DETERMINANTS OF PROFITABILITY OF NATIONAL TOBACCO ENTERPRISE (ETHIOPIA) SHARE COMPANY

BY:

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STATEMENT OF DECLARATION

I, Tekalign Dubale, declare that the research work reported in this thesis is my own work, except where otherwise indicated and acknowledged. It is submitted for the partial fulfillment of the requirements of Master of Business Administration (MBA) in Finance at Addis Ababa University. This thesis has not, either in whole or in part, been submitted for a degree or diploma in this or any other university.

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Date: June, 2017

STATEMENT OF CERTIFICATION

This is to certify that the thesis entitled ***"Determinants of profitability of National Tobacco Enterprise Ethiopia S.C"*** submitted by Tekalign Dubale to Addis Ababa University as partial fulfillment of the requirements of Masters of Business Administration (MBA) in Finance is carried out by him under my supervision and guidance.

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Acronyms

ACF:	*Auto Correlation Factor*
ADF:	*Augmented Dick-Fuller*
AR:	*Auto Regression*
ARCH:	*Auto Regressive Conditional Hetroskedasticity*
BG:	*Breusch – Godfrey*
BLUE:	*Best, Linear, Unbiased, Estimator*
CCC:	*Cash Conversion Cycle*
CLM:	*Classical Linear Model*
DW:	*Durbin – Watson*
ERR:	*Expense to Revenue Ratio*
FS:	*Firm Size*
GMROI:	*Gross Margin Return on Inventory*
IHP:	*Inventory Holding Period*
JB:	*Jarque – Bera*
JT:	*Japan Tobacco*
NTE:	*National Tobacco Enterprise*
OLS:	*Ordinary Least Square*
ROA:	*Return on Asset*
S.C:	*Share Company*
SCAR:	*Sales to Current Assets Ratio*
SG:	*Sales Growth*
TS:	*Time Series*

Abbreviations

Corr.: *Correlation*

Resid.: *Residual*

Var.: *Variance*

Abstract

The study of factors determining the profitability of companies has been given special attention over time in the fields of business research. In this study, a time series data set of National Tobacco Enterprise (Ethiopia) S.C was used for examining the determinants of the Company's profitability employing Ordinary Least Square (OLS) method. For this purpose financial information covering years 1968 – 2015 were collected and analyzed. Return on asset, considered as a measure for profitability, is the dependent variable while firm size, sales growth, expense to revenue ratio, gross margin return on inventory, sales to current asset ratio, and inventory holding period are considered as independent variables. According to the findings, firm size and expense revenue ratio showed statistically significant negative effect on profitability. Whereas, sales growth, gross margin return on inventory and sales to current asset ratios have significant positive effect on profitability. Inventory holding period, however, has positive but insignificant effect on profitability.

***Key words**: Profitability, profitability Determinants, time series data, manufacturing companies*

Chapter one: Introduction

This first chapter serves as a general framework for the paper as a whole. It provides background of the study, background of the company, statement of the problem, objectives of the study, Delimitation and limitations of the study, significance of the study and the structure of the paper.

1.1 Back ground of the study

Different corporate financial theorists enumerate the potential goals of corporate financing as maximizing revenues, profits, earning per share, returns, market share, or social good; minimizing costs, avoiding financial distress and bankruptcy, and survival. However, Kent H. Baker & Gary E. Powell (2005) argued that the primary corporate goal is to maximize long term firm value or wealth. Firms' profitability and ways of improving it are issues hotly debated among managers and Scholars. Identification of the sources of variation in firm level profitability is an important research theme in many fields including Economics, strategic management and accounting and finance (Goddard, Tavakoli & Wilson, 2005 cited in Pratheepan T., 2014). According to Camilia B. (2011), the information about company performance, especially about its profitability, is useful in substantiating managerial decisions regarding potential changes in the economic resources that the company will be able to control in the future. This implies that managers should have prior knowledge of factors influencing firm performance in order to prioritize the usage of scarce resources. Informed decision about the economic use of scarce resource is a vital step in the process of creating value to stakeholders.

In developing economies like Ethiopia, the identification of factors influencing company performance is of paramount importance in the way of efficient application of the nation's scarce productive resources towards goal achievement. This in turn will have a positive impact on the overall performance at macroeconomic level as it motivates both existing and potential investors to sacrifice additional resources.

For a manufacturing sector business that relies on the production and sale of goods to generate return for its shareholders, profit maximization is the prime goal. According to Ethiopian Customs and Revenue authority (cited in Mifta, 2016), there are 1002 large tax payer business organizations in Ethiopia as of March 31, 2015. Out of this the manufacturing sector business

constitute for 20.25%. National Tobacco Enterprise (Ethiopia) S.C is one of those companies categorized as large tax payers business organizations.

Studies have been conducted to determine factors affecting manufacturing companies' performance in different parts of the world. Pratheepan T. (2014), Camilia B. (2011), Kim C. Phan (2013), Pasupathi N. (2014), and Sivathaasan N., et al., (2013) had all studied the influencing factors of Company performance. On the other hand, empirical studies regarding manufacturing companies' performances and the influencing factors in Ethiopian context are few. Mifta A. (2016), Wubshet M. (2014), Mulualem M. (2011) and Tewodros (2010) cited in Mifta A. (2016) studied the relationship between working capital management and Performance of selected manufacturing Companies in Ethiopia using panel data. However, none of these studies tried to exhaustively identify major factors influencing manufacturing companies' performances. Accordingly, this study is believed to shade light on factors influencing manufacturing companies' performances in Ethiopian context using time series data from National Tobacco Enterprise (Ethiopia) S.C. covering years 1968 to 2015.

1.2 Company Background

National Tobacco Enterprise (Ethiopia) Share Company (NTE) was established as per the Tobacco Regie Act No.30, 2nd year Negarit Gazetta, No.2/1935 as "*Imperial Ethiopian Tobacco Monopoly*" with paid up capital of 50,000 'Martereza'. In 1981 the Enterprise was re-structured by proclamation No.1971/1981 and has become the "*National Tobacco and Match Corporation*" with total capital outlay of 80 million Ethiopian Birr. Latter, the Enterprise has again been re-organized as "*National Tobacco Enterprise*" in accordance with proclamation No. 37/1992. In article 4 of this proclamation the enterprise has been given an exclusive right to produce, process, manufacture, distribute, import, and export tobacco and tobacco products in Ethiopia.

In 1999, the Enterprise has once again been re-organized as a share company pursuant to the Privatization Proclamation Act No.146/1998. With the sales of shares to private investors, the ownership structure of the Company was changed and its memorandum of understanding and Articles of Associations were accordingly amended and adopted in accordance with the relevant provisions of the Commercial Code of Ethiopia. As of January 2001, the share capital of the company was Birr 250 million that was fully subscribed and paid up. However, with a recent

capital injection the share capital has increased to Birr 479,116,000 million. In August 2016, the Government of the Federal Democratic Republic of Ethiopia through a tender process sold 40% of its shares in the Company to JT International SA, a Company of the Japan Tobacco Group, for USD 510 million (Audit Corporate Report, 2015, pp 17 & Article of Association Amendment No. 5/2016).

Currently the Company is among the top public enterprises in terms of annual turnover, profitability, and its contribution to the economy as a whole. Annual turnover has continually increased, on average by Birr 190 million, during the previous five years period. Similarly, its contribution to the economy in terms of taxes, dividend to the share holders and job creation to the citizen is persistently increasing. Annual tax related contribution to the economy (VAT, Excise tax, Income tax, Dividend tax etc) has currently reached more than Birr 700 million. In addition, the Enterprise with one cigarette factory at Addis Ababa and four tobacco development farms at Shewa Robit, Awassa, Bilatie and Wolaita has employed more than 934 permanent employees and 3,305 temporary and casual workers (Company Website)

1.3 Problem statement

Survival in business and the ability to reward the owners with substantial amount of return depends on the profitability of companies (Pratheepan T. 2014). On the other hand, examining factors influencing profitability helps to understand how companies finance their operations. The knowledge of factors affecting company performance in turn helps decisions makers to prioritize among alternatives related to the use of scare productive resources.

Profitability has been given considerable importance in the finance and accounting literatures. The going concern of accounting principle holds true as long as firms are profitable. Moreover, the very existence of a business organization is to generate wealth to its owners. Hifza M. (2011), as cited in Pratheepan T. (2014), stated that *'profitability is one of the most important objectives of financial management since one goal of financial management is to maximize the owners' wealth, and, profitability is very important determinant of performance'*. Camilia B. (2011) links performance at microeconomic level to the proper grounding of managerial decisions in relation to the efficient use of economic resources within the operational, financing and investing activities. For this end, it is asserted among researchers that the most appropriate

indicators that express the aspects related to company performance and growth should be chosen and examined among the relative profitability indicators (Pratheepan T., 2014; Sivathaasan N. et al., 2013; Pasupathi N. , 2014; Kim C. Phan, 2013, & Camilia B. 2011).

Much of the currently available empirical literatures on factors affecting companies' performance in Ethiopian context are focused on the relationship between working capital management and profitability (Mifta A. 2016; Wubishet M. 2014; Mulualem M. 2011 and Tewodros, 2010 cited in Mifta A. 2016). As a result it is difficult to find an empirical evidence for factors influencing company performance that focused on identifying major influencing factors for manufacturing organizations like National Tobacco Enterprise (Ethiopia) S.C

As briefly stated under section 1.2 of this chapter National tobacco Enterprise (Ethiopia) S.C, the sole company in tobacco industry in Ethiopia, is in the business for the past 80 years (1935 – 2015). The company has started with a capital outlay of 50,000 '*martereza*' and recorded a total capital of Birr 479,116,000 by the end of year 2015. This implies that the enterprise is in a steady growth. Moreover, financial statements trend analysis report of the company, that covered year 2009 to year 2013, indicated that the company's net sales value had been increased annually on average by Birr 192 million or by 21%. In addition, the report indicated that net operating profit had been growing continually (Financial Statement trend analysis report, 2015). Moreover, as stated earlier, NTE is one of the large tax payer companies in the country; hence, contributing significantly to the nation's overall economic development and the prosperity of its citizen. As a result, this study tries to identify major performance influencing factors of the company to help understand and develop a frame work of profitability influencing factors in Ethiopian context. In addition, most of the empirical studies referred by the researcher found conflicting results about companies' profitability influencing factors. Inconsistency of results had been identified, among others things, as to the effect of firm size on a company's profitability. For example, Mehtap O. (2016), Pratheepan T. (2014), Kim C. Phan (2013) and Deloof (2003) reported positive and significant relationship while Evans (1987), Hall (1987), Mata (1994), and Becchetti & Trovato (2002) concluded significant negative relationship. Similarly, on the impact of inventory holding period on firm's profitability among others Mehtap O. (2016) and Deloof (2003) found significant and negative relationship while Shaid A. (2011) reported positive and significant relationship. Hence, in addition to identifying factors of profitability of the company, the study is

believed to shade light on the findings of similar empirical studies undertaken in other parts of the world.

To the best knowledge of the researcher, no study has been conducted so far to identify performance influencing factors for National Tobacco Enterprise (Ethiopia) S.C. Hence, this study is conducted to fill the gap as to factors influencing profitability in Ethiopian manufacturing business context using the case of National Tobacco Enterprise (Ethiopia) S.C

1.4 Objectives of the study

1.4.1 General Objective

The general objective of the study is to identify the determinants of profitability of National Tobacco Enterprise (Ethiopia) S.C.

1.4.2 Specific objectives

The specific objectives of the study are:-

i. To measure the magnitude and direction of relationships (if any) between factors of profitability such as firm size, sales growth, inventory holding period, expense to revenue ratio, gross margin return on inventory and sales to current asset ratio and profitability of the Company using regression analysis.

ii. To assess the level of intensity of firm size, sales growth, inventory holding period, expense to revenue ratio, gross margin return on inventory, and sales to current asset ratio on the profit maximization of the Company.

1.5 Scope of the study

The study is delimited to the analysis of the effects of firm size, sales growth, inventory holding period, sales to current asset ratio, expense to revenue ratio, and gross margin return on inventory on the profitability of National Tobacco Enterprise (Ethiopia) S.C. To this end financial data covering the period between 1968 and 2015 are used for the study as the researcher is unable to get data beyond year 1968. Therefore, future research should investigate generalizations of the findings beyond this organization as well as beyond those variables included in this study.

1.6 Limitations of the study

As profitability of a firm is influenced both by endogenous and exogenous factors, the dependence of the study only on firm specific variables may restrict the findings and conclusions accordingly. Moreover, the monopolistic nature of the company may undermine the comparison

of findings with research results deduced from the study of performances of other manufacturing companies.

1.7 Significance of the study

The study would greatly benefit both internal as well external stakeholders to the company. The identification of major performance determining factors would help in substantiating managerial decisions regarding potential changes in the economic resources that the company will be able to control in the future. This in turn affects the company's performance by avoiding uneconomical activities or reducing wastage of resources thereby resulting in operational efficiency. Improved performance, in turn, increases shareholders' wealth which is the optimal goal of corporate financial management. In such a way both the shareholders and the management would benefit from the result of the study. Furthermore, the study is believed to help interested researchers on a similar subject by furnishing the basic ground regarding profitability influencing factors in Ethiopian manufacturing business context.

1.8 Structure of the paper

The paper is organized into five chapters. Chapter one provides an introductory overview of the whole study comprising the statement of the problem, back ground of the company, objectives of the study, delimitation and limitation of the study, significance of the study, and the organization of the paper. The second chapter, literature review, covers literature on the subject of profitability and its influencing factors from the view point of manufacturing companies. The Chapter is further divided into two major parts: theoretical literature review and empirical literature review.

Chapter three presents the methodology used for the study and gives an overview of the population, sample, sampling technique, the research design, data source and collection procedures and data analysis procedures. It also provides the description of the relevant variables that are used in the model, and the different statistical tests applied. Chapter four discusses and summarizes the results of the study. Chapter five provides conclusions and recommendations on the overall study.

Chapter two: Literature Review

The purpose of this chapter is to introduce key theories and principles with regard to company performance and its determinants. The chapter is further divided into two major parts: theoretical literature review and review of empirical studies. The theoretical literature review introduces general theories surrounding company performance measures, focusing on manufacturing companies. The aim is to have a concrete ground on which to base the review of empirical studies. The objective of review of empirical studies, on the other hand, is to form a link between the theories and the result of the study at hand. Moreover, the findings of the empirical studies are used as a basis for the extraction of the dependent and independent variables used in this paper. In addition, they serve as a benchmark against which the findings of this study are analyzed and interpreted.

2.1 Theoretical Literature review

In the business policy literature there are two major streams of research on the determinants of firm performance. One is based primarily upon an economic tradition, emphasizing the importance of external market factors in determining firm success. The other line of research builds on the behavioral and sociological paradigm and sees organizational factors and their fit with the environment as the major determinants of success. Within this school of thought, little direct attention is given to the firm's competitive position. Similarly, economics traditionally has disregarded factors internal to the firm.

In order one company to run on a long-term performance way, it is needed to develop, implementation and maintaining the strategies, measures and coherent policies from economic and financial point of view, resulted from a good knowing of internal and external specific conditions in which the firm acts. The qualities of managerial options depend by the ability of identifying those elements that productively used could lead to increasing of the results and performance.

2.1.1 Economic Model of Firm Performance

Gary Hansen (1989) states that industrial organization economics has proven extremely useful to researchers of strategy content in providing a basic theoretical perspective on the influence of market structure on firm strategy and performance. According to the researcher while there is a range of specific models, major determinants of firm-level profitability include: (1)

characteristics of the industry in which the firm competes; (2) the firm's position relative to its competitors; and (3) the quality or quantity of the firm's resources. Scherer (1980: Ch. 9) surveyed many of the specific models of both industry- and firm-level performance, and Porter's review (1981) describes the influence of the Industrial - organization paradigm on business policy.

2.1.2 Organizational Model of Firm Performance

More than their economist counterparts, organizational researchers have developed a wide variety of models of performance. While the organizational behavior and theory literatures are rich in the breadth and depth of their studies of organization structures, systems, and people, the variety of conjectures and empirically tested models makes aggregation difficult. For example, just determining the appropriate construct of performance or effectiveness involves measures ranging from employee satisfaction to shareholder wealth (Cameron, 1986; Goodman and Pennings, 1977; Steers, 1975). In broad terms this stream of research suggests that managers can influence the behavior of their employees (and thus the performance of the organization) by taking into account factors such as the formal and informal structure, the planning, reward, control and information systems, their skills and personalities, and the relation of these to the environment. That is, managers influence organizational outcomes by establishing 'context', and that context is the result of a complex set of psychological, sociological, and physical interactions.

The difficulty in working with such multifaceted models lies in developing, collecting and aggregating appropriate measures (Bonoma, 1985; Bower, 1982).

Many constructs within the literature are difficult to measure and those which are relatively easier to capture are often at the micro (individual) level.

2.1.3 Firm Performance /Profitability

The welfare of a society depends upon the economic growth of their industries and their people. Through the creation and expansion of firms the economy generates new employment and opportunities making possible a more prosper life for the people.

Recognizing the importance of firms' growth, politicians, economists and international development agencies have devoted substantial resources to the creation and implementation of programs to assist firms' growth and in that way ensure economic prosperity. In order to ensure that these programs provide adequate results and, therefore, important public and private

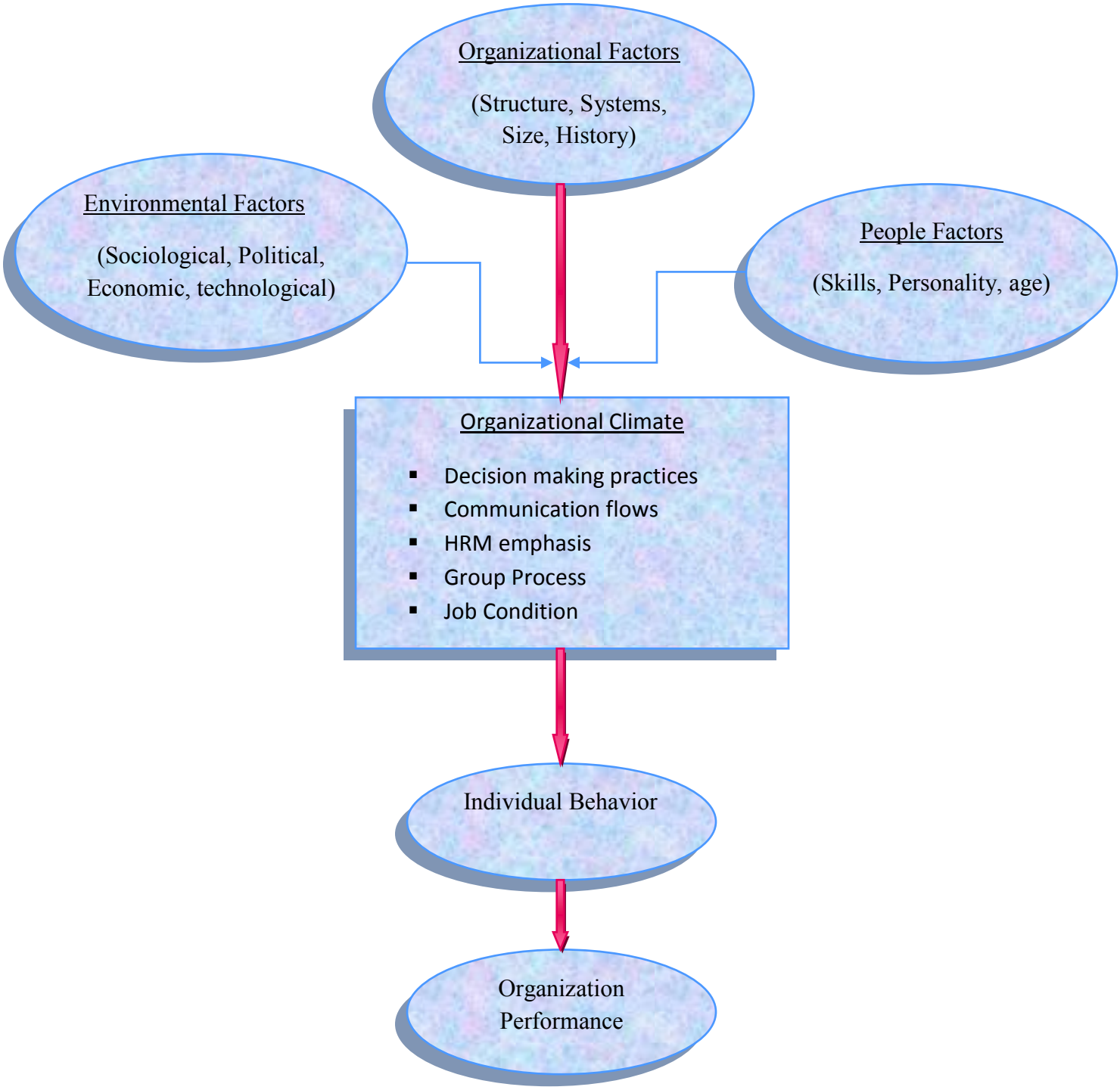
resources are not wasted, it is important to design highly effective and efficient strategies to improve firms' growth. Consequently, it is imperative to understand the process and the variables that grant or constrain firms' growth (Davidson et al 2002).

Great effort has been devoted to macroeconomic factors such as interest rates, economic stability and exchange rates, however, microeconomic factors have not deserved much attention. Even further, economic theory does not provide much help. Not many theoretical frameworks of firm formation and growth have been formulated and very few have been tested extensively (Davidson et al. 2002). The most recognized and empirically tested theory of firm growth is probably Gibrat's law that theorizes that the size of the firm at any given point in time is the product of a series of random growth rates in the history of the firm. In other words, the growth of a firm in any given period of time is independent of the size of the firm at the beginning of the period. A broader analysis of other factors affecting firms' growth empirically or theoretically has been less common. Not much research has focused on the microeconomic and management factors affecting firm growth.

The profitability of a company shows a company's ability to generate earnings for a certain period at a rate of sales, assets and certain of capital stock. Understanding the determinants of profitability is the key factor that helps managers in developing an effective profitability strategy for their company. One of the importance preconditions for long-term firm survival and success is firm profitability. The achievement and other financial goals of the firm are significantly affected by the profitability determinants of the firm. Those factors are important because it give an effect to the economic growth, employment, innovation and technological change. The primary goal of the company is to maximize their profitability. Without profitability a firm could not attract outside capital and the business will not survive in the long run. By knowing and understand firm profitability, it will give the feedback for the firm. The firm can find a policy that should be taken to solve the problem and minimize the negative impact for business continuity (Pratheepan T., 2014)

Different literatures propose different firm specific as well as general internal and external elements that are believed to affect a Company's performance. Among the different factors mentioned in literatures firm size, sales growth, capital structure, working capital management, inventory management, expense to revenue ratio, etc. are the major one (Pratheepan T., 2014; Kim C. Phan, 2013; Camilia B., 2011**;** Deloof, 2003)

Figure 2.1: *Traditional model of organizational climate affecting performance*



Source: *Gray S. Hansen (1989)*

2.1.4 Firm Size and Growth

Growth is the result of exploration of opportunities. Firms are a collection of a certain number of resources that provide the means to successfully take advantage of those opportunities and grow (Barney, 1986, 1991; Penrose, 1959). There is no limit to the growth of the firms, it is the rate of growth what is limited in the short run but there is no limit to the size of the firm (Penrose, 1959). The idea introduced by Penrose in 1959 that there is no limit for the size of the firm and unlimited growth is possible raised the question of the relationship between firm size and growth. A negative relationship between growth and size, that is a lower rate of growth for larger firms than for small firms, would put in doubt the hypothesis of unlimited growth. If this would be the case, the larger the firm becomes, the smaller would be the rate of growth until it would get to a point at which the large firm could not increase its size anymore.

Several studies have undertaken the task of assessing the relationship between growth and size of the firm. Early studies in the manufacturing industry found relationship between growth and size. This fact stimulated the idea that the relationship between growth and size is a stochastic phenomenon. This idea is known as the Gibrat's law (Oxford University Press, 1965). According to Gibrat's law, the size of the firm at a given point in time is the product of a series of random growth rates in the history of the firm. The key assumption then is that the growth of a firm, in any given period of time, is independent of the size at the beginning of the period.

2.2 Review of Empirical Studies on Factors Affecting Firm Performance

For theoretical principles and frameworks to be valuable to the welfare of societies, they must be empirically tested and proved as to their worthiness. The investigation into prior empirical studies related to determinants of firm performance helps the researcher to have some concrete background on which to construct the frameworks of the study. The empirical works also help in constructing the dependent and independent variables and the magnitude and direction of relationship among them. Furthermore, it helps as a bench mark against which the final outcome of the study is measured and judged. It is on this ground that the following empirical works are consulted by the researcher.

The subject of factors influencing companies' performance has been extensively explored by different researchers from different perspectives. Some studies focused on identifying the major determinants of profitability of manufacturing companies while most studies focused on the impact of working capital management and its components on profitability. This section reviews

previous empirical studies conducted regarding manufacturing companies' performance influencing factors.

Pratheepan T. (2014) and Kim Chin Phan (2013) investigated the relationship between firm size and profitability of manufacturing companies in Sri Lanka and Thailand respectively. They found that firm size was positively and significantly correlated with firms' performance. In contrast, Sivathaasan N. et al. (2013) studied the relationship between firm size and profitability of selected manufacturing companies listed on Colombo stock exchange and found that firm size had positive but insignificant effect on profitability.

Deloof (2003), Mehtap O. (2016), and Mulualem M. (2011) reported significant positive relationship between firm size and profitability of manufacturing firms while Amarjit G. et al (2010) found no relationship between firm size and profitability. The findings of Deloof (2013), Mehtap O. (2016), and Mulualem M. (2011) agree with the findings of Tratheepan T. (2014) and Kim C. Phan (2013) as discussed earlier.

Kumar (1985) and Chen, Babb and Schrader (1985) in a study of agribusiness sector firms found no relationship between size and growth. Acs and Audretsch (1990) also found, in a study of the US manufacturing sector for the period 1976 - 1980 that Gibrat's law was valid. So did Wagner (1992) and Fulton, Fulton, Clark and Parliament (1995) in an empirical study of firm growth in the agribusiness sector. All these studies' results suggested that Gibrat's law holds, that is, the growth rate of firms is independent of its size.

Contrary to the previously mentioned studies, Evans (1987a, 1987b) found that firm growth decreases with firm size in 89 out of 100 industries of the manufacturing sector analyzed. Also Hall (1987) found a negative relationship between size and growth for large firms in the US manufacturing sector for the period 1976 to 1983. Moreover, Mata (1994) and Becchetti and Trovato (2002) have found the same negative relationship between growth and size, implying that smaller firms grow faster than larger firms. Dunne et al. (1989) also rejected Gibrat's law in a study of manufacturing industries in the US, although, a positive correlation with size was found.

On the effect of sales growth on corporate profitability, Mehtap O. (2016) in his study of the impact of working capital management on firm profitability regarding Turkish manufacturing firm concluded that sales growth is strongly correlated with the profitability of the firms. His

finding agrees with the findings of Deloof (2003), Nazir and Afzal (2009) and Khanqah (2009) who reached the same conclusion in their respective studies.

Kim C. Phan (2013) and Pratheepan T. (2014) studied the influence of capital structure on firm profitability in Thailand and Sri Lanka respectively and found that debt to equity ratio was negatively related to profitability. However, Camilia B. (2011) and Sivathaasan N. et al (2014) found positive relationship between capital structure and profitability in their study of manufacturing firms in Romania and Sri Lanka respectively.

On the other hand, Deloof (2003) and Mulualem M. (2011) found negative relationship between debt to equity ratio and profitability. Their findings are in agreement with the findings of Tratheepan T. (2014) and Kim C. Phan (2013) who confirmed the same negative relationship between the variables.

The impact of fixed asset management on firms' profitability was one of the areas empirically studied. Camilia B. (2011), in a study conducted on a Romanian chemical company, analyzed the impact of fixed asset management on profitability and found negative relationship between profitability and the ratio of fixed asset to total asset. Similarly, Pratheepan T. (2014) and Amajit G. et al (2010) in a study of Sri Lankan and United States of America manufacturing companies respectively found negative and statistically significant relationship between asset tangibility and profitability.

On the other hand, Deloof (2013) indicated positive relationship with firm's profitability. This contradicts the findings of Camila Burja (2011), Tratheepan T. (2014) and Amarjit G. et al

The impact of working Capital management on firms' performance, on the other hand, was empirically investigated by numerous other researchers.

Deloof (2003) investigated the relationship between working capital management and firm profitability of Belgian firms, where he studied 1009 large Belgian non-financial firms for the period of 1992 to 1996. He found a significant negative relationship between gross operating income and the number of days of accounts receivables, inventories, accounts payable and cash conversion cycle of Belgian firms.

In analysis of the relationship and factors influencing the profitability of selected oil companies in India, Pasuphathi N. (2014) found working capital management to be highly influencing factor of firm profitability.

Mehtap O. (2016) empirically investigated the relationship between working capital management and profitability of a sample of 110 manufacturing firms listed on Bosra Istanbul during the period of 2005-2014. He found that Cash conversion cycle which is used as a comprehensive measure for working capital management had significant and negative impact on firms' profitability. In addition, the major findings of the study with respect to the individual components of working capital management revealed that while average collection period and days of inventory outstanding had a significant negative relationship with profitability, average payment period had a significant positive effect.

Barot Haresh (2012) examined the impact of Working Capital Management on profitability of pharmaceuticals firms in India. He found that accounts receivable (negative) and accounts payable (positive) were significant in explaining profitability, while inventory turnover and cash conversion cycle were found to be insignificant.

Shahid Ali (2011), in his analysis of the association between working capital management and profitability of textile firms in Pakistan, found that profitability (as measured by return on assets) was found to be significantly and negatively related to average days receivable, positively related to average days in inventory, and significantly and negatively related to average days payable.

Evidence from the United States of America manufacturing firms (Amarjit G. et al, 2010) indicated negative relationship between accounts receivables and corporate profitability. This finding is in line with the findings of Deloof (2003), Shahid (2011), Barot H. (2012) and Mehtap O. (2016). The study further indicated a positive relationship between cash conversion cycle and gross operating profit which agrees with the finding of Shahid A. (2011) but opposes the study results of Deloof (2003) and Mehtap O. (2016). The study found no statistically significant relationship between average days of accounts payable and profitability.

J. Aloy Niresh (2012) and Ikpefan O. Ailman et al (2014) studied the relationship between working capital management and profitability of manufacturing companies in Sri Lanka and Nigeria respectively. Their studies revealed the existence of negative relationship between performance measures and cash conversion cycles except that accounts payable period was found to be negatively related to profitability in the case of Nestle Nigeria.

Ibrahim A. et al & Ben Caleb et al (2013) investigated the impact of liquidity measures on manufacturing firms' profitability using sample companies from Palestine and Nigeria respectively. Their findings indicated the existence of positive relationship between predictor variables of liquidity (current ratio, liquid ratio and cash conversion cycle) and profitability.

The impact of working capital management on manufacturing firm's profitability in Ethiopian context had been studied by Mifta A. (2016), Wubshet M. (2014) and Mulualem M. (2011). Mifta A. (2016) found a significant and negative relationship between average collection period and profitability. This agrees with the findings of Deloof (2003), Shahid A. (2011), and Methap O. (2016). Further he found a negative but insignificant relationship between inventory holding period and profitability. On the other hand, he found insignificant but positive relationship between accounts payable period and profitability. Wubshet M. (2014) on the other hand, found negative relationship between profitability and the measures of inventory conversion period and accounts receivable collection period. He also found a significant negative relationship between cash conversion period and firms' profitability. Mulualem M. (2011), however, confirmed the existence of statistically significant negative relationship between profitability and working capital management measures as a whole.

These studies conducted on the relationship between working capital management and firm profitability for the larger part employed the use of accounts receivable collection period, accounts payable payment period, and inventory conversion period as individual measures of working capital management, while cash collection cycle is used as a comprehensive measure for working capital management (Deloof 2003). Besides the researchers used control variables in their models. These control variables included firm size, Debt ratio and fixed asset ratio.

In addition to the above mentioned profitability determinant factors, Camilia B. (2011) in his study of factors influencing Companies' profitability Romanian identified other profitability determinants that are much overlooked by other researchers cited in this paper. These factors are Sales to Current Assets Ratio (SCAR), Expense Revenue Ratio (ERR) and Gross Margin Return on Inventory (GRMOI). In his conclusion the researcher found that these factors are among those that have good implication on profitability.

According to Camilia B. (2011) a significant impact on the profitability increasing exerted the actions of lowering the all operating expenses. Due to the indicator Expense Revenues Ratio, Return on assets has considerably increased. Finally, the researcher concluded that proper organization of operating activities should be aimed at the efficient use of current assets, which usually have the highest share in total assets. The efficiency of utilization of current assets increases when the rotation of the component elements (inventories and receivables) speeds up so that overall result will be a higher performance.

Table 2.1: Summary results of empirical literature review

S/ No.	*Profitability determinant factors*	*Significant positive effect on firm profitability*	*Significant negative effect on firm profitability*	*No Relationship*
1	Firm Size (FS)	- Partheepan T. (2014) - Kim C. Phan (2013) - Deloof (2003) - Mehtap O. (2016) - Mulualem M. (2011)	- Evans (1987) - Hall (1987) - Mata (1994) - Becchetti & Trovata (2002)	- Kumar (1985) - Chen, et al (1995) - Acs & Audretsh (1990) - Wagner (1992) - Futon et al (1995) - Amajit G. et al (2010)
2	Sales Growth (SG)	Mehatp O. (2016) - Khanqah (2012) Nazir & Afza (2009) - Deloof (2003) - N. Sivathaasan (2013)		
3	Expense Revenue Ratio (ERR)	Camilia B. (2011)		
4	Sales to current asset ratio(SCAR)	Camilia B. (2011)		
5	Gross Margin Return on Inventory (GMROI)	Camilia B. (2011)		
6	Inventory Holding Period(IHP)	Shaid A. (2011)	- Deloof (2003) - Mehtap O. (2016) - J. Aloy et al (2012)) - Ikpefano et al (2014) - Mifta A. (2016) - Wubishet M. (2014)	Barot H. (2012)

2.3 Summary of the Chapter and Knowledge gap

This chapter started with theoretical literature review about firm performance models in which the economic model and organization model are briefly discussed. Furthermore, the three classical firm performance influencing factors namely; organizational, environmental, and people factors that directly and indirectly affect organizational performance are highlighted. In addition, theories related to firm size and growth in which Gilbart's law is briefly touched is also addressed.

Finally, empirical studies focused around the relationship between firm performance influencing factors and profitability had been thoroughly analyzed. In general the studies identified some of the major factors that affect manufacturing firms' profitability which are summarized as follows:

Regarding the effect of firm size on profitability Partheepan T. (2014), kim C. Phan (2013,) Deloof (2003) and Mehtap O. (2016) found that the size of the firm positively and significantly affects its profitability. These findings are against Gibrat's law which states that the growth of a firm, in a given period of time, is independent of the size at the beginning of the period. Other studies such as Evans (1987), Hall (1987), Mata (1994), and Becchetti & Trovata (2002) found that firm size affects profitability negatively and significantly implying that small firms grow faster than larger firms, opposing Gibrat's law.

The effect of sales growth on corporate profitability is studied among others by Mehtap O. (2016), Khanqah (2012), Nazir and Afza (2009). These findings supported the arguments of Shin and Soenen (1998) cited in Mehtap (2016), and Deloof (2003) who concluded that sales growth is strongly and positively correlated with the profitability of a firm.

In view of the impact of capital structure on firm profitability Camilia, B. (2011) and Sivathaasan, et al. (2014) concluded that capital structure affects firm's profitability positively and significantly. On the other hand, Kim C. Phan (2013), Pratheepan T. (2014), Deloof (2003), and Mulualem M. (2011) found that capital structure has significant but negative impact on profitability of manufacturing firms. The implication of these findings is that the classical Modigliani-Miller theorem of irrelevance of capital structure on firm value no more applies, and that financial leverage affects profitability either positively or negatively depending on the specific conditions under which companies operate.

In the study of the impact of fixed asset ratio on firm performance the conclusion of the empirical studies indicated negative and significant relationship implying that as the ratio of fixed assets grow above certain limit firm profitability will decrease owing to lack of enough working capital for the smooth operation of the day to day activities of businesses (Camilia, B., 2011; Pratheepan T. 2014; and Amajit G. et al., 2010)

The studies also analyzed the impact of Inventory holding period on profitability. Inventory holding period as a component of working capital management has been used in the empirical studies consulted. For example, Shahid A. (2011) in the study of the relationship between profitability and inventory holding period in Pakistan found positive and significant relationship. Deloof (2003), Mehtap O. (2016), Niresh (2012) and Ailman (2014) on the other hand, found that inventory holding period affects profitability negatively and significantly; implying that shortening the holding period enhances the efficiency of working capital management.

Besides these factors of profitability, Camilia, B. (2011) in his study of factors affecting profitability of Romanian pharmaceutical firm studied the effect of sales to current asset ratio, gross margin return on inventory ratio, and expense to revenue ratios on firm profitability. He found that these factors affect firm performance significantly.

Accordingly, major firm performance influencing factors and their degree and direction of influence had been identified from the empirical studies reviewed. However, due to the practical difficulty to incorporate all the identified variables into the study model, and also in consideration of the specific nature of the company under analysis, those variables that are believed to significantly affect the company's profitability are stressed. The variable of capital structure (measure of financial leverage) has been excluded as a result of the fact that the company has not shown any short term or long term loan on its balance sheet over the periods considered, except year 2014, when for the first time it acquired long term loan from Development Bank of Ethiopia. In addition, the variable of cash conversion period which is a comprehensive measure of working capital management has not been used in this study. Instead, inventory holding period, one of its components is used. The reason is that the company sells its products only on cash basis. Similarly raw materials are acquired on cash. As a result, there are no trade receivable and trade payable accounts on the company's balance sheet. The receivable and payable accounts of the balance sheet refer to sundry receivables and sundry payables. Thus, among the different variables employed in the empirical studies firm size, sales growth, expense

revenue ratio, gross margin return on inventory, sales to current asset ratio, and inventory holding period are selected and used in this study to see whether they actually influence the profitability of the company.

2.4 Conceptual frame work and Research Hypothesis

Most of the empirical literatures reviewed tried to link the profitability of manufacturing companies to three major factors: namely resource management, efficiency of the companies' management in running the business with the least possible operational cost, and the size of the firm. Included under the category of resource management are factors such as gross margin return on inventory, sales to current asset ratio and inventory holding period (Camilia, B. 2011). Firm size as factor of profitability had been extensively employed by lots of researchers (Deloof, 2003; Evans & Hall, 1987; Partheepan T. 2014; kim C. Phan 2013; Mehtap O. 2016). Expense to revenue ratio, gross margin return on inventory and sales to current asset ratios are employed in the work of Camilia, B., 2011. Time as a variable is used in the study to account for the trending nature of some of the variables (Gujarati, 2003).

From the empirical studies it is obvious that there is no consensus on the list of factors affecting manufacturing Companies' profitability. This might be due to the difficulty to incorporate all available variables affecting company's profitability in to a given model. On the other hand, the objective of the researchers and the specific conditions under which the firms operate might have influenced the selection of the variables. The conceptual framework proposed for this study is a synthesis of the empirical studies reviewed. Nevertheless, the proposed variables of interest are largely derived from the work of Camilia B. (2011).

Below are the dependent and independent variables employed in this study.

Dependent Variable:

- Profitability measured by Return on Asset (ROA)

Independent Variables:

1. Firm Size (FS),
2. Sales Growth (SG),
3. Expense Revenue Ratio (ERR),

4. Gross Margin Return on Inventory (GMROI),
5. Sales to Current Assets Ratio (SCAR),
6. Inventory Holding Period (IHP), and
7. Time (@trend)

Accordingly, the study tested the following hypotheses regards the effect of the these variables on the profitability of NTE (Ethiopia) S.C

H1: Firm size has positive and significant effect on profitability

H2: Sales growth has positive and significant effect on profitability

H3: Expense to revenue ratio (measure of management efficiency) has negative and significant effect on profitability.

H4: Gross margin return on inventory has positive and significant effect on profitability

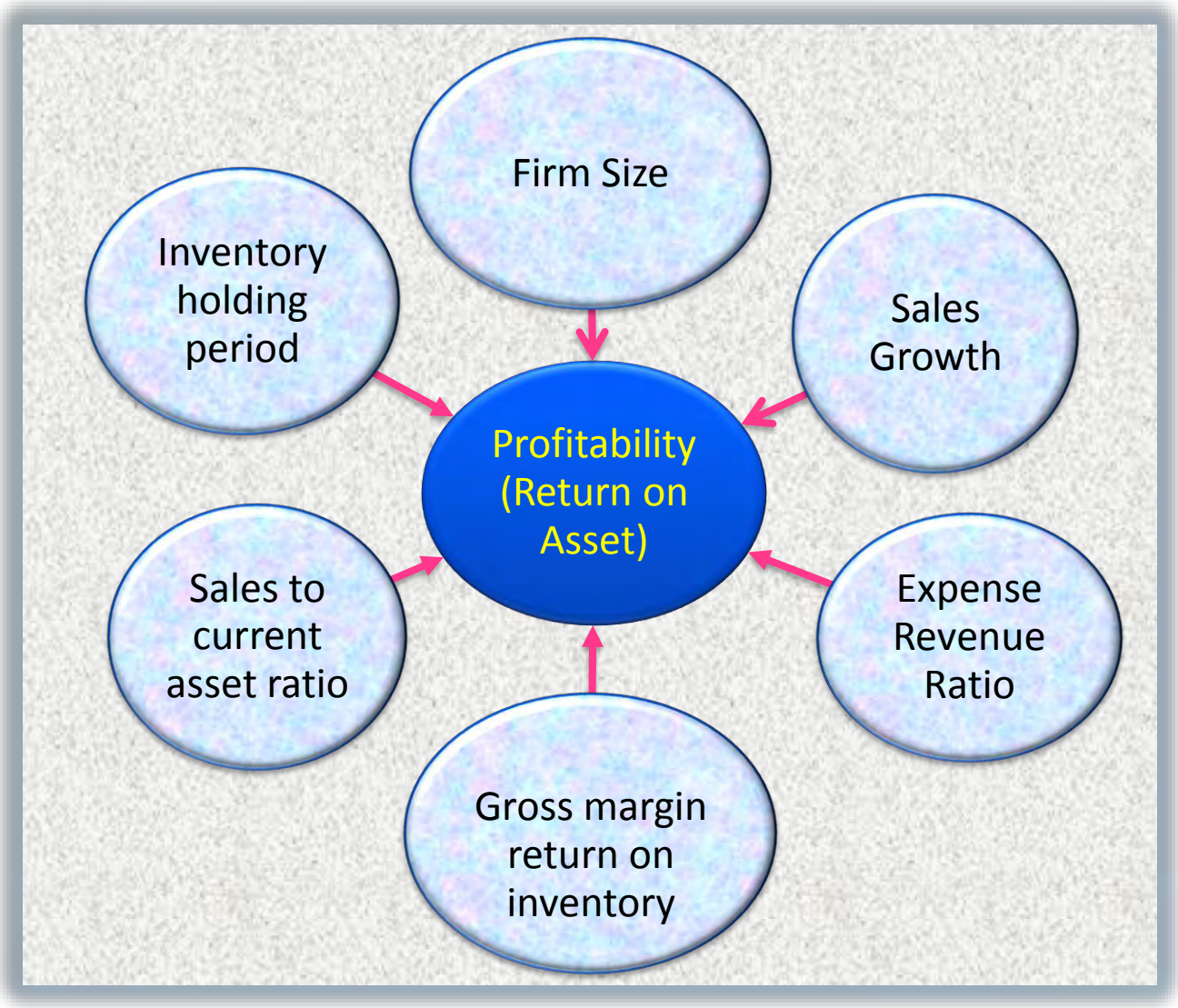
H5: Sales to current asset ratio has positive and significant effect on profitability

H6: Inventory holding period has negative and significant effect on profitability.

H7: Time has positive and significant effect on profitability

H8: Firm size, Sales growth, expense to revenue ratio, gross margin on inventory, sales to current asset ratio, inventory holding period, and time have significant joint effect on profitability

Figure 2.2: Schematic Conceptual Framework



Source: *Author's design based on the empirical studies reviewed.*

Chapter Three: Research Design and Methodology

The previous chapter described theoretical and empirical works related to company profit determinants as studied by different researchers. This chapter, however, moves a step further by showing the ways in which the relevant data and its collection methods have helped prove that indeed the identification of profitability determinant factors is a crucial issue for National Tobacco Enterprise in a today's highly competitive business environment. It covers research designs, data source and collection methods, population and sample size, description of variables, method of data analysis, and CLM assumptions and diagnostic tests.

3.1 Research Design

The study employed explanatory research approach in dealing with determinants of profitability of National Tobacco Enterprise (Ethiopia) S.C. Schindler and Cooper (2001) cited in Mifta A. (2016) discussed that explanatory studies unlike descriptive studies go beyond observing and describing the phenomena; and tries to explain the extent and nature of causal relationship among dependent and independent variables.

The justification for this approach is that it assists the researcher to explain the impact of influence factors on the profitability of the company. Moreover, as the approach goes beyond the description of phenomena, it enables the researcher to use earlier empirical studies to substantiate findings.

3.2 Data source and collection procedures

The study employed the use of secondary financial data. The data has been derived from audited balance sheet and statements of profit and loss of the company. Financial statements are synthesized reflection of company performance and position for a given period of time. Therefore, they are good sources of information related to factors influencing performance of a given business organization. The data is collected for a period of 48 years and covered years 1968 to 2015.

3.3 Population, Sample size and sampling technique.

A population is the total collection of elements about which the researcher makes some inferences. The collection of all possible observations of a specified characteristic of interest is called a population while a collection of observations representing only a portion of the

population is called a sample. In this study, the target population and sample size are the same in magnitude as the study employed financial time series data from the company's financial statements covering year 1968 to 2015. The sample size is the same as the population size, i.e., forty-eight firm years. This implies that there is no specific sampling technique employed to extract samples from the population.

3.4 Description of variables

In this study choice of variables is based on alternative theories related to factors influencing manufacturing companies' performances, and variables that were used in published empirical studies. All the variables stated below have been used to test hypotheses in the reviewed empirical studies. They are categorized as dependent and independent variables.

3.4.1 Dependent Variable

A dependent variable is a variable whose value is determined by the value of an independent variable. In this study, profitability is the dependent variable measured in terms of return on asset (ROA). ROA is a widely used financial tool to determine the level and intensity of returns that a firm has generated by employing its total assets (Mifta A. 2016). Burja, C. (2011) underlined the importance of using return on asset as measure of economic performance. He described return on asset as a measure of company's ability to generate profit as a result of productive use of resources and efficient management. Return on asset has been used as a measure of company performance in many of the reviewed empirical works (Tratheepan T, 2014; Camilia B., 2011; Shahid A., 2011; Sivathaasa N, 2014; Mifta A., 2016; Wubshet M., 2014).

ROA = Earnings before interest and tax/ Total Asset

3.4.2 Independent Variables

Independent variables are variables that are manipulated or are changed by researchers and whose effects are measured and compared. Independent variables predict or forecast the values of the dependent variable (http:/www. statisticssolutionns.com). The independent variables of this study are (1) Firm Size, (2) Sales Growth, (3) Expense to Revenue Ratio, (4) Sales to current assets ratio, (5) Gross Margin Return on Inventory, (6) Inventory Holding Period, (7)Time.

While the study explores factors influencing the profitability of National Tobacco Enterprise (Ethiopia) S.C, it is noted that the selected variables are not exhaustive as there are a number of

others performance influencing factors. The choice is based on (1) alternative theories about factors influencing companies' performance (factors influencing performance at micro and macro-economic levels), (2) the empirical works reviewed by the researcher, and (3) the very basic nature of the company under study. The description of how the variables are measured and computed is presented as follows:

1. **Firm Size (FS)**: is given by the natural logarithm of total assets as the original value of total assets may disturb the analysis.

   FS = logarithm of total asset

   Firm size as independent variable is used by Pratheepan T. (2014), Kim C. Phan (2013), Sivathassan N. et al (2013)**,** Deloof (2003), Mehatap O. (2016), Amajit G. et al (2010).

2. ***Sales Growth (SG)****: is* measured by [(current year's sales - previous year's sales) /previous year's sales]. The variable was used as independent variable and is consistent with the likes of Kim C. Phan (2013), Mifta A. (2016), Mehtap O. (2016), and Deloof (2003)

   SG = (current year's sales - previous year's sales) /previous year's sales

3. **Expense to Revenue Ratio (ERR):** The indicator Expenses to Revenue Ratio (ERR) connects expenses with revenue, and expresses the efficiency achieved by a company through minimizing its costs. In dynamic, a decrease of this ratio indicates an improvement in resources management and economic performance.

   Expense to Revenue Ratio (ERR) = Operating Expenses/Operating Income

   It is used as independent variable in the works of Camilia B., 2011.

Gross Margin Return on Inventory (GMROI): Gross Margin Return on Inventory (GMROI) indicates if the modality of inventory management generates profit. It is an inventory profitability evaluation ratio that analyzes a firm's ability to turn inventory into cash above its cost. It is an important indicator for appreciating the inventory efficiency and the company's performance. It is used as independent variable in the works of Camilia B., 2011.

Gross Margin Return on Inventory (GMROI) = Gross Margin/Average Inventory

4. ***Inventory Holding Period (IHP):*** Inventory holding period measures the number of days inventory is held by a company before it is sold. It is calculated by dividing the average

inventory by the cost of goods sold and multiplying the result by 365 days (Ibrahim A. & Fahema J., 2013)

Inventory Holding Period (IHP) = (Average Inventory / Cost of goods sold) X 365days

Cash Conversion Cycle (CCC)*:* The cash conversion cycle measures the *net time interval* between actual cash expenditures on a firm's purchase of productive resources and the ultimate recovery of cash receipts from product sales (Richards and Laughlin, 1980 as cited in Mifta Ahmed, 2016). Cash conversion cycle as a comprehensive measure of working capital management was used as independent variable in the empirical studies of Deloof (2003), Kim C. Phan (2013), Amarjit G. et al (2010), Shahid A. (2011), Mifta A. (2016), and Wubshet M. (2014). Cash conversion cycle is proxied by the interaction between accounts receivable period, accounts payable period, and inventory holding period. It is measured as follows:

Cash Conversion Period (CCP) **= Accounts Receivable Period (ARP) + Inventory Holding Period (IHP) - Accounts Payable Period (APP).**

While cash conversion period is defined by the interaction between accounts receivable period, inventory holding period and accounts payable period, it is represented in this study by ***Inventory Holding Period (IHP)*** only. This is due to the fact that National Tobacco Enterprise (Ethiopia) S.C sales its products only on cash bases (NTE's sales & marketing policy, 2010).

Sales to Current Assets Ratio (SCAR): is expressed as a ratio between Net sales and total current assets and shows the incomings of the company from the management of current assets. In dynamic, usually a decrease of the ratio means a narrowing down of the company's activity, which slows its production, thus diminishing inventories and accounting receivables, which are related to the current activity. On the other hand, an increase in the ratio signals of decreasing working capital. It is used as independent variable in the work of Camilia B., 2011.

Sales to Current Assets Ratio (SCAR) = Net Sales / total current assets

3.5 Data Analysis

The study collected the needed data from audited financial statements of the Company. The data is rearranged, edited and calculated in order to be complete and workable. These data is analyzed using E-view software version 8. Finally the results of E-view are interpreted. The analysis and interpretation of the results employed the following statistical techniques.

3.5.1 Classical Linear Model assumptions for time series regressions

According to Jeffrey Wooldridge (2009, pp. 370), there are six classical linear model (CLM) assumptions for time series regression application. Assumptions TS.1 through TS.5 are the time series versions of the Gauss-Markov assumptions (which imply that OLS is BLUE and has the usual sampling variance). The normality assumption, TS.6, is used so that we can perform exact statistical inferences for any sample size. These assumptions and the intended diagnostic tests for the study are discussed as follows:

3.5.1.1 Assumption TS 1: Linear in parameters

The first assumption simply states that the time series process follows a model which is linear in its parameters. This implies that;

(a) The expected value of dependent variable is a straight-line function of each independent variable, holding the others fixed.

(b) The slope of that line does not depend on the values of the other variables.

(c) The effects of different independent variables on the expected value of the dependent variable are additive.

Whether the model should be linear can be formally tested using Ramsey's (1969) RESET test which is general test for misspecification of functional form (Brooks, 2009, pp. 175)

The null and alternate hypotheses for model appropriateness test are:

H_0: The linear model is appropriate

H_1: The non-linear model is appropriate

Decision rule: If p- values of the F and chi-square tests are lower than 0.05 reject the null hypothesis; otherwise do not reject.

3.5.1.2 Assumption TS 2: Zero Conditional mean

For each t, the expected value of the error u_t, given the explanatory variables for *all* time periods, is zero. Mathematically,

$$\mathbf{E}(u_t / X) = 0, t = 1,2,\ldots, n.$$

Assumption TS.2 implies that the error at time t, u_t, is uncorrelated with each explanatory variable in every time period.

In this study simple hypothesis test is employed to test whether or not the mean of the residual series is zero.

The null and alternative hypotheses are

H_0: Mean equals zero

H_1: Mean is different from zero

Decision Rule: reject the null hypothesis if the p-value of the t-statistics of the test is less than 0.05; otherwise do not reject.

3.5.1.3 Assumption TS 3: No Perfect Co-linearity

In the underlying time series process, no independent variable is constant or a perfect linear combination of the others. In the case of perfect multi - colinearity the regression coefficients remain indeterminate and their standard errors are infinite.

Pair-wise correlation test is employed in this study. According to Gujarati, 2003, if the pair-wise or zero order correlation coefficient between two regressors is high, say, in excess of 0.8, then multicollinearity is a serious problem.

3.5.1.4 Assumption TS 4: No serial correlation

Conditional on $\boldsymbol{X}$, the errors in two different time periods are uncorrelated: Corr.$(u_t, u_s / \boldsymbol{X}) = 0$, for all $t \neq s$.

Breusch - Godfrey (BG) Serial Correlation LM Test is used to detect autocorrelation problem in this study.

The null and alternative hypotheses of the test are:

Ho: ρ=0, i.e. no serial correlation

H1: ρ=1 i.e. presence of serial correlation

Decision Rule: Reject the null hypothesis of no serial autocorrelation if p-value of the test statistics is less than 0.05; otherwise, do not reject the null hypothesis

3.5.1.5 Assumption TS 5: Homoskedasticity

Conditional on $\boldsymbol{X}$, the variance of u_t is the same for all t: Var $(u_t/\boldsymbol{X})$ = Var$(ut) = \delta^2$, $t = 1,2,\ldots, n$.

When this assumption does not hold, we say that errors are hetroskedastic. This study employed White's Test to detect the presence of Heteroscedasticity.

If the chi-square value obtained exceeds the critical chi-square value at the chosen level of significance, the conclusion is that there is heteroscedasticity. If it does not exceed the critical chi-square value, there is no heteroscedasticity.

The null and alternative hypotheses of the hetroskedasticity test are:

H_0: The residuals are Homoskedic

H_1: The residuals are Hetroskedic

3.5.1.6 Assumption TS 6: Normality

The errors, $u_{t,,}$ are independent of $\boldsymbol{X}$ and are independently and identically distributed as normal $(0, \delta^2)$.

In this study, Jarque-Bera statistics is used as the primary test statistics for normality distribution of the residuals. For Jarque-Bera statistics, the rule is that if the series are normally distributed, the histogram should be bell shaped and the Jarque- Bera statistic insignificant. It thus follows that residuals will be normally distributed at 5% level of significance if the probability of J-B statistic is greater than 0.05.

The null and alternative hypotheses for residual normality distribution test are:

Ho: The residuals have normal distribution

H1: The residuals have no normal distribution

Under Assumptions TS.1 through TS.6, the CLM assumptions for time series, the OLS estimators are normally distributed, conditional on $\boldsymbol{X}$. Further, under the null hypothesis, each t statistic has a t distribution, and each F statistic has an F distribution. The usual construction of confidence intervals is also valid

Thus, t statistics can be used for testing statistical significance of individual explanatory variables, and F statistics can be used to test for joint significance.

Under the full set of classical linear model assumptions for time series, TS.1 through TS.6, OLS has *exactly* the same desirable properties as for cross-sectional data. Likewise, statistical inference is carried out in the same way as it is for cross-sectional analysis.

3.5.1.7 Diagnosis of Multi-co-linearity

The diagnoses of multi-co-linearity include some rules of thumb:

1. Dropping a variable(s) and specification error. When faced with severe multicollinearity, one of the simplest things to do is to drop one of the collinear variables. But in dropping variables from the model we may be committing a specification bias or specification error. Specification bias arises from incorrect specification of the model used in the analysis (Gujarati, 2003).
2. Transformation of variables: The first difference regression model often reduces the severity of multi-co-linearity. An incidental advantage of the first difference information is that it may make a non-stationary time series stationary (Gujarati, 2003).
3. Additional or new data: Since multi-co-linearity is a sample feature, it is possible that in another sample involving the same variables co-linearity may not be so serious as in the first sample. Sometimes simply increasing the size of the sample may attenuate the co-linearity problem (Gujarati, 2003)

3.5.1. 8 Diagnosis of Auto Correlation

1. Try to find out if the autocorrelation is **pure autocorrelation** and not the result of mis-specification of the model.

2. If it is pure autocorrelation, one can use appropriate transformation of the original model so that in the transformed model we do not have the problem of (pure) autocorrelation.

3. In large samples, we can use the **Newey–West** method to obtain standard errors of OLS estimators that are corrected for autocorrelation.

3.5.1.9 Diagnosis of hetroscedasticity

Even if heteroscedasticity is suspected and detected, it is not easy to correct the problem. If the sample is large, one can obtain White's heteroscedasticity corrected standard errors of OLS estimators and conduct statistical inference based on these standard errors.

Otherwise, on the basis of OLS residuals, one can make educated guesses of the likely pattern of heteroscedasticity and transform the original data in such a way that in the transformed data there is no heteroscedasticity (Gujarati, 2003).

3.5.2 Trends and seasonality

Many economic time series have a common tendency of growing over time. We must recognize that some series contain a **time trend** in order to draw causal inference using time series data. Ignoring the fact that two sequences are trending in the same or opposite directions can lead us to falsely conclude that changes in one variable are actually caused by changes in another variable.

Including a time trend in a regression model creates a nice interpretation in terms of **de-trending** the original data series before using them in regression analysis.

If a time series is observed at monthly or quarterly intervals (or even weekly or daily), it may exhibit **seasonality**. Generally, we can include a set of **seasonal dummy variables** to account for seasonality in the dependent variable, the independent variables, or both. Trends and seasonality can be easily handled in a multiple regression framework by including ***time and seasonal dummy variables*** in our regression equations

3.5.2.1 Stationary And Weakly Dependent Time Series

A stationary time series process is one whose probability distributions are stable over time in the following sense: if we take any collection of random variables in the sequence and then shift that sequence ahead *h* time periods, the joint probability distribution must remain unchanged. A stochastic process that is not stationary is said to be a **non-stationary process**.

In stating a multiple regression model for time series data, we are assuming a certain form of stationarity in that the coefficient estimators do not change over time. Further, Assumptions TS.4 and TS.5 imply that the variance of the error process is constant over time and that the correlation between errors in two adjacent periods is equal to zero, which is clearly constant over time

3.5.2.2 Unit Root

Unit root is a feature of some stochastic processes that cause problems in statistical inference involving time series models. A linear stochastic process has a unit root if 1 is a root of the process's characteristic equation. Such a process is non-stationary but does not always have a trend. Unit root process is also called difference stationary.

3.5.2.3 Estimation when a unit root may be present

Often, OLS is used to estimate the slope coefficient of autoregressive model. Use of OLS relies on stochastic process being stationary. When the stochastic process is non-stationary the use of

OLS can produce invalid estimates called ***Spurious regression*** results: ***high R^2 value and high t-ratios*** yielding results with no economic meaning.

When the time series are highly dependent (they have unit roots), we must exercise extreme caution in using them directly in regression models. *An alternative to using the levels is to use the first differences of the variables*. When data are highly persistent, we usually have more faith in first-difference results.

3.5.2.4 Testing for Stationarity

Gujarati (2003, pp 817) recommends the use of Augmented Dick-Fuller (ADF) test. Accordingly, ADF test of the residuals is used to test for unit root in the data set. If the null hypothesis of unit root is rejected at 5% significance level (p-value less than 0.05) the data set is said to be stationary.

3.6 General Regression Model

The general regression model used in this study is given as follows:

$$\mathbf{Y_t = \beta_0 + \Sigma\, \beta_t\, X_t + \varepsilon_t}$$

Where;

Yt -Represents a Return On Assets of the firm at time t

β0 - Represents the intercept of the equation

β_t - Represents regression coefficients

X_t - Represents independent variables at time t

t –Represents time = 1, 2, 3 …….48 years (from year 1968 to 2015)

ε_t - Represents the error term

Chapter 4: Data analysis, Results and Discussion

In this chapter the actual data are analyzed using e-views software, results of the analysis interpreted and discussed. Moreover, CLM assumptions for time series analysis, as mentioned in the third chapter, are tested one by one. First the stationarity of the variable is tested using Augmented Dick-Fuller test statistics for unit root. After proving for the stationarity of the variables, the other tests are conducted which included test of normality (residual normality distribution), multi-co-linearity, serial auto-correlation, Hetroskedasticity, parameter stability and model appropriateness tests. These are discussed as follows:

4.1 Data Analysis

4.1.1 Stationarity test

To avoid the spurious regression problem that may arise from regressing non – stationary time series on one or more non-stationary time series we have to test for the stationarity of the data set. In this study group unit root test and residual unit root tests of the variables are employed. According to Gujarati, 2003 pp. 822, if after subjecting the error terms of the group to unit root test we find that it is stationary, i.e., I(O) , we can say that although some variables are individually integrated of order one , I(1), their linear combination is integrated of order zero. It follows that if the ADF unit root test of the residuals is stationary, i.e., I(0), hence the regression is co-integrated and it is not spurious, even if individually some variables are non-stationary. There is a stable long-run relationship between them (Gujarati, 2003 pp. 824).

In addition, using Durbin-Watson test for autocorrelation, If /P/<1, we say that the series is stationary. If p=1, the series is non-stationary. The Durbin-Watson coefficient for autocorrelation, *d*, is given by the formula 2(1-p). Hence, if the value for p is zero, i.e. no auto correlation, the DW- coefficient will be 2. This test is automatically included in the regression test result from e-views.

Group unit root test summary and residual unit root test results are presented in tables 4.1 and 4.2 below.

Table 4.1: Group unit Root Test

Group unit root test: Summary
Series: ROTA, ERR, FS, SG, GMROI, IHP, SCAR, YEAR
Date: 05/18/17 Time: 08:21
Sample: 1968 2015
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.29209	0.0110	7	328
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.32807	0.0000	7	328
ADF - Fisher Chi-square	66.9002	0.0000	7	328
PP - Fisher Chi-square	65.4109	0.0000	7	329

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: E-view output and author's computation

Table 4.2: ***Residual Unit Root test***

Null Hypothesis: RESID has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.805336	0.0000
Test critical values:	1% level	-3.577723	
	5% level	-2.925169	
	10% level	-2.600658	

*MacKinnon (1996) one-sided p-values.

Source: E-view output and author's computation

Table 4.1 summarizes the result of group unit root test of the variables. The test is conducted using Augmented Dick-Fuller test at level with intercept included. The result indicates that the null hypothesis of common unit root is rejected as the p-value of the test is less than 0.05. This in turn implies that the data set is stationary.

Table 4.2, on the other hand, summarizes unit root test result of the residuals. Similar to the group unit root test, it employed ADF test at level including the intercept. As observed from the table, the residuals are stationary at level since the null hypothesis that the residuals have a unit

root is rejected with p-value of 0.0000. Provided we checked that the residuals from the variables are I(0) or stationary, the traditional regression methodology (OLS), including the t and F tests, is applicable for data involving non-stationary time series (Gujarati, 2003 pp. 822). For the stationarity of the data set is proved it is possible to set the general regression model of the study.

4.1.2 Model Specification

4.1.2.1 General Regression Model

The theoretical and empirical studies discussed in chapter two imply that a company's profitability as measured by return on assets (ROA) has some relationship with the company's size (FS), sales growth (SG), expense to revenue ratio (ERR), gross margin return on inventory (GMROI), sales to current asset ratio (SCAR), inventory holding period (IHP) and time (@trend).

Based on this the model is formulated as follows:

$$ROA = f(FS, SG, ERR, GMROI, SCAR, IHP, @trend) \text{ ---------- 4.1}$$

The equivalent equation which is used in the regression estimation is

$$ROA = \beta_0 + \beta_1 fs + \beta_2 sg + \beta_3 err + \beta_4 gmroi + \beta_5 scar + \beta_6 ihp + \beta_7 @trend + \epsilon_t \text{ ---------- 4.2}$$

Where;

ROA - represents the dependent variable, i.e. return on asset;

β_0 – represent the constant

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ *and* β_7 - represent slope coefficients

Fs – represents firm size

Sg – represents sales growth

Err – represents expense to revenue ratio

Gmroi – represents gross margin return on inventory

Scar – represents sales to current asset ratio

Ihp - represents inventory holding period

@trend – represents time trend, and

ϵ_t - represents the error term.

4.1.2.2 Regression Model Estimation

Estimation Command:

==========

LS ROTA C FS SG ERR GMROI SCAR IHP @TREND

Estimation Equation:

==========

ROTA = C(1) + C(2)*FS + C(3)*SG + C(4)*ERR + C(5)*GMROI + C(6)*SCAR + C(7)*IHP + C(8)*@TREND

Substituted Coefficients:

==========

ROTA = 5.11135952665 - 0.298130470689*FS + 0.0437443759395*SG - 0.865669709778*ERR + 0.107947933504*GMROI + 0.116709150386*SCAR + 9.75810367167e-05*IHP + 0.0212412171786*@TREND

Source: E-view output and author's computation

4.1.3 Regression Result of Variables

Table 4.3 Regression statistics summary

Dependent Variable: ROTA
Method: Least Squares
Date: 05/17/17 Time: 17:15
Sample: 1968 2015
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.111360	0.658375	7.763594	0.0000***
FS	-0.298130	0.038417	-7.760387	0.0000***
SG	0.043744	0.025146	1.739586	0.0896*
ERR	-0.865670	0.154801	-5.592148	0.0000***
GMROI	0.107948	0.022402	4.818622	0.0000***
SCAR	0.116709	0.019844	5.881324	0.0000***
IHP	9.76E-05	3.99E-05	2.446348	0.0189**
@TREND	0.021241	0.003121	6.805754	0.0000***

R-squared	0.808700	Mean dependent var	0.285559
Adjusted R-squared	0.775222	S.D. dependent var	0.092548
S.E. of regression	0.043878	Akaike info criterion	-3.263809
Sum squared resid	0.077010	Schwarz criterion	-2.951942
Log likelihood	86.33142	Hannan-Quinn criter.	-3.145954
F-statistic	24.15649	Durbin-Watson stat	1.961143
Prob(F-statistic)	0.000000		

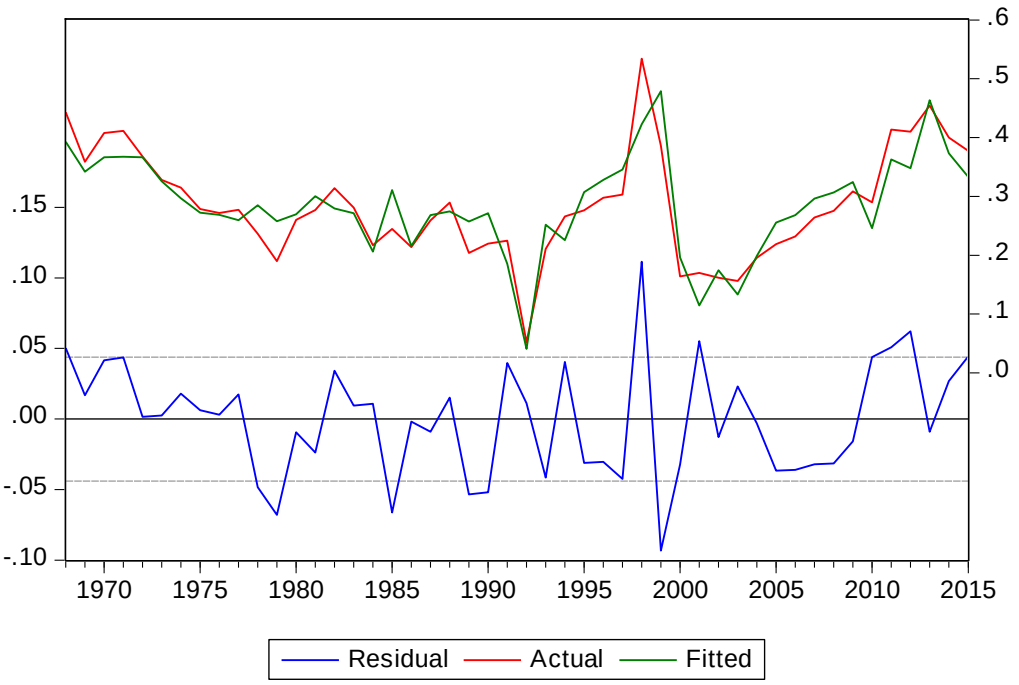
****Significant at 1%, ** significant at 5%, * Significant at 10%*

Source: E-view output and author's computation

Table 4.3 indicates the summary statistics of the regression model. The explanatory power of the model is indicated by the adjusted R squared with value of 78 percent. This implies that 78 percent of the variations in return on assets can be explained by the variables used in the model. The Adjusted R-squared value in this equation is found to be sufficient enough to infer that the fitted regression line is very close to all of the data points taken together (has more explanatory power). The t-statistics and the corresponding p-values of the independent variables and the intercept, except for the variable of sales growth (SG) and inventory holding period, indicate that they are significant at 1%. The independent variable sales growth (SG) is significant at 10% while inventory holding period is significant at 5%.

F-statistics is used to test the joint significance of the variables. From F-statistics results it is obvious that the model is fit with F- statistics of 24.16 and p-value of 0.0000. The Durbin-Watson d coefficient of 1.96 (~ 2) implies that the value of *p* is zero or there is no auto correlation in the error terms. As such it supplements the fact that the data set is stationary.

Graph 4.1 Actual, fitted, residual graph



The above graph indicates that the fitted regression line (Green color) is very close to all of the data points taken together, i.e. the actual data points (red color). Accordingly, the adjusted R^2 is sufficient enough to draw conclusions from the overall analysis.

4.1.4 Residual Normality Test

The first assumption for classical linear regression model requires that the average value of the errors is zero (Brooks, 2008, pp. 157). Normality tests in statistics are used to determine if a data set is well modeled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed.

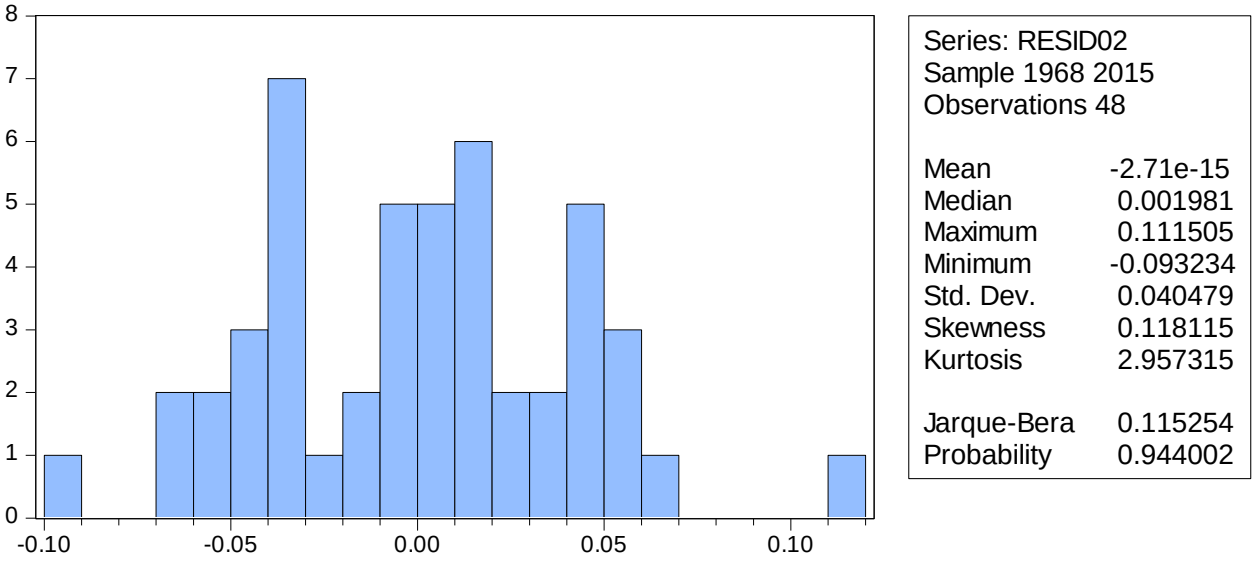
One of the approaches to testing normality is to compare a histogram of the sample data against normal probability curve. The empirical distribution of the data (histogram) should be bell-shaped and resembles normal distribution. In this study, Jarque-Bera statistics is used as the primary test statistics for normality distribution of the residuals. In addition, other empirical test statistics such as Anderson – Darling, Durbin – Watson, and Carmer –Von Mises, provided by e-views software, are used to subordinate Jarque –Bera test results. For Jarque-Bera statistics, the rule is that if the series are normally distributed, the histogram should be bell shaped and the Jarque- Bera statistic insignificant. It thus follows that residuals will be normally distributed at 5% level of significance if the probability of J-B statistic is greater than 0.05.

The null and alternative hypotheses for residual normality distribution test are:

Ho: The residuals have normal distribution

H1: The residuals have no normal distribution

Graph 4.2 Histogram of Residual Distribution



Source: *E-view output and author's computation*

The above graph with Jarque-Bera p- alue of 0.944 (> 0.05), kurtosis of 2.957(~ 3) and skewness of 0.11 indicates that the residuals are normally distributed with zero mean.

Table: 4.4: Empirical Distribution test of Residuals

Empirical Distribution Test for RESID
Hypothesis: Normal
Date: 05/18/17 Time: 15:38
Sample: 1968 2015
Included observations: 48

Method	Value	Adj. Value	Probability
Lilliefors (D)	0.086153	NA	> 0.1
Cramer-von Mises (W2)	0.031455	0.031783	0.8222
Watson (U2)	0.031413	0.031740	0.7898
Anderson-Darling (A2)	0.240742	0.244739	0.7617

Source: *E-view output and author's computation*

Table 4.4 indicates the empirical distribution test of the residuals using Carmer-Von Mises (W2), Durbin-Watson (U2), and Anderson – Darling (A2) methods provided by e-view software. The results of the tests with p-values greater than 0.05 imply that the null hypothesis of normal distribution is not rejected subordinating the conclusion drawn from the Jarque-Bera test statistics.

4.1.5 Multi- Co- Linearity

As discussed in the third chapter multicollinearity is a question of degree and not of kind. The meaningful distinction is not between the presence and the absence of multicollinearity, but between its various degrees. Therefore, we do not *"test for multicollinearity"* but can measure its degree in any particular sample. We do not have one unique method of detecting it or measuring its strength. What we have are some rules of thumb, some informal and some formal (Gujarati, 2003, pp.359). Pair-wise correlation test and variance inflation factor tests (VIF) are the two commonly employed methods for multicollinearity.

Pair wise correlation test is employed in this study. According to Gujarati, 2003, if the pair-wise or zero order correlation coefficient between two regressors is high, say, in excess of 0.8, then multicollinearity is a serious problem. The following tables presents pair-wise correlation test of the independent variables used in this study.

Table 4.5: Pair-wise correlation matrix

	FS	SG	ERR	GMROI	SCAR	IHP
FS	1.000000	0.098603	-0.001067	0.275948	0.522512	-0.229561
SG	0.098603	1.000000	-0.208837	-0.158819	0.066631	0.072910
ERR	-0.001067	-0.208837	1.000000	-0.058326	-0.390963	0.213187
GMROI	0.275948	-0.158819	-0.058326	1.000000	0.175602	-0.372861
SCAR	0.522512	0.066631	-0.390963	0.175602	1.000000	-0.532421
IHP	-0.229561	0.072910	0.213187	-0.372861	-0.532421	1.000000

Source: *E-view output and author's computation*

Table 4.5 presents pair-wise correlation test results of the independent variables used in the regression equation. The test result indicates that the highest correlation coefficient observed, i.e. 0.53, is between inventory holding period (IHP) and sales to current assets ratio (SCAR). However, the degree of correlation is by far lower than the maximum amount for a multicollinearity to be considered a serious problem, i.e., 0.8, as stated by Gujurati, 2003, pp 359). Hence, multicollinearity is not a problem of the variables used in this study.

4.1.6 Testing for serial auto correlation

In dealing with time series data, successive observations are likely to exhibit inter-correlations, especially if the time interval between successive observations is short, such as a day, a week, or a month rather than a year (Gujurati, 2003)

In the presence of such a phenomenon, ordinary least squares are no longer BLUE (Best Linear Unbiased estimators) and R-squared may be overestimated. Therefore, the test for serial correlation in the residuals should be given due attention.

Breusch-Godfrey (BG) Serial Correlation LM Test is used to detect autocorrelation problem in this study. According to Gujarati, 2003, BG serial correlation test is preferable in the sense that it allows for (1) non-stochastic regressors, such as the lagged values of the regressand; (2) higher-

order autoregressive schemes, such as AR(1), AR(2), etc.; and (3) simple or higher-order **moving averages** of white noise error terms.

The null and alternative hypotheses of the test are:

Ho: ρ=0, i.e. no serial correlation

H1: ρ=1 i.e. presence of serial correlation

Decision Rule: Reject the null hypothesis of no serial autocorrelation if p-value of the test statistics is less than 0.05; otherwise, do not reject the null hypothesis

The results of BG test for serial auto correlation is presented in table 4.6 below.

Table 4.6 Serial Correlation test result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.021594	Prob. F(2,38)	0.9786
Obs*R-squared	0.054491	Prob. Chi-Square(2)	0.9731

Source: *E-view output and author's computation*

Accordingly, the p-values of both the F-statistics and the chi-square are greater than 0.05 implying that the null hypothesis of no serial auto correlation is not rejected. Therefore, the residuals are not serially correlated.

4.1.7 Testing for hetroskedasticity

Conditional on $\boldsymbol{X}$, the variance of u_t is the same for all t: Mathematically, this is stated as follows:

Var $(u_t/\boldsymbol{X})$ = Var$(ut) = \delta^2$, $t = 1,2,\ldots, n$.

This assumption means that Var$(u_t/\boldsymbol{X})$ cannot depend on $\boldsymbol{X}$—it is sufficient that u_t and $\boldsymbol{X}$ are independent—*and* that Var(u_t) must be constant over time. When this assumption does not hold, we say that errors are hetroskedastic (Jeffrey M. Wooldridge, 2009)

If heteroscedasticity occur, the estimators of the ordinary least square method are inefficient and hypothesis testing is no longer reliable or valid as it will underestimate the variances and standard errors. There are several tests to detect the Heteroscedasticity problem, which include Park Test, Glesjer Test, Breusch-Pagan-Goldfrey Test, White's Test and Autoregressive Conditional Heteroscedasticity (ARCH) test.

This study employed White's Test to detect the presence of Heteroscedasticity.

Decision rule: If the chi-square value obtained exceeds the critical chi-square value at the chosen level of significance, the conclusion is that there is heteroscedasticity. If it does not exceed the critical chi-square value, there is no heteroscedasticity.

The null and alternative hypotheses of the hetroskedasticity test are:

H_0: The residuals are Homoskedic

H_1: The residuals are Hetroskedic

The following table summarizes the test result of hetroskedasticity.

Table 4.7 White's hetroskedasticity test result

Heteroskedasticity Test: White

F-statistic	0.369266	Prob. F(7,40)	0.9148
Obs*R-squared	2.913557	Prob. Chi-Square(7)	0.8929
Scaled explained SS	1.980122	Prob. Chi-Square(7)	0.9609

Source: *E-view output and author's computation*

From the test results above both the F-stat and the chi-square p-values are greater than 0.05. Hence, the null hypothesis of homoskedasticity is not rejected implying that the errors are homoskedastic.

4.1.8 Parameter Stability test

Regression analyses embody the implicit assumption that the parameters (β_1, β_2, β_3,…) are constant for the entire sample, both for the data period used to estimate the model, and for any subsequent period used in the construction of forecasts. This implicit assumption can be tested using parameter stability tests (Brooks, 2008 pp. 180). Chow break point test, provided by e-views software is used in this study. The entire data set is divided into two sub-samples. Year 1991 is taken as the break-point as it breaks the entire data in to two equal sub-samples. The first sub-sample is contains data between 1968 and 1991, and the second sub-samples contains data from 1992 to 2015. The null hypothesis is that the parameters are stable between these two sub-samples at 5% confidence level.

Decision rule: reject the null hypothesis of no breaks at the specified breakpoint if p-value is less than 0.05; otherwise do not reject the null hypothesis.

Table 4.8: Chow break point test

Chow Breakpoint Test: 1991
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1968 2015

F-statistic	1.282253	Prob. F(8,32)	0.2873
Log likelihood ratio	13.34680	Prob. Chi-Square(8)	0.1005
Wald Statistic	10.25802	Prob. Chi-Square(8)	0.2474

The test results with p-values higher than 0.05 imply that the parameters are stable between the two sub-samples considered.

4.1.9 Model appropriateness test

A further implicit assumption of the classical linear regression model is that *'the appropriate functional form'* is linear. This means that the appropriate model is assumed to be linear in the parameters. Whether the model should be linear can be formally tested using Ramsey's (1969) RESET test which is general test for misspecification of functional form (Brooks, 2009 pp. 175)

The null and alternate hypotheses for model appropriateness test are:

H_0: The linear model is appropriate

H_1: The non-linear model is appropriate

Decision rule: If p- values of the F and chi-square tests are lower than 0.05 reject the null hypothesis; otherwise do not reject.

Table 4.9: Ramsey's RESET test result

Ramsey RESET Test
Equation: EQ03
Specification: ROTA C FS SG ERR GMROI SCAR IHP @TREND
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.302176	39	0.2005
F-statistic	1.695663	(1, 39)	0.2005
Likelihood ratio	2.042874	1	0.1529

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.003209	1	0.003209
Restricted SSR	0.077010	40	0.001925
Unrestricted SSR	0.073801	39	0.001892
Unrestricted SSR	0.073801	39	0.001892

Source: *E-view output and author's computation*

Both F-and X^2 versions of the test are presented, and it can be seen that there is no apparent non-linearity in the regression equation and so it would be concluded that the linear model for the equation is appropriate.

4.2 Discussion of results

In the preceding part of this chapter a rigorous data analysis has been undertaken with the objective of testing whether the data set follow major classical linear regression (CLR) model assumption for time series. The stationarity of the data set, the normality of distributions of the error terms, the degree of multicollinearity among the independent variables, the presence of serial auto correlation and hetroskedasticity in the residuals, the stability of the parameters over the entire analysis period and the overall appropriateness of the functional form of the model are all tested using the appropriate econometric techniques. The results all indicated that the data set is fit to construct a viable regression model and thereby to infer conclusions from the analysis.

Accordingly the results of the regression analysis, in view of the theoretical and empirical studies provided in the second chapter and broadly categorized as descriptive and inferential statistics, are briefed as follows.

4.2.1 Descriptive statistics

Descriptive statistics is the term given to the analysis of data that helps describe, show or summarize data in a meaningful way such that, for example, patterns might emerge from the data (http:/www.statistics.lared.com). Descriptive statistics do not, however, allow us to make conclusions beyond the data we have analyzed or reach conclusions regarding any hypothesis we might have made. They are simply a way to describe our data. They do estimate population parameters that are typically of intrinsic interest. Classical descriptive statistics include among others mean, minimum, maximum, median, and standard deviation.

Table 4.10: Descriptive statistics summary

Date: 05/19/17
Time: 10:17
Sample: 1968 2015

	ROTA	FS	ERR	GMROI	SCAR	IHP	SG	YEAR
Mean	0.285559	2.38E+08	0.073867	1.075774	1.517028	211.7083	0.133334	1991.500
Median	0.276465	1.22E+08	0.068141	1.012721	1.511789	148.5000	0.123771	1991.500
Maximum	0.534325	1.04E+09	0.402413	1.753867	2.917050	1505.000	1.470000	2015.000
Minimum	0.052003	16066117	0.030833	0.545625	0.459164	94.00000	-0.550000	1968.000
Std. Dev.	0.092548	2.53E+08	0.053195	0.328294	0.491784	211.4583	0.269915	14.00000

Source: *E-view output and author's computation*

As depicted in table 4.10 above, for the periods covered by this study the company had average total asset (measure of firm size) of Birr 238 million with variation of Birr 253 million. The minimum and maximum firm values were Birr 16.01 million and Birr 1.04 Billion respectively. The figures are indicative of the steady growth in the firm's value for the periods considered.

The company's sales had grown on average by 13.33% each year during the periods considered. Maximum sales growth, i.e. 147%, was recorded between year 1993 and year 1994. On the other hand, the company's sales had dropped by 55% between year 1990 and 1991. Steady and continues growth in sales indicate the presence of markets not reached by a company's product or a growing demand for its products as a result of company specific competitive advantage such as price, quality, delivery systems or even the designs and packaging of the products. Demand also increases in line with increased disposable income.

The company's expense to revenue ratio was on average 7.4% with a minimum of 3.1% and a maximum of 40%. It has a standard deviation of 5.32%. The variable's higher deviation from the mean is attributed to the loss the company incurred in the year 1992 as a result of which its expense to revenue ratio reached a maximum of 40%.

The company's average gross margin return on its inventories was 107.6% with minimum and maximum returns of 54.56% and 175.4% respectively. This implies that during the periods covered by the study the company has sold its products on average at a gross margin of 107.6%. The company's gross margin return on inventory reached its maximum of 175.4% in the year 2009.

Sales to current asset ratio (SCAR), a measure of the incomings of the company from the management of current assets, has a mean value of 151.7% with variation of 49.2%. The variable portrayed a maximum ratio of 291.7% and a minimum of 45.9% in the periods analyzed. A high level of this indicator signals the existence of working capital deficit. On the other hand, decrease of the ratio implies narrowing down of the company's activities, which slows it production, thus diminishing inventories.

On average it took the company 212 days to sale its inventory for the periods covered by this study. The minimum and maximum inventory holding periods were 94 days and 1,505 days respectively.

Finally as a cumulative effect of the independent variables described above, as well as other factors not covered by this study, the company's average return on its total asset for periods considered is 28.55% with a maximum of 53.4 % and a minimum of 5.2% respectively.

The company's average return on total asset, i.e., 28.55%, is much higher than the average returns for the sixteen manufacturing share companies studied by Mifta A., 2016 in which National Tobacco is also included. The average return on total asset for the sixteen companies was 14.18% with a standard deviation of 6.9%. On the other hand, Mulualem M., 2011, in the study of the impact of working capital management on 13 manufacturing firms located in Addis Ababa city found the average return on asset to be the same 14 % which again is much lower than National tobacco's mean return on its asset. This implies that the company has higher return on its asset as compared to the other manufacturing companies in Ethiopia. This in turn indicates the prevalence of company specific competitive advantage. One such competitive advantage is the monopolistic nature of the company that gave it an exclusive right on the selling prices of its products as well as the country's market for cigarettes (memorandum of association, amendment no. 5/2016)

The descriptive statistics also showed that it took the company on average 212 days to convert and sell its inventories. This is lower than the average inventory holding period of similar manufacturing share companies in the country which is 248 days (Mifta A. 2016). However, the company's inventory holding period in days is higher than the average for manufacturing company's located in Addis Ababa city which is 98 days (Mulualem M. 2011). Nevertheless, the company's performance in terms of inventory turnover is lower than the country-wide mean of 248 days. This is attributed to the company's monopoly right in the tobacco industry for it is the only cigarette manufacturer, importer and distributor in Ethiopia and this helped to sell its products in the absence of competition of any kind.

The company's average expense to revenue ratio, i.e. 7.38% is very close to the finding of Camilia, B., 2011, who found that the average in a Romanian Pharmaceutical firm to be 7.9%. This is an indicative of the cost effective ways by which the company's management is running the day to day routines of the business as compared other companies. On the other hand NTE's average gross margin returns on inventories and sales to current asset ratios are 107.5% and 151.7% respectively. As higher sales to current asset ratio may imply the existence of working capital deficit, the status of NTE is relatively favorable.

4.2.2 Inferential Statistics

Inferential statistics uses a random sample of data from a population to describe and make inference about the population. Inferential statistics are valuable when it is not convenient or possible to examine each member of an entire population (*http/www.support.minitab.com*).

The need for inferential statistics arises out of the fact that sampling naturally incurs sampling error and thus a sample is not expected to perfectly represent the population. The methods of inferential statistics include (1) the estimation of parameters, and (2) testing statistical hypothesis

Accordingly, the inferential statics results of this study emphasizing the estimated parameters and the hypotheses tested are discussed as follows:

As indicated in table 4.3 the analysis of the regression parameters is accomplished using Ordinary Least Square (OLS) method. The estimation of parameters considered the 5% significance level or 95% confidence interval. The 10% significance level or 90% confidence interval is also acceptable for social sciences (Jeffrey M. Wooldridge, 2009, pp. 137)

Inferences are made using the student t- distribution, F-distribution and the chi-square distributions depending on the type of the test.

Accordingly, the test of significance for the individual variables indicates that the constant and the independent variables are significantly different from zero. Except for the independent variables of sales growth (SG) and Inventory holding period the rest of the variables are significant at 1% significance levels. Sales growth is significant at 10% while inventory holding period is significant at 5%.

The explanatory power of the model as can be seen from the adjusted R squared value is 78 percent. This implies that 78 percent of the variations in return on assets can be explained by the independent variables used in the model.

F-statistics is used to test the joint significance of the variables. From the F-statistics it is obvious that the model is fit with F- statistics of 24.16 as the p-value is 0.0000.

The regression results in the table indicate that holding other things constant a unit increase in firm size is associated with a decrease in profitability by 29.81% and it is statistically significant at 1% significance level. It shows significant negative relationship between firm's size and its profitability. The outcome is in line with the findings of Evans (1987), Hall (1987), Mata (1994), and Becceti & Troveta (2002). It implies the fact that smaller firms grow faster than larger firms as opposed to Gibrat's law which theorized that '*the growth of a firm in any given period of time*

is independent of the size of the firm at the beginning of the period'. The implication for the company under study is that as size increases return on investment decreases. This in turn indicates that the company's productivity does not increase proportionately with firm size resulting in higher fixed cost per output. As a result, any plan of expansion should ensure for a proportionate increase in the level of production and sales that can outweigh the effect of increasing fixed costs per output.

Regarding the impact of sales growth (SG) on profitability the result is that holding other things constant a unit growth in sales is associated with 4.37% increase in profitability. It is statistically significant at 10% significance level. The result shows significant and positive relationship between sales growth and profitability. The result is in line with the findings of Deloof (2003), Nazir & Afza (2009) and Khanqah (2012). The general conclusion is that managers can increase corporate profitability by increasing sales. The implication for National Tobacco is that the firm can generate higher return on investment by increasing sales. This is an indicative of an untapped market share as the company's overall cigarette market share is 70%; the remaining 30% being supplied by contraband and illicit cigarette trade (Business plan for expansion of Cigarette factory and leaf tobacco growing facilities, 2015). Hence, increasing production and sales ultimately increases the company's profit.

The regression result of expense to revenue ratio (ERR), which connects expense to revenue and expresses the efficiency achieved by a company through minimizing its costs, indicates that holding other things constant a unit decrease in expense to revenue ratio is associated with 86.6% increase in profitability and it is statistically significant at 1% significance level. The relationship is negative and significant. The finding agrees with the finding of Camilia, B.,(2011) who studied the relationship between this variable and the profitability of a pharmaceutical firm in Romania. The decrease of the ratio implies an improvement in resources management and increase in economic performance. The finding further implies the efficiency of the management, as expressed by the ability to run the day to day activities of the enterprise at a minimum operational cost. Hence, strategies towards cost minimization will bring about higher return for the company.

The regression result of gross margin return on inventory (GMROI), an indicator of if the modality of inventory management generates profit, indicates that holding other things constant a unit increase in gross margin return on the company's inventory is associated with 10.8%

increase in profitability; and the variable is statistically significant at 1% significance level. This means that the relationship between inventory management and the company's profitability is positive and significant. The finding is in line with the finding of Camilia Burja (2011). Its implication for National Tobacco is that an optimal level of inventory will help satisfy the need for cigarettes at time of sudden surge in market demand while at the same time reducing holding costs associated with unnecessary stock pileup. Hence, optimal inventory management systems result in increased profitability.

The regression result of Sales to current asset ratio (SCAR), which shows the incomings of the company from the management of its current assets, indicates that holding other things constant a unit increase in sales to current asset ratio is associated with 11.67% increase in profitability. The variable is statistically significant at 1% significance level. This result is again in line with the finding of Camilia Burja (2011). This implies that proper management of current assets will have positive and significant impact on a company's profitability through the increase of turnover. However, high level of this indicator signals the existence of working capital deficit. On the other hand, a decrease of the ratio means a narrowing down of the company's activity, which shows its production, thus diminishing inventories and accounts receivable. As a result an optimum level of sales and current assets should be the goal of the company in view of the above mentioned reasons.

The regression result of inventory holding period (IHP), the time it takes for the company to sell its inventories, shows that holding other things constant a day increase in inventories is associated with 0.98% increase in profitability and the coefficient is significant at 5% significance level. Hence, the impact of inventory holding period on profitability is insignificant and inconclusive. This finding agrees with the finding of Barrot H. (2012), who in the study of the impact of working capital management on profitability of pharmaceutical firms in India, found insignificant relationship between profitability and inventory holding period.

The regression result of the dependent variable on time (@trend) indicates that holding other things constant every year return on total asset of the company increases by 2.12%. The regression coefficient of time is statistically significant at 1% significance level. The increase in return on asset with passage of time is an indicative of the influence of macroeconomic factors

such as inflation, changes in interest rate, and exchange rates. As a result, future studies should consider for the impact of these factors in addition to those variables addressed in this study.

Finally, table 4.3 indicates that the joint regression coefficient of the variables (F-statistics) is significant at 1% significance level. As a result, it can be concluded that impact of firm size, sales growth, expense revenue ratio, sales to current asset ratio, gross margin return on inventory, inventory holding period and time on the profitability of the company is significant.

The results of the regression analysis, as described above, are used to determine the hypotheses stated in chapter two of this paper as shown under section 2.4.

Accordingly, the first hypothesis is that firm size has positive and significant effect on profitability. Contrary to the hypothesis, the indicator of profitability, i.e. return on asset, is negatively related and significantly affected by firm size at 1% significance level.

The second hypothesis is that sales growth has positive and significant effect on profitability. In conformity with the hypothesis, the indicator of profitability, i.e. return on asset, is positively related and significantly affected by sales growth at 10% significance level.

The third hypothesis is that expense to revenue ratio, a measure of management efficiency, has negative and significant effect on profitability. In conformity with the hypothesis, the indicator of profitability, i.e. return on asset, is negatively related and significantly affected by expense to revenue ratio at 1% significance level.

The fourth hypothesis is that gross margin return on inventory, indicator of if the modality of inventory management generates profit, has positive and significant effect on profitability. In conformity with the hypothesis, the indicator of profitability, i.e. return on asset, is positively related and significantly affected by gross margin return on inventory at 1% significance level.

The fifth hypothesis is that sales to current assets ratio has positive and significant effect on profitability. In conformity with the hypothesis, the indicator of profitability, i.e. return on asset, is positively related and significantly affected by sales to current asset ratio at 1% significance level.

The sixth hypothesis is that inventory holding period, the average days it takes a firm to sell its products, has negative and significant effect on profitability. Contrary to the hypothesis, the indicator of profitability, i.e. return on asset, is positively related but not affected much by inventory holding period at 5% significance level.

The seventh hypothesis is that time has positive and significant impact on profitability. In conformity with the hypothesis, the indicator of profitability, i.e. return on asset, is positively related and significantly affected by time at 1% significance level.

The eighth hypothesis is that firm size, sales growth, expense revenue ratio, sales to current asset ratio, gross margin return on inventory, inventory holding period and time have joint significant effect on profitability. In conformity with the hypothesis, the indicator of profitability, i.e. return on asset is significantly affected by the above variables with F-statistics significant at 1% significance level.

4.3 Chapter summary

Three major issues are addressed in this chapter. First, the regression model of the study is specified using Ordinary Least Square (OLS) method. Secondly, the estimated model and the individual variables used in the study are tested for fitness using different statistical techniques provided by e-views software. Third, the results of both descriptive and inferential statistics are discussed and hypotheses are tested.

The specification of the model and the different diagnostic tests followed classical linear model assumptions for time series analysis. Six major tests have been conducted on the model and individual variables. The variables have been tested for stationarity using Augmented Dick-Fuller (ADF) test for the presence of unit root and found to be stationary. Jaque-Bera statistics is employed to test for the normality of residual distribution. It is found that the residuals are normally distributed. Breuch-Godfrey (BG) test and Durbin-Watson tests are employed to test for the presence of serial correlation among the residuals. It is proved that the residuals are not serially correlated. White's test for hetroskedasticity is used to test if the residuals are hetroskedic. The test proved that the residuals are homoskedic. Chow-test is used to see if the variables are stable across the study period. The sample is divided in to two sub-samples and tested. The result found that the variables are stable across the sub-samples. Finally, the appropriateness of the functional form of the model is tested using Ramsey's RESET test. It is found that the linear functional form employed is appropriate for the model

Descriptive and inferential statistics results have been thoroughly investigated to help drive conclusions on the nature of the population directly from the descriptive statistics or to infer the characteristics of the population form the sample using the inferential statistics.

Finally, the result of the inferential statistics is used to test for the hypothesis stated in the second chapter. From the analysis it is found that except for hypothesis number one and hypothesis number 6, the rest are in conformity with the findings of this study. Hypotheses number one and hypotheses number six are found to be contrary to the findings of the study.

Chapter 5: Conclusion and Recommendations

This chapter presents conclusions drawn from the overall overviews of the research and its main findings. Then recommendations have been forwarded by the researcher based on the findings. Finally, future research direction is provided.

5.1 Summary of Findings

The research objective of this paper is to investigate how economic performance is achieved by National tobacco Enterprise (Ethiopia) S.C. To this goal, it is believed that the most appropriate indicators that express the aspects related to economic development and performance growth of the company should be chosen among the relative profitability indicators.

The empirical study of the correlations between different impact factors and profitability has been conducted using information derived from the annual financial reports of the company for the period 1968-2015. The study employed Ordinary Least Square method in estimating the regression model. Each of the six classical linear model assumptions for time series regression has been tested using the appropriate statistical tools provided by e-views software.

Return on Assets is used as dependent variable. Firm size, sales growth, expense revenue ratio, gross margin return on inventory, sales to current asset ratio and inventory holding period are used as independent variables. Regression analysis is employed to examine the impact of the independent variables on the dependent variable.

Descriptive and inferential statistics results of the analysis are interpreted. Descriptive statistics is used to describe and show the behavior of the population while inferential statistics is used to estimate parameters and to test hypotheses. These are briefed as follows:

From the descriptive statistics result the mean return on total asset of the company was found to be 28.55% with a minimum return of 5.2% and a maximum return 53.4%. On average it took 212 days for the company to sell its products. Average expense to revenue ratio and gross margin return on inventory were 7.38 % and 107.57% respectively. The company's average sales growth per year was 13.33%.

The regression analysis of firm size indicates that there is a significant negative relationship at 1% significance level between firm size and profitability. This may be explained by the fact that big firms are less effective than small firms in terms of efficient use of existing technical and productive infrastructure. On the other hand, agency theory states that as firms become larger,

presumably with well paid managers, the incentive for these managers to expand their firms becomes greater. Expansion of firms can increase the turnover contribution of each employee, but in the process the overhead costs and bureaucratic costs more than offset the gains.

The regression analysis of sales growth indicates that there is significant positive relationship at 10% significance level between sales growth and profitability. It indicates that managers can increase the return on total assets by increasing sales turnover.

The regression analysis of expense to revenue ratio indicates that there is significant negative relationship at 1% significance level between this ratio and profitability. This implies that a significant impact on profitability increasing exerted the action of lowering all the operating expenses. Due to the indicator expense to revenue ratio, return on asset considerably increased.

The regression analysis of gross margin return on inventory indicates that there is significant positive relationship at 1% significance level between profitability and this ratio. This implies the fact that the modality of inventory management employed by the company is positively contributing to its profitability.

The regression of sales to current asset ratio indicates that there is significant positive relationship at 1% significance level between profitability and the ratio of sales to current assets. It implies that the proper organization of operating activities is aimed at the efficient usage of current assets in generating sales revenue. The efficiency of utilization of current assets increases when the rotation of the components (inventories & receivables) speeds up so that overall result will be higher earnings.

The regression analysis of inventory holding period indicates that there is positive but insignificant relationship at 5% level between profitability and the indicator inventory holding period.

5.2 Recommendations

The recommendations of the research are premised around the summary of the findings as indicated above. The study portrayed a clear understanding of the relationship between the company's profitability and some of the factors contributing to it. In general, it stressed the need for proper management of scarce economic resources for a better profitability. Accordingly, the following major recommendations are forwarded on the basis of the findings.

The negative effect of firm size on profitability indicates that increasing the technical and productive infrastructure can result in diminished return unless the increased investment is

substantiated by a greater performance. Increasing investment in capital infrastructures without the proportionate increase in output results in higher fixed cost per unit of output thereby reduced profitability.

The study found significant positive relationship between sales growth and profitability. This implies that managers can improve their company's return on investment by continually striving for a greater market share through increased production and sale of their products. Increasing production and thereby sales turnover implicitly assumes the fact that there is increasing demand for the product.

The highly significant and negative effect of expense to revenue ratio on profitability implies that the higher the efficiency achieved by the company through minimizing operating cost the higher is the return on total investment. Outsourcing non-core business activities, which if handled by the company results in higher expenses, is one of the areas to be considered when operational efficiency is planned. Implementing employee motivating schemes also help motivate employees to give more value to the firm thereby tackling wastages. Periodic monitoring and control of systems that result in unnecessary expenses to the company is also another area to be focused in an effort to control operational costs to the business. Hence, managers striving for better company performance should prioritize the issue of efficiency through cost control.

The study found positive and significant relationship between gross margin return on inventory and the company's profitability. As this indicator implies if the modality of inventory management is contributing towards better performance, and the relationship is positive and significant, managers should stress a well organized and scientific inventory management system as this is a way towards better efficient resource management which results in higher profit.

Sales to current asset ratio is positively and significantly related to the company's profitability. It is an indicative of the incomings of the company form the management of current assets. A high level of this indicator signals the existence of working capital management. On the other hand, a decrease in the ratio means narrowing down of activities, which slows its production, thus diminishing inventories and receivables. Therefore, an optimal combination of sales and current assets should be sought for a healthy business activity. The modality to ensure the optimal meet between inventories and sales call for the application of scientific inventory management system. Just in time (JIT) and economic order quantity (EOQ) are among the scientific inventory

management systems that if applied effectively will reduce the rescue of working capital shortage as well as the unnecessary costs related to the holding of excess stock items.

Accordingly, the company can improve its profitability through the designing and implementation of proper scientific management approaches. The use of just in time inventory (JIT) not only reduce inventory holding costs but also helps to divert scarce resource towards more profitable projects that will be tied up if inventories are held in excess.

Outsourcing of non-core business activities is a modern approach to business management which helps the management to focus more on core business areas. Waste minimization is another area that is getting momentum in recent years as new management approaches such as Kaizen are getting wider acceptance.

Subordinating the traditional way of carrying business activities with information technology is another area that is crucial for survival in a today's highly competitive business environment. Investment in the technical and productive infrastructures should always need to be accompanied by improved output as this would help control the fixed production costs per unit of output. Environmental stewardship is also one of the issues not to be ignored as the survival of a business depends on the conduciveness of not only the political and economic environments but also the natural environment.

Emphasizing social responsibility is another area that has greater influence on the profitability and the very existence of companies involved in socially controversial businesses such the tobacco industry.

In general, the study affirms that a better management of company profitability implies adoption of some adequate strategies which can be identified through analysis of how were manifested the phenomena in their concrete microeconomic environment. The elements on which it can intervene for improving the performance are those with a high impact, and factors that influenced negative the profitability constitute some reserves of economic increasing in the future activity.

5.3 Suggestions for further research

This study has focused on identifying factors determinant to the profitability of National Tobacco Enterprise (Ethiopia) S.C. Emphasis was given to the impact of firm specific factors such as firm size, sales growth and resource management. Hence, further research on the impacts of the company's profitability with Management Quality, Corporate Governance, and Risk Management as

well as the impact of macroeconomic factors such as inflation, gross domestic product, availability foreign currency and the like will not only add value on explaining profitability of the company but also add value to the academic literature.

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Appendix I: Hetroscedasticity test Result

Heteroskedasticity Test: White

F-statistic	0.369266	Prob. F(7,40)	0.9148
Obs*R-squared	2.913557	Prob. Chi-Square(7)	0.8929
Scaled explained SS	1.980122	Prob. Chi-Square(7)	0.9609

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/18/17 Time: 21:54
Sample: 1968 2015
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007013	0.009814	0.714629	0.4790
FS^2	-1.96E-05	3.10E-05	-0.632067	0.5309
SG^2	0.000149	0.001167	0.127307	0.8993
ERR^2	-0.010262	0.016132	-0.636131	0.5283
GMROI^2	0.000501	0.000569	0.880363	0.3839
SCAR^2	-4.85E-05	0.000292	-0.166390	0.8687
IHP^2	2.08E-10	1.17E-09	0.177925	0.8597
@TREND^2	1.39E-06	2.10E-06	0.662359	0.5115

R-squared	0.060699	Mean dependent var	0.001604
Adjusted R-squared	-0.103679	S.D. dependent var	0.002268
S.E. of regression	0.002383	Akaike info criterion	-9.089874
Sum squared resid	0.000227	Schwarz criterion	-8.778007
Log likelihood	226.1570	Hannan-Quinn criter.	-8.972019
F-statistic	0.369266	Durbin-Watson stat	1.299787
Prob(F-statistic)	0.914758		

Appendix II: Serial Autocorrelation test Result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.021594	Prob. F(2,38)	0.9786
Obs*R-squared	0.054491	Prob. Chi-Square(2)	0.9731

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/18/17 Time: 21:10
Sample: 1968 2015
Included observations: 48
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006098	0.704269	0.008659	0.9931
FS	-0.000537	0.041375	-0.012981	0.9897
SG	-5.34E-05	0.025916	-0.002060	0.9984
ERR	-0.002194	0.160035	-0.013707	0.9891
GMROI	0.000698	0.023288	0.029989	0.9762
SCAR	0.001492	0.022343	0.066774	0.9471
IHP	3.39E-06	4.42E-05	0.076799	0.9392
@TREND	1.38E-05	0.003315	0.004174	0.9967
RESID(-1)	-0.016611	0.187090	-0.088788	0.9297
RESID(-2)	-0.035033	0.178646	-0.196101	0.8456

R-squared	0.001135	Mean dependent var	-2.25E-15
Adjusted R-squared	-0.235438	S.D. dependent var	0.040479
S.E. of regression	0.044992	Akaike info criterion	-3.181612
Sum squared resid	0.076923	Schwarz criterion	-2.791778
Log likelihood	86.35868	Hannan-Quinn criter.	-3.034293
F-statistic	0.004799	Durbin-Watson stat	1.944033
Prob(F-statistic)	1.000000		

Appendix III: Co-integration Test result

Date: 05/19/17 Time: 12:22
Sample (adjusted): 1970 2015
Included observations: 46 after adjustments
Trend assumption: Linear deterministic trend
Series: ROTA FS SG ERR GMROI SCAR IHP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.777232	196.2563	125.6154	0.0000
At most 1 *	0.683819	127.1815	95.75366	0.0001
At most 2 *	0.506456	74.21523	69.81889	0.0213
At most 3	0.321803	41.73266	47.85613	0.1663
At most 4	0.195734	23.87005	29.79707	0.2060
At most 5	0.168796	13.85011	15.49471	0.0871
At most 6 *	0.109711	5.345619	3.841466	0.0208

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.777232	69.07480	46.23142	0.0000
At most 1 *	0.683819	52.96628	40.07757	0.0011
At most 2	0.506456	32.48258	33.87687	0.0726
At most 3	0.321803	17.86260	27.58434	0.5066
At most 4	0.195734	10.01994	21.13162	0.7428
At most 5	0.168796	8.504489	14.26460	0.3297
At most 6 *	0.109711	5.345619	3.841466	0.0208

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Appendix IV: Financial Ratios

Year	ROTA	SG	FS	DR	FL	FAR	SCAR	SER	GMROI	ERR	CR	IHP
1968	0.44	0.00	16.59	0.21	0.27	0.16	1.23	1.31	0.99	0.07	4.00	352
1969	0.36	0.02	16.71	0.17	0.20	0.14	1.10	1.14	0.83	0.08	5.11	411
1970	0.41	0.08	16.79	0.18	0.22	0.15	1.11	1.14	0.93	0.05	4.73	337
1971	0.41	0.16	17.02	0.19	0.23	0.17	1.05	1.07	1.40	0.04	4.40	236
1972	0.37	0.07	17.13	0.17	0.20	0.21	1.06	1.00	1.62	0.05	4.65	220
1973	0.33	0.10	17.26	0.16	0.20	0.27	1.10	0.96	1.19	0.04	4.43	309
1974	0.31	0.13	17.38	0.15	0.18	0.29	1.16	0.95	1.00	0.04	4.50	283
1975	0.28	0.13	17.49	0.17	0.20	0.29	1.15	0.98	0.97	0.05	4.23	242
1976	0.27	0.36	17.59	0.16	0.19	0.26	1.36	1.19	0.89	0.07	4.61	265
1977	0.28	0.21	17.70	0.22	0.28	0.23	1.41	1.39	1.11	0.08	3.51	113
1978	0.24	0.14	17.81	0.28	0.39	0.20	1.39	1.55	1.37	0.07	2.84	115
1979	0.19	0.20	17.87	0.32	0.47	0.18	1.53	1.84	0.83	0.06	2.56	166
1980	0.26	0.30	18.03	0.41	0.69	0.15	1.62	2.33	1.15	0.07	2.10	106
1981	0.28	0.13	18.09	0.43	0.74	0.18	1.79	2.57	1.34	0.07	1.93	119
1982	0.31	0.11	18.18	0.46	0.84	0.16	1.80	2.77	1.10	0.07	1.83	170
1983	0.28	0.13	18.20	0.46	0.84	0.17	2.00	3.05	0.66	0.07	1.82	130
1984	0.22	(0.11)	18.29	0.49	0.97	0.15	1.60	2.66	0.73	0.08	1.72	142
1985	0.24	0.19	18.30	0.48	0.94	0.15	1.87	3.09	0.76	0.03	1.76	123
1986	0.21	0.05	18.50	0.57	1.32	0.12	1.56	3.18	0.67	0.04	1.54	169
1987	0.26	0.23	18.56	0.58	1.40	0.11	1.79	3.80	0.79	0.03	1.52	102
1988	0.29	(0.07)	18.60	0.69	1.43	0.14	1.66	3.45	1.02	0.03	1.46	120
1989	0.20	(0.08)	18.57	0.58	1.25	0.13	1.60	3.03	0.69	0.04	1.52	148
1990	0.22	0.07	18.64	0.60	1.40	0.12	1.60	3.27	0.83	0.05	1.46	114
1991	0.22	(0.55)	18.50	0.60	1.18	0.12	0.83	1.55	0.98	0.11	1.46	200
1992	0.05	(0.34)	18.23	0.45	0.81	0.12	0.73	1.10	0.84	0.40	1.86	433
1993	0.21	0.11	18.72	0.59	1.44	0.07	0.46	1.01	0.55	0.09	1.53	1505
1994	0.27	1.47	18.88	0.58	1.41	0.07	0.96	2.11	0.58	0.11	1.56	459
1995	0.28	0.72	18.81	0.46	0.87	0.07	1.49	2.50	0.55	0.07	1.94	241
1996	0.30	0.04	18.76	0.48	0.92	0.08	1.65	2.81	0.66	0.08	1.85	200
1997	0.30	0.05	18.79	0.46	0.86	0.08	1.66	2.80	0.87	0.10	1.95	164
1998	0.53	0.02	18.90	0.47	0.88	0.07	1.49	2.58	1.62	0.07	1.96	171
1999	0.39	(0.02)	18.76	0.36	0.56	0.07	1.70	2.40	1.54	0.08	2.53	132
2000	0.16	(0.11)	19.51	0.05	0.06	0.46	1.28	0.69	1.38	0.10	9.67	140
2001	0.17	(0.07)	19.65	0.04	0.04	0.38	0.86	0.55	1.03	0.07	16.28	148
2002	0.16	0.39	19.76	0.08	0.08	0.46	1.21	0.71	1.34	0.10	6.95	141
2003	0.16	0.01	19.76	0.09	0.10	0.43	1.16	0.73	1.01	0.11	6.32	240
2004	0.20	0.19	19.78	0.07	0.07	0.44	1.39	0.84	1.02	0.09	8.07	153

2005	0.22	0.21	19.83	0.09	0.10	0.38	1.44	0.98	1.46	0.09	6.92	120
2006	0.23	0.12	19.90	0.12	0.14	0.37	1.48	1.07	1.48	0.08	5.31	130
2007	0.26	0.17	19.93	0.12	0.13	0.33	1.58	1.20	1.52	0.08	5.80	116
2008	0.28	0.18	20.04	0.17	0.20	0.29	1.58	1.35	1.71	0.08	4.26	95
2009	0.31	0.20	20.10	0.18	0.22	0.25	1.69	1.55	1.75	0.08	4.22	113
2010	0.29	0.23	20.24	0.27	0.37	0.20	1.70	1.86	0.88	0.05	2.96	195
2011	0.41	0.33	20.20	0.33	0.49	0.20	2.39	2.82	0.89	0.05	2.40	149
2012	0.41	0.17	20.35	0.22	0.29	0.16	2.32	2.46	1.10	0.05	3.68	106
2013	0.45	0.11	20.37	0.19	0.24	0.28	2.92	2.55	1.40	0.04	3.66	94
2014	0.40	0.14	20.66	0.26	0.35	0.36	2.74	2.36	1.36	0.05	3.52	127
2015	0.38	0.07	20.77	0.21	0.27	0.35	2.58	2.14	1.26	0.04	4.28	98