

**The Determinants of Profitability:  
Evidence from Japanese Automobile and Parts  
Industry**

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## **ABSTRACT**

The purpose of this research is to examine the determinants of profitability of the firms operating in the “Automobile and Parts” industry in Japan over the 2005-2015 periods. The findings of this study are expected to provide important implications to managers of sample firms in tailoring appropriate strategies to improve profitability. In this study, firm size, sales growth, current assets, liquidity ratio, long term debts, gross domestic product growth rate, and annual inflation rate are chosen as independent variables. On the other hand, return on assets is used as a measure of profitability which is the dependent variable.

Secondary data were obtained from balance sheets and income statements of 101 firms operating in the Automobile and parts industry in Japan. In order to explore the determinants of profitability, “Panel Data” analysis is used and “Fixed Effects” and “Random Effects” methods are utilized. The results demonstrate that firm size, sales growth, liquidity ratio, and gross domestic product growth rate have statistically significant positive impact on profitability. On the other hand, current assets and long term debt are found to have statistically significant negative impact on Profitability.

**Keywords:** Profitability, Panel data, Automobile industry.

## ÖZ

Bu çalışmanın amacı Japonya’da Otomobil Sektöründe faaliyet gösteren 101 işletmenin 11 yıllık verilerini kullanarak karlılıklarını belirleyen faktörleri incelemektir. Yapılan çalışma sonucunda, karlılığı etkileyen faktörlerin neler olduğu ve bu faktörlerin karlılığı ne yönde etkilediğinin tespit edilmesinin, örnek firma yöneticilerine karlılıklarını artırmaları yönünde önemli bilgiler sağlayacağı beklenmektedir. Bu kapsamda, işletme büyüklüğü, dönen varlıklar, likidite, uzun vadeli borçlar, gayri safi milli hasıla, ve yıllık enflasyon oranı bağımlı değişkenler olarak kullanılmıştır. Aktif karlılığı ise bağımlı değişken olarak ele alınmıştır.

Araştırmada kullanılan değişkenler, 101 adet işletmenin Bilanço ve Gelir Tablosundan elde edilmiştir. Bilanço ve Gelir Tabloları ise “Data Stream” veri tabanından indirilmiştir. Araştırmada kullanılan bağımlı değişkenlerin işletmelerin karlılığını nasıl ve ne yönde etkilediğinin tespit edilmesi için “Panel Veri” analizi kapsamında “Sabit Etkiler Modeli” ve “Rassal Etkiler Modeli” yöntemleri kullanılarak tespit edilmiştir. Araştırma sonucuna göre satış büyüklüğü, gayri safi milli hasıla, likidite ve işletme büyüklüğü istatistiksel olarak anlamlı bir şekilde karlılığı pozitif yönde etkilemektedir. Diğer taraftan, uzun vadeli borç ve dönen varlıkların işletme karlılığını negatif yönde etkilediği tespit edilmiştir.

**Anahtar Kelimeler:** Karlılık, Panel veri analizi, Otomobil endüstris.

# **DEDICATION**

I dedicate this dissertation to my elder sister, rest on till we see again.

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# Chapter 1

## INTRODUCTION

The global market unevenness has brought about many challenges faced by many listed industries (Yazdanfar, 2013). Several factors have been determined to influence the profitability of many industries overtime.

Profitability is defined as the ability to earn a profit after deducting cost incurred. Profitability has been further expressed as a price-earnings ratio which measures income and expenses (Hofstrand, 2009). Nimalathan (2009) states that profit are a primary objective of a business which is earned by successful companies who have a choice between debt and equity to finance their operations. Profitability of an industry not only depends on the success of the product but also on the development of the market for the product.

According to Michael, McGivern, & Tvorik (1997), organizational determinants of profitability deals with the firms' overall performance which implies that the profitability of an industry is determined by factors such as size, leverage, current assets and sales growth.

Profitability of an industry is also affected by its macro-economic environmental factors such as the country's gross domestic product, inflation rate, pricing policies, innovation and technological changes (McGivern, Michael & Tvorik, 1997).

Albert, Saleem & Myles (2011) explain the results from econometric studies suggesting that profitability is a significant determinant of current profit margin and industry concentration is positively related to firms' profit margin.

Another research study conducted by Bourgeois III, Ganz & Gonce (2014) shed more light on some variables that contribute to industry profitability. The findings suggest that the firms within an industry have varying profitability levels relative to their size, growth rate, current assets and return on assets.

Furthermore, profitability of an industry is determined by the concentration of firms within an industry (Powell, 1996). The growth rate and economies of scale which leads to increase outputs and low cost per unit increases as an industry becomes more concentrated and the industry's effect on firms performance grows (Bourgeois III, Ganz & Gonce, 2014).

## **1.1 Importance of Automobile and Parts Industry and Economic Development in Japan**

The Automobile and Parts industry is a very important sector in Japan which played a vital role in the development of Japan's economy and its capital market. The increase in demand for vehicles has led to strict regulations by the Japanese government to decline fuel economy (Wohlgemuth, 1992). The Automobile and Parts industry has been progressively developing with blue prints for the modern automobile in Germany and France in the late 1800s.

Japan as a developing country has gone through two main periods of economic development. The first began in 1868 up to WW II and the second one began in 1945

and continued till mid-1990s. In both periods, Japan opened itself to Western ideas and influences which have brought about economic, social, political and revolutionary changes (Cárdenas, Ocampo & Thorp, 2016). Japan experienced industrialization in various stages under different sectors such as government, business communities and individuals (Ohno & Fujimoto, 2006).

The Japanese automobile enterprise became global as the leading automaker by 1980. Japan's economy has grown steadily and she had become the third largest automobile manufacturer and exporter with an annual production of 9.9 million automobiles by 2012. Japan also ranked the first largest automobile manufacturer and exporter within the periods 1980-1993 and 2006-2008 (Schmidt & Nakajima, 2013). Japanese automobile production has been growing consistently over the past two decades from 5.3 million automobiles in 1970 to its peak of 13.5 million automobiles in 1990. This growth has been in three stages which are infant domestic development, export driven and regionalization (Lin, 1994). The Automobile and Parts industry has contributed to the economic growth of Japan as it is one of Japanese economy's core industrial sectors which make huge investments in equipment and research and development.

## **1.2 Aim of the Study**

The aim of this research is to investigate the influence of the various selected variables on the profitability of the firms in the Automobile and Parts industry in Japan. This research examines the concepts of profitability with regards to internal and external determinants. The internal determinants include firm size, sales growth, current assets, liquidity ratio and long term debts. The external determinants, on the other hand, are gross domestic product growth rate and annual inflation rate.

By exploring the factors influencing profitability of the sample firms, the current study strives to achieve the following objectives:

- Assessing the level of intensity of the various variables on the Return on Assets of the firms.
- Providing the local libraries with scientific material dealing with variables that affect profitability of the Japanese Automobile and Parts industry.
- Providing some conclusions and recommendations for top management and decision makers at automobile companies to deal with variables that affect organizational performance in order to enhance their company's financial success.

By fulfilling these objectives, this research is the best of its kind being carried out in the Automobile and Parts industry in Japan, to the best of our knowledge. The outcomes are expected to guide managers on how to handle issues concerning the performance of their firms. The determinants of profitability are of great importance to both the individual firms within the industry and the industry as a whole because understanding these factors assists the firms to focus on increasing their overall value in order to improve the performance. These firms will be able to understand and monitor the various determinants within the industry in order to organize their strategies and better improve industrial performance.

This research work will be useful for future studies in similar areas in this field because it is a contribution to academic knowledge.

### **1.3 Scope of the Study**

The scope of this research study is based on an analysis of the profitability of firms in the Automobile and parts industry in Japan. It also examines how the selected determinants which are firm size, sales growth, return on assets, current assets,

liquidity ratio, long term debts, gross domestic product growth rate and annual inflation rate varies over time.

#### **1.4 Methodology of the Study**

For the purpose of this study, all firms in the Automobile and Parts industry in Japan were used as sample for this research. This sample was taken in order to assess the influence of various selected variables on profitability of the firms in the industry.

Panel data is used for this research study as it provides a powerful instrument of research and it is possible to include time effects (Asimakopulos, Samitas & Papadogonas, 2009).

The data for this research was collected from Datastream developed by Thomson Reuters ©2012. The data were collected from the balance sheets and income statements of 130 firms over 11 years period.

For data analyses, descriptive statistics are first of all used to calculate mean, median, and standard deviation for the variables. Next, correlation analyses are carried out to test the relationships among the study variables. Then, Fixed and Random effects methods are utilized to explore the impact of the independent variables on profitability. Finally, Hausman test is performed to analyze to test whether Fixed or Random effects method gives better results.

#### **1.5 Limitations of the Study**

Firstly, the time used for this research work is a limiting factor in exploring more determinants of profitability and comparing them with the reality in the industry. Determinants such as firm size, sales growth, return on assets, current assets,

liquidity ratio, long term debts, gross domestic product growth rate and annual inflation rate have been selected from the lots.

Secondly, the data for 130 firms was not easy to collect from Datastream in the Automobile and Parts industry in Japan. This is due to the system update each firm's Balance sheet and Income statements had to be extracted separately for 11 years.

Thirdly, due to limited research carried out in the area, it was difficult to get a lot of information from pervious sources and related articles.

## **1.6 Structure of the Study**

This research work is organized as follows:

Chapter one introduces the concept of profitability, the economic progress of Japan and the determinants of profitability on a general level. It goes further to outline the aim of this dissertation, the scope of the study, the methodology, limitations and the structure of the research.

Chapter two makes a review of the empirical literature related to the determinants of Profitability and goes further to make an analysis of the literature with respect to the selected determinants.

Chapter three seeks to present details of the data sample collected, the variables and measurements, the data analysis using two models; fixed and random effects models. It goes further to use descriptive statistics, correlation analysis and Hausman test to analyze the data further. The hypotheses were established to test the statistical significance of the variables.

Chapter four gives a deeper look at the results and interpretation of the study from the descriptive statistics table, the correlation analyses table, Fixed and Random effects tables, and Hausman test tables.

Finally, Chapter five provides a summary of the conclusions, implications and recommendations of the study.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Empirical Literature**

This chapter reviews the literatures related to Profitability, how it is influenced by the various determinants in different industries. Many variables exist which can be used to examine the varying degree of influence on profitability. However, the following prime variables exert substantial importance on profitability though they produce mixed results.

A positive and significant relationship has been found amongst profitability and size, debt to equity proportion and stock turnover proportion. The discoveries likewise demonstrate a negative however noteworthy relationship amongst liquidity and productivity as indicated by research did balance the Indian car industry over a five years' time span (Mistry, 2012).

Small Non-financial firms were inspected to decide on the level of impact between industry affiliation and profitability in four industrial sectors in Sweden utilizing apparently unrelated regression. The results show a positive influence of size, lagged profitability, growth and productivity on profitability (Yazdanfar, 2013).

Bashar & Islam (2014) concluded from their examination of the pharmaceutical organizations in Bangladesh, that efficient management of inventories and a

reduction in account payables will have a direct influence on the performance of the firms in the pharmaceutical companies in Bangladesh.

The factors influencing profitability were examined by Pratheepan (2014) in the manufacturing companies in Sri Lanka. The findings show a positive relationship between firm size and profitability while leverage and liquidity were found to have an insignificant influence on the profitability of these companies. On the other hand, tangibility was found to have an inverse statistically significant relationship with profitability.

Ha-Brookshire (2009) investigated the profitability of non-manufacturing US companies and the results show that entrepreneurship and the profitability of firms are both affected by the firm size.

Stierwald (2010) carried out a study which examines the factors influencing profitability of 961 large Australia firms. A substantial positive effect was found to exist between lagged profit, productivity level and size on the profitability of the firms.

Dong & Su (2010) examined the firms recorded on the Vietnam stock exchange market and investigated the relationship between working capital management and profitability. They discovered that there exists a solid negative relationship between operating profits and cash conversion cycle.

Older firms were found to be unable to easily adapt to rapid changes in market condition because of their “bureaucratic” organizational structures, hence firm size was seen to affect profitability negatively (Papadogonas, 2007).

Kester (1986) examined the performance of firms and report shows that high debts levels affects firms negatively since it requires high interest payments there by making the company risky leading to inferior performance. The level of financial debts may increase when the organizations require monetary support for new ventures and this tend to enhance performance.

Majundar (1997) investigated the effects of inventory stocks on profitability and found that higher stocks of assets creates working capital needs which increases interest costs and thus resulting to declining performance. On the other hand, firms are able to quickly respond to changes in demand with high inventory ratios. The impacts of stocks on productivity were analyzed in the Tourism part where the request is general and firms know about very factor limit use proportions. The outcomes demonstrate a dubious relationship between the two factors.

Jovanovic (1982) and Wernerfelt (1984) examined the determinants of company performance and concluded that particular firm level resources and capabilities are the fundamental determinants of an organization’s performance. They additionally found that these distinctions follow verifiably diverse historical development paths which create diverse competences and skills that are required to influence their performance more than the environmental figures in which they work.

Barbosa & Louri (2005) investigated the determinants of profitability to check the influence of firm's size on profitability. The outcomes demonstrate that smaller firms have higher normal cost than bigger firms since large firms take advantage of economies of scale.

Stinchcombe (1965) examined the profitability of firms with regards to age and found that more aged firms have more experience and greater system of connections that can help them get superior performance.

Martin & Stiefelmeyer (2001) investigated the determinants of profitability and found that profitability and market share of a firm are relevant indicators of its competitiveness. They go further to say when firms gain more competitive advantage; they become more profitable and have a greater market share. This leads to more efficiency, increase productivity and profitability of the firms.

Agiomirgianakis, Voulgaris & Papadogonas (2006) surveyed 3094 Greek manufacturing firms over the years 1995-1999 and examined the factors influencing profitability and employment growth. They found that size and total asset turnover has a direct influence on profitability. This means that large firms with more fixed and current assets are more profitable than smaller firms with less total assets. They also discovered that export variables have a negative impact on profitability.

The profitability of non-financial Greek listed firms was examined for the period of 1995-2003 using panel data estimations technique and the results shows profitability is positively affected by sales growth, long term debt and productivity of employees

and negatively by the liquidity ratio, extensive credit terms and size (Asimakopoulos, Samitas & Papadogonas, 2009).

Liargoras & Skandali (2010) found from their research that firm's performance is positively affected by the increase in leverage and negatively affected by the liquidity ratio and capitalization (measured by fixed assets to total assets) which is negatively related to a firm's financial performance. This research was carried out using 102 firms recorded on the Athens stock trade showcase.

The determinants of profitability for electrical organizations in the UK were investigated by Grinyer & McKiernan (1991). The discoveries let us know that sales growth, working capital, decentralization and capital intensity assume a huge part in explaining corporate profitability.

Additional look into the factors influencing profitability for assembling industries in New Zealand reveals that market power and market efficiency are significant factors that have impact on profitability (Bennenbroek & Harris, 1995).

Unlike Keith (1998) carried out an investigation in the Tayside district of Scotland utilizing manufacturing firms. The results indicate that industry group and age have limited value in explaining the profitability of an organization.

McDonald (1999), using Australian manufacturing companies, found that industry concentration and lagged profitability are important determinants of profitability.

In another study, Fenny (2000) found strong evidence that capital intensity and size have a positive association with profitability.

Goddard, Tavakoli & Wilson (2005) carried out a study of the determinants of profitability and the results show that size and gearing ratio negatively affect profitability of a firm. On the other hand, market share and higher liquidity were found to have a direct relationship with profitability.

Another research conducted by Amir Shah & Sana (2006) shows that age of inventory, average collection period and sales growth have an inverse relationship with profitability of an industry. The results also demonstrate that positive relationship exists between the number of days of account payable and profitability of an industry.

Bhayani (2010) examined cement firms in India from 2001-2008 and the results show that profitability is influenced by factors such as interest rate, operating ratio, liquidity, inflation and age of the firm.

Nunes, Serrasqueiro & Sequeira (2009) carried out an investigation of the service industry in Portuguese in order to examine the influence of the various determinants on profitability. Profitability was found to be influenced by size and growth rate, lower levels of fixed assets and debt.

Ito and Fukao (2010) also conducted a study which examines the determinants of profitability from 1989-2002 for the manufacturing organizations in Japan with affiliates in China and different districts. This discovery demonstrates that

profitability is influenced by local sales and procurements which positively affect the organizations in Japan.

In addition, Burja (2011) investigated the Romanian Chemical industry to determine the factors that influence profitability. The results show that profitability is positively influenced by debt level, leverage, inventory stock and efficiency of capital.

Another research which examines the relationship between debt ratio and profitability found that it was more profitable to use retained earnings to finance investments than borrowed funds. Concentration ratios also show a negative but statistical significant impact on profitability (Eriotis, Frangouli & Ventoura-Neokosonides, 2011).

Malik (2011) examined insurance companies in Pakistan, both life and non-life, and tested their profitability. The results show that there exist no relationship between age and profitability of firms while firm size and volume of capital were found a direct significantly influence on profitability.

Alipour (2011) did a review utilizing multiple regression and the Pearson's correlation test for organizations recorded on the Tehran stock trade market. The discoveries demonstrate that a statistical significant relationship exist working capital administration and benefit.

Furthermore, an investigation of life insurance companies in India to determine their profitability found evidence to show that there exist altogether positive relationship

between size, liquidity and productivity and a negatively significant relationship between premium growth, equity capital and profitability (Charumathi, 2012).

The profitability of the Pharmaceutical business in Nigeria was analyzed by Mary & Matthew (2013). The results show affirmation of negative and insignificant relationship amongst profitability and total assets turnover rate, creditor's velocity and debt turnover ratio.

Another research was conducted amongst liquidity and the performance of oil and gas organizations. The discoveries uncovered a significant effect of liquid ratio on ROA and an insignificant impact on ROE and ROI, along these lines there is a close connection between liquidity and profitability on the grounds that an expansion in one leads to a decrease in the other (Saleem & Rehman, 2011).

Dave (2012) examined the association among financial management and profitability for 64 public limited pharmaceutical companies of the Indian Pharma sector for 10 years. Total asset sales ratio and creditors' velocity were found to be central variables in enhancing the performance of the firms.

Mary, Okelue & Uchenna (2012) analyzed the determinants of profitability in the Lager Brewery industry. The results revealed that account receivables to sales, sales, general administrative expenses to sales, and ratios of inventory to cost of merchandise sold were found to have impact on gross overall revenue of the brewery firms in Nigeria.

Quayyum (2012) made an effort to study the relationship between operating capital management and profitability of manufacturing enterprises enrolled in the Dhaka Capital market for a long time (2005-2009). The outcomes demonstrate that all industries aside from the food industries have a vital level of association between the indices of profitability and working capital portions.

The relationship between the efficiency of working capital management and profitability for 20 years annual financial statements of organizations for the time period from 2004 to 2008 was explored by Danuletiu (2010). The report shows a weak negative linear connection between operating capital administration indicators and profitability rates.

Capkun (2009) carried out an investigation between inventory performance and financial performance of manufacturing companies for a period of 26 years from 1980 to 2005. The report demonstrates that there is a huge positive relationship between stock performance and measures of financial performance for firms in the manufacturing enterprises.

Mohammadzadeh (2013) investigated the relationship between the capital structure and the profitability of the top 30 pharmaceutical organizations. The financial data of these Iranian companies were gathered for a period of 10 years (2001 to 2010). The net profit margin and the debt to asset ratio are used as indicators of profitability. In that study, capital structure and sales advancement were used as the control variables. The outcomes demonstrate a noteworthy negative relationship amongst productivity and the capital structure of pharmaceutical organizations.

Abor (2005) researched the relationship among capital structure and profitability of recorded enterprises on the Capital Market in Ghana for a 5 years' time frame. The discoveries demonstrate a fundamentally positive connection among the ratio of short-debt debts to aggregate assets and return on equity.

Salawu (2009) studied the effect of capital structure on profitability of 50 non-financial recorded companies in the stock exchange market of Nigeria. The report demonstrates that there exist a positive connection between short-term debt, value and profitability and a reverse connection with long-term det. The review additionally uncovered a negative relationship between total debt to total assets ratio and profitability.

Lazaridis (2006) investigated the relationship between corporate profitability and capital management for 131 companies listed on the Athens Stock Exchange for a long time from 2001 to 2004. The findings shows a statistical significant between corporate profitability and gross operating profit and the cash conversion cycle.

## **2.2 Analyses of the Literature**

The above studies have examined the factors affecting different aspects of profitability in different industries. Our main focus will be on the firm size, sales growth, current asset, liquidity ratio, long term debts, annual inflation rate and gross domestic product growth rate. This study makes use of return on assets as a measure of profitability which measures an association's capacity to make utilization of its benefits. The following financial measurements are regularly utilized for measuring profitability in an industry:

### **2.2.1 Firm Size**

Firm size has been determined as the most important factor affecting profitability and found to have a positive and significant influence on performance according to the results from previous research carried out by Pratheepan (2014), Mistry (2012), Papadogonas (2007), Yazdanfar (2013), Ha-Brookshire (2009), Stierwald (2010), Barbosa & Louri (2005), Kieth (1998), Tavakoli & Wilson (2005), Nunes, Serrasqueiro & Sequeira (2009), Malik (2011) and Charumathi (2012), Agiomirgianakis, Magoutas & Sfakianakis (2013),. The findings report that large firms enjoy economies of scale, are less risky and therefore can achieve lower cost of production and capital. On the other hand, small firms are more flexible and can adjust easily to market changes (Williamson, 1968).

### **2.2.2 Long-term Debt**

Long-term debt was observed to be a critical determinant of profitability which influences execution both contrarily and emphatically. Kester (1968), Nunes, Serrasqueiro, & Sequeira (2009) and Dave (2012) found that increasing debt levels negatively affects performance. This is because higher debt increases the interest payments leading to higher company risk, while lower debt levels are said to increase profitability. Nevertheless, some of the studies such as Asimakopoulos, Samitas & Papadogonas (2009), Burja (2011), and Abor (2005) report a strong positive relationship between long term debt ratio and profitability. This means that there are mixed results in the literature regarding the impact of long-term debt on performance.

### **2.3.3 Sales Growth**

According to Nunes, Serrasqueiro and Sequeira (2009), Ito and Fukao (2010), Dave (2012), Yazdanfar (2013), Mary, Innocent & Uchennam (2012), Asimakopoulos,

Samitas & Papadogonas (2009) and Grinyer & McKiernan (1991), sales growth has a positive influence on the performance of a firm. Increase in sales growth leads to an increase in profitability according to the results from the above studies. Thus, majority of the studies found that growth opportunities influence performance positively. However, some of the few studies such as the one conducted by Shah & Sana (2006) show that when sales grows, profitability of a firm falls down.

#### **2.2.4 Current Assets**

Burja (2011), Mistry (2012), Dave (2012), Majundar (1997), Capkun (2009) found similar results showing current assets have direct and critical association with the profitability. On the other hand, according to some other studies such as Liargoras & Skandali (2010), Nunes, Serrasqueiro & Sequeira (2009) and Innocent, Mary, & Matthew (2013), current assets have a negative influence on the performance of an industry.

#### **2.2.5 Liquidity Ratio**

Adequate liquidity is required by firms in order to attain market share and carry out its operations. The Liquidity ratio was found to have a significant and positive influence on the performance of firms according to some studies (e.g. Charumathi, 2012; Saleem & Rehman, 2011). On the contrary, Pratheepan (2014), Mistry (2012) and Bhayani (2010) found a negative and significant relationship between the liquidity ratio and the profitability of an industry. This means that there are contradictory results in the literature regarding the impact of liquidity on performance.

#### **2.2.6 Annual Inflation Rate**

A rise in the inflation rate causes an increase in the price of raw materials which tend to reduce the performance of the firms. Previous studies conducted shows that

inflation rate has a positive impact on the profitability of the firms, these studies include Kofi. K & Aaron (2010), Demirguç-Kunt and Huizinga (1999), T. Uhomoibhi (2008), and S. Bennaceur and Goaid, (2008). On the other hand, other studies found an inverse relationship between inflation rate and profitability (A. Husni, 2011; Sufian, 2008).

### **2.2.7 Gross Domestic Product Growth Rate**

Financial development is measured by the genuine gross domestic product development rate. Generally, a positive association is desired to exist between productivity and gross domestic product. The discoveries of Hassan and Bashir (2003) bolster the idea of favorable association between gross domestic product growth rate and performance. On the contrary, some few authors such as A. Husni (2011) found an unfavorable association occurring between increase in gross domestic product and profitability.

## **2.3 Hypotheses**

From the above literature on the various research work done, the following hypotheses can be proposed to test the relationships between the dependent and independent variables. The following hypotheses are formulated based on the findings of majority of the previous studies:

H1: Firm Size has a statistically significant positive influence on the Profitability of firms in the Automobile and parts industry in Japan.

H2: Current Asset has a statistically significant positive influence on the Profitability of firms in the Automobile and parts industry in Japan.

H3: Liquidity ratio has a statistically significant positive influence on the Profitability of firms in the Automobile and parts industry in Japan.

H4: Sales Growth has a statistically significant positive influence on the Profitability of firms in the Automobile and parts industry in Japan.

H5: Long Term debt ratio has a statistically significant negative influence on the Profitability of firms in the Automobile and parts industry in Japan.

H6: Gross Domestic Product growth rate has a statistically significant positive influence on the Profitability of firms in the Automobile and parts industry in Japan.

H7: Annual Inflation rate has a statistically significant negative influence on the Profitability of firms in the Automobile and parts industry in Japan.

## Chapter 3

### RESEARCH METHODOLOGY

#### 3.1 Data Sample

Population is a collection of everything/everyone you want to make inferences. A sample is characterized as the way toward selecting a delegate subset of the aggregate population (Alasuutari, 1995).

The sample for this study includes all firms operating in the Automobile and Parts Industry in Japan. This industry was purposefully chosen because few studies have been done in the Automobile and Parts sector in Japan.

The data for this research is panel data collected from Thomson Reuter's online Data Stream. The balance sheet and income statements were separated from published financial statements of 130 firms in the business over a time of 11 years (2005-2015). The choice of the period was made because a relatively huge number of firms were needed for estimation purposes. In addition, during this period, Japan experienced a lot of developments and transformation in the automobile sector and the economy as a whole. It was discovered that 29 companies had missing data for some years and 101 companies were found with complete balance sheet and profit and loss data throughout 11 years.

Panel data was used for this research because it is a capable research instrument that provides outcomes that couldn't be assessed by Cross Sectional or Time Series Data (Asimakopoulos, Samitas, & Papadogonas, 2009). Panel data also has more advantages contrasted with cross-sectional approach because the number of data points and the degree of freedom can be increased and the problem of multicollinearity can be reduced improving the efficiency of econometric estimates (Hsiao, 1986). Time impacts can be incorporated in order to control heterogeneity which is caught by Fixed or Random effects methods. These are segments that lead to one-sided outcomes when disregarded in cross-sectional or time arrangement estimations (Baltagi, 1995).

### **3.2 Variables and Measurements**

The determinants of profitability have been investigated for many years in different areas, many factors have been found to influence an industry's performance over a certain period of time. The variables used in this study are widely used determinants of profitability. The dependent variable used in this study is return on assets and the independent variables include firm size, sales growth, current assets, liquidity ratio, and long term debts, gross domestic product growth rate and annual inflation rate. The following table shows the study variables, measurements, and references:

Table 1: Variables and Measurements of the Study

<b>Variables</b>	<b>Measurements</b>	<b>References</b>
Profitability	Net profit divided by total assets (return on assets)	Amato and Wilder (1985)
Firm Size	Natural logarithm of sales	Agiomirgianakis, Magoutas, and Sfakianakis (2013)
Sales Growth	Rate of growth in Sales	Mohamed and Hazem (2015)
Current Assets	Natural logarithm of current assets	Asimakopoulos, Samitas and Papadogonas (2009)
Liquidity Ratio	Ratio between total current assets and total short-term debt.	Nickell and Nicolitsas (1999)
Long term Debt	Ratio between long-term debt and Total Assets.	Pratheepan (2014)
Gross Domestic Product growth rate	Annual Real GDP growth rate	William (2012)
Annual Inflation	Annual average increase in the Japanese consumer price index	William (2012)

### 3.3 Data Analyses

The relationships between the reliant and autonomous factors were tried utilizing panel data for the accompanying reasons. First, it allows us to control for variables that we cannot observe or measure like actual factors (Oscar, 2007). Second, it accounts for individual heterogeneity and therefore it does not run the risk of obtaining biased results (see the handout on “Clustering in the Linear Model”). Third, panel data gives more informative data, less collinearity among the variables, more degrees of freedom and more efficiency (Liargovas & Skandalis, 2010). And finally, Liargovas & Skandalis, (2010) argue that panel data is able to identify and measure effects that are simply not detectable in pure cross section or pure time-series data.

In order to measure the impact of the independent variables on the dependent variable, the Fixed and Random effect models are utilized in this study. In addition,

Hausman test is used to find which model is better. Furthermore, descriptive statistics are calculated and correlation analysis is also carried out as additional tests.

### 3.3.1 Fixed Effects Model

This model assumes that something within the individual may impact or bias the predictor or outcome variables and we need to control for this (Bun and Carree, 2005). This is the rationale behind the assumption of the correlation between an entity's error term and predictor variables (Oscar, 2007). This method removes the effect of time-invariant characteristics. Therefore, we can assess the net effect of the predictors on the outcome variable (Harris, 2009). Those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics.

Nickell (1981) points out that estimating with Fixed Effects method yields inconsistent parameter estimates with eq. 1.

$$y_{it} = \beta_0 + \beta_1 x_{1,it} + \dots + \beta_k x_{k,it} + \gamma_2 E_2 + \gamma_n E_n + u_{it} \dots \dots \dots [\text{eq.1}]$$

Where

- $y_{it}$  is the dependent variable (DV) where  $i$  = entity and  $t$  = time.
- $x_{k,it}$  represents independent variables (IV),
- $\beta_k$  is the coefficient for the IVs,
- $u_{it}$  is the error term
- $E_n$  is the entity  $n$ . Since they are binary (dummies) you have  $n-1$  entities included in the model.
- $\gamma_2$  Is the coefficient for the binary repressors (entities).

The equation for the fixed effects model becomes:

$$y_{it} = \beta_1 x_{1,it} + \alpha_i + u_{it} \dots \dots \dots [eq.2]$$

Where

- $\alpha_i$  (i=1....n) is the unknown intercept for each entity ( n entity-specific intercepts).
- $Y_{it}$  is the dependent variable (DV) where i = entity and t = time.
- $X_{it}$  represents one independent variable (IV),
- $\beta_1$  is the coefficient for that IV,
- $U_{it}$  is the error term

$$Y_t \text{ (ROA)} = b_0 + b_1 X_1(\text{lnsize}) + b_2 X_2(\text{sales}) + b_3 X_3 (\text{lnca}) + b_4 X_4 (\text{liquid}) + b_5 X_5 (\text{lnLTD}) + b_6 X_6 (\text{GGDP}) + b_7 X_7(\text{infla}) + u_t \text{ (1)} \dots \dots \dots [eq.4]$$

Where  $Y_t$  is the measure of profitability of the firm using return on assets. On the other hand, “u” denotes a random disturbance term. The regression coefficient (bj) represents the expected change in the performance indicator associated with one-unit change in the z'th independent variable. Additionally,  $X_1$  (lnsize),  $X_2$  (sales),  $X_3$  (lnca),  $X_4$  ( liquid),  $X_5$  (LTD),  $X_6$  (GGDP),  $X_7$  (Infla) represent firm size, sales growth, current assets, liquidity ratio, long term debt, gross domestic product growth rate and annual inflation rate respectively.

### 3.3.2 Random Effects Model

The rationale behind the Random effects model is that the variation across entities is assumed to be random and uncorrelated with the independent variables included in the model (Oscar, 2007). Green (2008) points out that the crucial distinction between Fixed and Random effects is whether the unobserved individual effect embodies elements that are correlated with the independent variables in the model. The

Random effects model can be estimated consistently by both RE and FE estimators. The RE estimator is preferred if we can be sure that the individual-specific effect really is an unrelated effect (RE1). The assumption of no relatedness (RE1) is better tested by running the auxiliary regression (Woodridge, 2010; Mundlak, 1978).

$$y_{it} = \alpha + x_{0,it}\beta + z_{i0}\gamma + x_{0i}\lambda + \delta_t + u_{it} \dots \dots \dots [\text{eq3}]$$

Where;

- $\bar{x}_i = 1/T \sum_t x_{it}$  are the time averages of all time-varying regressors.

The assumption of RE1 is extremely strong and the FE estimator is always much more convincing than the RE estimator (Schmidheiny, 2015).

### 3.3.3 Hausman Test

Hausman's (1978) specification test implementation makes a comparison of an estimator  $\theta_{b1}$  that is known to be consistent with an estimator  $\theta_{b2}$  that is efficient under the assumption being tested (Hausman, 1978). We will compare the Fixed and Random effect models in order to check which is consistent. The null hypothesis is that the estimator  $\theta_{b2}$  is indeed an efficient and consistent estimator of the true parameters. If there is a systematic difference in the estimates, there is a reason to doubt the assumptions on which the efficient estimator is based (Hausman, 1978).

Thus, the following hypotheses can be outlined:

Ho: Random effects model is a consistent estimator

H1: Fixed effects model is a consistent estimator

Reject  $H_0$  if  $P \text{ value} > \chi^2$ .

### **3.3.4 Descriptive Statistics**

The descriptive statistics are terms used to describe and summarize data in a meaningful and simple way. Conclusions cannot be reached from the results from this data because they only describe the data (Lund, 2013). Two measures are done using descriptive statistics which are measures of central tendency which includes the mean, median and mode, as well as the measures of spread which includes the range, variance and standard deviation (Williams, 2006).

### **3.3.5 Correlation Analyses**

The correlation statistics provides the correlation coefficients among the study variables. This measurement tells us about the degree of significance of the relationships between the variables.

## Chapter 4

### RESEARCH FINDINGS AND DISCUSSIONS

#### 4.1 Descriptive Statistics

In this segment, unmistakable measurements factors are shown. Table 2 gives data about the descriptive statistics such as means, median, and standard deviation. Fluctuation can be surveyed by looking at the standard deviation which measures the variability of a variable. From the observation of the descriptive statistics table, it can be concluded that the profitability of firms in the Automobile and Parts industry is noticeably unstable since the value of the standard deviation (0.1008338) is above the average. In the case of explanatory variables such as firm size, liquidity, current assets, sales growth, gross domestic product growth rate and long term debts, it can be concluded that the volatility is not particularly high since their standard deviation are below the average. On the other hand, annual inflation rate has a high volatility standard deviation (1.0427841) which is above the average.

The descriptive statistics table shows that over the period under study, the financial ratios measured by gross domestic product growth rate, sales growth, return on assets, annual inflation rate, liquidity and firm size have a positive mean value which ranges from 0.005265 for gross domestic product growth rate to 8.115014 for firm size. The high mean value of firm size indicates that firms in this industry are large firms that take advantage of their size to enjoy economies of scale and positive externalities.

Table 2: Descriptive Statistics

	<b>Mean</b>	<b>Standard deviation</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>
Return on assets	0.196322	0.1008338	0.177243	- 0.0847	0.7239
Firm size	8.115014	0.7915701	8.035322	6.3181	10.4351
Liquidity	1.395740	0.5211646	1.300164	0.4278	4.5018
Sales growth	0.31278	0.1557484	0.58925	- 1.5452	1.0000
Current assets	7.747995	0.8001641	3.1345	5.8882	10.2537
Long term debts	0.254077	0.1327479	0.241064	0.0082	0.8280
Gross Domestic Product	0.005265	0.0246803	0.012965	- 0.0585	0.0453
Inflation rate	0.267273	1.0427841	0.060000	- 1.3400	2.7500

## 4.2 Correlation Analyses

Table 3 demonstrates correlations among the variables. As Table 3 shows, there is a positive association among return on assets and firm size, liquidity degree and increase in sales. However, there is no relationship between return on resources and gross domestic product and inflation rate.

Table 3 also demonstrates that a noteworthy relationship exists between firm size and sales growth. Yet, there is an inverse association between firm size and liquidity ratio, long term debt and gross domestic product growth rate. In like way, we can see from the outcomes that there is no fundamental association between firm size and annual inflation rate.

We can also observe that there is a positive relationship between sales and gross domestic product growth rate and annual inflation rate (0.165 and 0.360 respectively). There is no significant relationship between gross domestic product growth rate, liquidity ratio and sales growth.

Table 3: Correlations among Variables

	<b>Return on assets</b>	<b>Firm size</b>	<b>Liquidity</b>	<b>Sales growth</b>	<b>Current assets</b>	<b>Long term debts</b>	<b>Gross domestic product growth rate</b>	<b>Annual inflation rate</b>
Return on assets	1.000							
Firm size	0.085*	1.000						
Liquidity	0.143*	-0.111*	1.000					
Sales growth	0.148*	0.115*	-0.045	1.000				
Current assets	0.042	0.984	-0.015	0.102	1.000			
Long term debts	-0.100*	-0.015	-0.541**	-0.158*	0.096	1.000		
Gross domestic product growth rate	0.002	-0.014	0.011	0.165*	0.081*	-0.091*	1.000	
Annual inflation rate	0.048	0.046	0.036	0.360*	0.060	-0.122*	0.086	1.000

\*\* means correlation is significant at 5% (2-tailed)

### 4.3 Panel Data

This part of the review introduces the examination of profitability and the key factors in the Automobile and Parts industry in Japan. The results of both panel estimation methods and the effects specification for a fixed period and a random period are used. Based on the results obtained from the panel models, a high R-squared value has been found for both Fixed and Random effects methods. This appears to be able to explain variations in profitability. The “F” statistics for both models confirms the significance of all variables. The following lists and explains how each of the independent variables influences profitability:

### 4.3.1 Firm Size

In particular, the assessed coefficients of firm size end up with being positive and significant in both instances of Fixed and Random effects models. This can be seen with a positive t-value ( $t=9.66$ ) for the Fixed Effects model and z-value ( $z=11.60$ ) for the Random Effects model which infers that firm size is a significant determinant of performance in the Automobile and Parts industry in Japan. This finding indicates that large firms enjoy higher profits compared to small ones. It also shows that large firms can better adapt to new technology and the macroeconomic environment. This finding also suggests that large firms take advantage of their position in negotiating the purchasing price for their material inputs and this leads to a reduction in the average costs. Therefore,  $H1$  is accepted which states that firm size has a statistically significant positive impact on profitability of the firms in the Automobile and Parts industry in Japan.

The previous studies that support the results from this finding include Mistry (2012), Papadogonas (2007), Agiomirgianakis, Magoutas & Sfakianakis (2013), Yazdanfar (2013), Pratheepan (2014), Ha-Brookshire (2009), Stierwald (2010), Barbosa & Louri (2005), Kieth (1998), Tavakoli & Wilson (2005), Nunes, Serrasqueiro & Sequeira (2009), Malik (2011) and Charumathi (2012). The findings report that large firms enjoy economies of scale, are less risky and therefore can achieve lower cost of production and capital.

Table 4: Fixed Effect Model (Return on Assets is the Dependent Variable)

Variables	Coefficients	t-values	P> t
Firm Size	0.2013256	9.66	0.000
Current Assets	-0.2241902	-11.99	0.000
Sales Growth	0.0705047	9.98	0.000
Liquidity Ratio	0.0350073	7.65	0.000
Long Term Debts	-0.2502383	-12.69	0.000
Gross Domestic Product growth rate	0.864826	2.02	0.043
Annual Inflation Rate	0.0015248	1.43	0.154
<i>F</i> test that all $u_i=0$ N* of obs.=1111 N* of groups=101 N* of years=11	$F(7,1003)=83.15$ $R$ squared within=0.3672 $Prob>F=0.0000$		

Note: R squared represents the percentage change in ROA that is explained by the independent variables. So, approximately 36.72% change in the ROA can be explained by the variables used in this study. The unexplained part is represented by 63.28% which is influenced by other variables not included in the study.

Table 5: Random Effect Model (Return on Assets is the Dependent Variable)

Variables	Coefficients	Z-values	P> z
Firm Size	0.2219232	11.60	0.000
Current Assets	-0.2230422	-12.32	0.000
Sales Growth	0.0682158	9.74	0.000
Liquidity ratio	0.0355884	7.95	0.000
Long term debts	-0.2462224	-12.59	0.000
Gross Domestic Product growth rate	0.1008996	2.37	0.018
Annual Inflation rate	0.0008606	0.85	0.397
$\rho=0.88880394$ (fraction of variance due to $u_i$ ) N* of obs=1111 N* of groups=101 N* of years=11	$F(7,1003)=$ $R$ squared within=- 0.3655 $\text{Sigma } u=0.08577975$ $\text{Sigma } e=0.03034076$		

Note: R squared represents the percentage change in ROA that is explained by the independent variables. So, approximately 36.55% change in the ROA can be explained by the variables used in this study. The unexplained part is represented by 63.45%.

### 4.3.2 Current Assets

Current assets give an intriguing discoveries being negative in both Fixed and Random effects models. This finding recommends that expansive current assets value demonstrates profitability of firms in the Automobile and Parts industry is unfavorably influenced by administrative inefficiency and use of income control methods. Therefore,  $H_2$  is confirmed and it is concluded that current assets have

statistically significant negative impact on profitability of the firms in the Automobile and Parts industry in Japan.

This result is supported by other researchers such as Liargoras & Skandal (2010), Nunes, Serrasqueiro & Sequeira (2009) and Innocent, Mary, & Matthew (2013).

#### **4.3.3 Liquidity Ratio**

The coefficients of the liquidity value show a significantly positive value ( $t$ -value=7.65 for Fixed effects and  $z$ -value=7.95 for Random effects). This proposes that firms ought to expand their present resources and lessen their present liabilities in view of the positive relationship between the liquidity proportion and the performance of the organizations. The discoveries additionally show that organizations in this industry have higher market operations which prompt to more noteworthy piece of the pie achievement. We in this way acknowledge  $H3$  and infer that liquidity ratio has a statistically significant impact on profitability of the firms in the Automobile and Parts industry in Japan.

The results from such studies as Goddard, Tavakoli & Wilson (2005), Charumathi (2012), Saleem & Rehman (2011) support the fact that liquidity ratio has a positive influence on the performance of the firms.

#### **4.3.4 Sales Growth**

As shown on the tables below, sales growth value is  $t=9.98$  and  $z=9.74$  for Fixed and Random effects respectively. These values are said to be significant at 5% significance levels. This implies that sales growth has a positive and statistically significant influence on profitability of firms in this industry. This finding suggests that firms will experience a decline in their marketing costs as a percentage of sales,

also the demand for their products will increase and they can take advantage of the high demand to increase prices and make more gains. In this case, *H4* is accepted.

According to evidence from the prior studies such as Nunes, Serrasqueiro & Sequeira (2009), Ito & Fukao (2010), Dave (2012), Yazdanfar (2013), Mary, Innocent & Uchennam (2012), Asimakopoulos, Samitas & Papadogonas (2009) and Grinyer & McKiernan (1991), sales growth has a positive influence on the performance.

#### **4.3.5 Long-term Debt**

The last internal determinant of profitability being long-term debt ratio shows a negative t-value ( $t=-12.69$ ) and z-value ( $z=-12.59$ ) for Fixed and Random effects models respectively. The negative values indicate that long-term debt has a negative statistically significant influence on the profitability of these firms. This finding implies that these firms have a large debt sum which will take many years to pay off. This, in turn, affects firms negatively because much of their capital is devoted to interest payments which make it difficult to allocate money to other profitable areas. Thus, we conclude by accepting *H5* and therefore state that long-term debt has a statistically significant impact on profitability of the firms in the Automobile and Parts industry in Japan.

Kester (1968), Nunes, Serrasqueiro, & Sequeira (2009) and Dave (2012) support the results from this study that increasing debt levels negatively affects performance.

#### **4.3.6 Annual Inflation Rate**

The annual inflation rate is an external determinant of profitability which is proposed to have a negative statistically significant influence on profitability of firms in the Automobile and Parts industry in Japan. This proposition is not found to be true with

evidence of positive  $t$  and  $z$  values ( $t=1.43$ ,  $z=0.85$ ) for both Fixed and Random effects models respectively. This finding indicates that inflation rate has a positive effect on the performance of firms but this impact is not statistically significant. This implies that there may be an export boom with lower prices for goods and services on a competitive global scale. This finding lets us reject  $H6$  meaning we reject the proposed hypothesis that inflation rate has a statistically significant inverse impact on profitability of the firms in the Automobile and Parts industry in Japan. This finding is also supported by (Bhayani, 2010).

#### **4.3.7 Gross Domestic Product Growth Rate**

The last external determinant of profitability being gross domestic product growth rate was found to have positive values ( $t=2.02$ ,  $z=2.37$ ) for both Fixed and Random effects models which implies that gross domestic product has a statistically significant positive influence on the performance of these firms. The economic growth of a country is measured by the real gross domestic product which is generally expected to have a positive influence on the firms in the Automobile and Parts industry in Japan. Higher economic growth leads to greater demands for goods and services and balance of payment surplus resulting from higher exports. We therefore accept  $H7$  and conclude that gross domestic product growth rate has a statistically significant impact on return of assets of the firms in the Automobile and Parts industry in Japan.

The findings of Hassan & Bashir (2003) support the notion of positive relationship between gross domestic product growth rate and the profitability of firms.

#### 4.4 Hausman Test

Table 5 shows the results of the Hausman test which evaluates whether Fixed or Random effects model is consistent. In this regard, the following hypotheses are tested:

Null hypothesis: Random effect model is appropriate.

Alternative hypothesis: Fixed effect model is appropriate.

From the table below, we can see that the P value is 0.0000 and the Chi2 is equal to 34.32. This implies that we reject the null hypothesis which states that Random effect model is appropriate and finally we conclude that Fixed effect model is appropriate. Therefore, the results given by Fixed effects analysis should be taken into account for this study.

Table 6: Hausman Test Results

Variables	Fixed (b)	Random (B)	Difference (b-B)	S.E Sqrt diag (V_b-V_B)
Current Assets	- 0.2241904	- 0.2230422	- 0.0011482	0.0046591
Liquidity Ratio	0.0350073	0.0355884	- 0.0005811	0.0009602
Firm Size	0.2013256	0.2219232	- 0.0205976	0.0082998
Sales Growth	0.0705047	0.0682158	0.0022889	0.0009685
Long Term Debts	- 0.2502383	- 0.2462224	-0.004016	0.0024494
Gross Domestic Product Growth Rate	0.0864826	0.1008996	- 0.0144171	0.0045574
Inflation Rate	0.0015248	0.0008606	0.0006642	0.000333
Chi2(7)=34.32 Prob>chi2=0.0000 V_b-V_B is not positive definite				

As a conclusion, Table 7 shown below summarizes the hypotheses tests and previous studies which have found similar results:

Table 7: Summary of Findings

Variables and relevant hypotheses	Excepted relationships	Outcome	Accept	Previous studies with same results
Firm size, H1	+	+	Accept	Mistry (2012), Papadogonas (2007), Agiomirgianakis, Magoutas and Sfakianakis (2013), Yazdnafar (2013), Pratheepan (2014), Ha-Brookshire (2009), Stierwald (2010), Barbosa and Louri (2005), Kieth (1998), Tavakoli and Wilson (2005), Nunes, Serrasqueiero and Sequeira (2009), Malik (2011) and Charumathi, (2012)
Current assets, H2	-	-	Accept	Liargoras and Skandal (2010), Nunes, Serrasqueiero and Sequeira (2009) and Innocent, Mary, & Matthew (2013)
Sales growth, H3	+	+	Accept	Nunes, Serrasqueiero and Sequeira (2009), Ito and Fukao (2010), Dave (2012), Yazdanfar (2013), Mary, Innocent & Uchennam (2012), Asimakopoulos, Samitas & Papadogonas (2009) and Grinyer & McKiernan (1991),
Liquidity ratio, H4	+	+	Accept	Goddard, Tavakoli and Wilson (2005), Charumathi (2012), Saleem and Rehman (2011)
Long term debt, H5	-	-	Accept	Kester (1968), Nunes, Serrasqueiero, Salawu (2009), Sequeira (2009) and Dave (2012)
Gross Domestic Product Growth rate, H6	+	+	Accept	Hassan and Bashir (2003)
Annual Inflation rate, H7	-	+	No significant	Bhayani (2010).

## **Chapter 5**

# **CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

The purpose of this study was to investigate the influence of the various selected variables on the profitability of the firms in the Automobile and Parts industry in Japan. In this regard, the impacts of firm size, sales growth, current asset, liquidity ratio, long term debts, gross domestic product growth rate and annual inflation rate on profitability are analyzed. The data for this research is panel data collected from Thomson Reuter's online Data Stream. The balance sheet and income statements were separated from published financial statements of 101 firms in the business over a time of 11 years (2005-2015). In order to measure the impact of the independent variables on the dependent variable, the Fixed and Random effect models are utilized in this study.

The outcomes demonstrate that firm size, sales growth, liquidity, and gross domestic product have statistically significant positive impact on profitability of the firms in the Automobile and Parts industry in Japan. Conversely, the current assets and long-term debt were found to have statistically significant negative impacts on performance.

## 5.2. Implications

The results of this study are expected to provide firms within the Automobile and Parts industry with realistic evidence about the determinants of profitability and they are expected to help these firms within the industry to improve level of performance.

Based on the results, the following implications can be listed:

- Since Profitability is the primary objective of undertaking any business, top management should ensure that various factors influencing it should either be encouraged or controlled to enable the firms achieve increment in their performances.

- This study implies that there is a positive relationship between firm size, liquidity ratio, sales growth and gross domestic product growth rate and profitability of the firms. This means that higher levels of these factors leads to higher profitability levels and lower levels leads to lower performances of the firms in this industry. Thus, managers should encourage and foster increases in firm's size, sales growth and liquidity ratio in order to help firms improve their revenue generation ability. Since firm size positively affects the profitability of the industry and has a significant influence on its performance. This means managers and top management should encourage activities that lead to increases in the size of the firms. These activities include investing more capital on research and development activities. Other factors such as sales growth, liquidity ration and gross domestic product growth rate should also be encouraged. Sales growth can be encouraged by reducing the price at present in order to increase demand as the percentage of sales increases. Firms should lessen their liabilities and extend their resources in order to increase their liquidity ratio.

- Current assets and long-term debt were found to have an inverse relationship with profitability, which implies that the higher the current assets and long-term debt, the lower the profitability of the firms. Managers should reduce the amount of current assets in order to be able to efficiently monitor and control them and debt levels should be monitored too so as to reduce the liabilities of the firms.

### **5.3 Limitations and Suggestions for Future Studies**

The above mentioned implications should be interpreted in light of several limitations. First, this study has been done in the Automobile and Parts industry in Japan which consists mostly of Japanese firms. Therefore, this research is limited because only a small sample was selected from the firms in a single industry in a single country and this does not represent the entire population. In this regard, further studies should focus on different countries so as to get more substantial understanding of the determinants of profitability of Automobile and Parts industry. Since only five internal determinants were considered, further studies should be done on other internal determinants which influence the firms in the Automobile and Parts industry in Japan and in other countries. Second, the financial statements may not reflect the actual performance and worth of the firms in the industry given that some information may not be included in these statements. The data provided cannot be totally relied on knowing that information changes with time. Third, the measure of firms' performance was done by extracting the balance sheet and income statements from Data Stream because of time constraints.

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