ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 4, pp: (685-692), Month: October - December 2018, Available at: www.researchpublish.com

Market Forms; bilateral monopoly, duopoply and oligopoly

AMKPA Rose Nimmo

Abstract: **Market forms are characterized by the existence of sellers and buyers and have distinct features or assumptions that distinguishes one from the other. Price, output and profit are determined based on the market form. This paper reviewed duopoly, oligopoly and bilateral monopoly market forms. The forces of demand and supply do not determine price and output in these markets. Price and output are determined by the assumptions underlying each market form. In Nigeria economy bilateral monopoly is not common. The most common market form in Nigeria is the oligopoly market.**

Keywords: **Market forms, bilateral monopoly, oligopoly market.**

1. INTRODUCTION

Market forms are characterized by the existence of sellers and buyers and have distinct features or assumptions that distinguishes one from the other. Price, output and profit are determined based on the market form. This paper reviewed duopoly, oligopoly and bilateral monopoly market forms.

1.1Bilateral Monopoly:

A bilateral monopoly is a market structure consisting of both a monopoly (a single seller) and a monopsony (a single buyer). There are no lose substitutes for the commodity it produces (heterogeneous) and there are barriers to entry. Monopsony denotes a market condition where there is a solitary consumer of a product or service. Monopsony is defined as the case of a single buyer who is not in competition with any other buyer for the output which he seeks to purchase and as a situation entry into the market by other buyers is impossible.

Main causes that lead to monopoly are;

1. Ownership of strategic raw materials, exclusive knowledge of production techniques.
2. Patent right s for a product or for a production process.
3. Government licensing or imposing foreign trade barriers to exclude foreign competitors.

Example of bilateral monopoly is that of a single firm producing all the copper in a country, and if one firm uses this metal, the copper market would be a bilateral monopoly market. The equilibrium in such a market cannot be determined by the traditional tools of demand and supply. Economic analysis can only define the range within which the price will eventually be settled. The precise level of the price and output will ultimately be defined by non economic factors such as bargaining power, skill and other strategies of the participant firms. Bilateral monopoly occurs usually in the intermediate stages of a production process since no one party can dominate the other. The bilateral monopoly market form is not common in the Nigerian economy.

1.1.1 Postulations of bilateral monopoly/Assumptions of bilateral monopoly:

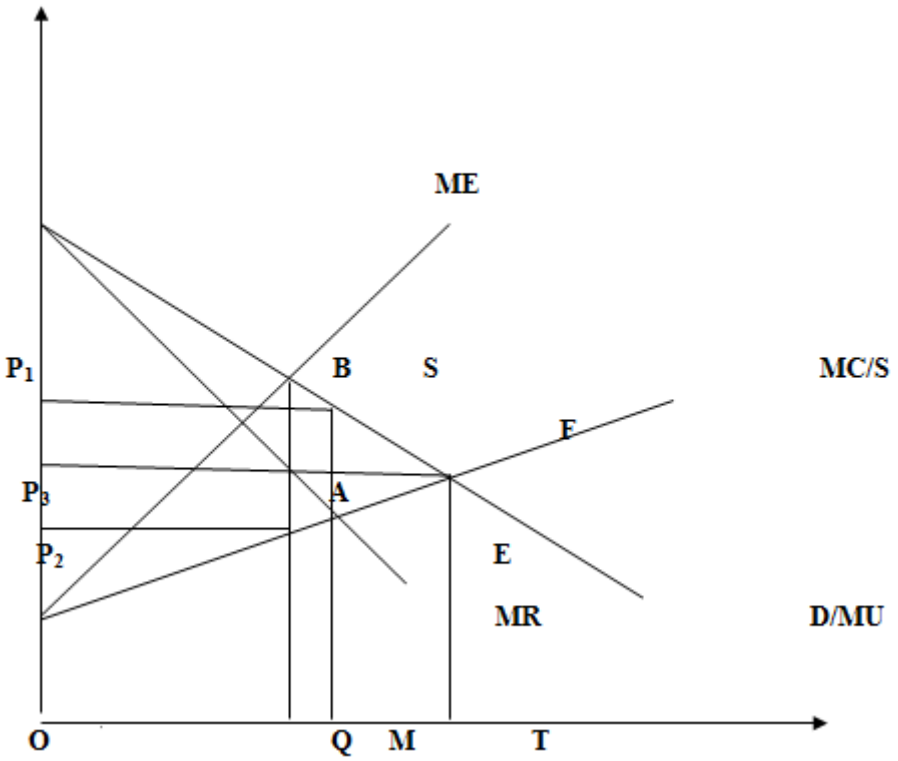
1. There is a single commodity with no close substitutes.
2. The monopolist is the sole producer or seller.
3. The monopsonist is its only buyer.
4. The monopolist and the monopsonist are both free to maximize their individual profits.

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 4, pp: (685-692), Month: October - December 2018, Available at: www.researchpublish.com

1.1.2 Price Output Determination:

Given these assumptions, price and output ascertainment under bilateral monopoly is presented in figure 1. In the figure D is the demand curve of the monopolist's producer and MR is its corresponding MR curve of the monopolist cost added by producing one additional unit of product or service. The MC curve of the monopolist is the supply curve S factoring the monopsonist. The upward incline indicates that if the monopsonist wants to buy more he will have to pay a higher price. So when he buys more units of the product his marginal outlay or marginal expenditure increases. This is shown by the upward inclination ME curve, which is the marginal expenditure curve to the total supply curve MC/S. the curve D is the marginal utility curve of the monopsonist.

1.1.3 Diagram Representation of Bilateral Monopoly:



A monopolist does not have an output supply function relating price and quantity. He selects a point on his buyers' demand function that maximizes his profit. Similarly, a monopsonist does not have an input demand function. He selects a point on his sellers' supply function that maximizes his profit. Bilateral monopoly is a market situation with a single buyer and a single seller. It is not possible for the seller to behave as a monopolist and the buyer to behave as a monopsonist at the same time. The seller cannot exploit a demand function that does not exist. Something must give, three general outcomes possible:

1. One of the participants may dominate and force the other to accept his price and /or quantity decisions
2. The buyer and seller may cooperate and achieve a solution such as the Nash solution or
3. The market mechanism may break down in the sense that no trade takes place at all.

1.1.4 Profit Maximization in Bilateral Monopoly:

Consider a case of bilateral monopoly in the market for a produced good, Q_2. The buyer uses Q_2 as an input to produce Q_1 according to his production function: $q_1 = h(q_2)$. He sells Q_1 in a competitive market at the fixed price p_1. The seller uses a single input X for the production of Q_2. He buys X in a competitive market at the fixed price r, assume that his production function can be expressed in inverse form as $x = H(q_2)$. The solutions that would be achieved by monopoly, monopsony, and quasi – competition provide useful reference points for an analysis of this market. A monopoly solution would be achieved if the seller dominated and forced the buyer to accept whatever price he set. The buyer's profit is

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 4, pp: (685-692), Month: October - December 2018, Available at: www.researchpublish.com

$\pi_B = p_1h(q_2) - p_2q_2 = 0$

he sets $d\pi_B/dq_2$ equal zero to maximize profit

$d\pi B/dq2 = p_1h'(q_2) - p_2 = 0$

and $p_2 = p_1h'(q_2)$ ……(1)

Which is the buyer's inverse demand function for Q2. The buyer purchases Q2 up to a point at which the value of his marginal product equals the price set by the seller. The monopolistic seller substitutes from equation (1)for p_2 and maximizes his profit:

$\pi_s = p_1h'(q_2)q_2 - rH(q_2)$

$d\pi_s/dq_2 = p_1[h'(q_2)+h''(q_2)q_2] - rH'(q_2) = 0$

$p_1[h'(q_2)+h''(q_2)q_2] = rH'(q_2)$
……(2)

The equilibrium condition equation (2) states that the seller equates his MR and MC.

A monopsony solution would be achieved if the buyer dominated and forced the seller to accept whatever price he set. The seller's profit is

$\pi_s = p_2q_2 - rH(q_2)$

He sets $d\pi_s/dq_2$ equal zero to maximize profit:

$d\pi_s/dq_2 = p_2 - rH'(q_2) = 0$

and $p_2 = rH'(q_2)$ ……..(3)

which is the inverse supply function for Q2. The seller produces and sells. Q2 up to a point at which his marginal cost equals the price set by the buyer. The monopsonistic buyer substitutes from equation (3) for p_2 and maximizes his profit:

$\pi_B = p_1h(q_2) - rH'(q_2)q_2$

$d\pi_B/dq_2 = p_1h'(q_2) - r[H'(q_2)+H''(q_2)q_2] = 0$

$p_1h'(q_2) = r[H'(q_2)+H''(q_2)q_2]$……
……(4)

The equilibrium condition states that the buyer equates the value of his marginal product to the marginal cost of the input.

1.2 OLIGOPOLY:

A market with a small number greater than two sellers is an oligopoly. The oligopoly market is characterized by few sellers, selling homogeneous or differentiated products. In other words, the oligopoly structure lies between the pure monopoly and monopolistic competition, where few sellers dominate the market and have control over the price of the product. Firms producing homogeneous products are called pure or perfect oligopoly. This is found in producers of industrial products such as aluminum, copper, steel, zinc, iron e.t.c

The firms producing heterogeneous products are called imperfect or differentiated oligopoly. Such oligopoly is found with producers of consumer goods such as automobiles, soaps, detergents, television, refrigerators, e.t.c.

1.2.1 Features of Oligopoly:

In order to differentiate oligopoly situation from perfected monopoly situations, it is essential to understand the features of oligopoly which are;

1. Few sellers: under oligopoly market, the sellers are few and the customers are many. Few firms dominate the market and enjoy a considerable control over the price of the product.

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 4, pp: (685-692), Month: October - December 2018, Available at: www.researchpublish.com

2. Interdependence: it is one of the most important feature of an oligopoly market, where in the seller has to be cautious with respect to any action taken by the competing firms. Since there are few sellers in the market, if any firm makes the change in the price or promotional scheme, all other firms in the industry have to comply with it to remain in the competition. Thus, every firm remains alert to the actions of others and plans their counter attack before hand to escape the turmoil. Hence, there is a complete interdependence among the sellers with respect to their price-output policies.

3. Advertising: under oligopoly market every firm advertises their products on a frequent basis, with the intention to reach more and more customers and increase their customer base. This is due to advertising that makes the competition intense. If any firm does a lot of advertisement while others remained silent, then he will observe that his customers are going to that firm who is continuously promoting in order to be in the race each firm spends lots of money on advertisement activities.

4. Competition: it is genuine that with a few players in the market there will be an intense competition among the sellers. Any more taken by the firm will have a considerable impact on its rivals. Thus, every seller keeps an eye over its rival and be ready with the counter attack.

5. Entry and Exit barriers: the firms can easily exit the industry whenever it wants, but has to face certain barriers to entering into it. These barriers could be government license, patent, large firms economies of scale, high capital requirement, complex technology, e.t.c

Also, the government regulations favor the existing firms, thereby acting as a barrier for the new entrants.

6. Lack of uniformity: there is a lack of uniformity among the firms in terms of their size, some are big and some are small. Since there are less number of firms, any action taken by one firm has a considerable effect on the other. Thus, every firm must keep a close eye on its counterpart and plan the promotional activities accordingly.

Price and output determination in oligopoly is similar to duopoly, but in oligopoly with product differentiation the producer faces his own distinct demand curve. The quantity he can sell depends upon price decisions of all members of the industry.

$q_i = f_i (P_1,P_2,\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots P_n)$ $i= 1,\ldots\ldots\ldots\ldots..n$ ----------(1)

where $dq_i/dp_i < 0$ and $dq_i/dp_i > 0$ for all $i \neq j$

An increase in price by the i^{th} seller, other prices remaining unchanged would result in a reduction of his output level. Some of his customers would turn to his competitor. The i^{th} seller can sell a larger quantity at a fixed price if another seller should increase his price. Some of his competitor's customers will turn to him. The cournot solution can be modified for product differentiation by replacing $p= F(q_1+q_2)$ with individual demand functions.

$P_1= F_1(p_1, p_2,p_3)$ $p_2 = F_2(p_1,p_2,p_3)$ $p_3 = F_3(p_1,p_2,p_3)$

This can be extended to cases in which prices are the independent variables:

Profits were expressed as functions of quantities in cournot solution, so by substitution;

$\pi_1 = h_1[f_1(p_1,p_2,p_3),f_2(p_1,p_2p_3), f_3(p_1,p_2,p_3]= H_1(p_1,p_2,p_3)$

$\pi_2= h_2[f_1(p_1,p_2,p_3),f_2(p_1,p_2,p_3), f_3(p_1,p_2,p_3] = H_2(p_1,p_2,p_3)$

$\pi_3= h_3[f_1(p_1,p_2,p_3),f_2(p_1,p_2,p_3), f_3(p_1,p_2,p_3]= H_3(p_1,p_2,p_3)$

The profit of each oligopolist is a function of both prices and maximization may proceed with respect to prices. Profits also depend on the amount of advertising expenditures. When advertising is effective it allows a firm sell larger quantity at a given price or a given quantity at a larger price.

$P_1 = F_1(q_1,q_2,q_3,A_1,A_2, A_3)$ $P_2=F_2(q_1,q_2,q_3,A_1,A_2,A_3)$ $p_3 = F_3 (q_1,q_2,q_3,A_1,A_2,A_3)$

Where A_1,A_2,A_3 are the amounts of advertising expenditure by I,II,III respectively. The profit function becomes

$\pi_1= q_1F_1(q_1,q_2,q_3,A_1,A_2,A_3) – C_1(q_1)- A_1$

$\pi_2= q_2F_2(q_1,q_2,q_3,A_1,A_2,A_3) – C_2(q_2)- A_2$

$\pi_3= q3F_3(q1,q2,q_3,A_1,A_2,A_3) – C_3(q_3)- A_3$

Each oligopolist would have to maximize profit with respect to his advertising expenditure as well as output level.

Common industries overshadowed by oligopoly are; cable television services, entertainment industries, airline industry, mass media, pharmaceuticals, auto industry, cellular phone services, smart phone and computer operating system.

The Nigerian cement industry is oligopolistic, few firms are involved in the manufacturing of cement. Examples are Dangote cement, Lafarge cement WAPCO Nigeria Plc, Reagan cement company Nigeria Ltd, Eastern bulken company limited and Glova paint and cement.

1.3 DUOPOLY:

A duopoly is a form of oligopoly where only two sellers exist in one market. In practice, the term is also used where two firms have dominant control over a market. It is the most commonly studied form of oligopoly due to its simplicity. A duopoly can have the same impact on the market as a monopoly if the two players collude on prices or output. Collusion results in consumers paying higher prices than they would in a truly competitive market. A common example of duopoly is that involving visa and master card, who between them control a large proportion of the electronic payment processing market.

1.3.1 Features / Characteristics of duopoly:

1. Existence of only two sellers
2. Presence of monopoly element. So long products are differentiated, the firms enjoy some monopoly power as each product will have some loyal customers.
3. Price rigidity exists in this type of market structure. It means price of product in the market does not change immediately with change in demand and supply in the market.
4. In this type of market structure either advertising is done to increase its sales volume or by improving quality f its product.
5. There is interdependency among firms, as no firm can ignore the action and reaction of its rival firm.
6. The demand curve is indeterminate, any step taken by rival firm will effect firms product demand.
7. There exists a conflict attitude among firms as they have two types of attitude, on one hand they want to have joint venture to increase their profit and on the other hand they want to earn profit individually. So these attitudes have conflict among themselves.
8. There are two popular models of duopoly that is, Cournot's model and Chamberlains model.

The characteristics of duopoly markets are similar to that of oligopoly. The uncertainty with respect to the behavior pattern of a firm under oligopoly arising out of their unpredictable action and reaction makes a systematic analysis of oligopoly difficult. However, classical and modern economists have developed a variety of models based on different behavior assumptions. The models can be classified into two categories

1. Classical duopoly models and
2. Modern oligopoly duopoly models

When there are only two sellers of a product, there exists duopoly.

- The Cournot's duopoly model
- The Chamberlain duopoly model
- The Bertrand's duopoly model
- The Edgeworth duopoly model

The price –quantity combination and profit of a duopolist or oligopolist depend upon the actions of all members of his market. He can control his own output level (or price, if his product is differentiated), but he has no direct control the other variables which affect his profit. The profit of each seller is the result of the interaction of the decisions of all market

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 4, pp: (685-692), Month: October - December 2018, Available at: www.researchpublish.com

members. There are no generally accepted behavior assumptions for oligopolists and duopolists as there are for perfect competitors and monopolists. There are many different solutions for duopolistic and oligopolistic markets. Each solution is based upon a different set of behavior assumptions as listed above.

1.3.2 Profit Maximization in duopoly (homogeneous product):

Consider a market in which two firms produce a homogeneous product. The inverse demand function states price as a function of aggregate quantity sold:

$P= F(q_1+q_2)$……(5)

Where q_1 and q_2 are the levels of the duopolist's outputs. The total revenueof each duopolist depends upon his own output level and that of his rival.

$R_1= q_1F(q_1+q_2)=R_1(q_1,q_2)$

$R_2=q_2F(q_1+q_2)=R_2(q_1,q_2)$

The profit of each equals his total revenue less his cost, which depends upon his output level alone:

$\pi_1= R_1(q_1,q_2)-C_1(q_1)$

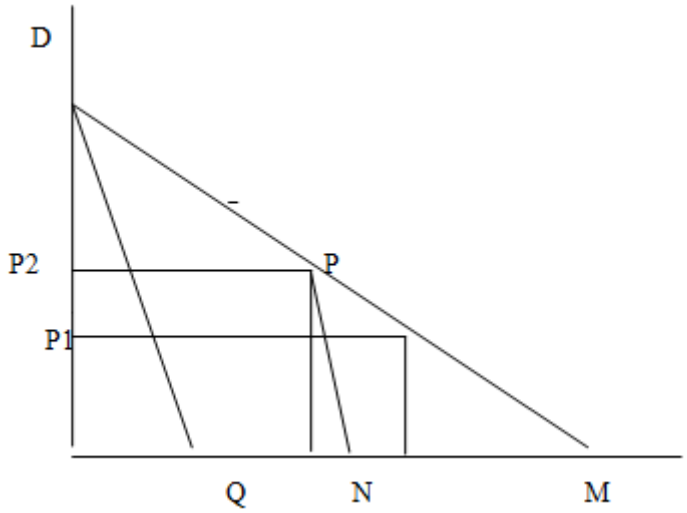
$\pi_2= R_2(q_1,q_2)-C_2(q_2)$ ……(6)

1.3.3 Cournot's duopoly model:

Augustin Cournot a French economist was the first to develop a formal duopoly model in 1838. To illustrate his model Cournot assumed

1. Two firms, each owing an artesian mineral water well;
2. Both operate their wells at zero marginal cost;
3. Both face a demand curve with constant negative slope;
4. Each seller acts on the assumption that his competitor will not react to his decision to change his price.

1.3.4 Diagramatic representation of the Cournot's duopoly model:



To begin the analysis, suppose that there are only two firms A and B, and that, initially is the only seller of mineral water in the market. In order to maximize his profit (revenue) he sells quantity OQ where his MC=OMR, at price OP2 his total profit is OP2PQ. Now let B enter the market. The market open to him is QM ,which is half of the total market . He can sell his product in the remaining half of the market. He assumes that A will not change his price and output as he is making the maximum profit. That is, A will continue to sell OQ at price OP2 thus, the market available to B is QM and the demand curve is PM. To maximize revenue B, sells ON at price OP1, his total revenue is maximum at QRP'N.

ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 4, pp: (685-692), Month: October - December 2018, Available at: www.researchpublish.com

Note that B, supplies only QN=1/4=(1/2 of the market). With the entry of B, price falls to OP, therefore as A's expected profit falls to OP1PQ faced with this situation, A attempts to adjust his price and output to the changed condition. He assumes that B will not change his output QN and price OP1 as he is making maximum profit. Accordingly A assumes that B will continue to supply ¼ of market and he has ¾ (1-1/4) of the market available to him. To maximize his profit, he supplies ½ of ¾ that is, 3/8 of the market.

Note that A's market share has fallen from ½ to 3/8.

Now it is B's turn to react. Considering cournot's assumption B assumes that A will continue to supply only 3/8 of the market and market open to him equals 1-3/8=5/8. In order to maximize his profit under the new conditions B supplies 1/2×5/8=5/16 of the market, it is now left for A to reappraise the situation and adjust his price and output accordingly. This process of action and reaction continues in successive periods. In the process, A continues to lose his market share and B continues to gain. Finally a situation is reached when their market shares equal at 1/3 each. Any further attempt to adjust output produces the same result. The firms therefore, reach their equilibrium position where each one supplies one third of the market.

1.3.5 The equilibrium of firms according to Cournot's model is presented in the table below:

Period	Firm A	Firm B
I		½(1)=1/2 ½(1/2)=1/4
II	½(1-1/4)=3/4	½(1-3/8)=5/16
III	½(1-5/10)=11/32	½(-11/32)=-21/24
IV	½(1-11/32)=43/128	½(1-43/128)=85/256
----------	----------	----------
----------	----------	----------
N	½(1-1/3)=1/3	½(1-1/3)=1/3

This is Cournot's behavioral assumption on the basis of this model he concluded that each seller ultimatelty supplies one third of the market and charges the same price. While one third of the market remains unsupplied. Cournot's model of duopoly can be extended to general oligopoly.

The basic behviour assumption of the cournot solution is that each duopolist maximizes his profit on the assumption that the quantity produced by his rival is invariant with respect to his own quantity decision. The first duopolist (I for short) maximizes π_1 with respect to q_1, treating q_2 as a parameter, and the second (II for short) maximizes π_2 with respect to q_2 treating q_1 as a parameter.

Setting the appropriate partial derivatives of equation (6) equal to zero,

$d\pi_1/d\pi q_1 = dR_1/dq_1 - dC_1/dq_1 = 0 \qquad dR_1/dq_1 = dC_1/dq_1$

$d\pi_2/dq_2 = dR_2/dq_2 = 0 \qquad dR_2/dq_2 = dC_2$

First order conditions require that each duopolist equate his MC to his MR. the second order condition for each duopolist requires that

$d^2\pi i/dq^2 i = d^2Ri/dq^2 i - d^2Ci/dq^2 i < 0 \qquad i=1,2$

$d^2Ri/dq^2 i < d^2Ci/dq^2 i \qquad i=1,2$

Each duopolist's MR must be increasing less rapidly than his MC. The MRs of the duopolists are not necessarily equal. Let $q=q_1+q_2$ and $dq/dq_1 = dq/dq_2 = 1$

The MRs of the duopolists are

$dR_i/dq = p + q_i\, dp/dq \qquad i=1,2$

The duopolist with greater output will have the smaller MR. The duopolistic market is in equilibrium if the values of q_1 and q_2 are such that each duopolist maximizes his profit, given the output of the other, and neither desires to alter his output.

2. CONCLUSION

The paper reviewed three market forms namely; bilateral monopoly, duopoly and oligopoly. The forces of demand and supply do not determine price and output in these markets. Price and output are determined by the assumptions underlying each market form. Bilateral monopoly is not common in the Nigerian economy.

REFERENCES

[1] James M. Henderson and Richard E. Quandt (1980). "Microeconomic Theory, A Mathematical Approach" Tata McGraw – Hill Publishers, New Delhi, India, pp 199-225.

[2] Koutsoyiannis A. (1977). "Modern Micro Economics Theory" Palgrave Macmillian, New York, United States, pp 93-99.

[3] Orley Amos and Randal Amos (2018). Bilateral Monopoly, Duopoly and Oligopoly https://www.AmosWEB.com. Encyclonomic