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# DETERMINANTS OF FIRM PROFITABILITY: EVIDENCES FROM BANGLADESHI MANUFACTURING INDUSTRY

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## ABSTRACT

This study aims to investigate the factors which have impact on profitability of the manufacturing firms of Bangladesh. The determinants are divided into three categories i.e. firm-specific, industry-specific and macroeconomic factors and the profitability of the firms is defined with return on assets (ROA). To investigate this relationship, the study has taken into consideration of 508 sample observations from 113 Bangladeshi listed manufacturing firms covering the year from 2014 to 2018. The model this study used, includes the dynamic aspect of profitability and thus a dynamic panel estimator i.e. the General Method of Moments (G.M.M.) was applied. The result of this study shows that firm-specific factors (age, labor cost), industry-specific factor (concentration) and macroeconomic factors (G.D.P. growth rate, inflation) have significant influence on manufacturing firm's profitability.

**Contribution/Originality:** This study examined the Panel data by using General Method of Moments (G.M.M.) to investigate the determinants of profitability which contributes to the existing literature in manufacturing industry of Bangladesh by introducing variables from three different categories; firm-specific, industry-specific and especially macroeconomic factors for the very first time.

## 1. INTRODUCTION

According to Charles, Ahmed, and Joshua (2018) the way a firm uses its assets in the first place of business in order to generate income is known as the measurement of profitability. It demonstrates a firm's capacity to ensure earnings with regards to capital stock, assets and sales for a certain period (Margaretha & Supartika, 2016). On the basis of the firm performance, the owner and managers take futuristic decisions to validate the sustainability of the company in the long run. For this purpose, good performing firms always try to optimize the shareholders values through different aspects of performance indicators. Primarily, the objective of a company is to optimize the firm return which maximize the wealth of shareholders and which depends on the wise and optimal decisions, taken by managers, regarding balancing of assets and liability level (Khalid, Saif, Gondal, & Sarfraz, 2018). Therefore, the necessity of having a proper knowledge about which factors are mainly deriving the performance of the organization is ever increasing. Despite of having several theories and researches conducted previously by scholars on the reasons why one firm is performing superior to another, this topic still attracts many practitioners and researchers as an inexhaustible phenomenon.

Previously, many researchers had investigated the impact of different performance determinants on different industry. Khan (2017) investigated determinates of profitability in the banking sector of Bangladesh. Mahmud, Mallik, Imtiaz, and Tabassum (2016); Saimum and Ahmed (2015) and Hossain and Khaled (2018) also studied the profitability determinants for banking sector of Bangladesh. Rezina, Ashraf, and Khan (2020) focused specifically on cement sector, Islam and Khan (2019) on pharmaceutical sector for identifying the profitability determinants. A few number of study examined the whole manufacturing industry of Bangladesh. In a study, conducted by Haque, Aziza, Khatun, and Islam (2017) manufacturing industry data were incorporated as a whole but assessed only on the firm leverage and risk as the profitability indicators. Thus, this study found it logical to investigate the determinants of profitability of manufacturing industry as a whole which includes different sectors (Pharmaceuticals, Cement industry, Food and Allied industry, Ceramic industry, Tannery, Textile and Engineering, Jute, Power and Fuel). Moreover, a lot of researchers had investigated the impact of different performance determinants only from the perspective of industry specific determinants. For instances, firm age (Khan, 2020; Swiss, 2008) firm size (Hamid, 2016; Khan, 2020; Malik, 2011) liquidity of firm (Doğan, 2013) leverage (Haque et al., 2017; Mule & Mukras, 2015) corporate governance (Meah & Chaudhory, 2019) Audit characteristics (Rahman, Meah, & Chaudhory, 2019) and capital structure (Wali & Islam, 2018). A very few studies incorporated firm-specific, industry-specific and macroeconomic factors like this study. Hence, this study certainly will add brick to the vast wall of knowledge of profitability determinants.

The above stated facts validate the purpose of this study which is to develop a model to analyze the factors those have effect on firms profitability. To create the model, this study categorized the determinants in three categories: (1st) firm-specific (2nd) industry-specific and (3rd) macroeconomic factors. The 1st category embodies on some firm specific determinants i.e. age of firm, liquidity and the labor cost. The 2nd category emphasizes on the industry specific determinants i.e. Capital intensity and Industry concentration that describes the market structure. And finally, the 3rd category encompasses growth in gross domestic product (GGDP) and annual inflation which can also influence profitability. Time dummy variable in addition were included in the model to control cross-sectional dependency. However, the main concentration of this study is on the performance of Bangladeshi listed manufacturing companies.

The rest of the manuscript is arranged as follows: Section 2 outlines the existing literature and description of the determinants. Section 3 explains methods of data collection and introduce empirical model. Section 4 provides the results of the study and discussions. And finally, Section 5 concludes the study.

## 2. LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Firm's profitability determinants can be justified from several perspective of theoretical framework, empirical studies and the data which are available in the stock market. All the variables taken into consideration for this study are either from the theoretical explanation or previous literature. Explanations and justifications of these variables are described in following paragraphs.

### 2.1. Firm Age

A significant number of researchers and educationists tried to argue why older firms might perform better than the new ones from different areas like economics, strategic management and finance. It is mostly argued that the older firms might get easy financing due to wide experiences, compatibility and business reputation. In a research, Vijayakumar (2011) found that the Age of a firm has a positive impact on profitability. Bhayani (2010) also found a positive relation between firm's age and its profitability. An insignificant influence was found in a research of Gaur (2011). However, older firms sometime lack flexibility in making prompt decisions and innovations due to bureaucracy. Majumdar (1997) in a study has investigated the influence of firm's age on the firm's profitability and found that the younger firms earn more profit compared to older firms whereas, older firms are more productive

than Youngers. In another study, Salman and Yazdanfar (2012) found negative effect that a firm have on the profitability with respect to age. Some other recent studies for instance, Pervan, Pervan, and Curak (2016) and Hirsch and Hartmann (2014) also confirmed firm's performance deterioration with the firm age. Based on the previous research, the following hypothesis is formulated:

*H1: Age as a determinant, influences firm's profitability.*

## 2.2. Labor Cost

Labor cost in a competitive market has always been an important determinants of profitability especially in the manufacturing industries in Bangladesh. Increased labor cost is associated with improved quality thus leading to a better performance for the firm. Ton (2008) conducted a research by using data from large retailer store and found that profitability increases with the increase of labor cost through the impact on conformance quality. Hopp, Iravani, and Yuen (2007) argued that, an increase in labor amount leads the employees to interact 4 times more effectively that eventually increase profitability. In another study, Oliva and Sterman (2001) also found that increasing the amount of labor can lead to a higher profitability as it reduces the workload and errors of individual employees. Fisher, Krishnan, and Netessine (2006) again showed that more labor at retail stores results in higher sales and higher customer satisfaction. Relationship between a good service quality and profitability has been examined by many researchers. In the United States a study of 140 firms is conducted by Ittner and Larcker (1998) and showed a positive relationship between the market value of firm's equity and customer satisfaction. Furthermore, a study of 200 firms in America, Anderson, Fornell, and Mazvancheryl (2004) found a similar result. Based on the previous research, the following hypothesis is formulated:

*H2: Labor cost as a determinant, influences firm's profitability.*

## 2.3. Firms Liquidity

Liquidity of a firm refers to the ability to pay short term debts of the company and thus it is considered as a measure of risk whether a firm will be able to pay its short term debts or not (Pervan, Pervan, & Ćurak, 2019). Along with short term obligations to be settled in near future, a firm's liquidity also confirms long-term survival. In a study, Doğan (2013) by using multiple regressions model found that a firm's profitability is positively influenced by its liquidity ratio. In another study, Issa (2013) investigated some listed firms in agricultural sector of Nairobi (NSE) and found a statistically significant effect of liquidity that firms had on performance. Situm (2015) in a study, also found that increased liquidity reduces the probability of firm failure. Furthermore, Hirsch and Hartmann (2014) identified that firm's liquidity in short term has significant and positive relationship whit the profitability. However, some studies (Majumdar, 1997; Sur & Chakraborty, 2011) found no relationship and even some found a negative relationship between liquidity and profitability of the firm (Eljelly, 2004). the following hypothesis is formulated on the basis of previous findings.

*H3: Liquidity as a determinant, influences firm's profitability.*

## 2.4. Industry Concentration

In an economy, industry structure and the industry concentration can have a significant impact on the profitability of a company. In some early research findings, it was confirmed by Mason (1949) and Bain (1951) that the performance of the firm is influenced by the industry structure it operates in. Empirical studies found different relationship of industry concentration with firm's profitability. Jeong and Masson (1990) and Hirsch, Schiefer, Gschwandtner, and Hartmann (2014) also found industry concentration to be positively related with firm's profitability. However, in a study, Prince and Thurik (1995) found a negative relationship between profitability and concentration level. Moreover, Yoon (2004) for the Korean manufacturing firms also identified that industry concentration has negative influence on the profitability. Even a negative and insignificant influence of industry

191

concentration is being found by Kaluwa and Reid (1991). The following hypothesis is formulated after analyzing all the previous results:

*H4: Industry concentration as a determinant, influences firm's profitability.*

## 2.5. Capital Intensity

To make higher profit is challenging in a capital intensive industry. The organization requires higher fixed investments and as well as the working capital for day to day operations. On top of that, initial startup cost is much higher compared to other non-intensive sectors. According to Grazzi, Jacoby, and Treibich (2016) firms with an intensive investment in modern technology and equipment can achieve greater productivity which eventually leads to a higher level of profit in the firm. Moreover, competition in entering and surviving both are challenging. Larger capital employed firms may be considered superior. Firms with a higher capital investment in an intensive market can have higher profitability in considerate of newer competitors (Prince & Thurik, 1992). In several earliest studies, Strickland and Weiss (1976); Domowitz, Hubbard, and Petersen (1986); Prince and Thurik (1993) it is argued that compared with less capital-intensive industries, highly capital-intensive industries earn a higher margin which result in higher profitability. However, in a recent study, Dickinson and Sommers (2012) found that excess capital investment in the mature phase of a company can negatively influence the profitability. The following hypothesis is based on previous works:

*H5: Capital intensity as a determinant, influences firm's profitability*

## 2.6. Economic growth

Economic growth refers to the macroeconomic scenario of a country. In other words, it indicates the ups and downs of a country's economic situation which certainly have impact on the performance of a firm operating under that economy. It is mostly anticipated that the boom in economic situation of a country in a certain period results in profit boost of a firm. In contrast the recession lead a company to a downfall in performance. The demand for services & goods goes up or down with the fluctuation in growth rate. In a study, Machin and Van Reenen (1993) showed a characteristic of profit as pro-cyclical in a large sample of British manufacturing firms. In another study, Lima and Resende (2004) for the Brazilian firms, found same trends as well. Pattitoni, Petracci, and Spisni (2014) found a positive influence of G.D.P. growth on the profitability of the European firms. However, no significant relationship between profitability and business growth is found by Lee (2009) for publicly-held firms in USA. The following hypothesis is developed considering the literature:

*H6: Economic growth as a determinant, influences firm's profitability.*

## 2.7. Inflation Rate

Inflation is defined by Pervan et al. (2019) as a boost in the price of the goods and services that can impact the revenue and costs of a firm. It is anticipated that the inflation rate have significant impact on the firms profitability like G.D.P. Pervan et al. (2019) also found that inflation could decrease the demand of goods as value of money decreases. The customers who have fixed income, will lose the purchasing power. As a result of decrease in the demand of the goods, companies eventually start to lose profitability. A negative impact of inflation thus is found here in profitability of the firm. In another study on Turkish firms, Demir (2009) found negative impact. Moreover, Pattitoni et al. (2014) confirmed same negative effect for European firms. However, in an early study conducted by Perry (1992) it was argued that the profitability of firms depends on anticipation of the inflation. While in anticipated inflations firms can adjust their product prices to avoid losses, unanticipated inflation does not give chance to adjust prices of the goods leading to a decline in performance and profitability as well. Based on above literature, the following hypothesis is formulated:

*H7: Inflation rate as a determinant, influences firm's profitability.*

## 3. RESEARCH METHODOLOGY

### 3.1. Data Detail

The research is conducted on the basis of published data from financial statements of 113 listed manufacturing firms of Bangladesh from 2014 through 2018. The final sample includes 508 firm-years from Pharmaceuticals, Cement industry, Food and Allied industry, Ceramic industry, Tannery, Textile and Engineering, Jute, Power and Fuel sector. The firm specific variables i.e. return on asset, liquidity ratio, labor cost and capital intensity are taken from the financial statements. However, additional sources and websites are used to derive non-financial data like the year of incorporation. Since the number of total firm year is changing every year as a result of merger, liquidation and acquisition, a series of unbalanced panel data is used in this research. No specific statistical data is found regarding the industry concentration in the secondary sources and thus the concentration ratio and the Herfindahl–Hirschman index were individually computed. In a study, Pervan et al. (2019) used the index to identify the market share ratio and industry competitiveness. Industrial concentration as a determinant of profitability had never been included in previous studies in Bangladeshi manufacturing industry. Finally, the data related to macroeconomic factors were derived from the database of WDI (World Development Indicators) of the World Bank (2018).

### 3.2. Model Estimation & Variables

In the estimation model, a dynamic component is introduced in the form of a lagged dependent variable as a regressor. Since it is assumed that the profitability of the current year to some extent is related and influenced by the previous year's profitability of the firm, the study introduced a lagged dependent variable.

$$ROA_{it} = \alpha + \delta ROA_{i,t-1} + \sum_{p=1}^{P} \beta_p X_{it}^p + \sum_{q=1}^{Q} \beta_q X_{it}^q + \sum_{r=1}^{R} \beta_r X_{it}^r + \varepsilon_{it}$$

Here,

$ROA_{it}$ refers to the profitability of firm i at time t, (i=1, …, N and t=1, .., T)

$\alpha$ is a constant term,

$\delta$ is the speed of convergence toward equilibrium,

$ROA_{i,t-1}$ is the one-year lagged profitability,

$\beta_p$ , $\beta_q$ and $\beta_r$ represent the coefficients,

$X_{it}^r$'s are the explanatory variables (where, $X_{it}^p$ represents firm-specific variables; $X_{it}^q$ represents industry-specific variables and $X_{it}^r$ represents macroeconomic variables),

$\varepsilon_{it}$ is the error term.

The definition of variables and measurements are presented in Table 1. Among the variables, only Current ratio and labor cost are the endogenous variables which were instrumented with their lags. As the lag model is used, Ordinary Least Squire (O.L.S) method won't provide correct and consistent result. Thus, a dynamic panel estimator is applied, which is known as the generalized methods of moment (G.M.M.).

**Table-1.** Measurement of variables.

| Variables | | Symbols | Description |
|---|---|---|---|
| Dependent variable | Return on Asset | ROA | Ratio of profit or loss before tax and total assets |
| Firm-specific Variables | Age | Age | Number of years the firm operates in the market |
| | Current ratio | Liq | Current assets divided by Current liabilities |
| | Labor cost | Lab | Ratio between firm's labor cost and its sales |
| Industry-specific variables | Herfindahl–Hirschman Index (Industry concentration) | HHI | Sum of the squared market share of firms operating in the respective industry. |
| | Capital intensity | Cap | Ratio between fixed assets and sales |
| Macro-economic variables | Inflation rate | IR | Annual inflation rate |
| | Growth rate of economy | GGDP | Annual growth rate on GDP |

## 4. RESEARCH RESULTS AND DISCUSSIONS

Table 2 and Table 3 represent the result of the model as descriptive statistics and pairwise correlation matrix respectively. Most of the correlation coefficients in Table 3 are very low value other than the coefficient of between Inflation rate and the GDP growth variables which was reported as equals to 0.38. Since this still not is a very significant percentage, multicollinearity should not arise here.

**Table-2.** Descriptive Statistics.

| Variable | Maximum | Minimum | Mean | Std. Dev. |
|---|---|---|---|---|
| ROA | 0.4101 | −0.2415 | 0.135033 | 13.10382 |
| Age | 119 | 1 | 14.23349 | 13.13373 |
| Lab | 1257.572 | 0 | 0.435575 | 7.340466 |
| Liq | 100 | 0 | 2.605145 | 5.898342 |
| HHI | 7744 | 146.7322 | 1261.737 | 1420.540 |
| Cap | 7063.448 | 0 | 43.40608 | 127.7611 |
| IR | 7.7025 | 0.0143 | 1.932241 | 1.755538 |
| GGDP | 7.1500 | -7.3837 | -0.22405 | 3.272971 |

**Table-3.** Pairwise Correlation.

| Variable | ROA | Age | Lab | Liq | HHI | Cap | GGDP | IR |
|---|---|---|---|---|---|---|---|---|
| ROA | 1 | | | | | | | |
| Age | - 0.0109** | 1 | | | | | | |
| Lab | - 0.0402** | - 0.0014 | 1 | | | | | |
| Liq | 0.0726*** | 0.0496** | - 0.0049 | 1 | | | | |
| HHI | - 0.0057 | 0.0477** | 0.0167* | 0.0202* | 1 | | | |
| Cap | - 0.0135* | 0.0128* | 0.0035 | 0.0048 | 0.1956*** | 1 | | |
| GGDP | 0.0567*** | - 0.0037 | - 0.0047 | - 0.0066 | 0.0217** | - 0.0146* | 1 | |
| IR | 0.0446** | - 0.0624*** | - 0.0091 | - 0.0166* | 0.0348** | - 0.0265* | 0.3844*** | 1 |

**Note:** ***indicate significance at the 1% level, ** indicate significance at the 5% level, * indicates significance at the 10% level.

After the application of System GMM it was found that instruments of variables were not valid and thus a difference GMM estimator is used and the results are represented in Table 4. This application to estimate the model is validated through Hansen test (P value refers to the validity of over-identifying restrictions) and Arellano and Bond's P test (m1 and m2) confirms the nonexistence of autocorrelation).

Table-4. Profitability Determinants.

| Independent Variables | Dependent Variable: ROA | |
|---|---|---|
| | Coefficient | Standard Error |
| $ROA_{(t-1)}$ | 0.21656*** | 0.137870 |
| Age | 6.0809*** | 0.119413 |
| Lab | -0.0721*** | 0.017047 |
| Liq | 0.13891 | 0.163620 |
| HHI | -0.00060* | 0.000342 |
| Cap | 0.00037 | 0.000325 |
| GGDP | 0.12690*** | 0.024720 |
| IR | 11.9006*** | 0.208680 |
| Hansen test (p value) | 0.225 | |
| Arellano–Bond (m1) (p-value) | 0.001 | |
| Arellano–Bond (m2) (p-value) | 0.823 | |

**Note:** ***indicate significance at the 1% level, ** indicate significance at the 5% level, * indicates significance at the 10% level.

From the obtained result, ROA (t-1) indicates that the profit persistence of manufacturing industry in Bangladesh is low. A value of 0.21656 indicates a high level of market competition within this industry. As a result of this high competition, speed of convergence toward industry's mean profit is much higher.

### 4.1. Age as a Profitability Determinant

The obtained result indicates that the profitability of the firms in manufacturing industry of Bangladesh is positively influenced by the age of the firm (see also (Bhayani, 2010; Vijayakumar, 2011)). It is likely that an older firm have better market position and knowledge about its stakeholders compared to a newer one. Moreover, older firms have business reputation which it can capitalize to get easy financing and reduced capital cost. Cost of production is also controlled over time. Thus, profitability increases as time goes by. According to the result, H1 is accepted.

### 4.2. Labor Cost as a Profitability Determinant

The obtained result indicates that the profitability of the firms in manufacturing industry of Bangladesh is significantly influenced by the labor cost of the firm (see also (Hopp et al., 2007; Oliva & Sterman, 2001; Ton, 2008) . The value of this variable is negative ((Ittner & Larcker, 1998) found positive) which implies higher cost of labor will result in lower profitability. To reduce the cost of labor and implementing the cost leadership concept might be useful for Bangladeshi manufacturing companies as the relationship is statistically significant. Based on the finding, H2 is accepted.

### 4.3. Liquidity as a Profitability Determinant

The result shows that the profitability of the firms in manufacturing industry of Bangladesh is positively influenced by the Liquidity of the firm (See also (Doğan, 2013)). However, unlike Issa (2013) and Situm (2015) this study found that the impact is not statistically significant. Firms with low liquidity may search for ways to collect their receivables shortly and financing the organization in short term with bank and supplier credits. This might eventually harm the profitability of the firm. According to the result, H3 is accepted.

### 4.4. Industry Concentration as a Profitability Determinant

The finding indicates that Industry concentration as a profitability determinant has significant negative impact on Bangladeshi manufacturing firm's profitability (see also (Prince & Thurik, 1995; Yoon, 2004)). As the value is negative, it indicates that an increase in industry concentration can decrease the profitability. As it affects the performance of the firm, H4 is accepted.

*4.5. Capital Intensity as a Profitability Determinant*

According to the result, the value of capital intensity is positive which indicates it can increase the profitability of a firm (see also (Domowitz et al., 1986; Prince & Thurik, 1993; Strickland & Weiss, 1976)). An intensive capital is only considered as a barrier at the entry point. But if the capital could be employed in some fixed asset, the profitability through production cost can be increased. However, the impact of capital intensity in this research found to be insignificant as a determinant of profitability in Bangladeshi manufacturing firms. Thus, H5 is accepted as it has influence.

*4.6. Economic Growth as a Profitability Determinant*

In accordance with the obtained result, it can be said that the economic growth rate of a country from the perspective of macroeconomic affairs positively (see also (Pattitoni et al., 2014)) and significantly (opposite of the result found by Lee (2009) influence the profitability of the manufacturing firms of Bangladesh. A good economic condition can increase the demand of the goods which eventually results in higher revenue as well as profit. Thus, H6 is accepted.

*4.7. Inflation Rate as a Profitability Determinant*

The inflation rate, according to the result indicates a positive and statistically significant impact on profitability of Bangladeshi manufacturing firms. It implies that with the increase in inflation rate, companies are able to adjust their product price and as well as can control the operating cost which results in higher profit. However, Demir (2009) and Pattitoni et al. (2014) confirmed a negative relationship between profitability and the inflation rate. From Bangladeshi context, result indicate the positive relation and validate the inclusion of macroeconomic variable in our model. H7 is accepted.

## 5. CONCLUSION

On the basis of different theoretical framework and literature, the study aimed to prove the influences of factors which is categorized in 3, one is Firm specific (Age of the firm, Liquidity and Labor cost), another is industry specific (Capital intensity of the industry and industry concentration) and the other one is macroeconomic variables (GDP growth and Inflation rate) on the profitability of Bangladeshi manufacturing firms from the year 2014 to 2018. The panel data is estimated with a regression model and examined by G.M.M (General Method of Momentum).

In accordance with the result of the estimation, it is found that Age is positively influencing the profitability of Bangladeshi manufacturing firms. That means the older firms are performing better than the newer firms in terms of profitability as those will have advantage of market knowledge and reputation. Liquidity on the other hand, also influence the profitability positively. Though the effect is not significant, it is implying that more firms can improve the profitability by concentrating on their cash conversion cycle and getting short term finance easily. A very significant negative relationship is found between Labor cost and the profitability of the firm. It is found that the more efficient a firm in cutting the labor cost the higher will be the profitability and vice versa. Industry concentration and capital intensity as industry specific variable are also found to have influence on firm's profitability in Bangladeshi manufacturing industry. While Industry concentration negative and statistically significant impact on the profitability, capital intensity has positive but insignificant impact. However, Capital intensity can determine the initial starting cost of the business which influence the revenue by introducing high productive machineries. From the macroeconomic perspective, GDP growth rate improves the purchasing power of the customers and demand of the products gets a boost. Hence, an increase in GDP rate is eventually increasing the profitability by increasing the revenue. Lastly, Inflation rate has a positive and significant impact on the

profitability as it is implied that Bangladeshi manufacturing firms are capable to adjust price with the rate of inflation and this lead to non-drop of sales revenue during the inflation.

The findings from this study suggest that the giant companies in an industry must be supervised carefully by the governing bodies to ensure the market equilibrium and perfect competition. Furthermore, government also needs to ensure a suitable economic condition by taking timely actions to maintain the macroeconomic situation of the country. Price stability and the inflation rate might be controlled by central Bank carefully through monetary policy. Inflation, to some extent may boost sales but harmful in an uncontrollable situation.

This study has some limitations and constraints certainly. Only manufacturing industry is taken into consideration while future studies may incorporate more data from other industry as well. Additionally, this study only examines data from 2014-2018 whereas older of recent data may influence the decisions.

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