

# How Much Output should be Produced by the Firm? An Analysis

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## Abstract

In this study, the main objective of the firm is to determine output and price level; we have taken the time series data of the firm and have applied the ordinary least square technique. We find out the equilibrium point of the firm where marginal revenue is equal to marginal cost and at that point firm earn the maximum profit and we also determine the price level of the firm. The output level that the firm should produce would be of 3922 units, at this point its total cost is 1131611, total revenue is 1115890, marginal revenue is 308.6689, marginal cost is 308.6702 and optimal price is 284.5206.

**Keywords:** Price and Output Determination, Empirical Study,  $MR = MC$

## 1. Introduction

A firm consists of all the actual potential buyers and sellers of a particular product. Firm's structure refers to the competitive environment in which the buyers and sellers of the product operates. The best level of output of the firm is at the point where plant to produce the best level of output. If profits can be earned in industry more, firms will enter in the industry in the long run until all profits are eliminated.

If input prices are constant the firm supply curve obtained by the horizontal summation of the competitive firm supply curve. In this study we bring together demand analysis and production and cost analysis in order to analyses how price and output are determined. We begin this study by identifying the various industries. We examine and show how the equilibrium price and quantity are determined and also how the firm determines the optimum level of output. The process by which price and outputs are determined in the real world is strongly affected by the structure of the firm. The main objective of the firm is to determine the output and to know how much level of output there it will be profit maximize. If the marginal cost is above the marginal revenue then the firm will face loss. In this situation firm can shut down its production units

Apart from introduction, the rest of the paper is arranged as follows: section II portrays review of the literature; section III discusses data and methodological issues. Results are interpreted in section IV. Finally, conclusions and policy implications are given in section V.

## 2. Literature Review

Faith (2005) presented a study to determine the output level and price level using the time series data. Keeping in view the importance of estimation of output and price level we presented some empirical evidences. At Keynesian theory assert that various micro economics factors, include process of production bottlenecks, law of diminishing returns and wage bargaining are the main determinants of the price level. Keynes owns formulation about the theory of the price level initiates the transmission mechanism of money to economic activity. An increase in money supply leads to decrease in the interest rate, which in turn leads to increase in investment. For the period of 1980 to 2000, they used multivariate co integration technique. They conclude that the pricing behavior of the sub sector of the Turkish manufacturing industry by using Johnson's co integration analysis. In

accordance with the expectation of the Keynesian it has been found that prices and demand and unit wage cost demonstrated integration relation in 14 out of 16 sub sectors.

William (2011) used binary flow chart to study price stimulation. The elements uncovered include both market factors and organizational factors. Testing the model for predictive accuracy and simulative ability is reviewed. Marketing implications include a legitimate defense against charges of collusion in price setting in an oligopoly and better understanding of market reaction to organizational components. They concluded that the implications for marketing policy and strategy overlap those of organizational theory and those of organizational behavior theory of the firm. Prominent in the market area are possible defense against charges of collusive in price settings of collusive in price setting

### 3. Data and Methodology

The data of 26 quarters has been collected from the company and this collected data will be put in Microsoft excel then we will use E-View to analyze this data. In this study we will take the data of time series and will use the technique least square. Price and output will be determined at point when;

$$\text{Marginal Revenue} = \text{Marginal Cost}$$

Marginal cost can be calculated by;

$$MC = \Delta TC / \Delta Q$$

Marginal revenue can be calculated by;

$$MR = \Delta TR / \Delta Q$$

Total revenue and total costs can be estimated by the following function.

$$TR = f(Q, Q^2)$$

$$TC = f(Q, Q^2, Q^3)$$

Where Q is output produced, MR is marginal revenue, MC is marginal costs, TR shows total revenue of the firm and TC shows total cost. After calculating the above Total Cost and Total Revenue function we put the different value of output 0 to 5000 units and can have Total Revenue & Total cost, Marginal revenue & Marginal Cost values and prices.

### 4. Results and Discussion

Based on the industrial data, estimated Total Revenue and Total cost function as written as below:

$$TR = 155591 + 180.6697 Q + 0.0163 Q^2$$

$$TC = 9152.73 + 239.1203 Q + 0.018278 Q^2 - 0.0000016 Q^3$$

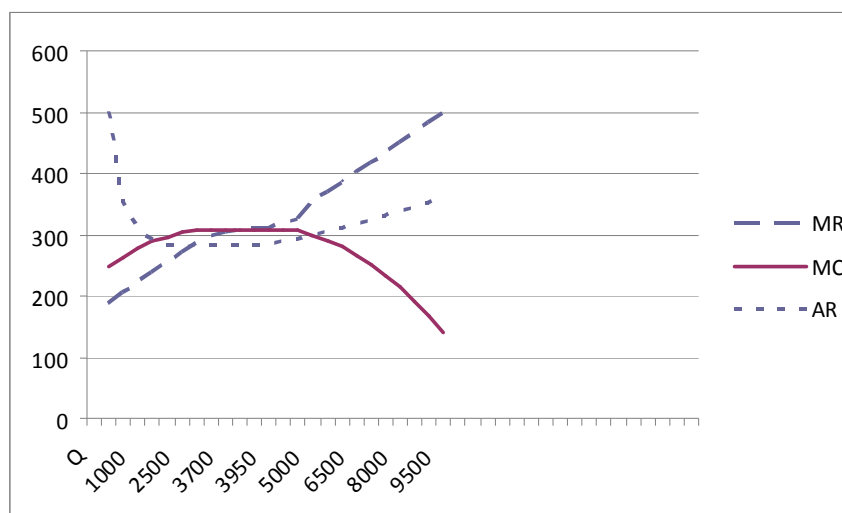
We have put the value of output from 0 to 5000 in above the functions and find out the values of total Revenue, Total Cost, Marginal Revenue, Marginal Cost and Prices. The output level should be 3922 where the profit of firm would be maximized.

**Table 1**

Q	TC	TR	MR	MC	AR
0	9152.73	155591	---	---	---
500	133082.4	250016.9	188.8517	247.8593	500.0337
1000	264951	352624.7	205.2157	263.7373	352.6247
1500	403558.7	463414.6	221.5797	277.2153	308.943
2000	547705.3	582386.4	237.9437	288.2933	291.1932
2500	696191	709540.3	254.3077	296.9713	283.8161
3000	847815.6	844876.1	270.6717	303.2493	281.6254
3500	1001379	988394	287.0357	307.1273	282.3983
3700	1063079	1048092	298.4905	308.4979	283.2681
3900	1124820	1109099	305.0361	308.7051	284.3844
3922	1131611	1115890	308.6689	308.6702	284.5206
3950	1140253	1124556	309.4871	308.64234	284.6976
4000	1155682	1140094	310.7635	308.5864	285.0235
4500	1309524	1299976	319.7637	307.6833	288.8835
5000	1461704	1468040	326.3093	306.2585	293.6079

In the diagram we take the output in the horizontal and take the prices in vertical axis and we show the MR curve with margin lines and MC with straight lines and AR with dots, in this diagram the equilibrium output level 3922 where the Marginal revenue is equal to marginal costs, at this point firm earn the profit and firm determine the price 285.

**Figure 1**



### 5. Concluding Remarks

In the study, we have concluded that firm should produce 3920 units of output where marginal revenue is equal to marginal cost. At this point, firm earns the maximum profit. We have also found total cost of the firm that is

1131611, total revenue is 1115890, marginal cost is 308.6702, marginal revenue is 308.6689 and optimum price is 284.5206.

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[http://en.wikipedia.org/wiki/output\\_price\\_level](http://en.wikipedia.org/wiki/output_price_level)

## Appendix

**Table A**

Dependent Variable: TR				
Method: Least Squares				
Sample(adjusted): 1 49				
Included observations: 48				
Excluded observations: 1 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Stat.	Prob.
C	155591	83185.63	1.870407	0.0679
QD	180.6697	68.88954	2.6226	0.0119
QD*QD	0.016364	0.0081	2.020157	0.0493
R-squared	0.731873	Mean dependent var		541439.9
Adjusted R-squared	0.719956	S.D. dependent var		874600.5
S.E. of regression	462831.3	Akaike info criterion		28.98857
Sum squared resid	9.64E+12	Schwarz criterion		29.10552
Log likelihood	-692.7258	F-statistic		61.41545
Durbin-Watson stat	2.467074	Prob(F-statistic)		0.0000

**Table B**

Dependent Variable: TC				
Method: Least Squares				
Sample(adjusted): 1 49				
Excluded observations: 1 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Stat.	Prob.
C	9152.73	21599.8	0.423741	0.6738
QD	239.1203	38.24534	6.252274	0
QD*QD	0.018278	0.011187	1.633861	0.1093
QD*QD*QD	-1.60E-06	7.45E-07	-2.153755	0.0367
R-squared	0.970054	Mean dependent var		403545.5
Adjusted R-squared	0.968058	S.D. dependent var		652815
S.E. of regression	116673.1	Akaike info criterion		26.25025
Sum squared resid	6.13E+11	Schwarz criterion		26.40468
Log likelihood	-639.1311	F-statistic		485.9086
Durbin-Watson stat	1.133852	Prob(F-statistic)		0.0000

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