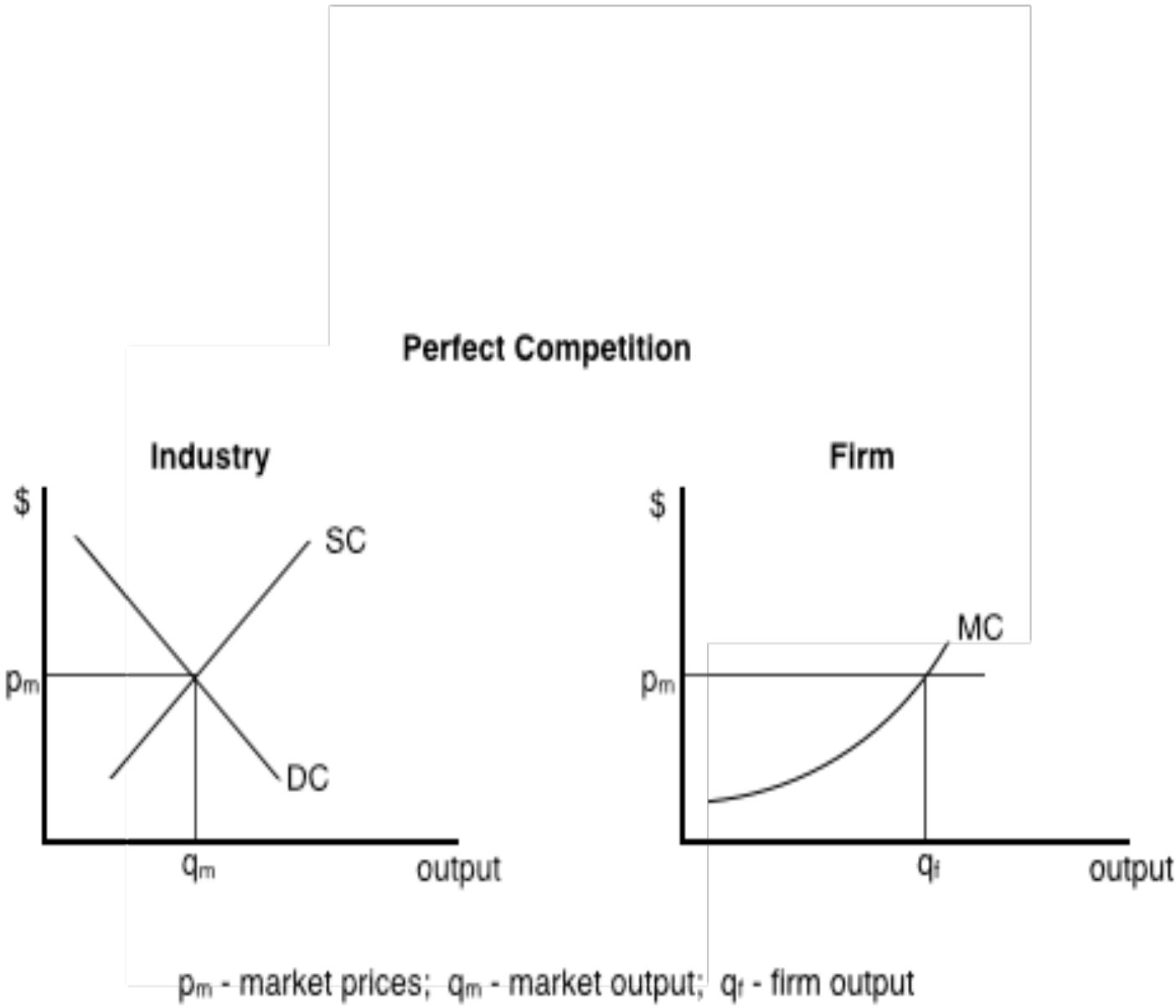
Previous discussion dealt with the various ways firms organize the market for their advantage. Now we want to evaluate their impact on the economy as a whole. That is, we want to know whether say, a cartel, hurts the economy overall, even though it benefits the firms in it. The implication of this inquiry is that a public policy could be devised to promote market organizations/institutions, which benefit the economy as a whole, and to discourage and/or prevent those that are detrimental to the economy as a whole. Economists have generally approached this problem by first stipulating what conditions must exist for the economy to maximize the welfare of all the individuals in it and secondly by developing what is called the structure-conduct-performance paradigm in which a particular market structure is investigated to see whether its conduct is conducive for the maximization of the economy's welfare in a broad sense. On the other hand, other economists have approached the problem in a rather different manner in which a particular market organization is judged in term of its contribution to the revolutionizing and growth of the economy. The structure of the following analysis is to present the structure-conduct-performance paradigm and then contrast it with the alternative approach.

Structure-Conduct-Performance Paradigm

The origin of this approach to analyzing the price and profit performance of industry can be found in the work of E. H. Chamberlin's *The Theory of Monopolistic Competition*, and in the development of perfect competition and welfare economics.

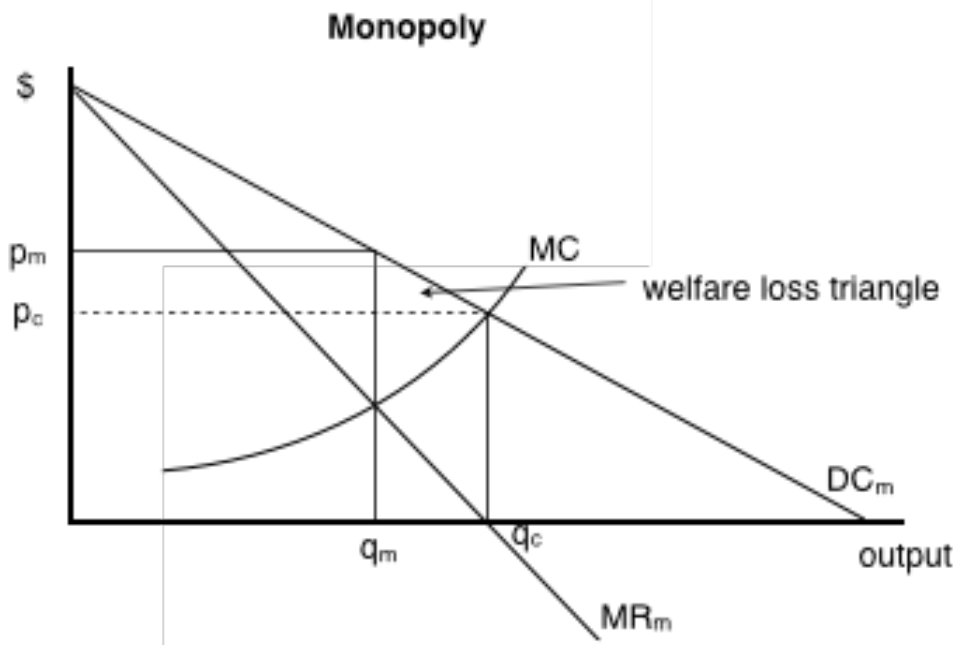
(1) <u>Perfect competition and welfare economics</u> – since this is covered in intermediate micro, all that needs to be said is that Pareto Optimality, which implies the most efficient use of resources, occurs only with perfect competition. This point can be illustrated with the following diagrams:

Figure 22.1


Perfect Competition
Industry
$
SC
pm
DC
qm
output
Firm
$
MC
pm
qf
output
pm - market prices; qm - market output; qf - firm output

Under perfect competition we find that the firm determines its profit maximizing output by equating its marginal costs to the market price. Now let us consider a monopoly:

Figure 22.2



Under monopoly we have monopoly price, p_m, and monopoly output, q_m. The first thing we notice is that p_m MC and that p_m > MC. Therefore, we must conclude that monopoly output, $q_m < q_c$ competitive output. Consequently, economists conclude that non-perfectly competitive markets disrupt the efficient allocation of resources because their prices (p_m > MC) provide the wrong signals for the other consumers and firms in the economy. The result is a loss of welfare as indicated in the welfare loss triangle above. Therefore, it is argued that, in theory, policies should be designed that would promote perfect competition and discourage non-perfectly competitive markets.

(2) E.H. Chamberlin – As noted above Chamberlin introduced the notion of monopolistic competition to the economic profession. However he did more than that – rather he argued that there existed a

continuum of market from perfect competition to monopoly and that number and size of sellers and homogeneity of the commodity could distinguish each market:

Perfect competition – many sellers, small size, homogenous commodity

Monopolistic competition – many sellers, small size, heterogeneous commodity

Pure oligopoly – few sellers, large size, homogeneous commodity

Differentiated oligopoly – few sellers, large size, heterogeneous commodity

Monopoly – single seller, homogeneous commodity

Furthermore, he argued that the long and short period prices and quantities depended on the interaction between the firms in the market – that is, it depended on whether firms perceived that interdependency exists. The implication of Chamberlin's work is that he showed, within the realm of theory, what conditions must exist for a firm to adopt production and price setting policies which would result in prices and quantities different from those in perfect competition. Combining this result with the conditions, which would maximize the welfare of the participants in the economy, it can easily be deduced that market conditions, which do not promote perfect competition results would be done away with. However in trying to determine in the real economy which markets/industries are non-competitive, it is quickly discovered that Chamberlin's analysis is "non-operational" because it relies on demand curves, cost curves, elasticity of demand which are virtually impossible to calculate. Therefore, a more operational approach had to be developed and the result was the structure-conduct-performance paradigm.

E.S. Mason, J.S. Bain, and the Structure-Conduct-Performance Paradigm

Mason complained that Chamberlin's analysis was non-operational since demand curves, and elasticity of demand were not calculable. Therefore, Mason had to devise "proxies" for them which could be empirically ascertained. Mason argued that a firm's price and production policies were (1)

influenced by its organization in terms of its response to given market situations, and (2) influenced by its market structure. To substantiate this claim he first had to define market, market structure, and firm organization and then show the causal relationship between these influences, production and pricing, and productive and allocative efficiency. First, the definitions:

(i) market – it must be defined with respect to an individual firm and includes all buyers and sellers, of whatever product, whose action he considers to influence his volume of sales. The definition implies that the cross elasticity of demand for the products in the market is high.

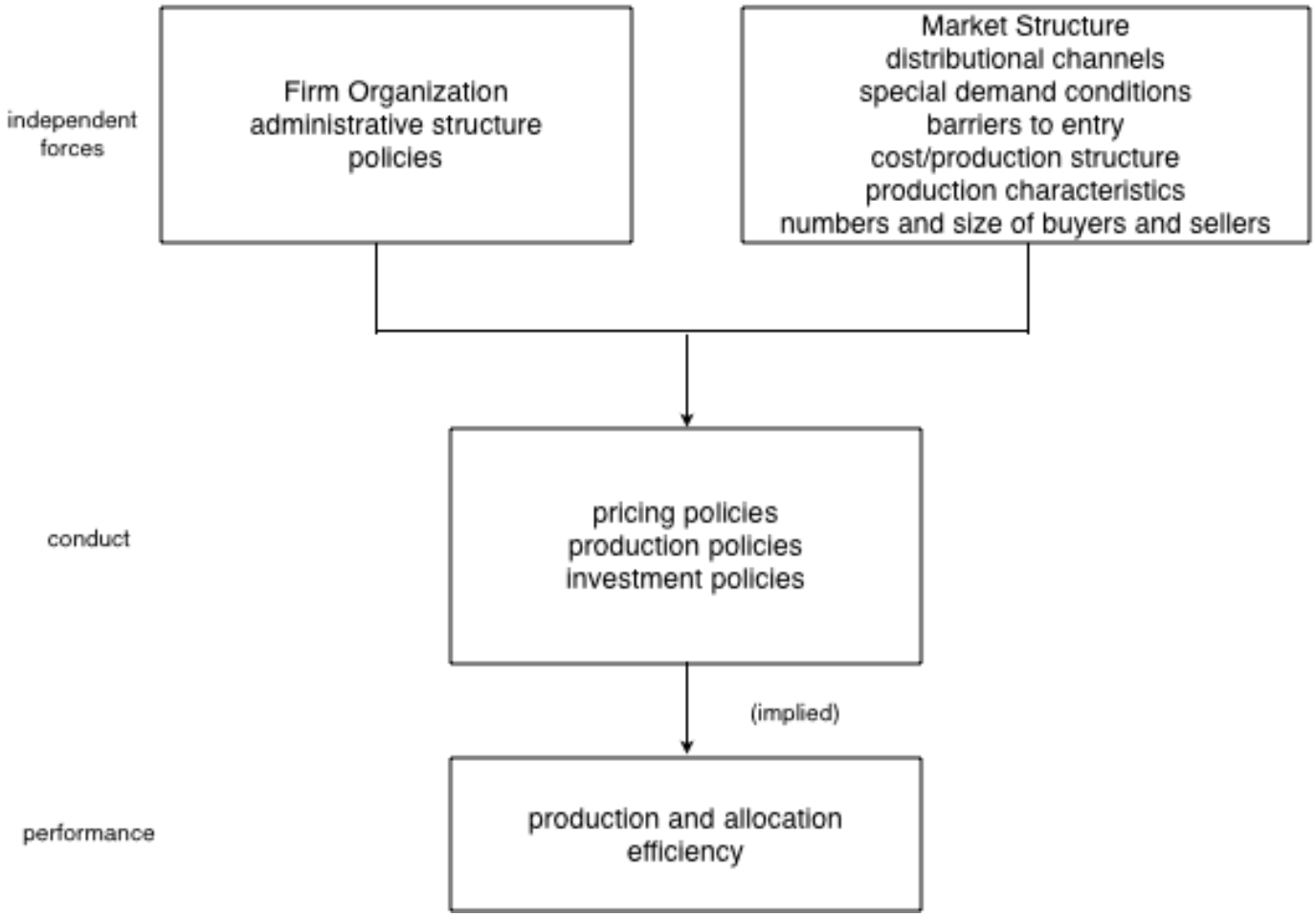
(ii) market structure – includes all those "external" consideration which the firm takes into account in determining its business policies and practices. These considerations include the following: (1) economic characteristics of the product – is it a producers or consumers good, is it durable or non-durable, it is "differentiated" or standardized, (2) cost and production characteristics of the firm's operation (given technology) – ratio of overhead to variable costs at given volumes of output, the flexibility of costs, location factors, joint costs, (3) numbers and relative sizes of buyers and sellers in the market, (4) ease of entry into the market, (5) demand conditions which are empirically determinable – sales trend, seasonal and cyclical fluctuations of sales, and (6) distributional channels.

(iii) firm organization – it refers to the internal running of the firm such as a centralized or decentralized administrative structures, and to the policies advocated by different "power" centers within the firm.

Given the definitions, Mason could now delineate the causal relationship above. The causal relationship, Mason argued ran from the organization of firms and market structure to price and production policies. That is, given the organization of the firm and the "technological" determined market structure, the pricing and production policies could be directly and uniquely determined; in turn, by implication, the

impact of production and allocation efficiency could be easily deduced. Thus Mason's vision can be delineated in the following manner:

Figure 22.3



With the causal relationships stated, (however, as we shall see, Mason did not develop a theoretical explanation for the relationship between market structure and conduct, especially pricing policies), Mason suggested that two specific relationships could be investigated within this approach – (1) relationships between stable (or inflexible prices and concentration – the administered price controversy and (2) relationship between firm size and price policy. Both of these relationships have been extensively investigated.

J.S. Bain and Mason's Framework

In spite of Mason's statements, the theoretical relationship between firm organization and market structure, and conduct was not clearly specified. This was partly rectified when Bain advanced the theoretical arguments that high concentration promotes conclusion and that barriers to entry determine the long period profit maximizing equilibrium price. That is starting with the view that the firm is not a short period profit maximizer, but rather is a long period profit maximizer and that firms in concentrated industries clearly recognize the problems of interdependency, Bain argued that tacit or explicit collusion would be necessary, in concentrated industries, if the firms were going to maximize their long period profits. In such an industry, the profit-maximizing price is determined, as Chamberlin inferred, through the use of equating marginal cost and revenue. However, to maintain collusion in the long period, entry must be prevented, thus the price must be low enough not to entice entry. Thus, barriers to entry determine the level, which, the "monopoly" price can exceed the competitive price. The barriers, which Bain emphasize included:

(i) absolute cost advantage – the established firms have absolute lower costs than an entering firm due to, say, control of production techniques via patent

(ii) product differentiation – buyers have preference for the output of the established firms

(iii) economies of scale – existing firms have significant scale economies, which the entering firms could not obtain. Consequently the entering firms would have higher costs, hence, lower profits at any price.

Aside from maintaining the conditions necessary for collusion [it should be noted that collusion is the only condition which oligopolistic firms would necessarily set a price higher than the competitive price], barriers to entry perform an additional purpose – they "explain" why firms may not set short or long period prices by equating marginal cost and marginal revenue. That is, they determine the level, which

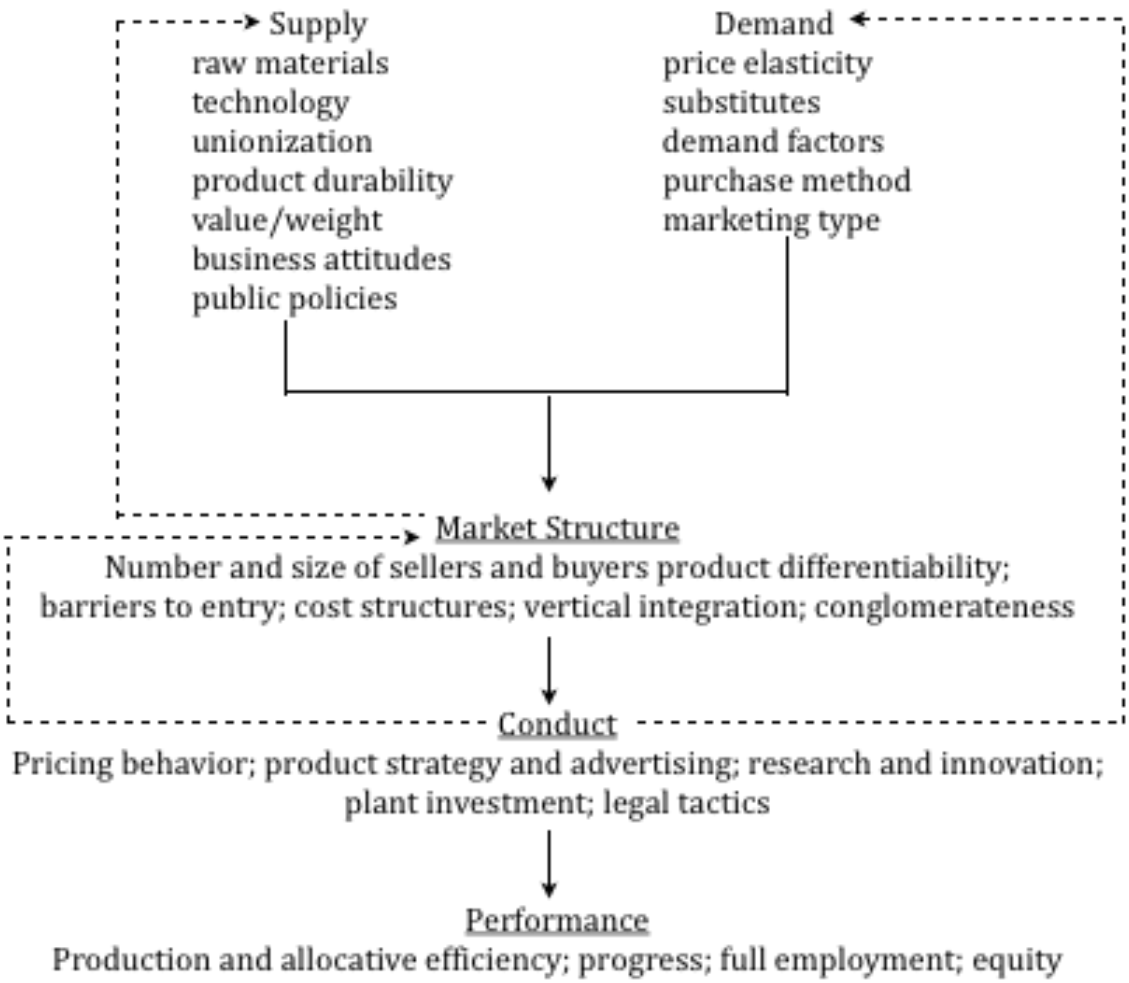
the long period profit-maximizing price could be set which would prevent or severely limit entry; and such a price may not necessarily exist where marginal cost equals marginal revenue.

The impact of Bain's work on Mason's framework was twofold. First, firm organization was ignored and thus ceased to be an important influence. In addition, market was "redefined" so as to be more consistent with the term industry used by the government in gathering statistics. Thus, market ceases to be defined from the perspective of an individual firm – rather it is a collection of firm on the basis of a similarity both of products and production processes. Consequently, market and industry are nearly synonymous. Thus, Mason's framework has been subtly changed so that it is now – concern with the relationship between market structure and market "outcome" (as opposed to firm outcome). Second, by de-emphasizing firm organization and adopting a profit maximizing limit pricing approach, the relationship between market structure and pricing policies (conduct) was taken as given. Consequently the intermediate step between market structure and performance was ignored. This is easily seen in Bain's work on profit rate and concentration.

The consequence of Bain's work was that Mason's framework was converted into a paradigm. Moreover, economists could now develop the paradigm beyond Bain and Mason in that they argued that a two-way street existed between market structure and conduct. This development ensured that attention would be given to the relationship between market structure and conduct. Furthermore, research expanded the paradigm in terms of the elements which belong under market structure, conduct, and performance and created; in addition the paradigm was somewhat altered with the inclusion of the category of basic conditions, which included the forces of "supply" and "demand". Finally, Mason's independent force of firm organization was either subsumed under basic conditions or conduct, thus ceasing to be an independent entity. As a result the structure-conduct-performance paradigm can be delineated in the following manner:

Figure 22.4

Basic Conditions



Because of the breath of the paradigm, there are a number of "topics" which could be explored. However, we shall restrict ourselves to only two: concentration and profits and concentration and advertising. [MORE]

Before considering the above topics, let us consider the way economists consider their results. To test, say, whether there is a relationship between concentration and profit rates, economists employ a regression equation of the following form: $\pi_i = a + bC_i + \varepsilon$

where π_i is the profit rate of the ith industry;

C_i is the concentration ratio of the ith industry;

a,b are coefficients; and

ε is an error term.

The regression equation indicates the kind of relationship that exists between π and C. If b>0, then we can say that as concentration increases so will profit rates. To determine whether b>0, we have to look at its t-value – the larger the value the more likely will be the probability that b is different from zero (this conclusion also depends on the degrees of freedom and the level of confidence assumed). Now we can inquire how much of the variety of is explained by C – this is done by reference to the correlation coefficient R^2. If R^2, which lies between 0 and 1, is high – that is close to 1, then the regression equation "explains" a great deal of 's variability. Finally, it is obvious that the regression equation can contain more than one independent variable; hence each one would have a t-value and the correlation coefficient can adopt for on, some, or all the coefficients.

Concentration and Profits

The origin of this controversy can be traced back to Bain's development of Mason's framework. Working with the long period, Bain argued that high levels of concentration promoted collusion, thus a long period monopoly price which is above the competitive price. Therefore, he concluded that profits in the industry would be above normal or the industry's profit rate will be above the competitive profit rate. To support his argument, Bain devised the following empirical test. First he chose the years 1936-40 as his long period equilibrium thus eliminating any problems arising with transitory profit rates and fulfilling the necessary theoretical requirements of his argument. Second he constructed the following regression equation $\pi_i = \alpha + \beta C_i + \varepsilon_i$, where C_i is the level of concentration in industry *i* for the years 1936-40 and π_i is the profit rate for the *ith* industry for the years 1936-40. Bain's initial results were "poor" (R^2 = .33). However, he noticed that at the 70% 8-firm concentration level, there appeared to be a

significant split between the rates of profit. Testing for this, he found the split significant and thus concluded that industries with an eight-firm concentration ratio above 70% tended, in 1936-40, to have significantly higher average profit rates than those with a ratio below 70%. To see what Bain is talking about, consider the following chart:

Figure 22.5

In concluding his study, Bain noted that his argument and analysis did not take into account other factors which could affect the profit rate, such as barriers to entry. This omission was rectified in subsequent studies by Bain and other economists.

After Bain's original article, there came many other studies supporting Bain's findings. The studies can be divided into two camps. One kind of study used industry profit rate as the dependent variable, and concentration and barriers to entry as the independent variables. The studies were generally cross-sectional and limited to a "short" period of time. Thus, working with the following regression equations $\pi_i = \alpha + \beta C_i + \gamma BE_i + \varepsilon_i$, where BE_i are the barriers to entry in the *ith* industry, the investigators discovered a significant relationship between profit rates, concentration, and barriers to entry. A second kind of study involves the use of the price-cost margin. In the first study, π is usually available on firm basis and then the firm is placed in a particular industry and finally π_i is determined as

an average. The problem with this is that firms span many industries/markets, thus making π_i a very uncertain number. To get around this problem, economists adopted an approach which takes advantage of the fact that the U.S. Census Bureau collects statistics on manufacturing activity at the level of the individual plant. Each plant is assigned to its primary industry, and since plants are on average much more specialized than firms, the problem of contamination is greatly reduced. From the aggregate Census industry statistics, it is possible to compute an average *price-cost margin*, defined approximately as:

$$PCM = \frac{total\ plant\ \cos ts\ -\ material \cos ts\ -\ in\text{-}plant\ payroll\ \cos ts}{total\ plant\ \cos ts}$$

The index is a poor measure of net profitability because Census data do not permit one to identify with any precision, and hence deduct, such out-of-plant costs as advertising, central office costs, sales force expenditures, and separate research and development laboratory outlays as well as in-plant depreciation. However, it serves as a crude approximation to the Lerner Index - $\frac{P - MC}{P} \geq 0$ and if equal to zero perfect competition exists and if greater than zero imperfect competition exists. A principal attraction of the price-cost margin is its ready availability at a level of aggregation that exactly matches the level at which industry concentration are published. Working with the following regression equation $PCM_i = \alpha + \beta C_i + \gamma BE_i + \varepsilon_i$, where PCM_i is the price cost margin for the *ith* industry, the investigators found a significant relationship between PCM and concentration and barriers to entry.

Since most studies used a cross-sectional approach, the question of the persistence over time of the empirical relationship between concentration and profit rates was not explicitly addressed until Y. Brozen attempted to find evidence to substantiate the basis on which President Johnson's Task Force on Antitrust Policy called for a Concentrated Industries Act for the purpose of reducing market concentration. Brozen found that if profit rates were looked at over time they converged to the

prevailing "average/competitive" profit rate. Thus, he argued that deviations from the competitive rate of profit indicated that a disequilibrium situation exists. In addition, he argued that, in principle, there is no relationship between concentration and profit rates over time, hence concluding that concentrated industries exist because it is the best way for it to be organized.

The implications of the controversy are uncertain – if profit rates and concentration are significantly correlated, then resources are being misallocated and thus should be corrected; if there is no correlation, then deconcentration might be harmful. Therefore, more work is needed before a sound policy can be implemented. [more historical etc. discussion is needed]

Concentration and Advertising

This controversy arises because of the perceived relationship between profits and advertising. That is, Chamberlin presented a theoretical argument in this book *Monopolistic Competition* in which the firm could affect its demand curve, hence profit, through varying its selling costs. On the empirical side statistical evidence has been gathered which shows a positive relationship between industry/ market and firm profit rates and advertising variable – frequently defined as advertising dollars divided by sales dollars. One study reported that industries characterized by heavy advertising outlays have profit rates nearly 4 percentage points higher than other industries. In addition, the significant and positive impact of advertising persists when other determinants of profitability, such as concentration, growth of demand, and entry barrier measures, are included in the analysis. Given the significance of the profit-advertising relationship, the question of its basis arises and with it the concentration-advertising controversy.

One argument that was developed to explain the profit-advertising relationship was that advertising promotes concentration which in turn promotes greater than competitive/normal profits. N. Kaldor present on the first discussions of the above argument. In his 1949-50 article, he argued that advertising led to or was essential for the concentration of industry on both a historical level and a

theoretical level. On the historical level (see paragraphs 29-35), Kaldor maintained that advertising in late 19th century England increased concentration by transforming the overall market structure so that national oligopolies replaced many local and regional competitors. Before the rise of large-scale advertising, the distribution of goods in England rested with a small group of wholesalers who were supplied by numerous small, independent, competitive firms. But in the late 19th century the manufacturers, desirous of transferring loyalty to themselves, began to advertise heavily, thus developing brand loyalty and customer goodwill for their products. The result was product standardization, longer production runs, economies of scale – and thus increased concentration.

Given this historical support, Kaldor proceeded to develop a theoretical argument linking advertising to concentration. He starts his argument by stating that advertising can have a significant impact on the demand of a particular firm's commodities:

> Let us assume that a particular industry/market was initially in equilibrium with *n* firms, not necessarily of the same size, but with a constant pattern of size distribution. If all firms adopted advertising, this would have a similar effect on the equilibrium of the industry to that of some new invention which introduced internal economies of scale: it would render the existing distribution of sales among firms unstable. The reason for this is that the shift of the demand curve resulting form advertising cannot be assumed to be strictly proportionate to the amount spent on advertising – the pulling power of the larger expenditure must overshadow that of smaller ones (i.e., "increasing returns" to advertising exists) with the consequence (a) that the larger firms are bound to gain at the expense of the smaller ones; (b) if, at the start, firms are more or less of equal size, those that forge ahead are bound to increase their lead, as the additional sales enable them to increase their outlay still further. Hence, after advertising has been generally adopted, and the trade settles down again to some sort of equilibrium, the pattern

> of the industry will have change; sales will have been concentrated among a smaller number of firms.

Given the impact of advertising on a firm's sales, hence industry concentration, the question that must be dealt with next is whether the process will lead to monopoly. Kaldor argued that "decreasing returns" will eventually occur thus placing a constraint on the size of the firm:

> there comes a point where the market becomes saturated with advertising and further increases of outlay will yield rapidly diminishing returns. Moreover, as the concentration process proceeds, and the surviving firms get larger in size, it becomes more and more difficult for any firm to increase its advertising outplay relatively to its competitors; since these competitors can, and would, react by increasing their own expenditure in turn, if necessary out of all proportion to the magnitude of their sales. Whereas the early stages of the concentration process are more or less automatic – the disappearance of the small firms proceeds automatically as a result of the increasing unprofitably of their business, due to the changing character of the market – the later stages are apt to take on the character of war, with each firm jealously guarding it own territory and being prepared, if necessary, to incur heavy losses in order to repel any attempt at intrusion by others. Hence, the ultimate effect of this concentration process is much more likely to be some form of oligopoly than monopoly.

The final part of Kaldor's argument was to relate concentration to economic welfare. That is, although advertising promotes concentration, its impact on economic welfare may be varied. First high concentration brought about by advertising could promote technical advancement and economies of large scale production and there have a beneficial effect. Secondly, advertising increases costs thus lowers welfare, it also can raise the margin for profit, and hence in the prices paid by the consumer, because of the reduction in the degree of freedom of entry of newcomers, and the consequent increase in

the degree of monopoly power enjoyed by those inside the trade. For the larger the size of, and the greater the amount of, goodwill attached to the firms in any particular trade, the larger is the initial outlay which must be risked by a potential newcomer who wishes to invade the market, the higher, therefore the level of "normal profits" which insiders can enjoy without attracting new competitors.

Joe Bain advanced an argument similar to Kaldor in which he argued that strong product differentiation and brand loyalty via advertising are frequently the basis for high concentration and barriers to entry. He went on to postulate a general tendency for buyers to prefer established products to new-products. This tendency places new entrants into a market at a cost disadvantage stemming from capital market constraints and possible economies of scale in advertising. To compete, new entrants must have access to enough capital either to outspend their established rivals on advertising or to sell below existing prices for considerable periods of time. Since new firms do not have easy access to capital, advertising does increase barriers to entry and concentration, thus resulting in above normal prices and profits.

The above arguments provide many hypotheses for investigation. One hypothesis available for investigation is whether economies of scale exist in advertising. The studies under taken conclude that there is no evidence whatever of scale economies in advertising. There is, for example, no evidence of quantity discounts or price discrimination in favor of large-scale TV advertisers. Nor is there evidence of increasing advertising effectiveness attributable to increasing frequency of advertising messages or audience size – indeed, most studies find evidence of decreasing returns to advertising. In short, there seems to be no evidence that scale economies in advertising exist and, therefore, that scale economies can lead to increased concentration. A second hypothesis available for investigation is the relationship between advertising and brand loyalty. The evidence suggests that advertising is not a strong determinant of brand loyalty. Brand loyalty exists, but whether it is caused or can be influenced by

advertising is doubtful. One study found that buyer inertia is strongly influenced by product performance and quality and little influenced by advertising and that advertising cannot artificially create brand loyalty. Thus it appears there is little, if any, empirical basis for the proposition that advertising creates brand loyalty. The third (and main) hypothesis available for investigation is the relationship between advertising and concentration.

The original test for the relationship was made by Kaldor. For 118 commodities in Great Britain, he examined advertising intensity and advertising concentration, which is measured according to the number of firms needed to account for 80% of industry advertising expenditures in the press. Advertising intensity turned out to be highest for the eight-firm advertising concentration level, declining substantially when four or fewer firms or nine or more firms were needed to account for the 80%. Kaldor interpreted this finding as suggesting an inverted-U relationship, with advertising intensity and concentration positively related up to some intermediate concentration level and negatively related thereafter. He concluded that large-scale advertising is unique to oligopolistic industries, with small-scale advertising characteristic of monopolies and of competitive industries. (However, it should be noted that a re-examination of the data casts doubt on Kaldor's conclusions.)

A second family of testing dealt with the hypothesis that a linear relationship between advertising and concentration exists. Working with the following equation: $C = \alpha + \beta(A/S) + \varepsilon$, where A/S is the advertising-sales ratio of the industry. Some economists found a positive relationship while others found no relationship. These results were not altered when a more complex regression equation was used: $C = \alpha(A/S)^{\beta}\varepsilon$ or $\log C = \log\alpha + \log\beta(A/S) + \log\varepsilon$. A third family of testing dealt with the hypothesis that advertising can lead to changes in concentration. As above, the empirical evidence supports a positive relationship and no relationship at all.

We are left with an ambiguous picture. Advertising appears to influence profit rates; but its relationship to concentration – the element through which its influence is expected to run – is questionable. The difficulty may lie partly with data problems; both concentration and advertising measures are imperfect. The difficulty may also be partly theoretical in that the theoretical relationship between concentration and advertising may be misspecified. Thus, more work remains to be done; but there is one conclusion that can be noted – it is not possible to conclude with the structure-conduct-performance paradigm that advertising distorts/reduces consumer welfare.

Other SCP Investigations

Criticisms of the Structure-Conduct-Performance Paradigm

So far we have considered only the structure-conduct-performance paradigm when evaluating market organizations. Now let us briefly consider the Austrian approach. The Austrian approach has a very different perspective on economic efficiency and resource allocation which is developed directly from a strict subjectivist approach to cost and utility. This approach holds that individual human action is purposeful and aims at accomplishing selected ends by adopting patterns of resource use (plans) consistent with those ends, then the means or plans are said to be efficiently employed.

The efficient accomplishment of ends in a social context requires that particular planned activity dovetail or coordinate with the planned activity of other market participants. Yet given the complex division of labor and the difficulty of obtaining accurate information, such a dovetailing is not automatic, indeed mutually inconsistent plans must be anticipated. If market participants had perfect information, all plans would be fully coordinated and markets would be efficient, by definition. But to assume perfect information is to assume away the problem of explaining social efficiency. The question of social efficiency is not how resources would be allocated if everyone had perfect information. The issue, instead, is an understanding of the process by which more accurate information

is produced, transmitted, and utilized such that a more consistent pattern of social plan coordination can be achieved.

An unhampered market economy automatically generates price information that can be utilized by decision makers in an effort to coordinate divergent plans. Decision makers are able to monitor behavior with strong incentives to pursue patterns of resource use that are more fully coordinated with the plans of others. Since information is not perfect and is constantly changing, this process of plan adjustment can never achieve any final equilibrium. What must be emphasized, however, is that the competitive market process creates powerful incentives to discover and utilize information and to correct plans that fall short of objectives. In short, an unhampered market provides the context within which individuals and institutions can engage in efficient action. It is both a necessary and a sufficient condition for an efficient market process.

Seen in this light, voluntary market agreements can be efficient, since they aim to more fully coordinate the plans of the respective parties. Such arrangements are judged appropriate *ex ante* to bring about some desired end or goal. To prohibit or restrict (by law) such agreements, from this perspective, would result in an unambiguous reduction in efficiency and social coordination. There are some distinct advantages associated with this theory of efficiency. The first is that the arrangement against highly advertised differentiated products simply collapses as an irrelevant discussions of ends; social efficiency relates only to means. Secondly, all government restrictions or prohibitions of trade and contractual agreements are revealed to be socially inefficient.

CHAPTER 23

BEHAVIORAL AND MANAGERIAL THEORIES OF THE FIRM

Limit Pricing Models

Behavioral Theory of the Firm

Managerial Theories of the Firm

Issues of profit maximization

Sales Maximizing Model

1. Baumol's Sales Revenue Maximization Approach

a. Separation of ownership from control permits management to pursue the good of sales revenue maximization.
b. Assumes monopoly pricing model – assumes no interdependence
c. Single-product model without advertising – static

(1) Assumptions
– maximization of sales revenue subject to profit constraint which is determine exogenously
- conventional cost curves and demand curve

(2) Let the demand curve for the firm be $p = a – by$, thus
$TR = py = ay - by^2$ Hence,
$MR = a – 2by$

(3) Let the total cost curve for the firm be $TC = C + 2y^2$, thus $MC = 4y$

(4) Maximization of sales revenue occurs when $MR = 0$ or $y = a/2b$, hence the corresponding price is $p = 1/2a$
(This occurs when $e_d = 1$.)

(5) Thus maximizing sales revenue is: $py = a^2/4b$

(6) Now how about the profit constraint Π_c

(a) if $\Pi_c < TR – TC = a^2/4b – c - a^2/2b^2$, then the profit constraint is non-operative;

(b) if $\Pi_c > TR – TC = a^2/4b – c - a^2/2b^2$, then the profit constraint is non-operative;

(c) if (b) holds and the profit constraint occurs where $Y_c = a/4b < a/2b$,

which means that $p = 3/4a > 1/2a$,
consequently Sales Revenue is $a^2/8b < a^2/4b$

(7) If maximizing Sales Revenue is to be different from profit maximization,
then $SR_m > SR_{pm}$

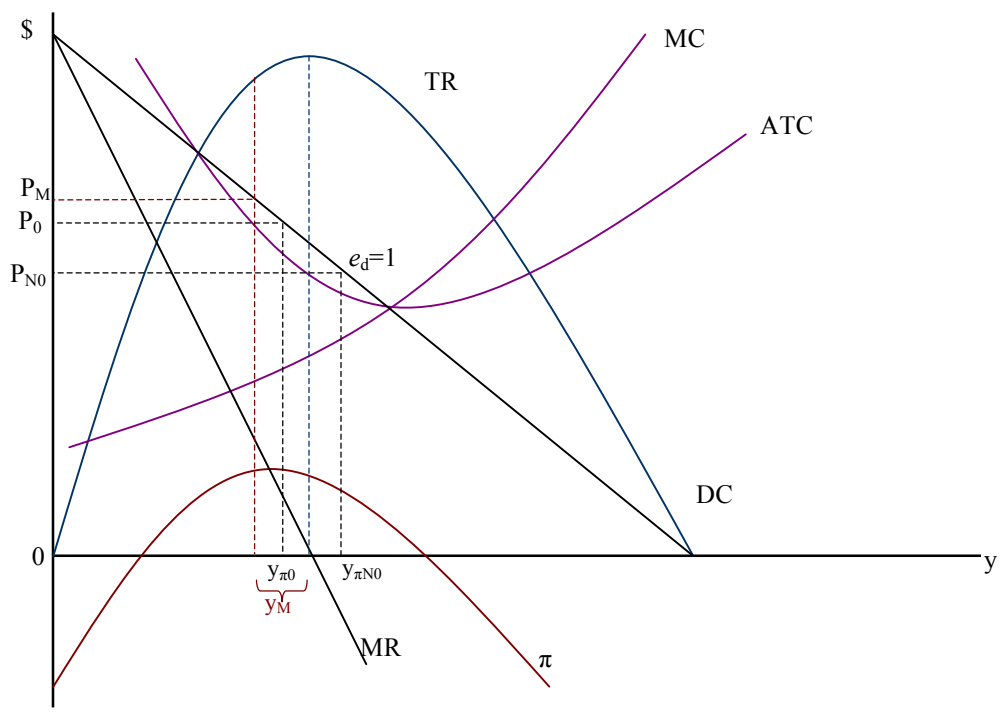
(a) For profit maximization, we have MR = MC or $a - 2by = 4y \rightarrow y = a/4 + 2b$, and
$p = a - ba/4 + 2b$

(b) So as long as $y_c > \dfrac{a}{4 + 2b}$, and
$\Pi_c < \Pi_{pm} = 4a2 = ba^2/(4+2b)^2 - 2a^2/(4+2b)^2 = 2a^2+ba/(4+2b)^2$

Then sales maximization is different from profit maximization.

(8) Diagram

Figure 23.1 [problem with diagram]



(9) How does everything change relative to the profit maximizing firm when fixed costs change, an lump-sum tax imposed, a sales tax imposed, variable costs change, or demand shifts.
d. Single-product Firm With Advertising
(1) The essential assumption is that advertising expands sales; thus the more advertising the more sales revenue; this is done by advertising shifting out the demand curve.

(2) The importance of advertising is that it makes the profit constraint always operative; this can be seen in the following manner:

(a) assuming $\Pi_c < \Pi_m$ and that Sales Revenues are to be maximized;

(b) demand curve for the firm $p = a + v - by$, where a, b are given and v is the effect of advertising;

hence, $TR = py = ay + vy - bY^2$ and 'MR' is

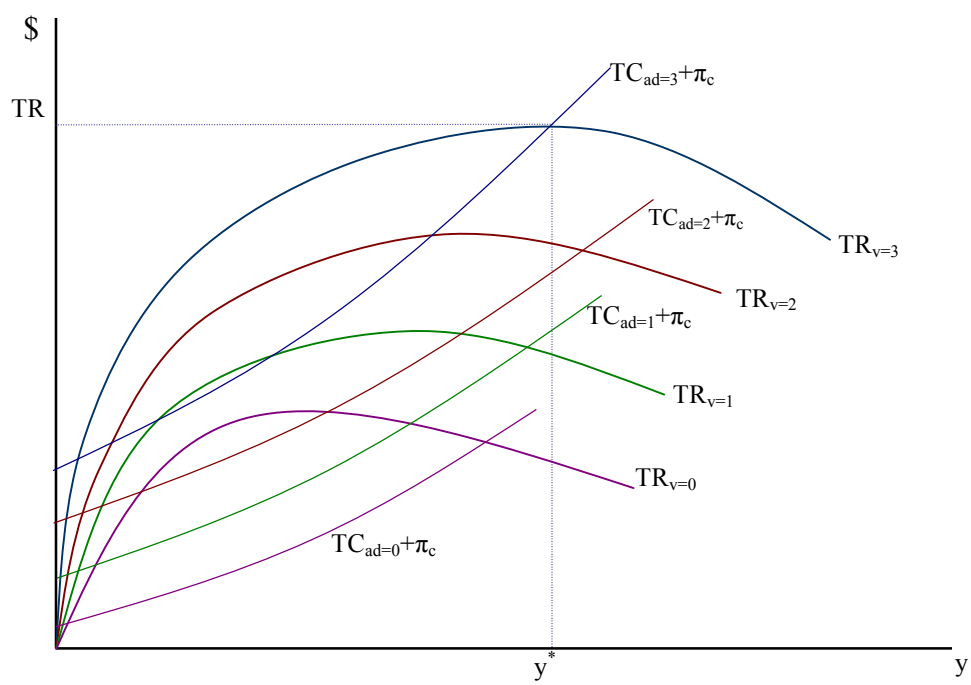
'MR' $= a + v - 2by = a - 2by + v = MR + v$

(c) total cost curve for the firm is $TC = c + ad + 2y^2$ where ad is a fixed cost for advertising, and $MC = 4y$

(d) the firm will increase advertising cost to increase sales to the point where

$\Pi_c = TR - TC$ or $TR = TC + \Pi_c$

Figure 23.2



(d) That is firm equilibrium occurs when
$TR - TC - \Pi_c = 0$ and
'MR' $= 0$ or
$ay + vy - by^2 - c\,ad - 2y^2 - \Pi_c = 0$

$a - 2by + v = 0$

Assuming ad = v we have two equations and two unknown (y & v)) which can be solved for.

(e) In equilibrium MC > 'MR' = 0 MC> MR where MR < 0 since v > 0;
As for price we have the following relationship:

$$p = \frac{TC + \Pi}{Y} = c + ad + \frac{2y2}{y} > 0$$

Now, $c + ad + 2y^2/y = 4y$, i.e. MC = ATC,

or $c + ad + 2y^2/y = 4y^2$ or

$c + ad = 2y^2$ or

$$\left(\frac{c + ad}{2}\right)^{1/2} = y_m$$

Since it can be shown that $y^* > y_m$ then

$MC(y^*) > ATC(y^*) = p$ so,

$MC > p > MR = 0$

e. Multiproduct Model – do yourself

f. Dynamic Model

(1) Maximizing growth of Sales Revenue over time via internal funds (profits)

(2) The growth of Sales Revenue can be depicted as:

$$S + R + R(1 + g) + R(1 + g)^2 + \ldots R(1 + g)^n$$

(3) The present discounted value of this stream is

$$S = R + R\left[\frac{1+g}{1+i}\right] + R\left[\frac{1+g}{1+i}\right]^2 + \ldots + \left[\frac{1+g}{1+i}\right]^n$$

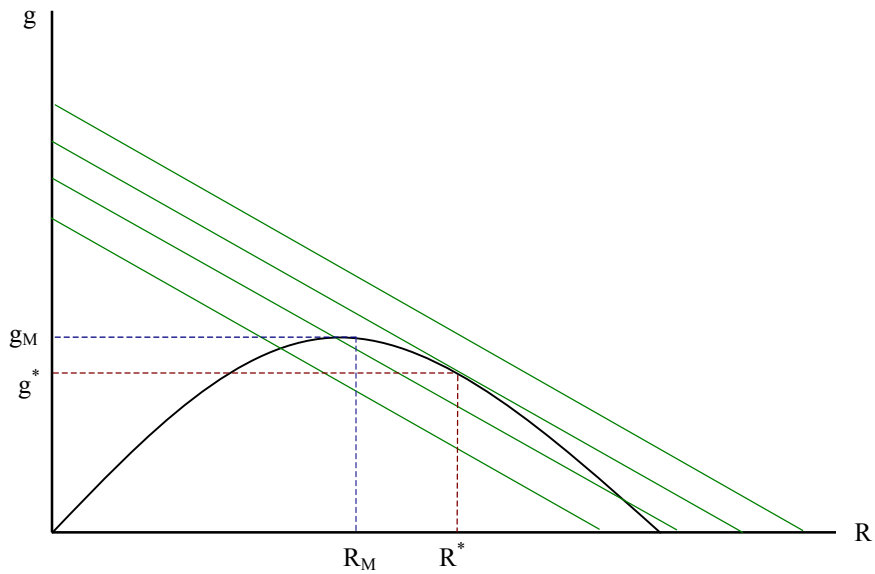
$$S = \sum_{t=0}^{n} R\left[\frac{1+g}{1+i}\right]^n$$ where *g* is growth rate,

i is subjective rate of discount and is exogenously determined.

(4) So what the firm has to do is to chose the initial R and *g* that will maximize S; this can be done as follows:

(i) a relationship between R and g can be depicted as:

Figure 23.3



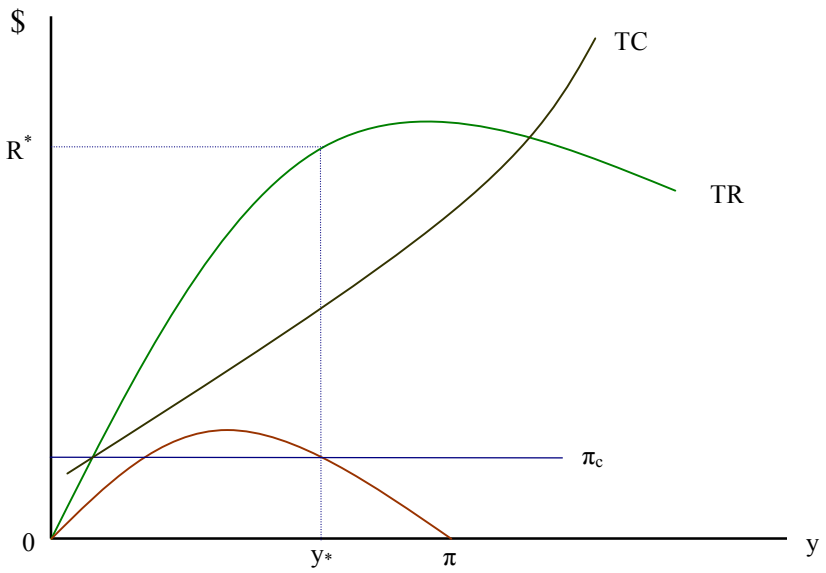
(ii) an iso-present value curve can be drawn:

S = ag + bR where a, b are given

Hence for different given values of S a set of different lines can be drawn; where S_I is tangent to the R-g curve the g^*R^* can be found.

(iii) Since R^* is known it is possible to derive p & y for the firm at the initial start:

Figure 23.4



And $p = \dfrac{R^*}{yR^*}$

<u>Growth Maximizing Model</u>

Morris's Model of the Managerial Enterprise

<u>Managerial Discretion Model</u>

<u>End of Interest in these Models</u>

CHAPTER 24

NATURE OF THE NEOCLASSICAL FIRM: TRANSACTION COSTS, CONTRACTS, AND RESOURCES

CHAPTER 25

GAME THEORY

Introduction

Oligopoly Models of Conjectural Variation

Game Theory

CHAPTER 26

CONTROVERSIES AND CRITICISMS

Introduction

Developments in oligopoly theory were in part driven by particular issues/controversies. Two controversies that are important concerned the determination of prices and price stability; then there is the cost curve controversy. Another one is the issue of profit maximization which was in part dealt with in Chapter 4, but will also be dealt with in this chapter. In this Chapter we shall deal with the controversies regarding price determination, price stability and maximization. These controversies emerged in the 1930s and continued into the 1970s; and then they emerged in the 1990s and continue to the present day. They emerged because the empirical evidence about prices contradicted economic theory.

Background: Empirical Evidence on Inflexible Prices and Price Determination

Introduction

To adequately understand these controversies, it is necessary to look at the tumultuous years of the 1930s. With the implementation of the National Industrial Recovery Act (1933) and the Agricultural Adjustment Act (1933), government officials began generating vast amounts of statistical data on prices and detailed descriptions of price setting procedures and price policies used by firms. For example, members of the National Recovery Administration (NRA) Consumer's Advisory Board and Research and Planning Division produced statistical data showing that prices under the NRA had become relatively more stable compared to pre-NRA prices. Concurrently, G. C. Means and other officials of the Agricultural Adjustment Administration argued that the codes of fair competition under the NRA reinforced the stability of industrial prices already made stable by the firm's strong technological base, which grew out of its scale of production and the relative concentration of the manufacturing industries.

As a result, they argued, prices in the economy were grossly misaligned, hence promoting the accumulation of excess savings, the failure of mass purchasing power, and the resulting decline in private investment opportunities and prolonging of the depression. Finally, in 1934, Roosevelt established a Cabinet Committee on Price Policy; under the guidance of Walton Hamilton it carried out a number of detailed studies of prices and price policies and eventually published them in 1938.

In the light of this data, there emerged two economic policy proposals that in turn generated additional data on prices, price setting procedures, and price policies used by firms. On the one hand, Means accepted the phenomena of stable prices, which he called administered prices, as inherent in the modern economy, even though they contributed greatly to the depression. He believed that national economic planning would alleviate the problem. Consequently, when he became director of the industrial section of the National Resources Committee in 1935, he embarked on a series of investigations that would lead to guidelines and some basic data necessary for effective planning. In particular, he investigated "the structure of prices in order to discover . . . the extent to which they do in fact contribute to full and effective use of resources" [Means 1939, p. 122]. On the other hand, the neo-Brandeisians accepted Mean's analysis of administered prices, but advocated a rather different remedy. That is, Means argued that administered prices emerged in industries in which firms had developed structures of production that limited the economic space in the industry available to competing firms and that were most efficiently operated if the market price was stable and they administered it. The neo-Brandeisians, however, did not believe that industrial concentration was based on the firms' productive structure; rather they believed it emerged from unsavory business practices. Hence, since administered prices were found in concentrated industries and were the principal cause for the continuation of the depression, they advocated the use of antitrust laws to break up the concentrated industries so that prices could become flexible and prosperity could be restored. This program for action gave rise to a variety of

inquiries into the present status of competition and prices conducted by government, private organizations, and economists and to the administered price-concentration controversy. More importantly it resulted in the establishment in 1939 of the Temporary National Economic Committee (TNEC). In the hearings and monographs that followed, politicians and economists alike were treated to a rich descriptive and statistical analysis of prices, pricing, and price policies.

Concurrently with the events described above, data on prices, price policies, and price setting procedures were being brought to light else-where. Concern over the emerging dominance of the chain stores and the increasing requests for and proliferation of fair trade laws resulted in a number of detailed studies of prices, price policies, and pricing procedures used by firms. In addition the concern with basing point pricing generated a great deal of price-related information. Finally, individual economists undertook detailed investigations of specific industries and firms, and of economic acts such as sales taxes that have a direct impact on firms. From their work emerged information specific to pricing procedures and price policies used by firms. With the emergence of the above data, economists began to realize by the late 1930s that a wide gap existed between their theory of prices and the real world of prices and pricing. [More discussion—also UK]

Bureau of Labor Statistics Wholesale Prices, 1890 - 1925

The first federal bureau of labor statistics began as the Bureau of Labor in the Department of the Interior in 1884. Four years later, the Bureau itself became the Department of Labor. Then in 1903, it reverted to being the Bureau of Labor in the newly created Department of Commerce and Labor; and finally in 1913 the current-day Department of Labor was created in which the Bureau of Labor became the Bureau of Labor Statistics. In 1890 - 1891, the Senate Finance Committee conducted an investigation of imports and tariffs and requested the Department of Labor to undertake a comprehensive survey of the prices of domestic and imported goods which was published in 1893.

Later in 1900 it compiled and published the wholesale price figures for 1890 to 1899. Then in response to the growing demand for price statistics, the Department in 1901 - 1902 undertook the compiling and publishing of wholesale price data for the period from January 1890 to December 1901. This latter collection became the basis for the collection of wholesale prices by the Department and later the Bureau of Labor Statistics. [Clague, 1968; BLS, 1902; and BLS, 1922]

In 1901 - 1902, price data was collected on 261 products, with 250 series of quotations secured for the entire period and an additional eleven for some portion of the period, arranged into ten product groups--see Table 26.1. In addition, the products for which the price series were collected were precisely defined and a single price series was obtained for each. The basis on which prices were collected ranged from weekly to monthly to yearly, as also noted in Table 26.1; and the price quotations ranged from a single day in the week, month or year, to an average for the week, month, or year, and to the range for

Table 26.1

Price Statistics

Product Groups	Number of Products	Frequency of Price Quotes		
		Weekly	Monthly	Annual
Farm Products	16	13	3	-
Foods	54	22	32	-
Hides and Leather Products	9	-	9	-
Textile Products	67	1	54	12
Fuel and Lighting Materials	13	1	12	-
Metals and Metal Products	39	-	39	-
Building Material	27	-	25	2
Chemical and Drugs	9	-	9	-
Housefurnishing Goods	14	-	12	2
Miscellaneous	13	1	12	-
Total	261	38	207	16

the week--see Table 26.2. Given the manner in which the prices were collected, the frequency with which they changed and hence their categorization as administered or market prices can be determined.[2]

Table 26.2

Types of Price Quotations by Product Group

Product Groups	Weekly Range	Average Week/ Month	Annual	Weekly Day	Monthly Day
Farm Products	1	-	-	12	3
Foods	1	2	-	20	31
Hides and Leather Products	-	-	-	-	9
Textile Products	-	1	12	-	54
Fuel and Lighting Materials	-	5	-	1	7
Metals and Metal Products	-	9	-	-	30
Building Material	-	-	2	-	25
Chemical and Drugs	-	-	-	-	9
Housefurnishing Goods	-	-	2	-	12
Miscellaneous	-	1	-	-	12
Total	2	18	16	33	192

Of the 261 price series, thirty-six series based on annual, average, or range of prices are discarded. Further, of the possible 225 weekly and monthly price series left, eleven are discarded because of too many absences of weekly or monthly price quotations[3] or because the product was not sufficiently homogeneous for the time period. Finally, to homogenize the series of price quotations so as to convey the same information with regard to frequency of price changes, the weekly price series are converted to monthly ones.[4] Given the above corrections to the price series data, the frequency of price change for the remaining 214 price series is calculated and are categorized as market price, administered price, or neither. The results of the exercise are that of the 214 prices, 110 are classified as administered while 48 are classified as market. The distribution of market and administered prices among the product groups is given in Table 26.3. It should be noted that although market prices are located in seven

Table 26.3
Distribution of Market Prices and Administered Prices
by Product Group, 1890 - 1901

Product Groups	Administered Prices	Market Prices	Total Number of Products
Farm Products	0	15	15
Foods	12	16	48
Hides and Leather Products	6	0	8
Textile Products	34	4	51
Fuel and Lighting Materials	4	0	7
Metals and Metal Products	17	6	28
Building Material	15	3	24
Chemical and Drugs	5	2	9
Housefurnishing Goods	12	0	12
Miscellaneous	5	2	12
Total	110	48	214

of the ten product groups, 65% are found in the Farm and Food Products product groups; on the other hand, administered prices are not found among farm products and that they occur less frequently than market prices in the foods product group. It can also be seen that administered prices dominant the other product groups.

A further empirical characteristic of administered prices is that they do not change for significant periods of time. With regard to the 110 administered-price products, 104 had prices which did not change for at least twelve consecutive months while 45 products had prices which did not change for at least thirty-six consecutive months.[5] Finally, 85% of the market-price price series were derived from trade journals and newspapers while only 34% of the administered-price price series were derived from such sources; on the other hand, 66% of the administered-price price series were derived from enterprises where as only 8% of market prices were. This division supports Means's position that market prices reported in trade journals are generally associated with commodity markets where the prices are made by a particular institutional arrangement whereas administered prices are most closely associated with the business enterprise determining the price and then administering it to the market. Thus the difference between the two types of prices, Means argued, lies in the mechanism by which they are determined and this in turn is determined by the particular market pricing mechanism in place--either the enterprises or organized markets. [Department of Labor, 1902]

The distinction between administered and market prices based on frequency of price change as well as their distribution by product group noted above remained a characteristic of the prices collected by the BLS for the next twenty-five years to 1925. In his study of the behavior of BLS prices, Frederick Mills calculated their frequency of monthly price changes for the periods 1890-97, 1898-1905, 1906-13, 1914-21, 1922-25, and 1890-1925. The distribution location of administered and market prices which emerged from his work--see Table 26.4--is basically the same as that in Table 26.3. In addition, a survey of the BLS prices for

Table 26.4
Indexes of Frequency of Change in Monthly Commodity Prices at Wholesale, 1890 - 1925, by Periods

Product Groups	Total # Products	1890-97		1898-1905		1906-13		1914-21		1922-25		1890-1925	
		MP	AP	MP	AP	MP	AP	MP	AP	MP	AP	MP	AP
Farm	24	21	0	20	0	21	0	21	0	21	0	21	0
Foods	39	25	8	23	6	19	10	22	6	23	8	21	8
Hides & Leather	8	0	4	0	6	0	5	0	0	0	5	0	3
Textile	33	5	20	4	17	4	18	6	6	9	14	7	17
Fuel & Lighting	11	5	2	4	1	4	3	4	0	5	0	4	0
Metals & Metal	34	9	17	9	15	8	15	5	14	14	14	9	14
Building	20	3	12	2	12	3	11	4	6	6	11	2	9
Chemical & Drugs	11	3	5	2	5	2	7	1	2	1	7	2	5
House-furnishing	15	0	14	0	13	0	15	0	9	0	14	0	13
Misc.	9	1	4	1	4	2	4	3	2	3	3	1	4
Total	204	72	86	65	79	63	88	66	45	82	76	67	73

[Derived from Mills (1927), Table VIII, pp. 502 - 506.]

frequency of price changes for the period 1920 to 1925 by the Federal Trade Commission revealed the same distinction between and distribution of market and administered prices--see Table 26.5. The same survey also showed that 93% of the administered prices did not

Table 26.5
Distribution of Market Prices and Administered Prices
by Product Group, January 1920 - December 1925

Product Groups	Administered Prices	Market Prices	Total Number of Products
Farm Products	0	21	23
Foods	7	26	49
Hides and Leather Products	10	0	17
Textile Products	14	6	30
Fuel and Lighting Materials	0	3	8
Metals and Metal Products	6	14	38
Building Material	9	8	23
Chemical and Drugs	10	7	32
Housefurnishing Goods	24	2	27
Miscellaneous	8	6	19
Total	84	101	266

[Derived from Federal Trade Commission (1929), Appendix C]

change for at least twelve consecutive months over the six year period, while 32% did not change for at least twenty-four consecutive months over the six year period; and that 65% of the market prices did not change for at least four months over the six year period. Finally, a study of Portland cement prices using BLS price data supplemented by other records reinforces the above empirical evidence that even prices which are not classified as administered prices can be maintained for twelve months or longer.[6] Thus the pre-1926 BLS wholesale price data supports the existence based on frequency of price change of a bifurcated price system consisting of administered and market prices and the empirical property of administered prices (as well as others) that they remain unchanged for periods of twelve months or longer.[7] [Mills, 1927; Federal Trade Commission, 1929; and Willis and Byers, 1924]

Means Data on Price Inflexibility

Means statistical research on the size and dominance of the modern corporation led him to question the neoclassical supply and demand explanation of market prices. Means noted that the modern corporation administered its economic activities. Internally, it administered its productive activities while externally it administered its prices to the market. Consequently, in an economy dominated by the large modern corporation, the character of the market altered in that the market price became a matter of administration rather than a matter of trading. Thus Means became concerned with the theoretical questions of how an administered price market operated and how its operation differed from the operation of a trading market (or supply and demand market) assumed in neoclassical price theory. He answered both questions by arguing that in an administered price market prices were fixed by administrative fiat before transactions occurred and held constant for periods of time and hence for sequential series of transactions, and that supply and demand never equated except by coincidence.

In 1934 Means undertook an empirical investigation into what he termed was *administered prices*. The data he examined was the Bureau of Labor Statistics (BLS) wholesale price data for the period 1926 to 1933. When Means started his empirical work on administered prices in 1934, the BLS collected price data on 784 products that were grouped into ten product categories, with forty-five sub-group categories--see Table 26.6. Even though some of the 784 products were composite products while others were not comparable from year to year and thus not suitable for Means's purposes, most of

Table 26.6

Product Groups and Sub-Groups in the BLS Wholesale Price Series

Farm Products
- Grains
- Livestock and poultry
- Other farm products

Foods
- Butter, cheese and milk
- Cereal products
- Fruits and vegetables

Metals and Metal Products
- Agricultural implements
- Iron and steel
- Motor vehicles
- Nonferrous metals
- Plumbing and heating

Building Material
- Brick and tile

- Meats
- Other foods

Hides and Leather Products
- Boots and shoes
- Hides and skins
- Leather
- Other leather products

Textile Products
- Clothing
- Cotton goods
- Knit goods
- Silk and rayon
- Woolen and worsted goods
- Other textile products

Fuel and Lighting Materials
- Anthracite
- Bituminous coal
- Coke
- Electricity
- Gas
- Petroleum products
- Cement
- Lumber
- Paint and paint materials
- Other building materials

Chemicals and Drugs
- Chemicals
- Drugs and pharmaceuticals
- Fertilizer materials
- Mixed fertilizers

Housefurnishing Goods
- Furnishings
- Furniture

Miscellaneous
- Automobile tires and tubes
- Cattle feed
- Paper and pulp
- Rubber, crude
- Other miscellaneous

them, being highly specific and comparable over time, were. The source of the price quotations, or what the BLS called the price reporter, included trade journals, enterprises or sales agents, boards of trade, trade associations, and Federal or state bureaus. Further, while each product had at least one price reporter a number had more than one from which the BLS obtained their price data. Later Means refined the data so that he came up with 617 useable products.

To use the data for identifying administered and market prices, Means assumed that a series of transactions took place within the market each month. Thus if the reported price remained the same from month to month, he assumed that the reported price did not vary with every transaction and in fact was held constant for a long series of sequential transactions. And for those prices that changed from month to month, he assumed that they varied with nearly every transaction. The second assumption Means made was that the prices reported to the BLS closely represented the pricing approach of the enterprises who produced and sold the product in question. That is, in markets where prices changed relatively infrequently, Means assumed that the enterprises set their prices and maintained them for a long series of sequential transactions; and in markets where prices changed relatively frequently, he

assumed that the prices were made in the market. With the frequency of price change data and the two assumptions in hand, Means concluded that those BLS wholesale prices which changed relatively infrequently were administered prices and those which changed quite frequently were market prices. However because of the inadequate nature of the data used, Means could not with any degree of assurance identify the BLS prices which fell between the two extremes as flexible administered prices--he simply left them unnamed.

Classifying the 617 BLS products according to their frequency of price change, those with twenty-four or less monthly price changes in eight years are identified as administered-price products and those with seventy-three or more monthly price changes are identified as market-price products.[15] Table 26.7 presents the U-shaped distribution of the 617 products by product groups according to the frequency of price change and shows the existence of 332 administered and 131 market prices.

Table 26.7

Products Classified According to Product Group and the Number of Monthly Price Changes 1926 - 1933

Number of Price Changes	Farm Products	Foods	Hides and Leather Products	Textile Products	Fuel and Lighting	Metals and Metal Products
			Number of Products			
Total	38	93	26	80	18	116
0	0	0	0	0	0	4
1 - 12	0	11	9	13	0	50
13 - 24	1	12	7	28	3	19
25 - 36	2	8	1	12	1	14
37 - 48	0	7	1	4	5	7
49 - 60	0	11	1	4	2	1
61 - 72	3	5	1	5	0	12
73 - 84	4	8	2	3	1	4
85 - 94	15	24	3	10	6	3
95	13	7	1	1	0	2

Number of Price Changes	Building Materials	Chem-icals and Drugs	House-furn-ishing Goods	Mis-cell-aneous	All Pro-ducts	% of Total
			Number of Products			
Total	81	84	36	45	617	100.00
0	1	1	1	0	7	1.10
1 - 12	35	36	23	21	198	32.09
13 - 24	16	26	8	7	127	20.58
25 - 36	7	3	0	6	54	8.75
37 - 48	7	8	3	1	44	7.13
49 - 60	1	3	1	2	26	4.21
61 - 72	2	2	0	0	30	4.86
73 - 84	1	0	0	2	25	4.05
85 - 94	10	4	0	5	80	12.97
95	1	0	0	1	26	4.21

Table 6.8 shows that administered prices are mostly found in the manufacturing dominated product groups while market prices are mostly found in the two product groups dominated by agriculture products.

Table 26.8

Percentage Distribution of Market and Administered Prices Among Product Groups

	Administered Prices	Market Prices
Farm Products	2.63	84.21
Foods	24.73	41.93
Hides and Leather Products	61.54	23.08
Textile Products	51.25	17.50
Fuel and Lighting	16.67	38.89
Metals and Metal Products	62.93	6.89
Building Materials	64.20	14.81
Chemicals and Drugs ...	75.00	4.76
Housefurnishing Goods .	88.89	0
Miscellaneous	62.22	17.78
Total.....	53.81	21.23

Thus Means's data indicates that the American economy has a bifurcated price system of administered and market prices, and that administered prices are found predominantly in the manufacturing sector and market prices found in the agricultural and other non-manufacturing sectors.

The frequency of price change represented, for Means, the degree of administrative control enterprises had over their prices. By having control over prices the large corporation also had the capability of maintaining prices when demand or sales declined. So Means argued that administered prices were associated with small changes in the price when demand fell while market prices were associated with large changes in the price when demand fell—and the empirical evidence supports this—see Tables 26.9 and 26.10. The Tables show that for the 1929 – 1932 economic decline more than eighty percent of the administered-price products had a price decline of thirty percent or less, while more than eighty percent of the market-price products suffered price declines of forty percent or more, thus clearly indicating there is a significant gross difference of administrative control between administered and market prices.

Table 26.9

Administered Prices

	Percentage of Price Change, 1929 - 1932 1929 = 100								
Product Groups	>0	0	1-10	11-20	21-30	31-40	41-50	51-60	61-70
Farm Products					1				
Foods	2	1	6	5	2	5	2		
Hides and Leather Products			2	6	5	3			
Textiles	1		5	4	11	11	8	1	
Fuel and Lighting Materials			2		1				
Metal and Metal Products	3	11	30	15	9	3	2		
Building Materials	3	3	7	22	9	5	2		1
Chemicals and Drugs	12	12	11	17	5	4	1	1	
House Furnishing Goods	1	4	2	9	8	7	1		

Miscellaneous	3	3	5	6	7	2	2		
Total	25	34	70	84	58	40	18	2	1
% of total items	8	10	21	25	17	12	5	1	0

Table 6.10

Market Prices

	Percentage of Price Change, 1929 to 1932 1929 = 100							
Product Groups	>0	0	21-30	31-40	41-50	51-60	61-70	71-90
Farm Products	1		1	3	6	12	7	2
Foods	1		2	2	15	10	8	1
Hides and Leather Products					1		4	1
Textiles					3	9	2	
Fuel and Lighting Products			2	3	1		1	
Metals and Metal Products				1	3	4	1	
Building Materials			2	2	3	3	1	1
Chemicals and Drugs				1	1		2	
Miscellaneous				1	2	1	3	1
Total	2	0	7	13	35	39	29	6
% of Total Items	2	0	5	10	27	29	22	5

The second relationship Means sought to establish was the existence of an inverse relationship between frequency of price change-magnitude of price change and magnitude of production change. In particular, he argued that for an economic decline, administered-price products would have greater production declines relative to the production declines of market-price products; and for an economic recovery, administered-price products would have greater production increases relative to market-price products. The evidence he collected showed that for the 1929 - 1932 decline, production declines were generally the greatest and prices declines the lowest for product groups and sub-groups dominated by administered prices, while production declines were generally the lowest and price declines the greatest for product groups and sub-groups dominated by market prices—see Table 26.11. Thus for Means, it was

Table 26.11
Relation Between Administered Prices, Market Prices, and Price and Production Declines by Product and/or Sub-Product Groups

Product Group or Sub-Group	Price Type	1929 - 1932 Decline MPC	MPrC
Farm Products	MP	54	1
Foods	MP	39	10
Petroleum Products	MP	36	17
Knit Goods	AP	42	5
Textiles	AP	39	28
Leather	AP	33	18
Paint & Paint Materials	AP	24	45
Paper and Pulp	AP	24	27
Clothing	AP	23	17
Fertilizer Materials	AP	23	51
Shoes	AP	21	33
Coke	AP	16	62
Iron and Steel	AP	16	76
Cement	AP	16	55
Chemicals	AP	15	38
Agricultural Implements	AP	14	84

because of the existence of the large modern corporation with its control over prices that the depression not only occurred by stayed around. Because administered prices did not adjust when demand declined, the brunt of the demand decline was carried out in terms of a decline in sales and hence increased unemployment. Consequently recovery from the depression would not come about by a fall in prices but by stimulating output.

Similarly to the detailed empirical evidence he provided for the existence of administered prices, Means relied on extensive empirical evidence to support the argument that administrative control over prices was grounded in enterprise size and market and absolute concentration. More specifically, Means argued that there was a discontinuous relationship between administrative control and size and concentration. Thus the absence of control was associated with very small enterprises and the absence of any concentration; while the existence of control was associated with relatively large enterprises and

relatively high degree of market and absolute concentration. The evidence he provided to empirically ground the discontinuous relationship included the employment, production, and asset figures on the largest two hundred non-financial corporations; the fact that in 1933 the largest two hundred non-financial corporations control fifty-seven percent of all non-financial corporation assets; and the concentration of industry sales among the four largest enterprises (as a proxy for market concentration). With regard to industry concentration, working with 1935 Bureau of Census data, Means and his co-worker Grace Knott produced for the first time four industry concentration ratios for the manufacturing sector of the American economy. Although the concentration ratios ranged from 1.4% for the women's, misses' and children's apparel industry to 92% for the chewing gum industry, Means considered all the manufacturing industries relatively concentrated relative to the cotton industry, for example, in which the largest four farms produced only .14% of the output. Furthermore, in 1935 there existed less than 170,000 separate manufacturing enterprises, whereas in the cotton industry alone there existed 4,850,000 farms. With the apparel industry ten times more concentrated than the cotton industry and the total number of manufacturing enterprises less than 4% the number of cotton farms implying that the former were on average very much larger than the latter, he concluded that generally all manufacturing enterprises had some degree of administrative control over prices relative to the cotton farmers which had virtually none. Extending the contrast to over industries and markets, Means felt that all enterprises in manufacturing, retail distribution, and customer service industries had at least some degree of administrative control over prices while enterprises in agricultural, construction, and some natural resources industries had none.

Determining Prices at the Level of the Business Enterprise

Between 1935 and 1939, Hall and Hitch and the economists at Oxford interviewed businessmen as to how they set their prices and whether they changed their prices with respect to changes in short

period demand. The answers they received were the following. First, with regard to price setting, the businessmen set their prices by marking up their normal average total costs. The Oxford economists called this price the *full cost price*, and the procedures used to obtain it *full cost pricing procedures*. From their interviews with the businessmen, the Oxford economists also found out the following: (1) all the businessmen inhibited oligopoly markets; (2) the businessmen would not charge more than the full cost price because their competitors would not also increase their prices, and as a result, they would lose a significant amount of their sales; (3) the businessmen would not charge less than the full cost price because their competitors would follow suit and, as a result, their total revenue would decline since the fall in price would not be compensated for by an increase in sales; and (4) because of these reasons, the businessmen stated that they would not change their full cost price if demand increase above the given level of output or if it fell below the given level of output. That is the businessmen argued that full cost price prices are *stable prices* as opposed to *flexible prices*. [MORE]

Marginalist Explanation of Stable Prices, 1930s

Introduction

During the 1930s it became clear to economists that a majority of prices in the economy were sticky or inflexible to variations in demand (or sales); and it also became clear to economists that these same prices were not determined in markets but were administered to the market by the firm (or business enterprise); and finally, economists realized that the inflexible administered prices so as to not maximize prices. What was upsetting about these emerging 'facts' about prices was their apparent theoretical incompatibility with the marginalist pricing model and hence marginalist prices developed by Robinson, Chamberlin, Abba Lerner (1934). Thus, significant effort was devoted to finding a way that the marginalist pricing model could explain inflexible administered prices. To do this it was necessary to argue that they were based on monopoly power, as represented by the divergence of marginal cost

from the price. This was accomplished when Galbraith (1936), Wallace (1936), and Mason (1936) assumed that the price-production behavior of administered prices could only occur if business enterprises had at least some monopoly power when it came to setting prices. Thus, it became possible to directly use the marginalist pricing model or elements of market structure as proxies for components of the model to explain inflexible administered prices.

Direct Marginalism

As noted in chapter 2, the marginalist pricing model can be depicted as $p = MC/(1 - 1/e_d)$. As long as market conditions were stable, marginal costs and price elasticity of demand would not changed, with the result that the price would remain unchanged. However, if *demand* changed, the resulting change in the price would depend on the changes in MC and e_d. After arguing that inflexible administered prices were based on monopoly power, Galbraith proceeded to adopt Robinson's marginalist pricing model to explain inflexible prices. Assuming increasing marginal costs, he argued that for the price in the new equilibrium position to be unchanged when the demand curve shifted leftward, the price elasticity of demand would have to decrease to offset the decline in marginal costs. Galbraith further argued that in the traverse from the old to the new equilibrium position, the interdependent relationship between competitors in monopolistic industries would convince the enterprise not alter its price. Thus, during the traverse the enterprise would rationally be foregoing any price changes and hence not be maximizing short period profits in order to maximize long period profits.

The Robinson-Galbraith pricing model was widely adopted, although at times implicitly, to explain inflexibility of administered prices, especially with regard to the flexibility of competitive prices, in face of demand changes. What emerged paradoxically from the research was the result, which was widely accepted by economists in the 1930s as well as in the subsequent decades, that monopolistic prices were no less flexible than competitive prices and perhaps more so. That is, for a given increasing

marginal cost curve, price flexibility depended on the movement of marginal costs vis-a-vis shifts in demand and the price elasticity of demand over the business cycle. Thus, Galbraith's argument for price inflexibility in face of changes in demand was viewed as depending on particular off-setting movements of marginal costs and price elasticity of demand which need not be accepted and thus could not be generalized. However, in contrast to Galbraith, Scitovsky (1941) argued that the price elasticity of demand varied inversely with demand thus making prices flexible. Hence, other factors needed to be introduced in order to explain price inflexibility. For example, it was suggested that the durability of the product could affect both the degree of shift of the demand curve and the price elasticity of demand in a manner that would contribute toward making its price inflexible. However these rather imprecise suggestions were gradually swept aside as various arguments emerged making strong arguments regarding the shape of the demand curve, the price elasticity of demand, and the shape of the marginal cost curve.

Working with Lerner's degree of monopoly, Galbraith (1939) followed up his earlier argument of long period maximization with the more precise argument that continuous short period profit maximization by an enterprise would not, except by accident, result in long period maximization of profits. Thus, he argued that the time horizon of the enterprise was longer than the short period with the result that the business enterprise focused of maximizing long period profits and hence on the long period demand curve and the long period degree of monopoly. Consequently, the enterprise used the long period degree of monopoly (or price elasticity of demand) when setting its sequence of 'short period prices,' with the result that the price elasticity of demand component in the short period price determination was constant. Complementing Galbraith's argument, Kenneth Matheson (1940) argued that the price elasticity of demand should be constant throughout the demand curve, while Neal (1942) argued "that, due to market imperfection--usual customer relationships, etc.--demand curves will be iso-

elastic (Neal, 1942, p. 50)." As for the marginal cost curve, from 1936 to 1942 empirical studies of various degrees of adequacy suggested that it was constant at least over the relevant output range.[23] In spite of numerous critical commentaries at the time warning economists not to wholeheartedly believe the results,[24] economists interested in the issue of price determination and inflexible prices quickly came to accept them. They then in turn invoked the constancy of marginal costs when dealing with the issue of price determination. As the arguments for constant price elasticity of demand and constant marginal cost curves became accepted, the step of combining them to explain price inflexibility under depressed conditions came fairly quickly and with an air dispassionate finality:

> One interesting consequence of the possibility of constant marginal costs in the 'usual' output range may be noted in connection with some of the labored explanations of rigid prices presented for depression periods. Many examples of explanations of inflexible prices may prove to be simple cases of nearly constant marginal costs combined with demand and marginal revenue curves which are shifted sharply to the left without noticeable change in elasticity by depression conditions. [Rowntree, 1941, p. 337]

Thus, the conclusion of the direct marginalism approach was that, with the constancy of the price elasticity of demand and a constant marginal cost curve accepted, the marginalist pricing model could explain inflexible prices. [Robinson, 1938; Mason, 1936; Humphrey, 1937; Wallace, 1936; Matheson, 1940; Stigler, 1940; Scitovsky, 1941; Rowntree, 1941; Reynolds, 1942; and Neal, 1942]

Marginalist Mark Up Pricing Model

---

[23]For example, see Reynolds and Learned (1938), Dean (1940 and 1976), and Ezekiel and Wylie (1940).

[24]For example, see Stigler (1940), Staehle (1942), Dean (1942), and Committee on Price Determination for the Conference on Price Research (1943). The motivation for this questioning attitude was, at least for Stigler, the desire to shield neoclassical economic theory and its explanation of distribution from criticism (Yordon, 1992).

Reacting to the empirical evidence that enterprises set prices by marking up costs at normal output, economists set about developing a marginalist version of mark up pricing/normal cost pricing. The starting position is that $MR = p_{yi}(1 - 1/e_d)$ where e_d is the price elasticity of demand and is negative. Since in equilibrium, MR = MC a relationship between p_{yi}^e, MC, and e_d can be restated as as a mark up on costs: $p_{yi}^e = MC/(1 - 1/e_d) = MC[e_d/(e_d - 1)] = MC[1 + 1/(e_d - 1)] = MC(1 + k)$, where $k = 1/(e_d - 1)$. As noted above, the marginalist pricing model does not generate stable prices in face of demand changes unless marginal costs and the price elasticity of demand are precisely specified. For example, to have stable prices with increasing marginal costs, then e_d must be procyclical to produce a counter-cyclical k.

The mainstream economists, who were confronting the issue of inflexible prices, were quite aware that business enterprises set their prices using normal cost and mark up pricing procedures. Due in part to the post-war marginalist controversy, they were also well aware that their marginalist pricing model and the pricing procedures might be quite incompatible. However, by the early 1950s, a consensus emerged regarding the constancy of marginal costs and the extent to which the profit mark up was sufficiently demand-influenced so as to make it amenable to marginal analysis. Therefore, given the increasing tendency towards formalization after 1945, the mark up/full cost/normal cost pricing procedures were transformed in a marginalist pricing model:

$$p = [cadc][1 + g][1 + r]$$
$$= [cmc][1 + k]$$
$$= [cmc][1 + 1/(e_d - 1)]$$

where cadc is constant average direct costs;

cmc is constant marginal costs;

g is the percentage mark up for average indirect costs at expected or normal output;

r is the percentage mark up for profit; and

k is the mark up for gross profit.

Although the marginalist pricing model was made more 'realistic' by recasting it in the form of a marking up pricing procedure, its explanation of inflexible prices remained the same, albeit more stark regarding the necessity for the price elasticity of demand to remain constant when the enterprise demand curve shifted. [Lee, 1984; and Lee and Irving-Lessmann, 1992]

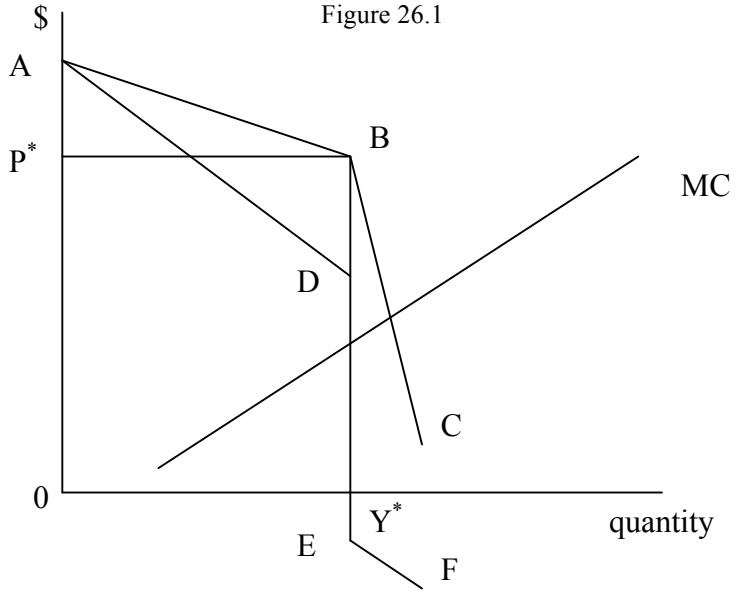
Kinked Demand Curve

Although the marginalist pricing model explained price inflexibility, the neatness of the theoretical explanation lacked real world conviction while at the same time raising questions about prices over the business cycle as both demand and marginal cost curves shifted. For example, the arguments for the existence of iso-elastic demand curves or iso-elastic shifts of the demand curve did not sit well with most economists. Moreover, the empirical studies by Dunlop (1939) and Neal (1942) did not suggest that the business cycle was characterized by iso-elastic shifts in the demand curve. The introduction of the demand curve with a corner in it, or the kinked demand curve, by Robert Hall and Charles Hitch (1939) and Paul Sweezy (1939) was one attempt to remove this doubt.

As noted above, between 1935 and 1939, Hall and Hitch and the economists at Oxford interviewed businessmen as to how they set their prices and whether they changed their prices with respect to changes in short period demand. The answers they received were the following. First, with regard to price setting, the businessmen set their prices by marking up their normal average total costs. The Oxford economists called this price the *full cost price*, and the procedures used to obtain it *full cost pricing procedures*. From their interviews with the businessmen, the Oxford economists also found out the following: (1) all the businessmen inhibited oligopoly markets; (2) the businessmen would not charge more than the full cost price because their competitors would not also increase their prices, and as a result, they would lose a significant amount of their sales; (3) the businessmen would not charge

less than the full cost price because their competitors would follow suit and, as a result, their total revenue would decline since the fall in price would not be compensated for by an increase in sales; and (4) because of these reasons, the businessmen stated that they would not change their full cost price if demand increase above the given level of output or if it fell below the given level of output. That is the businessmen argued that full cost price prices are *stable prices* as opposed to *flexible prices*. The Oxford economists used these results to develop the kinked demand curve explanation of stable prices. The kinked demand curve model can be illustrated as follows:

Figure 26.1



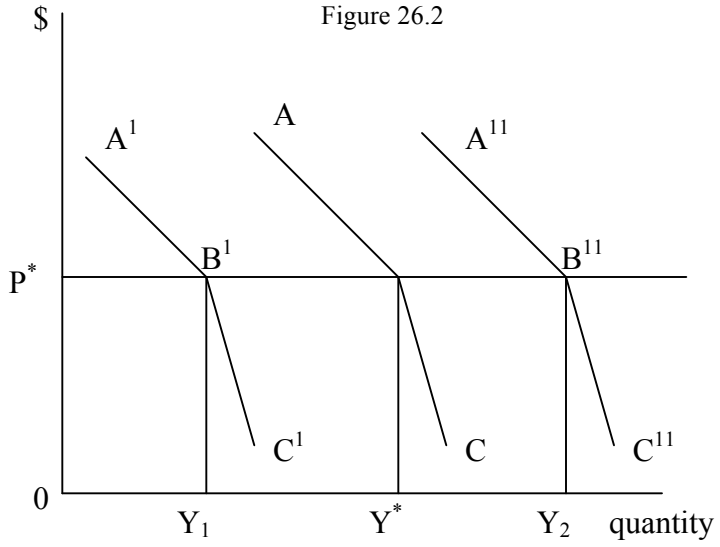
where ABC is the kinked demand curve.
ADEF is the discontinuous marginal revenue curve.
p* is the full cost price.
y* is normal output
MC is the marginal cost curve.

The segment AB of the kinked demand curve represents the businessman's fear that if he increased his price above the full cost price nobody would follow; hence he would have a significant decline in sales, total revenue, and profits. The AB segment represents this by being very elastic. The segment BC of the kinked demand curve represents the businessman's fear that if he decreases his price below the full

cost price everybody would follow. Hence he would have a significant decline in total revenue and profits since the decline in price was not matched by a large increase in sales. The BC segment represents this by being very inelastic. Consequently, the firm (businessman) faces a demand curve that has a kink in it where the full cost price occurs. At this point it needs to be noted that the businessman does not use marginal cost and marginal revenue to set his price. That is, the marginal revenue curve and the marginal cost curve do not intersect - rather, the marginal cost curve 'misses' the marginal revenue curve because it is discontinuous. Therefore, the Oxford economists argued that firms do not use the 'marginalist' approach to setting the price.

As noted above, businessmen said that they would not deviate from the full cost price when demand changed. This can be represented via the kinked demand curve in the following manner:

Figure 26.2



The ABC kinked demand curve is the one that exists at the full cost price, p*, and normal output, y*. If demand fell below y* to y_1, then the kinked demand curve would shift to the left to the position represented by A'B'C', but the full cost price would remain unchanged. If the demand increased to y_2, then the kinked demand curve would shift to the right to the position represented by A"B"C", but the full

cost price would remain unchanged. Thus we can conclude that because the firm faces a kinked demand curve (which is based on the full cost price), variations in demand will not affect the price - that is stable prices exist whenever firms face kinked demand curves.

Using a similar argument, Sweezy argued that realistically businessmen imagined they faced a kinked demand curve where, if they increased their price from the current level, they would lose their customers and, if they reduced their prices, their sales would not increase appreciably. Its corresponding marginal revenue curve would be discontinuous at the kink through which ran the upward sloping marginal cost curve. Soon thereafter, Martin Bronfenbrenner (1940) used the kinked demand curve to explain inflexible prices by arguing that shifts in demand would find business men not altering their prices, unless they were significant enough to have the marginal revenue curve intersect the marginal cost curve. Following Brofenbrenner, Reynolds (1942) combined a constant marginal cost curve with a nearly right-angle kinked demand curve and concluded that shifts in demand would have no impact upon the price. The relevance of the 'realistic' kinked demand curve for explaining inflexible prices through marginalist language and concepts was recognized, with some limitations, by economists:

> There is no doubt that this [kinked demand curve] is a realistic picture of the demand situation as envisaged by individual firms in a great number of industrial markets a large part of the time. It goes a long way toward explaining some important aspects of industrial price behavior. There is rather strong reason for believing that leading firms in the automobile, steel, agricultural implement, and many other industries act upon approximately this view of the situation. As a working hypothesis, however, it is probably limited.... [Committee on Price Determination for the Conference on Price Research, 1943, p. 278]

As a theoretical explanation of inflexible prices, the kink demand curve became widely adopted, with the result that inflexible prices became progressively portrayed as unchanging prices as demand

changed. However, the available Bureau of Labor Statistics price data, for example, showed that rigidly unchanging prices for long periods of time occurred only for a few of the inflexible-price products. Moreover, its theoretical explanation was not entirely consistent with marginalism in that prices at the kink were not profit maximizing. These inconsistencies prompted, in part, George Stigler's 1947 empirical critique of the kinked demand curve; and the lack of theoretical consistency and empirical support together slowly gave rise to the view that there was no generally accepted theory that explained the conditions under which inflexible prices were either possible or profit maximizing. [MORE TO COMPLETE THE STORY] [Sweezy, 1939; Hall and Hitch, 1939; Bronfenbrenner, 1940; Neal, 1942; Reynolds, 1942; Committee on Price Determination for the Conference on Price Research, 1943; and Lee, 1998]

Extended Marginalism

Other attempts to deal with price stability and stay within the marginalist framework included the introduction of features into the pricing context, such as managerial discretion, ignorance, uncertainty, risk, and costs of price change, which prevented the enterprise from taking full advantage of shifts in demand as in the marginalist pricing model.

The Generalization of Neoclassical Price Theory and the Absorption of Full Cost Pricing

A second line of discussion saw the conflict between full cost pricing and marginalism as a problem with the realism and applicability of the marginalist tools to explaining business behavior. That is, drawing on the Masonian and Berkelian arguments, economists produced a synthesis that explained the use of non-marginalist pricing procedures according to irreducible complexity, ignorance, and uncertainty that characterized the business world and that suggested that marginalism could be served if its theoretical core were generalized. Many economists contributed to the development of this synthesis, but it was Robert A. Gordon's 1948 article that fully articulated it and presented it to economists for

adoption. Gordon's view of the conflict between full cost pricing and marginalism "was influenced to a significant extent by the numerous interviews with business executives that he conducted in connection with his work on Business Leadership in the Large Corporation"[Gordon1 983]. So in 1947, at the annual meeting of the Pacific Coast Committee on Price Policy, Gordon presented a paper on "Issues in the Current Marginal Analysis Controversy" in which he stated the core ideas of his 1948 article. Reacting to the criticism of the conferees, who included J. Bain, W. Fellner, E. T. Grether, L. G. Reynolds, and possibly T. Scitovsky, Gordon wrote his well-known article "Short-Period Price Determination in Theory and Practice" [Social Science Research Council 1947]. In the article, Gordon criticized not neoclassical price theory itself, but some of its unrealistic assumptions that render many of its analytical tools less useful than they should be for the economist investigating business behavior. A ttacking the assumption of profit maximization, and the strict formulation of the cost and revenue functions, he presented a twofold argument for why firms adopt full cost price policies and full cost pricing procedures:(1) because businesspeople are largely ignorant and uncertain about their economic environment, they are unable to obtain the information needed for marginalist decision making; consequently they employ full cost price policies and pricing procedures that make the most of their limited information(and entrepreneurial ability); (2) because businesspeople view their firm as a going concern, short period profit maximization is not adopted as a policy since it would lead to the firm's demise in the long period. Thus, instead of striving to maximize profits, businessmen strive for satisfactory profits; instead of trying to calculate accurate marginal costs, given the presence of common costs, they opt for average total costs as determined by their cost accountants; and instead of trying to calculate marginal revenue (or the price elasticity of demand) associated with every shift in the unknowable short period demand curve, the businessman was more apt to maintain a fixed full cost price and let output adjust to the new conditions. Since firms cannot behave in the manner assumed by

marginalism, Gordon concluded that the conventional analytical tools of the empirical economists were of little help to him in his investigations. However, all is not lost, Gordon suggested, if the analytical core of marginalism is generalized, that is, made more useful: "While this paper is, in a limited sense, 'antimarginalist,' it is not intended to be antitheoretical. It is a plea for new and more useful analytical tools than those which empirical workers now have at their disposal.... The theory of the firm needs to reshape its tools to fit more closely than heretofore the facts of commodity and labor markets" [Gordon 1948, pp. 287-88]. The arguments contained in Gordon's article were widely disseminated (see [Fellner 1948; Scitovsky 1951; Bain 1952; and Reynolds 1948]), but they did not immediately result in arguments that reconciled full cost pricing with marginalism; rather Gordon's article began bearing fruit nearly a decade after being published. In the intervening years two arguments slowly took form, each centering on the assumption of profit maximization but from a different perspective. One argument replaced the assumption with some other maximization assumption while maintaining the strict formulation of the cost and revenue functions. That is, starting with Hicks [1935] and Higgins [1939], there began emerging the view-point that under imperfectly competitive conditions, firms can adopt objectives other than profit maximization-such as utility maximization [Higgins1 939; Papandreou1 952], sales maximization[Lynch1 940], and maximization of the firm's present value [Committee on Price Determination 1943]. In the 1950s, economists recognized that these non-profit maximizing objectives not only were consistent with the neoclassical notions of rationality and efficiency, but they were also entirely consistent with marginalism [Papandreou 1952]. Therefore when economists armed with models of the firm based on these nonprofit maximizing objectives, such as Baumol [1959], turned their attention to the full cost pricing doctrine, they found that the doctrine was compatible and consistent with the new extended marginalism. So by generalizing marginalism, economists were able to make neoclassical price theory appear more realistic and, in doing so, reconcile it with the full cost pricing

doctrine. A second argument that arose replaced the profit maximizing assumption with a satisfactory profit objective and assumed that uncertainty and incomplete information exist with respect to both the firm's cost and revenue functions. That is, starting in the 1940s, a line of thought began developing that saw the firma s a complex bureaucratic organization situated in a complex environment that it has incomplete and uncertain information about. Therefore the firm pursues satisfactory profits, and, more importantly, institutes" rule-of-thumb" procedures-such as inventory procedures to generate demand information and cost accounting procedures to generate accurate cost information-designed to improve its chances of survival in the long period. In this case, the full cost pricing procedures came to be viewed as one of many rules-of-thumb the firm employs as a guide to making price decisions. Because this line of reasoning (called the behavioral theory of the firm) accepted the general framework of neoclassical price theory while simultaneously repudiating marginalism, its absorption of the full cost pricing procedures meant that the doctrine itself ceased to be viewed as inconsistent with neoclassical price theory [Cyert and March 1963; Cyert and Pottinger 1979].

With the emergence of the managerial and behavioral theories of the firm, the full cost pricing doctrine ceased to be anomalous. In the former case, the extension of marginalism removed, in one sense, the conflict between it and the doctrine; in the latter case, the doctrine was shown to be consistent with the framework of neoclassical price theory although not with marginalism (extended or not). With the generalization of neoclassical price theory and the articulation of these new theories of the firm, this phase of the marginalist controversy came to an end.

Cost of Price Changes and Marginalism

Like Means, the inflationary price behavior of the inflexible-price industries in the 1950s in the American economy prompted Galbraith to slightly modify his pricing model. That is, when faced with a inflationary shift in demand, he argued that the enterprise would not immediately set the long period

profit maximizing price, but instead would set a series of short run non-profit maximizing prices leading up to the long run price:

> Thus if demand is strong and the industry is operating at or near capacity, a very large price and revenue increase may be possible. But there is also the danger that such an increase may bring new wage demands, or that it may attract new capacity, or there may be some fear of an adverse public reaction. Therefore, the industry keeps some its opportunity for higher prices and added revenue in reserve, as it were. [Galbraith, 1957B, pp. 38 - 39]

The incomplete adaption of the short run price meant that there existed "unliquidated monopoly gains in the inflationary context" which the enterprise could pursue even if there was not shift in demand. Thus, as long as inflationary shifts in demand were continually occurring, unliquidated monopoly gains continually existed with the result that the business enterprise continually adapted itself by increasing its prices in deliberate and discreet short run steps even in the situation when there was no short run shift in the demand curve. The outcome of this incomplete adaptation to the shifts in demand was that prices were relatively inflexible to demand shifts in a given short run but continually increased over many sequential short runs. [Galbraith, 1957A; and Swanson, 1971]

The discretionary latitude that Galbraith awarded the enterprise in order to account for the existence of inflexible prices and their increase independently of any visible demand pressures was not well received by those economists who accepted profit maximization and the marginalist pricing model. When he first examined the issue of inflexible prices in 1936, Galbraith noted that

> Professor Gardiner C. Means has drawn my attention to the cost of making a price change under modern conditions as an incentive to holding of prices constant. A concern with nation-wide sales outlets must make certain that dealers are informed of the change; it must distribute new price new price schedules and provide safeguards against leaks as well as risk a temporary

> cessation of business in case there is such a leak. It must also recast its advertising to acquaint the public with the change. All these things cost money and all of this expenditure is avoided if prices are allowed to stay where they are. [Galbraith, 1936, p. 470]

Later in 1947, Stigler followed this insight and suggested that, due to the cost of price changes, the enterprise's profit maximizing response to a change in demand could be to maintain a rigid price. After Galbraith's unliquidated monopoly gains argument, references to the cost of price changes as an explanation for inflexible prices that was consistent with profit maximization and marginalism increased. [Stutsman, 1975; Stigler, 1947; Heflebower, 1962 and 1965; Swanson, 1971;]

Risk, Uncertainty, and Marginalism

The failure of the marginalist pricing and the kinked demand curve models to adequately account for inflexible prices prompted various mainstream economists to take a closer look at why enterprises might pursue a stable price policy. Looking at the management decision process and using the full range of marginalist tools such as downward sloping demand curves, marginal cost curves, maximization, market clearing, equilibrium, and optimization techniques, they argued that the existence of risk and uncertainty could incline management to adopt a stable price policy as a way to maximize profits appropriately specified or some other objective, such as the value of the enterprise. For example, Schramm and Sherman (1977) argued that if management is risk averse, it might adopt a stable price policy which maintains prices below their profit maximizing level in order to maximize the market value of their enterprise. On the other hand, Wu (1979) argued that faced with uncertainty regarding future demand over a multi-period decision horizon, entrepreneurs would adopt a stable price policy in order to maximize their expected utility of their long-run profits. The maximizing price is set a the beginning of each period and maintained for its length in face of uncertain variations in demand. [Schramm and Sherman, 1977; Wu; 1979]

Administered Price Controversy, 1930s

The administered prices controversy involved two separate but interwoven lines of inquiry. One concern of the economists involved in the controversy was the relationship of administered prices to price flexibility, price and production changes over the business cycle, and inflationary conditions; and interwoven with this was the concern over the existence of administered prices and the definition and measurement of price flexibility. A second concern was the relationship of administered prices to product characteristics and market structures. The former concern will be the focus of this chapter, whereas the latter will be the focus of the next chapter. As argued in chapter 3, the BLS wholesale price collection had always exhibited a bifurcated administered-market price system. Studies by Mills (1936), Humphrey (1937), Tucker (1937) and Mason (1938) not only established that point in the 1930s but also suggested that the bifurcated price system stretched back to at least 1840 if not before.[25] Consequently, it was not possible to argue that the administered-market price dichotomy Means 'discovered' was due to a misreading of the BLS price collection. However, the historical inquiry had only limited relevance to economists since the core of the controversy consisted of a series of inter-related critiques which probed various ways of undermining the concept of administered prices and questioning their impact on the

[25]This historical point was, for a short while, a hot issue. Means argued that development had taken place in the American economy which greatly reduced its flexibility and impeded the making of the necessary economic readjustment, the most important of which was the increasing concentration of economic activity resulting in inflexible administered prices. Such an argument was quickly interpreted by some as laying the blame of the depression at the feet of the large business enterprise. To undermine the argument and deflect criticism from big business, the historical data was generated. However, because Means viewed the progressive concentration of economic activity as starting in the early 1800s and having a growing visible impact since the 1840s well before the rise of big business, the historical data significantly reinforced his argument as well as his denial that he was blaming the large business enterprise for the Great Depression. Thus, the historical controversy provided additional support for Means's thesis that administered prices had always existed in the American economy along side market prices, although slowly over time becoming relatively more dominant. [Means, 1935B; Bezanson, Gray, and Hussey, 1936; Laidler, 1936; Douglas, 1937; Mason, 1939A; Dunlop, 1939A; DuBrul, 1939; Backman, 1940, Wallace, 1940; Neal, 1942; Blair, 1955; Spence, 1977 and 1978; Hughes, 1986; and Lee, 1988]

economic performance of the economy. This is, given the 'factual' nature of administered prices and their impact on the operation of the American economy combined with their destructive theoretical implications for mainstream economic theory, the administered prices controversy consisted primarily of mainstream economists attempting in various ways to dismiss the concept and its implications. In other words, the controversy was a damage-limitation/cleansing rather than a knowledge enhancement exercise. In this chapter we shall focus on one group of the negative critiques which dealt with the existence of administered prices, with the relation of administered and market prices to magnitude of price change over the business cycle, with the relation of administered prices to changes in economic activity, and with administered prices and inflation.

Existence of Administered Prices

As noted in the previous chapter, Means used frequency of price changes as a rough empirical indicator for the degree of administrative control to which a price was subject; and upon applying the indicator to the 617 BLS prices, it was found that 332 were administered prices while 131 were market prices. Consequently, to many politicians and economists in the 1930s and 1940s, it appeared that administratively controlled prices were a significant if not predominant feature of the American economy. However, to other economists, the concept of an administratively controlled as opposed to market controlled price was questionable as it connoted "a fairly free choice whereas the nature of supply and demand, the character of the product, and market structure all effect the freedom of choice" (Thorp, 1987). The first and most common argument used against Means's evidence for the existence and prevalence of administered prices was to criticize the collection of the BLS prices themselves. Thus it was argued that the BLS wholesales price collection under reported frequency of price change because many of the prices it collected were list prices and not the actual prices occurring in transactions, did not

capture changes in discount structures, credit, freight and delivery, and other terms surrounding actual transactions, and did not capture secret rebates, concessions, and changes in quality.

A second argument, which was developed by Tibor Scitovszky (1941), was that if the time unit used to calculate the frequency of price change was a week instead of a month, then the number of price changes for each BLS product would have been much larger and hence the number of products with administered prices much less. In turn, this implied that the bifurcated administrative control-market control price system posited by Means did not empirically exist. Rather it was argued that there was a continuous range of prices between the two extremes of market and administrative control where the degree of administrative control imperceptibly increased along it as you moved from solely market control prices. Consequently, the distinction between market and administered prices would be invalid and prices could only be relatively more or less under market control. A third argument was initiated by Harry McAllister (1961) when he argued that the frequency of price change calculated by counting the number of times a product's BLS price index changed was invalid because the frequency with which the index changed was a function of the number of reporters used in the index. George Stigler then applied the critique to administered prices by claiming that Means's calculated his price change frequencies in such a manner. [Thorp, 1934 and 1936; Galbraith, 1936; Mason, 1936; Burns, 1937; Dunlop, 1939A; Kreps, 1939; Reynolds, 1939 and 1955; Blair, 1941; Scitovszky, 1941 and 1987; McAllister, 1961; Stigler, 1962; and Stigler and Kindahl, 1970]

Drawing on the first two arguments, a third argument emerged in the 1950s directed at the frequency of price change count. That is, it was argued that the frequency of price change calculated by counting the number of times a product's BLS price index changed was invalid because the frequency with which the index changed was a function of the number of reporters used in the index....Such a

problem was relevant for Mason (1938) and Troxel (1939) who based their frequency count on changes in the price index series....[MORE]

In response to the arguments, Means noted that the BLS wholesale prices were generally list prices less all regular discounts or simply net prices and therefore either are or closely approximates actual transaction prices. In addition, it was unclear that secret price changes or the actual discount, credit, and delivery terms in each transaction would significantly alter the general pattern of the frequency of price change. Finally, Means recognized the problem with changes in quality for a given product but doubts that it has any impact on frequency of price change while it would have some but not a significant impact on the change in magnitude of price change. Although Means's arguments answered most of the criticisms, the most telling 'argument' for the BLS prices was the absence of any supporting evidence for the critics claims.[26] Thus, given the lack of counter empirical evidence, Means felt that the BLS prices were more than adequate for the task of broadly indicating the existence of administered prices and market prices via the frequency of price change. As for the second argument, it is true that a frequency count based upon a comparison of successive monthly prices would not distinguish between those prices which changed minute to minute and those which remained stable for days or perhaps weeks. However, even in these cases, the degree of administrative control over prices is absent in the former while at least somewhat present in the former, especially when the number of transactions at a given price in each market is taken into account. Moreover, as with the first criticisms,

[26]The evidence that the critics offered was either an emotive filled statement that list prices exist but no attention was paid to them or an example(s) of transactions taking place off the list price. The latter evidence might or might not be related to BLS prices; but it certainly did not fully address the issue of frequency of price change. Since it would be possible for many transactions to take place at the same non-list price, the criteria for being an administered price would be met. Hence the acceptance of the critics claims had to be based on prior faith rather than any substantive evidence. [Reynolds and Learned, 1938;

no empirical evidence was produced to back up the theoretical conjecture.[27] [Arthur, 1934; Means, 1936; and Nelson and Keim, 1941]

Administered Prices, Market Prices, and Magnitude of Price Change

Given the existence of administered and market prices, Means argued with empirical evidence that an inverse bifurcated relationship existed between degree of administrative control-frequency of price change and magnitude of price change.[28] Since he further argued that there was an inverse bifurcated relationship between the magnitude of price change and magnitude of production change, Means concluded that the existence of administrative control over prices had disrupted the economy's automatic readjustment mechanism. To question Means's conclusion, economists needed to cast empirical doubt on either of the two relationships as well as sever the relationship of administrative control from the magnitude of price change.[29] One attempt was to question the magnitude of price change of the BLS prices. Using the same arguments as directed against the frequency of price change, economists both claimed and provided empirical examples that the BLS under reported the actual magnitude of price changes, while shying away from examples which suggested, for example, that discounts amounted to less than five percent of the price. The cogency of the arguments were recognized by Means in that he directed Saul Nelson to make an analysis of the validity of the BLS

---

[27]For the period 1890 - 1901, the BLS collected useable weekly price quotes on thirty-two products. For seventeen products, the weekly price changes occurred at least twice out of every three weeks whereas for two products the weekly price changes occurred once every sixteen weeks or less. The weekly frequency of price change for the remaining thirteen products generally occurred around twice every four weeks. Thus, even with weekly price quotes, it is possible to clearly classify the prices as market controlled, administratively controlled, or neither. Hence even at the time the theoretical conjecture was made there existed some empirical evidence which called it into doubt. [Bureau of Labor Statistics, 1902]

[28]Mason (1936) accepted Means results from the beginning. Moreover, using BLS prices, frequency of price changes, and slightly different definitions of magnitude of price change, Mason (1938) and Nelson and Keim (1941) re-confirmed the inverse relationship between frequency of price change and magnitude of price change, even though they did not restrict their studies to only market and administered prices. [Neal, 1942]

prices.[30] The outcome of the investigation was that Nelson partially validated the critics' arguments by documenting various cases where BLS prices significantly under reported the magnitude of price change. However, Nelson went on to conclude that since the under-reporting of changes in BLS prices was not skewed towards low frequency of price changes, the discrepancies between BLS and actual magnitudes of price changes did not invalidate the overall bifurcated inverse relationship between frequency of price change and magnitude of price change.[31] [Clague, 1934; Thorp, 1936; Galbraith, 1936; Burns, 1937; Mason, 1939A; Reynolds, 1939; Nelson, 1939; Blair, 1941; Nelson and Keim, 1941; and Lee, 1988]

With the critique of the BLS ineffective, the economists took the only avenue left open to them, that of by-passing the administrative control-frequency of price change relationship altogether under the pretext that it was not relevant for explaining price flexibility. Instead, it was defined solely in terms of magnitude of price change.[32] That is, by going directly to measures of the magnitude of price change as a way to define the flexibility of prices, economists deliberately removed or significantly down-played the administrative and market control explanations underlying the differential changes in magnitude. Without a theoretical base, various measurements of the magnitude of price change were possible and each could be associated with any ad hoc definitions of what constituted flexible and inflexible prices.[33]

---

[29]See for example, Humphrey (1937) and Neal (1942).

[30]Early on Means recognized that BLS prices under reported the magnitude of price changes of some products--see Lee (1988) and Means (1936).

[31]Blair used the same reasoning to refute the argument that BLS prices were not appropriate for analyzing the relationship between concentration and magnitude of price change. [Blair, 1956]

[32]Alfred Neal (1942) suggested a third approach in that the magnitude of price change accounts for the frequency of price change, thus making administrative control derivative of the factors determining the magnitude of price change. Examining the relation between frequency and magnitude of price change for all 617 BLS prices, we find in contrast to what Neal argued that MPC = a + b(FPC) provides a much better statistical explanation than FPC = a + b(MPC)--see Appendix III. Thus Neal's suggestion can be rejected.

[33]For a catalogue of the different statistical measures of magnitude of price change, see Nelson and Keim (1941).

However, irrespective of the measurement of the magnitude of price change or the definition of price flexibility used, as long as BLS prices were used, the inverse relationship between frequency and magnitude of price changes still emerged.[34] For example, in his study on price flexibility and changes in production, Jules Backman using BLS prices defined the magnitude of price change as the ratio of the monthly high in 1929 to the monthly low in 1933. Using the frequency of price change to identify administered and market prices, we find that seventy of the ninety-two administered price products had a percentage decline in price of thirty percent or less while eighty of the eight-three market price products had a percentage decline in the price of forty percent or more, thus validating the inverse relationship--see Table 26.12. Moreover, this gross relationship remained, even more stark, when Backman arbitrarily defined price flexibility as a decline in price of thirty-six percent or more. [Mason, 1938; Keim, 1939; Nelson and Keim, 1941; and Backman, 1939A, 1940A, and 1940C]

Table 26.12
Price and Production Changes

Products	Percentage of Price Change		Percentage of Production Change		Total # of Products or Industries
	30% or less	40% or more	30% or less	40% or more	
			Backman (1939A) - BLS Prices		
Administered Price	70	6	30	54	92
Market Price	1	81	62	13	84
			Thorp and Crowder (1941A) - Census Prices		
Administered Price	25	4	15	26	45
Market Price	3	10	14	3	16

[34]See for example, the studies already noted above by Mason (1938) and Nelson and Keim (1941).

	Neal (1942) - Census Prices				
Administered Price	16	6	15	4	28
Market Price	2	5	10	0	10

[Derived from Appendices VI, VII, and VIII]

In attempt to escape this, economists decided to discard BLS prices and work with net values or 'prices' derived from Bureau of Census data.[35] However, in spite of the differences between Census and BLS prices,[36] those studies which used Census prices still exhibited the inverse relationship--see Table 4.1. That is, in their study on price behavior Willard Thorp and Walter Crowder identified 407 Census products from which it was possible to associate sixty-one with BLS prices. Of the sixty-one products, forty-five were classified as administered price products of which twenty-five had price declines of thirty percent or less; and sixteen were classified as market price products of which ten had price declines of more than forty percent. In addition, of the sixty-eight Census industries Alfred Neal used in his study on price inflexibility, twenty-eight could be classified as administered price industries of which sixteen had price declines of thirty percent or less; and ten could be classified as market price industries of which five had price declines of more than forty percent. The existence of the relationship, irrespective of whether BLS or Census prices were used, meant that the role of administrative control in explaining the flexibility of prices still remained. [Nelson, 1939; Thorp and Crowder, 1941A and 1941B; and Neal, 1942]

Unable to detach administrative control-frequency of price change from magnitude of price change-price flexibility, economists such as Humphrey (1937) and Sumner (1939) increasingly took the position that the connection could be broken if the magnitude of price change or price flexibility was

[35]Bureau of Census 'prices' consist of the ratio of the total value of a Census product divided by the quantity of that product reported for a given year.

theoretically and statistically explained by factors other than administrative control, such as the price elasticity of demand, characteristics of the market, and product characteristics. The former approach led to an extensive theoretical debate on price determination which in part attempted to ground administrative control of prices in terms of market characteristics and the size of the business enterprise and its cost, and demand conditions rather than concentration and will be dealt with in the next chapter. The latter approach concerning product characteristics will be considered now. [Neal, 1942]

As noted in the previous chapter, Means argued that product characteristics were not the principle basis of administrative control and hence were not the causal factors determining the magnitude of price change. Studies by Thorp and Crowder, Neal, and Backman challenged Means's position by first arguing that concentration (as a proxy for administrative control) did not statistically account for magnitude of price change and then provided evidence that product characteristics did. For the 407 Census products in their study, Thorp and Crowder argued that concentration ratios had no measurable relation with magnitude of price change; on the other hand, Neal reported a slight relationship between concentration and magnitude of price change for the sixty-eight Census industries with national markets used in his study,[37] but then argued that it was a spurious correlation and that the real statistically causal factor was changes in direct costs.[38] Although dismissing concentration as a causal factor, neither Thorp and Crowder or Neal provided any evidence that product characteristics

---

[36]Implied in Nelson's study was that the differences did not increase as frequency of price change declined or concentration increased. [Nelson, 1939; and Blair, 1956]

[37]See results in Appendix VI and Thorp and Crowder and Appendix VII for Neal.

[38]Backman (1940A and 1940B) argued that many factors contributed to the magnitude of price change of which concentration was only one and probably a not very significant one in many cases. Thus he concluded:

> it is evident that prices may be flexible whether or not control is concentrated, and conversely, that many commodities which are controlled by only a few sellers are highly flexible in price. Under these circumstances, it is difficult to establish a definitive relationship between price inflexibility and

were important factors in the magnitude of price change.[39] However, Backman did provide evidence as such. Defining inflexible prices as those which declined by thirty-six percent or less for the period 1929 - 1932 and flexible prices as all others, he divided his sample of 607 BLS prices into 319 inflexible prices and 288 flexible prices.[40] Backman then categorized them with regard to state of fabrication, durability, interchangeability, and source--see Table 26.13. From the exercise

Table 26.13

Product Characteristics and Price Flexibility

Product Characteristic	Administered Prices	Market Prices	Total Products
Fabrication			
raw materials	18 (25%)	54 (75%)	72
semi-finished	30 (40%)	45 (60%)	75
finished	271 (59%)	189 (41%)	460
Durability			
non-durable	117 (45%)	144 (55%)	261
semi-durable	51 (38%)	83 (62%)	134
durable	151 (71%)	61 (29%)	212
Interchangeability			
standard	191 (46%)	227 (54%)	418
differentiated	61 (59%)	43 (41%)	104
unique	67 (79%)	18 (21%)	85

[Derived from Backman, 1940A]

he drew the conclusion that the more finished, durable, and unique a product was, the more likely it would have an inflexible price. [Thorp and Crowder, 1941A and 1941B; Neal, 1942; and Backman, 1940A and 1940B]

'fewness of sellers.' That concentration of control may result in price inflexibility in many cases is probably true--but such a relationship is far from universal. [Backman, 1940A, p. 34]

[39]Neal's direct cost explanation of price inflexibility will be discussed in the following chapter.

[40]Backman accepted BLS wholesale prices as the most comprehensive and complete data available for his study in spite of the discrepancies between BLS and actual magnitudes of price changes. [Backman, 1940A; for a similar position, see Thorp, 1934]

The studies by Thorp and Crowder, Neal, and Backman are flawed on two accounts--first they failed to deal exclusively with administered and market prices and secondly, they did not acknowledge the extent their results were compatible with Means.[41] The 'correction' of the data used in the studies is described in Appendices VI, VII, and VIII. Using the corrected data which only included administered and market prices, we find the following:

1. the relationship between magnitude of price change and concentration within market prices and administered prices does not exist and that it does exist somewhat when market and administered prices are brought together--see Appendices VI and VII;
2. the relationship between magnitude of price change and product characteristics within market price, administered prices, and all prices does not really exist--see Appendices VI, VII, and VIII;
3. the relationship between magnitude of price change and concentration and product characteristics does not really exist for the three groups of prices; and
4. the relationship between magnitude of price change and concentration, product characteristics, and frequency of price change exists due solely to the frequency of price change variable.

The above results are not different from the results that Means came up with as noted in the previous chapter. In particular, the magnitude of price does not appear to be statistically related to product characteristics thus undermining the claims of Thorp, Crowder and Backman.[42] More importantly, the

---

[41]According to Blair there were other problems with the Thorp and Crowder and Neal studies, such as including non-homogenous products and industries, regional and local markets, only freight absorption products and industries with high concentration ratios, and raw-material affected products and industries. These faults, he argued, made the results of the studies non-comparable with Means's results. Yet when Backman attempted to correct the Thorp-Crowder data, he ended up with 217 products whose correlation coefficient for the magnitude of price change and concentration was .178. Although Blair rejected the new results as still being based on faulty data, the results were not materially different from Means's own results....[MORE] [Blair, 1956 and 1958; and Backman, 1958]

[42]It should be noted that Backman's table of product characteristics is not significantly different from Means's--see Appendix II; thus it is not surprising that the products characteristics claim of Backman does not really hold up.

frequency of price change, that is administrative control, and not concentration is clearly the important variable for explaining the magnitude of price change in spite of the attempts to ignore it. Thus it can be concluded that, as Backman (1940A, 1940B, and 1940C) and Doblin (1940) suggested, concentration is only a weak partial proxy for administrative control.[43]

Business Cycle, Production and Price Changes

Given the failure of the above attempts to explain magnitude of price change in terms of product characteristics, economists turned to their last hope--that of showing the inverse relationship between magnitude of price change and magnitude of production change that Means posited was weak or non-existent. Such a result would suggest that administrative control over prices had little impact on the economy and thus could be ignored. First articulated in *Industrial Prices* with ten product groups (see Table 3.16), the price-production relationship caught the attention of many economists, some of whom felt that it encapsulated the explanation for the depression. A year later Means represented the relationship in terms of ratios of flexible to rigid prices and index of industrial production for 439 BLS prices. However, a little more detailed empirical examination of the inverse relationship (see Table 3.15) suggested to other economists that its empirical grounding and/or generality was questionable

Dr. Means has shown a striking correlation in the case of ten selected commodities; but until the correlation is shown to be significant for a much larger and more representative number of commodities, judgment must be suspended on the question which this correlation was designed to answer....[Wood, 1938, p. 671]

Within in weeks of the publication of *Industrial Prices* in January 1935, studies by Victor von Szeliski on the relationship between magnitude of price change and changes in employment and in man-hours

[43]It is of interest to note that Backman, in his account of the causes of price inflexibility, listed a number of factors, such as habits and customs, laws, and administrative decrees, in addition to the

pointed to a weak negative relationship where the former statistically accounts for only one-third of the observed variations in the latter.[44] However, further inspection of the data lead von Szeliski to suggest that the negative relationship was partly fictitious and that the true determinants of employment and man-hours was the character of the production and industry.[45] Similar empirical studies by Emery Troxel on fifty-one manufacturing industries and by Humphrey on fifty-nine manufacturing industries a few years later reached similar weak results: "There are...industries in which employment declined a great deal and price very little, but there are also many industries in which both price and employment dropped sharply" (Humphrey, 1939, p. 254).[46] [von Szeliski, 1935A and 1935B; Pribram, 1935A and 1935B; Means, 1936; McCraken, 1936; Laidler, 1936; Douglas, 1937; Kreps, 1939; Reynolds, 1939; Humphrey, 1939; Comer, 1940; Doblin, 1940; Troxel, 1940; and Nelson and Keim, 1941]

The principle empirical studies on the relationship between the magnitude of price and production changes were carried out by Backman (1939A and 1939B), Thorp and Crowder (1941A and 1941B), and Neal (1942). Examining 264 products with BLS prices and production data for the period 1929 to 1932, Backman found that the price-production relationship was only slightly discernable and due to the grouping together of products with different characteristics, and that when examining products with specific characteristics many times the relationship disappeared altogether or was a positive one.[47] Therefore he concluded that product characteristics, secular trends in demand, and other

---

concentration of control that would contribute to a basis for administrative control over prices [Backman, 1940B]

[44]Von Szeliski received an early draft of Industrial Prices in September 1934. [Means, 1934]

[45]The factors von Szeliski felt accounted for the other two-thirds variation in employment and man-hours included durability, distribution of income, quality improvement, interchangeability, prices of substitute goods, and the price elasticity of demand.

[46]Troxel in his study found that the correlation coefficients for magnitude of price change-frequency of price change and magnitude of price change-magnitude of payroll change were -.164 and -.163 respectively. A re-testing of his data.....Appendix IX. [Troxel, 1940]

[47]Backman also superimposed Means's price-production data from Table 2.16 on to a scatter diagram of his 264 price-production data. The result was to show that the close relationship between price

factors were more important than prices in determining the level of production.[48] Working with 407 Bureau of Census products for the period 1929 to 1933, Thorp and Crowder first examined, using a scatter diagram, the relationship between changes in production and concentration and concluded that there was virtually no relationship at all. Again using scatter diagrams, they concluded that an inverse relationship between magnitude of price change and magnitude of production change existed. Finally, since there was no relationship between concentration and the magnitude of price or production changes, Thorp and Crowder argued that the inverse price-production relationship could not be accounted for by the degree of concentration. Instead, they claimed that product characteristics explained both the magnitude of production changes and the inverse price-production relationship. Working with sixty-eight Census industries with national markets, Neal argued that according to his scatter diagram no statistical relationship existed between concentration and changes in production. On the other hand, for eighty-five Census industries, his scatter diagram suggested that an inverse price-production relationship existed. However, since concentration did not account for changes in production or prices, Neal obliquely concludes that it did not account for the inverse price-production relationship. [Backman, 1939A, 1939B, 1940A, and 1940B; Thorp and Crowder, 1941 and 1942B; and Neal, 1942]

Although the Backman, Thorp and Crowder, and Neal studies re-confirmed albeit weakly the inverse relationship between magnitude of price change and magnitude of production change Means postulated while rejecting that the relationship was correlated with concentration, their studies were

---

change and production change that Means highlighted was solely due to the selected he used. [Backman, 1939B]

[48]Nelson and Keim examined 111 products drawn from across the BLS wholesale price subgroups and found, like Backman, a weak price-production relationship when all products were considered together, with a correlation coefficient of -.32 and a standard error for the coefficient of .12. Further, like Backman, they found that the relationship did not hold up when considering products with specific product characteristics. Finally, they concluded, like Backman, that product characteristics and other factors were more important than prices in determining the level of production. [Nelson and Keim, 1941]

somewhat flawed in that they did not first identify the administered, market, and neither price products and industries and then delete the latter from their investigation. Upon refining the studies (as done in the previous section), we find for each that the vast majority of market price products and industries were associated with production declines of thirty percent or less whereas only a bare majority of the production changes for the administered price products and industries were forty percent or greater--see Table 26.1. Further, a more detailed statistical examination of the studies reveal a very weak relationship--see appendices VI, VII, and VIII. Finally, the weak relationship between price and production changes is not really statistically explained by concentration since (1) the relationship between magnitude of production change and concentration does not exist for market and administered price products either separately or together, and (2) the relationship between the magnitude of production change and magnitude of price change and concentration is very weak--see Appendices VI and VII.

The re-testing of the studies have so far confirmed the authors negative conclusions that the inverse price-production relationship was weak and that concentration did not account for production changes or the relationship. However, further examination of the studies also show that, in spite of the claims of Thorp and Crowder, Backman, and many others (see chapter 2), product characteristics do not account for production changes or the inverse price-production relationship--see Appendices VI, VII, and VIII. Thus, the conclusion that must be drawn from the re-testing of the studies is that administrative control over prices, concentration, magnitude of price change, and product characteristics have little or no statistical impact on the changes in production. This negative conclusion drove many economists to adopt a Keynesian-Hansen explanation centering on aggregate demand, income, and expectations for changes in the level of production and the continuing stagnation of economic activity.

[Humphrey, 1939; Reynolds, 1939; Wallace, 1940; Mason, 1940; Blair, 1941; Nelson and Keim, 1941; and Neal, 1942]

Concentration and Price Flexibility

To understand the controversy surrounding the relationship between market/industry concentration and price flexibility, we have to go back to the 1930s. Starting with the implementation of the National Industrial Recovery Act (1933), vast amounts of statistical data on prices and detailed descriptions of price setting procedures used by firms were being produced. Members of the Consumers' Advisory Board, and the Research and Planning Division of the National Recovery Administration, such as Victor von Szeliski, were producing statistical data showing that prices under the NRA had become relatively more stable compared to pre-NRA prices. Concurrently, G.C.Means and other officials of the Agricultural Adjustment Administration argued that the codes of fair competition under the NRA reinforced the stability of industrial prices already made stable because of the technological basis of the firm and the relative concentration of the manufacturing industries. In particular, Means in a monograph *Industrial Prices and Their Relative Inflexibility*, show that for the 747 commodity prices investigated over the period of 1926-1933, there existed a U-shaped distribution with respect to price changes - i.e. some commodity prices changed very frequently over the time period while others did not. In addition, Means show that the magnitude of the price change for the inflexible prices was relatively small compared to the magnitude of the price change for the more flexible prices and that commodities with inflexible prices had significant drop in production while the commodities with the more flexible prices had a relatively smaller drop in production. To explain the existence of inflexible prices, Means introduced the term *administered prices.* Unlike the competitive view of price determination, which is based on a multiplicity of buyers and sellers haggling in the market and a highly flexible price, there exist markets in which the price is set by administrative action and held constant for a period of time.

The basis for administered prices, Means argued, was not found in monopoly; rather it is found in markets which firms have large volume of output. That is, because of the technology embodied in its productive structure, a firm can produce a large flow of output. In order to do so, it must no only finely tune the flow of inputs into the firm and the flow of output out of it, it must also have at least some control over the flow of funds into the firm so that it can disperse them in a continuous and regular manner so as to maintain the flow of inputs. Consequently, the firm must obtain control over the price it charges for its commodity, while at the same time adjusting the flow of output to sales. These actions exhibit themselves as inflexible administered prices and large variations in output. Since the basis of administered prices is large output, firms who administer their prices are usually found, Means argued, in markets/industries, which are relatively concentrated. The implication Means drew from his analysis of prices, was that prices in the economy were badly misaligned, hence leading to the accumulation of excess savings, the failure of mass purchasing power, and therefore to a decline in private investment opportunities and the prolonging of the depression.

The response of economists and politicians to these revelations was multifold. On the one hand, Means accepted the phenomena of administered prices as inherent in the modern economy, even though they contributed greatly to the depression. Therefore, to alleviate the problem, Means felt that national economic planning was needed. Consequently, when he became director of the industrial section of the National Resources Committee in 1935, he embarked on a series of investigations from which guidelines and some of the basic data necessary for effective planning might be obtained. In particular, he investigated the structure of prices in order to discover the extent to which they do in fact contribute to full and effective use of resources. On the other hand, the anti-trusters in Roosevelt's administration accepted Mean's analysis of administered prices, but advocated a rather different remedy. That is, they did not believe that industrial concentration was based on technology and administrative coordination of

the flow of inputs and outputs; rather they believed it emerged from unsavory business practices. Hence, since administered prices were found in concentrated industries and were the principle cause for the continuation of the depression, they advocated the use of antitrust laws to break up the concentrated industries so that prices would become flexible and prosperity restored. This program for action gave rise to a variety of inquiries into the present status of competition and prices within government agencies and without. More importantly, it resulted in the establishment of the Temporary National Economic Committee (1938).

A third response was the administered prices controversy. In this controversy, economists explicitly explored the relationship between price flexibility and concentration. One aspect of the controversy involved defining what is meant by flexible and inflexible prices. Means was insufficiently clear in defining administered prices in that he did not explicitly say that they were inflexible only with respect to short-term fluctuations in output or with respect to both output and cost changes. Consequently, two definitions of administered prices became articulated:

(i) prices that did not vary with respect to variations in output in short period were called *stable prices*; and

(ii) prices that did not vary with respect to variations in output and costs "over time" were called *rigid prices.*

The relationship between quantity change and price change (ignoring cost changes - or implicitly assuming that cost changes did not occur) was mapped with respect to the concentration level over a period of time. Since it is unlikely for prices to remain completely rigid over a lengthy period of time the measure of price flexibility because the amplitude of change in price and quantity of the time period - large change in quantity small change in price was defined as a rigid price. The results of the study was that there was no significant difference between the price-output behavior for industries with high

concentration and those with low concentration. Although, this type of analysis does shed some light on the controversy at hand, many economists did not think it was adequate because it did not take into account cost changes. This was rectified in a different study in which it was argued that a change in prices, which closely matched the change in average direct costs were flexible prices, which did not, were "rigid" prices. In comparing this approach with concentration levels, it was found that rigid prices were not significantly correlated with levels of industrial concentration. However, many economists did not believe that the above studies clearly captured the correct conception of "administered" prices as captured by stable prices. Therefore, these economists argued that stable prices existed in industries, which were highly concentrated, i.e. in oligopolistic industries. Because the arguments are found in the kinked demand curve and full cost pricing literature, they had little impact on the administered price controversy. However, they did have a significant impact on the administrative inflation controversy that erupted in the late 1950s in which it was suggested that the continual rise in prices was due to the administered price policies found in concentrated industries.

Marginalist Controversy, 1946 – 1960s

Controversies revolves around marginalist pricing, profit maximization, and the question of empirical evidence vs. theory

American Marginalist Controversy

[WORK ON]

British Marginalist Controversy

empirical evidence: Brooster problem; $e_d < 1$, marginalist price > actual price by 50%.

Administered Inflation Controversy, 1950s – 1970s

The original administered price controversy died out around 1940. However, it came back in a slightly different guise when Means offered evidence at the Senate Antitrust and Monopoly

Subcommittee Hearings Administered Prices (1957) that the administered price industries were responsible for the "inflationary" price increases. Means argued that price rises could come about in one of two ways: (i) the increase in demand could pull up prices - as in the case of a fully employed economy or in "market dominated" prices; and (ii) the increases in costs and/or margin of profit would be passed on in terms of higher prices in those industries which could administer their prices. In this case, price movements would generally be independent of variations in market demand/sales. The consequences of administered prices for the economy, Means noted, was threefold:

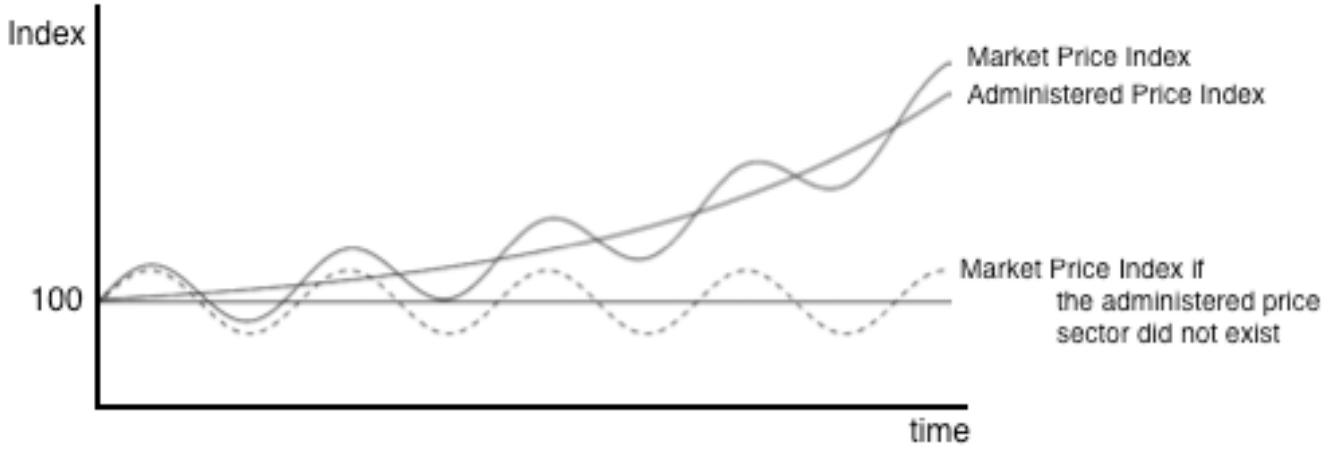
(i) at the level of a particular industry/market in which the price is administered prices could increase when demand falls (or increases) and could decrease when demand increases (or falls).

(ii) at the level of the economy as a whole the prices in the administered price markets/industries could and did vary counter-cyclical to variations in the level of national income.

(iii) the economy can be divided into two sectors - a market price dominated sector and an administered price dominated sector.

The interaction between the two sectors can be depicted in the following manner.

Figure 26.3



Because administered prices are not affected by "demand", they not only pull up the market price index

but also the price index for the economy as a whole - i.e. they are the basis for the sustain and continuous price inflation in the economy. The inflation because the administered prices affect the costs of producing commodities therefore since costs are continually creeping upward in the economy, so must prices - i.e. there must be creeping inflation.

The impact or significance of Means' arguments is that he connected/correlated concentrated industries with inflation. Thus economists began to seriously explore the relationship with respect to both the short and long period. The short period analysis dealt with the relationship between concentration levels and price changes - that is a cross-sectional analysis was undertaken in which the regression equation was of the form:

where P_i is the price change in industry i for years 1960-1963; and

C_i is the level of concentration in industry i for the years 1960-1963.

The results of the analysis have been statistically very weak. In the case of long period analysis two approaches were taken:

(i) the short period model was extended over a longer period of time; and

(ii) price change and change in concentration were investigated.

That is, the argument is made that if concentration is to cause continual inflation, then it must be increasing. Therefore, a regression equation was set up as follows:

where is the change in concentration in industry i over a given period of time.

The conclusion was either that there was no relationship or that it was negative. In the latter case, the implication is that high concentration actually lowers the rate of inflation.

The implications of the administered price/inflation controversy are that concentration is not the

basis for rigid (or stable) prices and that it is not that cause of inflation of nor does it sustain it. Thus government policies aimed at stopping inflation must pursue a different course than attacking large firms. Consequently bills introduced into congress designed to deconcentrated industry in order to slow down or stop inflation, and increase price flexibility so as to get back to a better more competitive world must be looked upon with great suspicion.

Price Stability and the Coordination of Economic Activity: Administered Price and Marginalist Controversy Reinvented, 1990s – 2010

Introduction

Mainstream Explanation of Stable Prices

Empirical Evidence

Conclusion

NEED TO SAY SOMETHING ABOUT THE OVERALL HISTORY OF IMPERFECT COMPETITION, ESPECIALLY FROM THE 1950S ONWARDS WHEN IT GETS ATTACKED