

Profit-concentration relation ship  
Evidence from Ethiopian large and medium Manufacturing Industries

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## Contents

List of tables -----	i
Abbreviations-----	ii
Abstract -----	iii
Sections	page number
1. Introduction-----	1
2. Ethiopian manufacturing industries: An overview-----	6
3. Methodology, Empirical specification-----	11
3.1. Structure-Conduct- Performance frame work -----	11
3.2. Measurement of the dependent and independent variables -----	11
3.2.1. Measuring performance -----	11
3.2.2. Measuring concentration-----	15
3.2.3. Measuring other independent variables -----	16
3.3. Empirical specification -----	17
4. Data, Estimation results and interpretation -----	19
5. Conclusion -----	21

**List of tables**

**page number**

**Table 1.** Manufacturing value added at basic price ----- 7

**Table 2.** Table: number of persons working in manufacturing industries and number of establishments from 2001/2 to 2005/6.----- 9

**Table 3.** Results when PCM is regressed on the market concentration only.----- 25

**Table 4.** Results when PCM is regressed on the market concentration and barriers to entry only.----- 25

**Table 5.**Results when PCM is regressed on the market concentration, barriers to entry and import intensity only.----- 25

**Table 6.**Results when PCM is regressed on the market concentration, barriers to entry and import intensity and export intensity.----- 25

## **Abbreviations**

CSA-Central Statistical Agency

EEA-Ethiopian Economics Association

NEIO- New Industrial Organization

IO- Industrial organization

PCM-Price-Cost-Margin

SCP- Structure –Conduct-Performance

## **Abstract**

This study has investigated the role of market structure on the profitability of Ethiopian larger and medium scale manufacturing industries. The market structure is measured by the four firm concentration ratio, import intensity, export intensity and barriers to entry and the average price- cost margin were used as proxy for performance of the industry. OLS multiple regression has been used for the period of 2005/6 in order to test the relation ship between the market structure variables and the profitability of the industries. The empirical investigation of this paper shows, the four firm concentrations, barriers to entry and export intensity affect the profit of the industries positively while import intensity has down effect on the profit of the industries.

**Key words:** market structure, profitability, OLS multiple regression

## **Section I. Introduction**

A central question in the field of industrial organization is how firms and markets should be organized to produce an optimal economic performance, and the issue of industrial economic performance is treated with frame work of structure, conduct and performance (SCP) paradigm. According to this approach the market structure which can be measured by the number of sellers in the market ,their degree of product differentiation, the cost structure ,the degree of vertical integration with suppliers ,barrier to entry ,etc. determines conduct which consists of price ,investment, research and innovation ,advertising and product strategy ,legal tactics ,etc, intern determines market performance.

There are several theoretical arguments as well as empirical evidences suggesting that market structure does exert static as well as dynamic influences on market conduct and performance. Similarly, market conduct and performance in turn generate significant short run and long run implications.

The main established theories that explain the firms conduct or market behavior are: the Neo classical Theory, Managerial Theory, Principal-Agent Theory, Transaction cost Theory and the Evolutionary Theory ( Eisa, 2004). The market conditions could also potentially influence the rate of technological change and hence society's welfare in the long run. There is an extensive literature on the impact of market structure variables on R&D intensity (Levin, Cohen and Mowery, 1984; Scott ,1984; Anglemar ,1985).

The SCP paradigm was the dominant framework for empirical industrial organization between 1950s and early1980s. During 1980-90 game theory took center stage with emphasis on strategic decision making and Nash equilibrium concept become increasing popular in industrial organization.

In NEIO, unlike the empirical literature on SCP, which primarily based in cross section studies, the NEIO focuses on econometric testing of particular aspects of conduct in a single industries with the objective of detecting market power or changes in the collusive –competition behavior of firms. The approach entails the construction of explicit structural models that provide theoretical analysis of how firms would behave under different market structures. Data would then be used to estimate the behavioral equations in the models.

In the SCP paradigm, there are two competing hypothesis. These are, the ‘structure performance ‘ and ‘efficient structure hypothesis.

Since 1992/3 Ethiopia has implemented a different market oriented policy reforms to foster the development of the country, such reforms includes: reforms in privatization and in investment. According to OCED (2008) 14 enterprises were privatized in 2007 and the main aim of policy reforms in investment is to encourage investors in different sectors of the economy including the manufacturing sectors, as a result it is expected to increase the flow of investors than the previous years. Hence, this may lead to the change of the market structure in different sectors of the economy of the country. In addition to this, the ever growing of trade liberalization and globalization is expected to have an impact on the market structure of the Ethiopian manufacturing industries. According to the above economic theory, the change in the structure of the industries can affect their performance. In spite of these changes, to the best of my knowledge I have not found any comprehensive study that empirically estimate the effect of market structure on performance (profitability) of the Ethiopian manufacturing industries. Hence it is not possible to know how much a particular industry is exerting its market power.

Therefore, the primary objective of this study is to empirically estimate the effect of market structure variables such as concentration of the firms, barriers to entry, import intensity and export intensity on the performance (profitability) of the manufacturing sector as measured by price –cost - margin.

## Section II. Literature review

Numerous studies were conducted on different economic sectors to analyze the impact of market structure variables on the performance of firms. However, the findings of these previous studies on the constancy relationship between concentration and profit have yielded contradictory and inconclusive results. This is to mean that, some of the studies are found to be consistent with theoretical expectation. On the contrary, the findings from other studies reject the positive relationship between concentration and profit hypothesis while other findings remains inconclusive about the positive correlation between market structure and the performance. This makes empirical research on industrial organization somewhat interesting. In line with this, some of the studies that support the market structure hypothesis are:

Haizheng et al.(2004) analyzed the relationship between market structure and performance taking the case study on the U.S.A pulp and paper industry based on the traditional SCP framework and using panel data for the industry from 1970 to 1997. Their findings indicate that one percent increase in market concentration increases price cost margin from 0.5 to 0.6 percentage points.

Round (1978) has found a positive concentration- profitability relationship for the Australian manufacturing industries using firm's level data by including variables that measure foreign intensity to measure the industry performance in addition to the concentration of the industries.

Phillips (1978) used a sample of 99 ASCIC 4 digit Australian manufacturing industries for the period of 1968 to 1969.the findings of the analysis shows that there is a positive and significant relationship between the profitability and the concentration of the firms. Simon, Feeny and Mark Rogers(1999) test the effect of market concentration on firm performance on 722 large Australian firms for the period of 1993 to 1996 using simple regression

techniques .They found that industry concentration as proxied by the four firm concentration has positive influence on profitability o f the industries.

Nor Ghani et al.(2003) have studied on the trends of Malaysian manufacturing industry and their work shows that there were some significant trends in several market structure variables including the concentration and entry variables.

MCdonald(1999),used the firm level data in Australian Manufacturing industries over the period of 1984 to 1993 to test the structure –performance hypothesis .He found that industry concentration is positively related to firm profit margins.

In contrast to the above evidences ,other researchers such as Csaba More et al.(2003); Goldberg and Rai, (1996); Albert J.Allen et al.(2006); Maudos (1998), have found out results that do not support the hypothesis. On the other hand other studies by Round, (1976b); Mooslechner and Schnitzer (1992), did not get a conclusive evidence on the positive relation ship between concentration and the profitability of firms. This study there fore, is expected to contribute in filling the knowledge gap of the controversial issue in the industrial organization and can also be a reference and base for other investigators who are keen to study on market structure, conduct of the firms, and their performance in the Ethiopian manufacturing sector and other sectors of the economy based on the structure- conduct-performance frame work.

### **Section III. Ethiopian manufacturing industries: An overview**

The manufacturing sector in Ethiopia mainly consists of: manufacturing establishments with 10 and above employees (large manufacturing scale), small-scale industries, cottage/hand craft industries, and informal industries.<sup>1</sup>

According to CSA, The total number of manufacturing establishments during the 1995/6 was, 1,172,379 of these manufacturing establishments with employees 10 and above persons and use power- driven machine were only 642 share of 0.05% to the total manufacturing sector. The numbers of cottage /hand crafts were 892,719 which are 1390.52 times greater than the large manufacturing industries and their share to the manufacturing sector was 76.15 percent. The number of establishments of small scale and informal industries were 2,731 and 276,719 correspondingly and their contributions to whole manufacturing industries were 0.23 %and 23.57 % respectively. The above figures indicate that cottage/hand crafts were the dominant in industries of the Ethiopian manufacturing industries.

Even though the contribution of the manufacturing sector to the whole economy of the country was 3% which is less than the neighboring countries such as Egypt (15%)and Kenya (11%).<sup>2</sup> The trend in the contribution of the industries to the total manufacturing sector of country has changed after 2003. As it can be seen from this table, the value added in 1997 was increased by 3.1 %. However, 1998 this increase does not keep on its improvement, instead it decreases by 14.2% and in the consecutive year the value added increases by 2% relative to the preceding year but decreases by 1.2% relative to the fiscal year of 1996. The value added in the year of 2001 has become diminished and the value added in the year was 7% less than the year

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<sup>1</sup>.Survey of manufacturing in 1995/6 by CSA

<sup>2</sup>. See the full discussion on:IEEA, annual report on the Ethiopian Economy ,Vol.I 1999/2000,p.204-207

1999, and this continues until the consecutive year (2002). The possible reason for this diminishing may be due to the war that has been taken place between Ethiopia and Eritrea. From the year 2003 to the year 2006 the manufacturing sector has shown an improvement on the value added, as compared to the period before 2002 fiscal year.

Table 1; manufacturing value added at basic price

year	value added (in birr)	annual growth %
1996	2,025,616.00	
1997	2,087,848.00	3.1
1998	1,792,384.00	-14.2
1999	1,828,456.00	2.0
2000	2,498,832.00	36.7
2001	2,300,936.00	-7.9
2002	2,098,432.00	-8.8
2003	2,220,383.00	5.8
2004	2,579,904.00	16.2
2005	3,030,640.00	17.5
2006	3,676,781.00	21.3

Source: computed from CSA, manufacturing survey from 2001-2006, and EEA, annual report on Ethiopian economy Vol.III.2003/04

The contribution of the value added to the manufacturing sector by different industries were not similar i.e. there is a high variability among the industries in the contribution of value added to the sector. As one expects in the case of Ethiopian industries, food and beverage manufacturing industrial groups were the major contributor to the total value added. For example the percentage contribution of the value added of this industry for the five consecutive years i.e. 2001/2, 2002/3, 2003/4, 2004/5 and 2005/2006 was 45.35, 46.97, 44.99, 41.87 and 40.31 percent respectively<sup>3</sup> However, the contribution of the industry on average is decreasing this may be possibly due to the improvement of performance in other industries of the sector.

In contrast to the food industry , tanning and Dressing of leather, manufacture of footwear and manufacture of machinery and Equipment have less contribution in adding value to the sector.

The combined percentage distribution of the value added to these industries in the above five consecutive years was 6.87,4.44,5.12,4.53,4.69<sup>3</sup> percentage respectively. If we were to rank the major industrial groups in terms of the distribution of value added to the total manufacturing sector; the food and beverage industry, non-metallic industry, chemical industry are the first, second and the third and their contribution to the total manufacturing in percentage was 40,16 and 14<sup>4</sup> respectively. According to the data obtained from CSA of the manufacturing survey 2002-2006, the number of persons engaged in the manufacturing industries has increased from year to year during the survey period. The increase on the number of persons engaged could be attributed to the increase in the number of establishments from time to time. The total number of persons working in the manufacturing in the year of 2001/2 was 98,986 and in the following year the number increased to 102,347 and in the year of 2003/4,2004/5 and 2005/6 the number of persons engaged increased to 106347,110160,and 119397 respectively. The number of establishments in the year was 909 and in the following four consecutive years, the figure has increased to 966,1074,1207,1244 respectively.

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<sup>3</sup> . the figures are from CSA, manufacturing industries survey ,403- statistical bulletin

<sup>4</sup> . . the figures are from CSA, manufacturing industries survey ,403- statistical bulletin

Table2: number of persons working in manufacturing industries and number of establishments from 2001/2 to 2005/6.

year	n.persons	n.estabili.
2001/2	98,986.00	909.00
2002/3	102,347.00	966.00
2003/4	106,151.00	1,074.00
2004/5	110,160.00	1,207.00
2005/6	119,397.00	1,244.00

Source: computed from CSA, manufacturing survey, 403-statistical bulletin of 2005/6

As it can be seen from the above table, one possible cause for the increase in creating employment opportunity is due to an increase of the establishments on the sector.

With respect to relative share of individual sub-sectors in the total employment ,similar to the contribution of the value added still manufacture of food and beverage took the highest share through the period under survey ( CSA,manufacturing industries survey,403-statistical bulletin ).During the 4<sup>th</sup> quarter of 2006/7 the share of the sub-sector was 21.1 percent of the work force followed by textile industries which contributes 13.6 percent of the total force in the manufacturing sector<sup>5</sup>. On the other hand, manufacturing industries of machinery and equipment have created least employment opportunities as compared to other sub-sectors.

When we see the owner ship distribution of the manufacturing out put, the private enterprises accounted only for 48.2 percent of the manufacturing sector in 1995/6 and during the same year the private sector contributed for 12 percent of the value added of the industries who can employ greater than ten persons. Even though the private manufacturing activities accounted only for about 12 percent of the total value added of the large and medium scale

<sup>5</sup> . quarterly bulletin of National Bank of Ethiopia,2007

manufacturing industries, there are sub-sectors in which the private sector dominated the manufacturing output. For instance, the manufacture of furniture where it accounted over 82 percent of the total value added is dominated by the private sector. On the other hand manufacture of food and beverage, tobacco, wood, paper and other metallic products were dominated by the public sector and they were accounted for the 90% of the total value added.<sup>6</sup>

However, in the fiscal year 2005/06 most of the manufacturing firms are owned by the private sector. Only tobacco products are monopolized by the public sector. During this year there were a total of 1213<sup>9</sup> number of establishments of which 88 percent (1072 establishments) are owned by private while the rest establishments are owned by the public sector.

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<sup>6</sup> .EEA, Annual Report on Ethiopian Economy, Vol. I. 1999/2000, pp. 216-217

<sup>9</sup> large and medium manufacturing establishments only

## **Section IV. Methodology, empirical specification**

### **IVa. structure-conduct- performance frame work**

The Structure-Conduct- Performance model is comprises three major elements.

- a) Structure-which refers to market structure. The variables that are used to describe market structure includes seller concentration, degree of product differentiation, barrier to entry, cost structures, vertical integration and diversification (Scherer and Ross “market structure and Economic performance”, p-5).
- b) Conduct-which refers to firm’s behavior in the market .The variables used to express firm behavior includes price strategies, collusion, advertising, research and development and capacity investment (Scherer and Ross, p-5).
- c) Performance-, which refers to the out come, assessed in terms of allocative efficiency.

The SCP model explains that there is a causal relation ship between industrial structures and industry performance indirectly through the behavior of the firms in the market.

### **IV.b. Measurement of the dependent and independent variables in the model**

#### **Measuring performance**

A number of measures of industrial performance have been used in the literature and these indicators can be categorized in to three groups .These are: the profitability indicators, productivity indicators, market share and competitiveness indicators and industrial organization indicators (Eisa, 2004). In this work the profitability indicators will be employed.

## Profitability measures of performance

Within this category there are a lot of proxies for measuring profitability.

Bain (1948) has developed a measure of profitability that gives profit in excess of normal return on invested capital. Bain's excess profit rate is given by

$$profit = \frac{PQ - (c * Q + D + rI)}{I}$$

Where:

P -is the price per unit out put

Q- is the total out put

C- is cost per unit of out put

r -is the value of the investment

D-depreciation

I - is the investment

Another measure of profitability is the Tobin's q which is defined as the ratio of the market of a firm's common and preferred stock plus the total value of outstanding debt to the cost of replacing total assets (Scherer and Ross,p-5 )

$$q = \frac{M_c + M_p + M_d}{A_r}$$

where:

M<sub>c</sub> -is common stock

M<sub>p</sub>-preferred stock

M<sub>d</sub> -total value of outstanding debt

A<sub>r</sub>- is the cost of replacing total assets.

And another measure of profitability, is the Lerner- index in which theory suggests a good measure of the firm's market power.

This is given by

$$\text{Lerner\_index} = \frac{P - MC}{P}$$

Where:

MC: marginal cost

P: price

Theoretically, the Lerner index is a good measure of performance, because it is related to the market share of the given firm's.

However, it is not always possible to the Lerner Index empirically, since it is difficult to obtain data for marginal cost. Hence, average variable cost is used instead of the marginal cost. A measure of performance that is conceptually closest to the Lerner index is the price cost margin (PCM).

$$PCM = \frac{TS - MC - PR}{TS}$$

Where:

PCM: is price cost margin

TS: is a total sale

PR: is payroll cost

There is no general consensus on which is the best measure of performance. The choice depends on the availability of the data and other factors such as aggregation level of the analysis

There are different types of indices that have been used by different scholars to measure industry concentration. Some of them are:

### **Gini coefficient**

The Gini coefficient is a measure of inequality of a distribution is defined as the ratio of area between the Lorenz curve of the distribution and the curve of the uniform distribution, to the area under the uniform distribution. It is often

used to measure income inequality. The possible value of the Gini coefficient is between 0 and 1.

Where 0 corresponds to perfect equality (every one has the same income) and 1 corresponds to perfect inequality (one person has all the income, while the others zero income).

In terms of industry concentration, the Gini coefficient is referred as a relative of industry concentration as distinct from an absolute measure such as the Herfindahl-Hirschman Index (HHI). As a relative measure, the Gini coefficient uses Lorenz curves to focus attention on the degree of inequality.

**Ellison and Glaser (1994)(EG)**

The Ellison and Glaeser index of industry concentration is given by

$$EG = \frac{\sum (S_i - X_i)^2}{1 - \sum X_i^2} \cdot \frac{1}{1 - HHI}$$

Where:

$S_i$  - is the firm's share

$X_i$  - is the area share of the total employment

**Maurel sedillot(1999) (MS)**

In this case ,there are N plants in the industry ,with employment shares  $Z_1, \dots, Z_N$  located across M geographic areas , $X_1, \dots, X_M$  are the shares of total employment. then the fraction of the industry's employment in area i is given by

$$S_i = \sum_{j=1}^N Z_j U_{ji}$$

Where:  $U_{ji}=1$ , if firm j locates in area i and zero otherwise.

$$MS = \frac{\sum S_i^2 - \sum X_i^2}{1 - \sum X_i^2} - HHI$$

$$\frac{1}{1 - HHI}$$

### **Concentration ratio**

The concentration ratio measures the total market share of the given number of (n) firms with largest market shares.

$$CR_N = \sum_{i=1}^N S_i$$

Where  $s_i$ - is the firm's market share

In most literature the value of N is equal to 4.

In this case the concentration ratio is called the four firm concentration ratio

### **Herfindahl-Hirschman Index(HHI)**

This index is a measure of the size of firms relative to the industry. It is defined as the sum of the squares of the market share of each individual firm. the domain of HHI is between 0 and 1. Decrease in HHI generally indicates a loss of pricing and an increase competition among the firms and the extreme case where  $HHI=0$  implies the market is competitive market . where as an increase in HHI implies the reverse. And the extreme case when  $HHI=1$  indicates that there is a single monopolistic producer of the product.

$$HHI = \sum S_i^2$$

Where  $s_i$ - is the firm's market share

In spite of the debates of the choice of concentration measures, the concentration ratio and HHI are the most commonly used concentration indices in empirical SCP studies. In choosing which of the two indices is best one should proceed from a theory showing seller concentration matters behaviorally. In practice, it does not matter which of the concentration indices you select, since they are highly correlated.(Scherer,p-72 ).

In this study ,the four firm concentration ratio will be used as a measure of seller concentration.

### **Other independent variables**

In addition to industry concentration, the empirical specification includes many other explanatory variables for the performance of the industry such as barriers to entry(e.g. comanor and Wilson ,1976;Collins and Preston ,1968) buyer concentration (which affects seller`s profit margin ),industry growth(to capture industry disequilibrium),ratio of imports to domestic production or consumption (to capture the influence of imports) and geographic dispersion measures(to capture the effect of regional or local markets) the above variables directly or indirectly affects the profit(performance) of the industry. In this paper barrier to entry, import intensity, export intensity is included in the model in addition to the seller concentration.

Barriers to entry can either be structural or strategic in nature. Structural barriers include scale of economies and product differentiation. On the other hand, strategic barriers of entry arise from the strategic behavior of the firm in order to deter entry of other firms. These includes: limit pricing and predatory pricing. The study of standard SCP has concentrated mostly on quantifiable structural barriers of entry.

The condition of barriers to entry is measured by three economies of scale variables namely: minimum efficient scale (MES), minimum capital requirement and product differentiation. There are a lot of proxies for these variables. The proxy for MES is calculated as the average size of the largest plants that account for at least 50% of total industry out put, and it is

calculated as  $\frac{\sum_{i=1}^m X_i}{m}$  where  $X_i$  of total out put of firm  $i$  and  $m$  is minimum number of firms accounting for at least 50% of the total out put (Ghani,2000).

The proxy for minimum capital requirement to enter an industry at a single optimal plant is calculated by multiplying the MES to the ratio of net book value of fixed assets to out put and product differentiation is measured by the ratio of advertising expenditure to total sales.

In this study advertising expenditure to total sales is used as proxy for product differentiation. More over the model in the paper includes import intensity as explanatory variable. As cited by Haizheng et al. (2004) there are a number of studies, including Ghosal (2000), Katic and Peterson (1994), Pugel (1980), and Caves (1985), that support the hypothesis imports have had an increasing influence on industrial price-cost margins and such influences tend to be stronger in more concentrated industries. In this paper the import intensity is measured by the ratio of imports to total industry consumption and similarly the export intensity is measured by the ratio of exports to the total sales of the industries.

#### ***IVc. Empirical specification***

This study reports an empirical attempt to relate industrial performance with market structure in the manufacturing sector. The basic model is:

$$PCM = \beta_1 + \beta_2 CR4 + \beta_3 BE + \beta_4 IM + \beta_5 EX + \xi_i$$

Where:

PCM . is the price- cost margin for industry

CR4-is the four firm concentration ratio in industry

$\beta$ 's- are parameters to be estimated.

BE- proxy for barriers to entry,

IM-import intensity

EX-Export intensity

$\xi$  –the random disturbance error

The model employs an industries profit as a function of seller concentration ratio in industry, barrier to entry, import intensity and export intensity. Seller concentration relates to the activities of the producers in determining price and out put in an oligopolist industries .It is usual in the literature to find concentrated industries linked to those possessed by large sized firms; one of the reasons advanced for this is that concentrated industries enjoy favorable access to capital. The four –firm concentration ratio is one measure of this: the larger the share of industry output supplied by few firms the greater the probability these firms will evolve some implicit or tacit collusion to raise price and restrict output. Hence, the expected sign of the parameter  $\beta_2$  is positive. Product differentiation, which is one measure of barrier entry, is likely to have a positive effect on profit rates. The firm's discretionary control over prices is positively associated with its ability to differentiate its product in the mind of the consumers. Therefore, the parameter  $\beta_3$  ,which is a measure of barrier to entry is also expected to be positive and  $\beta_5$  is expected to be positive . While,  $\beta_4$  is expected to have negative sign because import intensity decreases the market power of the firms.

## V. Data, Estimation results and interpretation

The data for this study were obtained from the survey of fifteen Ethiopia large and medium manufacturing industry by CSA for the fiscal year of 2005/06.

This analysis has employed only a simple and multiple regression techniques and uses the market concentration, barriers to entry, import intensity and export intensity as explanatory variables. The dependent variable (PCM) was first regressed on the market concentration by excluding the other explanatory variables and Stata software has employed to analyze the data.

Table[3] in the annex shows the result of this regression. In the regression, the results shows that the coefficient of the four firm concentration ratio(CR4) is positive and statistically significant at 10% level with a coefficient of determination( $R^2$ ) =0.482. However, the positive relation ship between profitability and concentration was not found strong. The price cost margin was also regressed on concentration and barriers to entry only. In this regression the results table [4] of the annex shows that the profitability has a positive correlation with the two market structure variables. But the magnitude of the regression coefficient of the market concentration was found to be less than of the coefficient the market concentration when the PCM was regressed on the market concentration only. In the results both the coefficients of the market concentration and barrier to entry was found statistically different from zero at 10% significance level and the coefficient of determination was approximately increased by 20 percent.

Table[6] of the annex shows the results when the dependent variable is regressed on the market concentration, barriers to entry, import intensity and export intensity. The regression results show that the coefficients of concentration, barrier to entry and export intensity were found positively associated with the dependant variable and statistically different from zero at

10% level of significance. On the other hand the regression coefficient of import intensity was found to be inversely related and statistically significant at 10% level. According to the economic theory, other factors holding constant, the profit in high level of market concentration earned would be more than in the absence of such concentration. Similarly the profits that could be earned in industries exercising barriers to entry are greater than in the absence of it. On the other direction, import intensity is expected to reduce the monopoly power of the industries and as a result, the profit that would be obtained in the absence of monopoly power would be less. The findings of this paper are in line with the above economic theory.

Holding other variables constant, a one percent increase in the four-firm-concentration –ratio causes 5.33 percent increase in the price- cost- margin. Likewise, one percent increase in barriers to entry causes 2.9 percent increase in the dependant variable. On the other hand, a one percent increase in the export intensity causes a 6.3 percent decrease in the price- cost- margin. Differently, a one percent increase in the export intensity causes a 0.27 percent increase in the profit of the industries.

## **VI. Conclusion**

This paper has provided a review of the theoretical and empirical literature on concentration, barriers to entry, import intensity and export intensity and on how those affect the industry performance. This is followed by analysis of these factors in the data set of large and medium Ethiopian manufacturing industries using simple and multiple linear regression models. This type of empirical investigation on the Ethiopian manufacturing sector is rare. This is one justification for this paper focus on reviewing the issues and providing exploratory analysis. Earlier studies of the positive relation ship between concentration and profitability have yielded conflicting results. In this study, Concentration and barriers to entry as measured by four- firm- concentration ratio and product differentiation was found a positive association with the performance of the industries as measured by price cost margin.

However, import intensity has a negative impact on the profitability of the industries. As the study indicates a number of areas of for future analysis seem clear.

For example, I have not investigated non-linear effects of concentration and the other explanatory variables, or possibly the interaction effect of explanatory variables to each other. Equally, the limited set of explanatory variables and the effect of small-scale industries in the structure of the market and the definition of the market call for investigation further.

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Annex 1. Estimation results

**Table 3. Results when PCM is regressed on the market concentration only.**

pcm	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cr4	.17498	.0047618	-0.37	0.719	-.0119628 .0084632	R-squared = 0.096
_cons	.4128464	.4706363	0.88	0.395	-.596568 1.422261	

**Table 4. Results when PCM is regressed on the market concentration and barriers to entry only.**

pcm	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cr4	.1640555	.0635226	-1.01	0.332	-.2012877 .0731766	
be	.3989899	.4056351	-0.98	0.343	-1.275311 .4773314	R-squared = 0.482
_cons	6.672727	6.381558	1.05	0.315	-7.11379 20.45924	

**Table 5. Results when PCM is regressed on the market concentration, barriers to entry and import intensity only.**

pcm	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cr4	.065537	.0630564	-1.04	0.319	-.2029252 .0718511	
be	.3956839	.4025771	-0.98	0.345	-1.272824 .4814561	
im	-.0926227	.0845881	1.09	0.295	-.0916789 .2769243	R-squared = 0.619
_cons	6.760302	6.333775	1.07	0.307	-7.039808 20.56041	

**Table 6. Results when PCM is regressed on the market concentration, barriers to entry and import intensity and export intensity.**

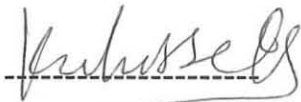
pcm	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cr4	.0533581	.0694079	-0.77	0.458	-.2061238 .0994077	R-squared = 0.810
be	.02943068	.461378	-0.64	0.537	-1.309793 .7211793	
im	-0.0639366	.1041063	0.61	0.552	-.1651998 .293073	
ex	0.002766267	5.463785	-0.51	0.623	-14.79198 9.259442	
_cons	5.560454	6.955818	0.80	0.441	-9.749197 20.87011	

## DECLARATION

I, the undersigned, declare that this project is my original work and has not been presented for a degree in any other university and that all sources of materials for this project have been duly acknowledged.

kahasse Gebrekidan

[Name]



Signature

Syed Hasan(Ph.D)

[Advisor]



Signature