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Research Paper on Market Structures and Models: A Situation Analysis

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Abstract: **Understanding market structures and models is key for firms in achieving competitive advantage and this is based on the fact that market structures influence a firm's behaviour and profit opportunity and are therefore critical to understanding how a market function. This research paper examines "market structures and models: a situation analysis"; with the following objectives; to provide and analysis market structures and models and as well as pricing decisions available for firms, to examine the relationship between marginal revenue (MR) and marginal cost (MC) in profit maximization and to explain how different market structures affect business decisions and the researcher recommends on the need for firms to adopt these models so as to achieve profit maximization in its business decisions.**

Keywords: **Market Structures, Pricing Decisions, Marginal Revenue (MR) and Marginal Cost (MC).**

1. INTRODUCTION

A firm does not exist in isolation but it exists in an environment and understanding different market structure and models serves as an instrument for an organization in meeting its objectives.

The terms market structures refers to the level of competition experienced by businesses in an industry (Mashhud A, 2009, p.71). An average market does not exist but however, models of market structures give a general representation of a real market. These are extremes seen in market structure models that are not likely to happen in the real world, but they allow us to compare and contract model information and real world. In reality firms may function under four primary market structures which are; perfect competition, monopoly, monopolistic competition and oligopoly. These market structures affect a market's outcomes based on its influence over a firm's behaviour and profit opportunity.

A market is anywhere buyers and sellers are in contact; consumers and producers together constitute the market. Consumers pricing decision are influence by these market structure and a firm behaviour is also influence by this structure and this is based on the fact that consumers and firms decisions is govern by models of market structure.

For perfect competitive, the theory illustrates an extreme form of capitalism. In it, firms are entirely subject to market forces. Also firms in this market have no power whatever to affect the price of product and this is because the price they face is determine by the interaction or forces of demand and supply. Monopoly structure have to deal with a situation in which one seller exist and the seller on her discretion have the power to inflate changes in the price of the product and consumers buy what even product that is offer by the seller and this is as a result in which there is no substitute.

Monopolistic competitive is capital intensive by nature and this market structure deal with a situation in which the sellers sell homogeneous and heterogeneous products. Firm decision in this structure is influence by branding its products. And lastly, oligopoly structure deals with a situation in which few sellers that control a large part of the market influence decisions in terms of prices and output. This research paper will examine "market structures and models: a situation analysis" in which the researcher will look at different market structures and how these structures affect consumers and firm decisions in a market and different models available for firm in which firm can use in meeting its objective of profit maximization will also be considered.

1.1 PURPOSE OF STUDY:

The objective of this paper is to provide and analysis "market structures and models: a situation analysis.

Other objectives for this study are;

i) To analysis different market structures and models available for firms for profit maximization.

ii) To examine the relationship between MR and MC in profit maximization

iii) To explain how different market structures affect business decisions among firms etc.

iv) To explain and illustrate pricing decisions available for firms.

2. OVERVIEW OF MARKET STRUCTURE

The concept of seller market structure is most widely used in the characterization of market structures in the theory of the firm (Samuelson and Nordhaus, 2001, p.166-173). Market structures is conventionally categorized into four types, namely; perfectly competitive market, pure monopoly, monopolistic competition and oligopoly.

2.1 PERFECTLY COMPETITIVE MARKET:

Is a structure where innumerable producers and sellers in the market producing a homogeneous product, such that the action of one seller or a group of sellers would not have no perceptible impact on the market price.

The major characteristic of perfect competitive market is the existence of innumerable buyers and innumerable sellers, each independent in making decision, so that none of them can influence price or control it (Mashhud A, 2009, p.74).

The buyer or seller in a perfect competition is a price taker, and the quantity he decides to buy or sell has no effect on prices. Thus, the firm in a perfect market faces a perfectly elastic demand curve or price line (P = AR = MR in fig 1) implying that the price remains constant with respect to its output q. in other words, price will never change in response to any change in the output of the firm. Any fluctuation in the market in price will be due to extraneous or exogenous factors and not because of any decision taken by the firm.

Since price p is constant in this respect, so also will the average revenue (AR) and marginal revenue (MR) be constant and equal. That is, p = AR = MR. this can be demonstrated as follows;

i) $AR = R/q$ but $R = pq$, so that $AR = pq/q = p$

ii) $MR = \Delta R/\Delta q = (R_1 - R_0)/ (q_1 - q_0)$;

But since $R_1 = pq_1$ and $R_0 = pq_0$, $MR = (pq_1 - pq_0)/(q_1 - q_0) = p(q_1-q_0)/(q_1-q_0)$

$= P$ and $MR = P = AR$

Equilibrium condition of a profit maximizing firm in a perfect competitive market is shown below;

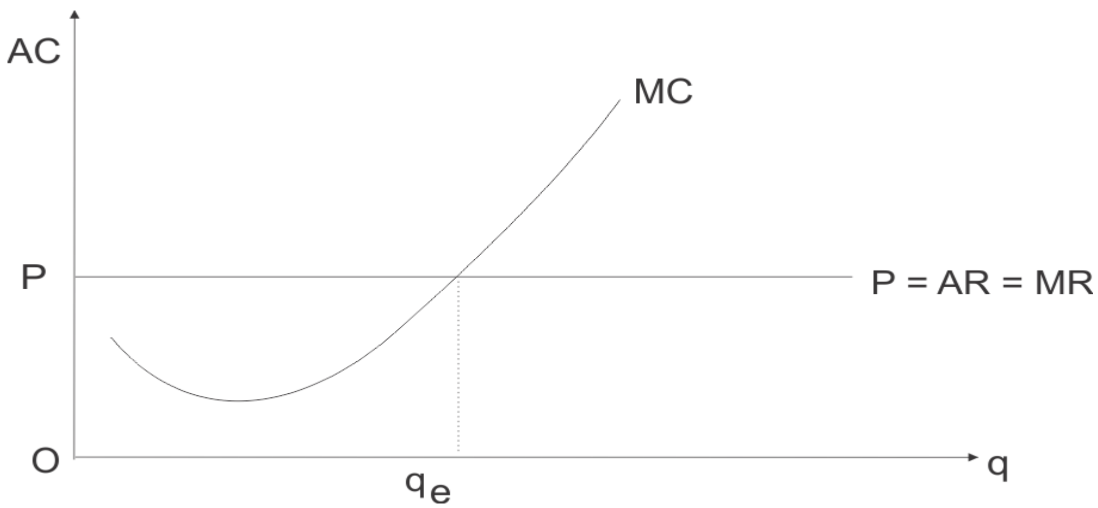

Fig. 1: Equilibrium condition of a profit maximizing firm

Short –Run condition for a profit maximizing firm:

The short-run is a period where some costs are fixed, particular the fixed capital formation. Once the plant has been installed, the cost has been incurred and it cannot significantly vary as the firm varies its output within the output capacity of the plant. If the firm discovers that the investment is not worth it, it cannot throw it away as long as something can be salvaged from the investment.

In other words, if the revenue from the businesses covers more than the costs of variable inputs (variable cost VC), it does not pay to close down the business even if total cost exceeds revenue and losses are being sustained. If the firm should shut down, the loss would be the fixed costs of operation.

i.e. Profit = Revenue – cost or R – C

So in case of situation of loss, we have C – R, and loss could be defined as;

Loss = Total Cost – Revenue or C – R.

But, C = FC + VC, so that Loss = FC + VC – R.

Where the firm shuts down;

VC = 0 and R = 0, so that Loss = FC.

Where the firm operates and R > VC,

Loss = FC + (VC –R) < FC,

Since VC – R is negative.

For the firm, it pays to continue operation in the short run if the revenue covers the variable cost (VC) not minding the fixed cost (FC).

Also R > VC is the same as AR > AVC since AR = R/q and AVC = VC/q.

Example;

Let R = 300, FC = 140 and VC = 200.

Then, Profit = 300 – (140 + 200) = - 40

Or Loss = 300 – 340 = - 40

If the firm shuts down, R = 0, VC = 0 and Loss = FC = 140.

And this is because the loss is greater when the firm shuts down then when it continues operating because R (= 300) is greater than VC (= 200). Since profit maximization implies loss minimization, it is better for the firm (profit maximization firm) to continue operation in the short run as long as R > VC not minding the fixed cost.

Long –run equilibrium of a firm in perfect market:

Since the primary objective of a firm is to maximize profit, and loss is being sustained in the long run, the firm will shut down. And this is because in the long run all costs variable and the condition for continued operation in the long run is that revenue must cover all costs or profit must not be negative.

i.e. R $\geq$ C meaning AR $\geq$ AC (dividing by q)

This implies above that average revenue is greater than or equal to average cost; or profit is greater than or equal to zero or not negative. This is the condition for all profit maximization firms.

In reality, a firm in a perfect market cannot hold on to pure profit in the long run, since the existence of profit will attract other firms which can make their free entry into the industry or market. Since perfect competition does not bar the free entry or exit of any firm, as many other firm enter the market, equilibrium price falls. And as price falls, average revenue falls, thus reducing the profit until it is no more; for as long as there is profit, more firms will be entering the industry until all profit is competed away. So we can say that the long run equilibrium condition of a profit maximization firm in a perfectly competitive market is given as;

MC = MR = AR = AC

In graph**; fig. 2**

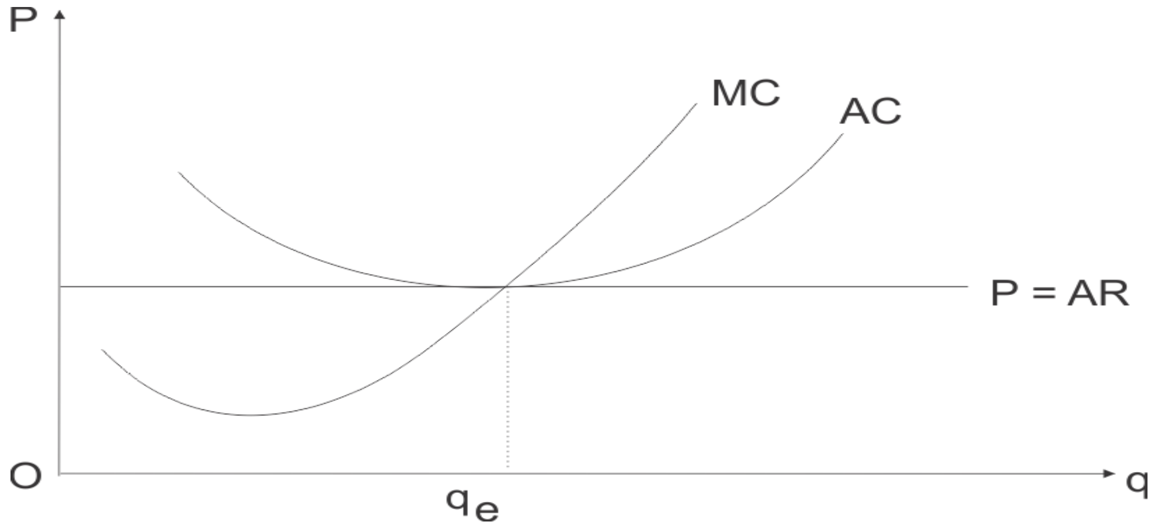

Fig. 2

Form the above graph; AC = AR implying zero profit.

But AR = p = MR for a firm in a perfect market

Where MC = MR in a profit maximizing condition.

So we have MC = MR = AR = AC.

2.2 MONOPOLY MARKET STRUCTURE:

This is a market situation in which a single firm exists. In reality, we speak of a monopoly firm when the supply is dominated by a single firm and the market is monopolized because of the existence of a barrier to entry for other firm.

The monopoly firm is capable of making losses as well as profits in the short run. When losses are sustained, the firm continue operation if AR > AVC, otherwise shuts down, if the goal of the firm is profit maximization. The MR is also equal to MC to obtain the profit maximization output. When the firm makes profit it can hold on to it due to barrier of entry.

The monopoly firm MR is downward sloping and this because the firm faces a downward sloping demand curve. The demand curve is the price line or the average revenue (AR).

In graph; **fig 3:**

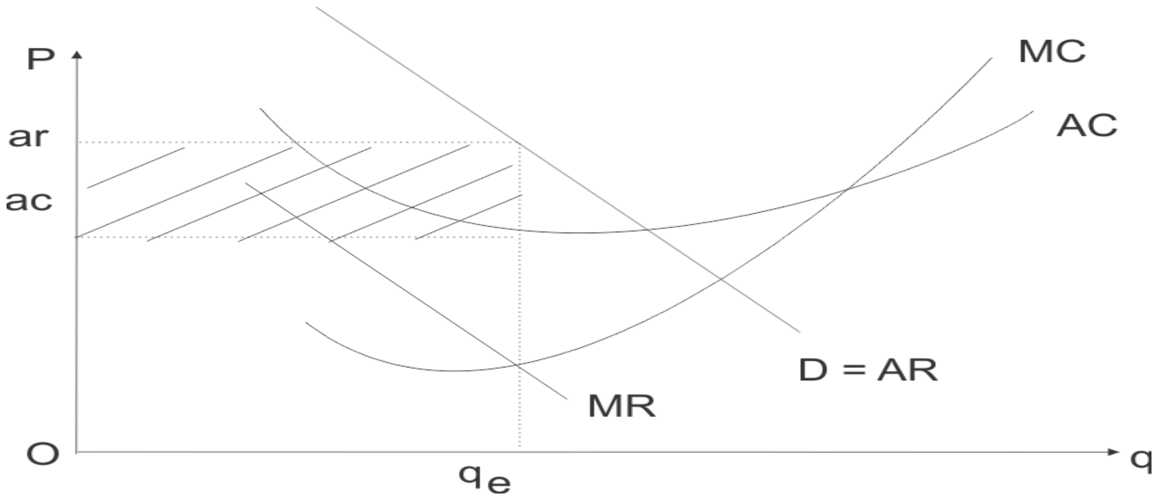

Fig. 3

Equilibrium output = q_B (at MC = MR)

Profit = (AR – AC) q shown as shaded region (q(ac-ar)

The equilibrium conditions of a firm in monopoly are;

Short run: MC = MR; AR > AVC

Long run: MC = MR; AR > AC

Condition for monopoly price discrimination:

Price discrimination is a situation in which consumers of various categories are charged different prices persistently by a firm for an identical product or for differentiated products where the differences in production costs are negligible or insignificant relative to the differences in the prices charged.

It is obvious that price discrimination will be feasible only when the following factors are considered;

- ✓ The producers or sellers can control the supply to the market
- ✓ The markets or buyers for which discriminatory prices are charged are, or can be segregated to prevent resale between them.

Price discrimination is profitable if feasible, given the fact the consumers have different elasticities of demand or willingness to pay. And this is because profit maximization occurs at the point where MC is equal to MR but MR depends on the price elasticity of demand according to the relationship.

$MR = P\,(1- 1/\mathcal{E})$, where $\mathcal{E}$ is the price elasticity of demand.

If the consumers with higher willingness to pay are separated from consumers with low willingness to pay then the firm can charge higher price to consumers with higher willingness to pay.

Form the relationship given above, given the goal of profit maximization, we can show that prices have to differ for two groups of consumers (say A and B) with different elasticities of demand, $\mathcal{E}_A$ and $\mathcal{E}_B$. Profit maximization required that $MR_A = MR_B$ for any given output level, implying that;

$$MR_A = P_A\,(1- 1/\mathcal{E}_A) \quad = \quad MR_B = P_B\,(1-1/\mathcal{E}_B)$$

$$\text{i.e.}\quad P_A = P_B\,\{\,(1- 1/\mathcal{E}_B)/\,(1- 1/\mathcal{E}_A)\,\}$$

$$\text{or}\quad P_A/P_B = (1-1/\mathcal{E}_B)/\,(1- 1/\mathcal{E}_A)$$

If $\mathcal{E}_B < \mathcal{E}_A$, then $1/\mathcal{E}_A < 1/\mathcal{E}_B$. This implies that:

$$(1- 1/\mathcal{E}_A) > (1-1/\mathcal{E}_B)$$

This is because both quantities are negative, $(1- 1/\mathcal{E}_B)/\,(1- 1/\mathcal{E}_A) > 1$. For positive numbers, if $b > a$, $a/b < 1$.but if both numbers are negative, $a/b > 1$. Example if $b = -3$ and $a = -6$, $b > a$; but $a/b = 2 > 1$.

This implies that consumers with higher elasticity of demand will pay higher price, provided both groups have inelastic demand.

For example if $\mathcal{E}_B = 0.3 < \mathcal{E}_A = 0.6 < 1$, then

$1/\mathcal{E}_A = 3.5 < 1/\mathcal{E}_B = 7$ and

$(1- 1/\mathcal{E}_A) = -2.5 > (1-1/\mathcal{E}_B) = -6$ or

$(1-1/\mathcal{E}_B)/\,(1- 1/\mathcal{E}_A) = 2.4 > 1$.

Let consider two markets, with demand functions given respectively by;

$$P_A = a + bQ_A\,; \text{ and } P_B = \alpha + \beta Q_B.$$

And cost function as;

$$C = c_0 + c_1Q + c_2Q^2.$$

To find the profit maximizing output and the allocation between the two market and to do that, the first thing is to determine the firm's equilibrium condition which is given as; $MC = MR_A = MR_B$.

$$R_A = (a + bQ_A)\,Q_A = aQ_A + bQ_A^2;\text{ and}$$

$$R_B = (\alpha + \beta Q_{B.})\,Q_B = \alpha Q_B + \beta Q_B^2.$$

Thus $MR_A = a + 2bQ_A$; and $MR_B = \alpha + 2\beta Q_{B.}$

$MC = c_1 + 2c_2Q. = c_1 + 2c_2\,(Q_A + Q_B)$.

This is equal to;

$$a + 2bQ_A = \alpha + 2\beta Q_B = c_1 + 2c_2\,(Q_A + Q_B).$$

This is the sufficient equations for solving for the variables Q_A, Q_B and $Q = Q_A + Q_B$, in terms of the parameters a, b, α, β, c_1 and c_2

2.3 MONOPOLISTIC COMPETITION:

In this market structure, sellers sell homogeneous and heterogeneous products to numerous buyers. It is an imperfect competition among many with many firms purporting to produce a different commodity whereas they produce quite similar commodities which are differentiated by brand names and other superficial means.

In this market structure, firms face a very elastic downward sloping demand curve. Its features are similar to those of the monopoly or oligopoly except that there is little or no restriction to entry by new firms. This ensures that firms in monopolistic competition cannot hold on to profit in the long run as it will tend to be competed away.

For a monopolistic firm, the short run and long run profit maximization equilibrium condition is shown as;

Short run: MC = MR; AR > AVC

Long run: MC = MR; AR = AC

In graph**; fig 4:**

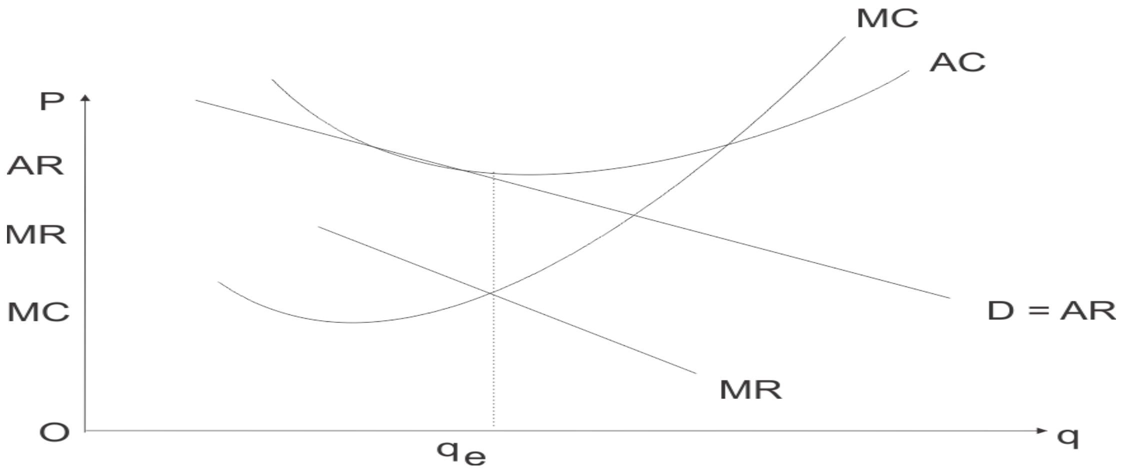

Fig. 4: profit maximizing equilibrium conditions for a firm in monopolistic competition

The graph above shows the profit maximizing equilibrium conditions for a firm in monopolistic competition in the long run.

2.4 OLIGOPOLY:

This market structure consists of a few dominant firms in the industry. This implies that the number of firms in this market structure may be small or large, provide that a few (four to nine) dominate the market and control more than 50% of the total market shares.

For oligopoly structure, where the number of firms in the market is small, the firm may be capable of engaging in collusion deliberately or tacitly. Oligopoly firm can adopt the following models below;

2.4.1 The Quasi- competitive or Bertrand model:

This model addresses the case of not so little number of firms in the market, such that each firm believes or assumes that its activity will not alter the market price for the product.

This means that firms that want to maximize profit will hold it price as a constant and this implies that the marginal revenue will also be hold as constant and is equal with price.

And MC = P gives the profit maximizing equilibrium condition and this model tends to produce minimum profit and largest output among all types of oligopoly models.

In graph; **fig 5:**

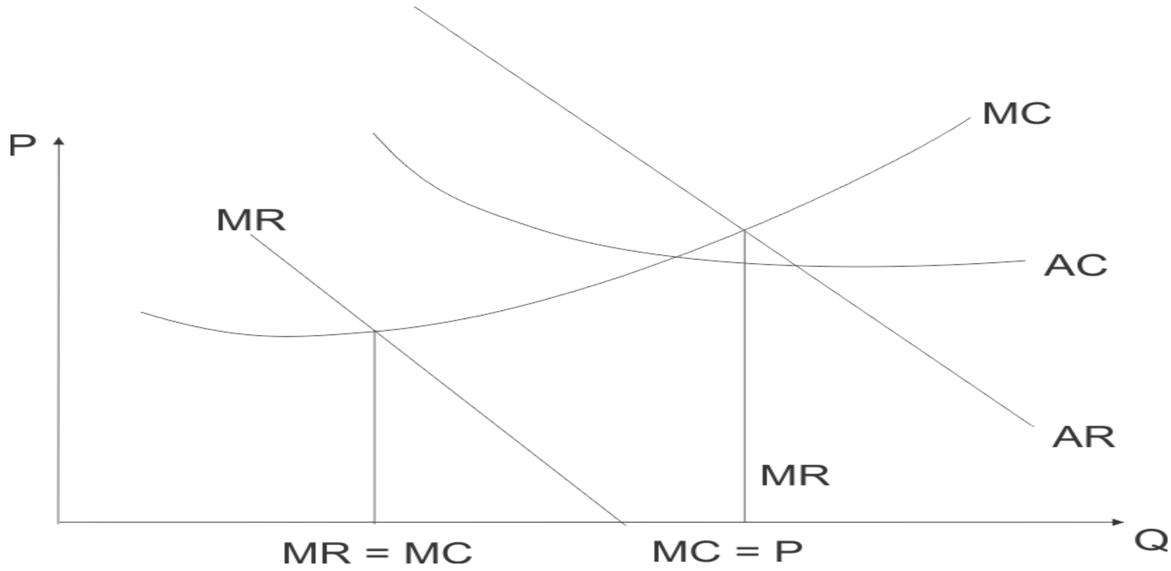

Fig. 5

2.4.2 The Collusion model:

The Chamberlin's (1956) small group oligopoly model, consist of very few firms, permit collusion without open agreement but with tacit understanding. This leads to a monopoly solution with maximum total profit and minimum total output. The equilibrium in the model is that maximization of total profit (π) requires that marginal total profit with respect to the output Q_1 of every firm be equated to zero. i.e. $\partial\pi/\partial Q_i = 0$. Where i = 1, 2, 3…… n.

Also tacit collusion can be obtained through many strategies such as price leadership. In price leadership the leading firm fix prices and other follow and so competition is largely non-price but through advertisement and other methods. Another strategy is through sharing of markets by regions, by quotas in an informal manner. And also kinked demand model is consistent with the collusion model as with other models.

2.4.3 The Cournot classical model:

In the Cournot classical model, the firm assumes that other firms will not change their output as it changes its own output. On that count, the firm maximizes profit by equating the marginal cost (MC) to its marginal revenue (MR). But in reality other firms will change their output and this will force price down and the marginal revenue falls, requiring the firm to reduce its output as a reaction to other firms actions.

This is illustrated by the intersection of the reaction curves of the firm in a duopoly model. Price of the commodity; P = f (Q_1, Q_2).

While profits for the firms are respectively;

$D_1 = R_1 - C_1$, where $R_1 = f(Q_1)$ and C1 = f (Q1)

$D_2 = R_2 - C_2$, where $R_2 = f(Q_2)$ and $C_2 = f(Q_2)$

Since revenue $R_1 = PQ_1 = f(Q_1, Q_2)Q_1$ and $R_2 = PQ_2 = f(Q_1, Q_2)Q_2$ the reactions functions obtained by taking partial derivatives of profits of the firms and equating to zero, produces two equations in two unknown, Q_1 and Q_2, with definite solution.

2.4.4 Stackelberg model:

The Stackelberg model give comprehensive possibilities to oligopoly market behaviour by assuming realistically that the firm in an oligopoly market is aware that its profits and prospects depend not only on its own output decisions but also on the decisions of rival firms about the levels of their output among others. This model recognizes oligopolistic interdependence and its influence on output and price decisions of the firm. This means that the behaviour of the oligopoly firm in respect of output or price decisions takes into account the reactions of rival firms. i.e. suppose "n" represents the number of firms in the oligopoly market, then profit of each firm "j" depends directly on its own output level and indirectly on "n-j" output levels of all firms. This is shown below;

$$Q_j = f_j (Q_1, Q_2, Q_3, \ldots\ldots\ldots\ldots Q_n); \quad j = 1, 2, 3 \ldots\ldots\ldots \ldots n$$

The equilibrium of the profit maximizing oligopoly firm (determining the optimal output levels) is respectively given as;

$$\frac{\partial \pi_1}{\partial Q_1} = \frac{\partial f_1}{\partial Q_1} + \frac{\partial f_1}{\partial Q_2}\frac{\partial Q_2}{\partial Q_1} + \frac{\partial f_1}{\partial Q_3}\frac{\partial Q_3}{\partial Q_1} \ldots\ldots \ldots + \frac{\partial f_1}{\partial Q_n}\frac{\partial Q_n}{\partial Q_1} = 0$$

$$\frac{\partial \pi_2}{\partial Q_2} = \frac{\partial f_2}{\partial Q_2} + \frac{\partial f_2}{\partial Q_1}\frac{\partial Q_1}{\partial Q_2} + \frac{\partial f_2}{\partial Q_3}\frac{\partial Q_3}{\partial Q_2} \ldots\ldots \ldots + \frac{\partial f_2}{\partial Q_n}\frac{\partial Q_n}{\partial Q_2} = 0$$

$$\frac{\partial \pi_n}{\partial Q_n} = \frac{\partial f_n}{\partial Q_n} + \frac{\partial f_n}{\partial Q_1}\frac{\partial Q_1}{\partial Q_n} + \frac{\partial f_n}{\partial Q_2}\frac{\partial Q_2}{\partial Q_n} \ldots\ldots \ldots + \frac{\partial f_n}{\partial Q_{n-1}}\frac{\partial Q_{n-1}}{\partial Q_n} = 0$$

2.4.5 The Kinked demand model:

It postulates that oligopoly firms realize their interdependence such that they will avoid price competition below a particular level. If any firm cuts price below that level (or Kink), others will react by cutting their own prices, so that the first cut price will not gain any advantage. If others were not to react, the price cut will divert customers in a significant manner to the firm whose price has been cut. But with the reaction of others, the firm will not gain any significant number of customers. Therefore, the demand curve below that price level (the Kink) is much more inelastic than the segment of the demand curve above the Kink.

In graph; **fig 6:**

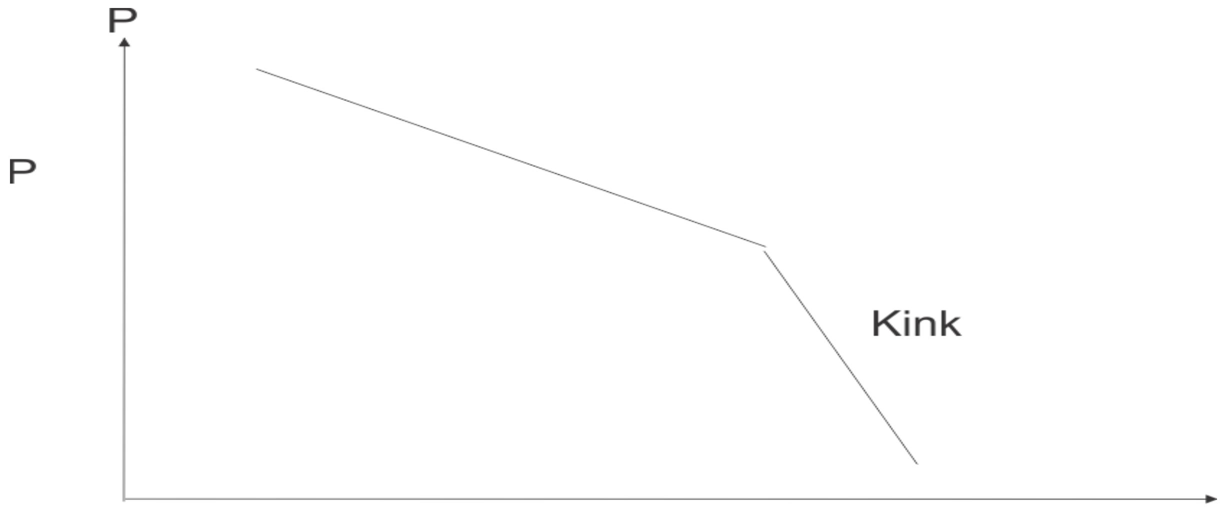

Fig. 6

Form the above; if any firm attempts to raise its price, others are not likely to follow, with the consequence that the firm will lose a lot of customers to its competitors. This means that there is a tendency for prices to cluster at or a little above the Kink.

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3. CONCLUSION

This research paper examines 'market structure and models: a situation analysis' by looking at four major market structures and its impact on business decisions. This research paper examines and explain different models that effect market structure and this is based on the fact that the primary objectives of firms is to maximize profit and understanding this models by businesses will serve as instrument in achieving business decisions and based on that, the researcher recommends the following;

i) The need for firms to adopt these models in its business decisions

ii) If profit maximization is the primary motive on why businesses exist that is need for firms to ensure that it maximize profit by operating at a point where MR is greater than MC in the long run.

iii) That a firm may incur loss in the short run in a perfect competitive structure, but that if revenue (R) is greater than variable cost (VC) not minding the fixed cost (FC), that the firm should continue producing and this is based on the fact that shutting down in the short run that the loss will be greater than when the firm continue operating.

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