PROFITABILITY ANALYSIS IN CHINA INTEGRATED CIRCUIT (IC) INDUSTRY

By

Qi Tianhao
014201500169

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The Panel of Examiners declare that the skripsi entitled **"PROFITABILITY ANALYSIS IN CHINA INTEGRATED CIRCUIT (IC) INDUSTRY"** that was submitted by Qi Tianhao majoring in Management from the Faculty of Business was assessed and approved to have passed the Oral Examinations on 11th January 2019

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I declare that this skripsi, entitled "**PROFITABILITY ANALYSIS IN CHINA INTEGRATED CIRCUIT (IC) INDUSTRY**" is to the best of my knowledge and belief; an original piece of work that has not been submitted, either in whole or in part, to another university to obtain a degree.

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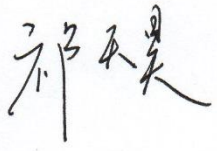

Qi Tianhao

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When I finished the graduation thesis, there was a feeling of relief and a lot of emotion when I finished the graduation thesis. On the completion of my graduation thesis, I would like to express my sincere gratitude and best wishes to all the people who care and help me.

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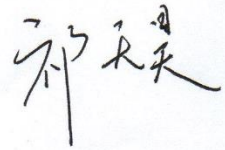
Thanks to my classmates and friends who have been with me in the past four years, thank them for the suggestions and opinions they have made for me. With their support, encouragement and help, I have been able to live a full four years of study and life.

Sincerely yours,



Qi Tianhao

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ABSTRACT

The purpose of this study is to analyze the Integrated Circuit (IC) industry profitability performance in China. This study is urgently important due to the impact of the Sino-US trade war that happens recently. Also, the Sino-US trade war is predicted to influence seriously the economic development speed and un-employment issue in China and the United States. In this regard, the study analyses the financial performance of the five big IC corporations in China, such as the sales volume, the percentage of R&D personnel, the percentage of top 5 customers, and the percentage of top 5 suppliers as independent variables. Then, this study employs net profit and ROAE as the proxies of profitability analysis that represent dependent variables. The research methodology is panel data general least square (GLS) regression by STATA M-64. The result of the study is that the sales volume, the percentage of R&D personnel, the percentage of top 5 customers, and the percentage of top 5 suppliers has a significant influence on the corporation profitability. In addition, this study shows that the percentage of personnel in R&D has the greatest influence on the corporate profitability. Through this finding, this study confirms that in China IC industry, the percentage of personnel in R&D plays important role to generate its profitability, therefore, this study encourages the future researcher to emphasis on the human capital characteristics that will be needed to sustain IC corporations in China in the future.

Keywords: *Sino-US trade war, Integrated Circuit, corporation profitability,*

CHAPTER I

INTRODUCTION

1.1 Background

Trade wars refer to a series of retaliations and counter-retaliations caused by high tariff and non-tariff barriers, restricting the entry of goods from other countries into the domestic market, and at the same time competing for foreign markets through dumping and foreign exchange depreciation. trade war. If the weapons of trade war are limited to mutual improvement of the tariff rate, this is called “tariff war”.

The US Secretary of Commerce said on April 4, 2018 that the trade friction between China and the United States may eventually evolve into negotiations.

On the evening of June 15th, Beijing time, the US government issued a list of tariffed goods, which will impose a 25% tariff on about 50 billion US dollars of goods imported from China, including about 34 billion US dollars from July 6 this year. Since the implementation of the tariff increase measures, and the addition of tariffs on about 16 billion US dollars of goods began to seek public opinion.

The State Council Customs Tariff Commission issued an announcement on the 16th, deciding to impose a 25% tariff on 659 items of approximately US$50 billion worth of imported goods originating in the United States, of which 545 items of approximately US$34 billion were imposed on July 6, 2018. Tariffs, involving agricultural products, automobiles, aquatic products, etc.

The chip is China's most dependent and highest trade amount on the United States. China's annual import of integrated circuit chips exceeds 200 billion US dollars, which is greater than the amount of oil imports. Cutting off chip supply can be basically seen as cutting off the upstream lifeline of electronic manufacturing. The US

chip embargo on ZTE has thoroughly clarified this point. The chip design and process are the soul of the technology industry and are fundamental to the development of the country. It has helped the industry, the government and the society to form a joint force and firmly promote the localization of the chip.

Objectively speaking, China's semiconductor and flat panel display devices mainly rely on imports. The main sources of PVD and plasma cleaning equipment explicitly mentioned in the list are AMAT and LAM corporations in the United States, while the domestic corporations with competitive potential are North Huachuang (corporation). The North Huachuang Annual Report showed that its sales of export products in 2017 was only RMB 0.22 billion, accounting for 1.12%. Jingsheng Electromechanical 2017 Annual Report shows that all of its business is in China.

Therefore, I believe that the trade war launched by the United States has little substantive impact on China's semiconductor equipment corporations. but the reason is that China's semiconductor equipment, application materials and production are far less than foreign countries, even the automatically Equipment manufacturing, key components and process design are still in the hands of corporations in the US, Japan, Korea and Europe. In the list issued in the United States, we did not find products related to semiconductor raw materials. Therefore, this trade war has no substantial impact on China's semiconductor raw material corporations.

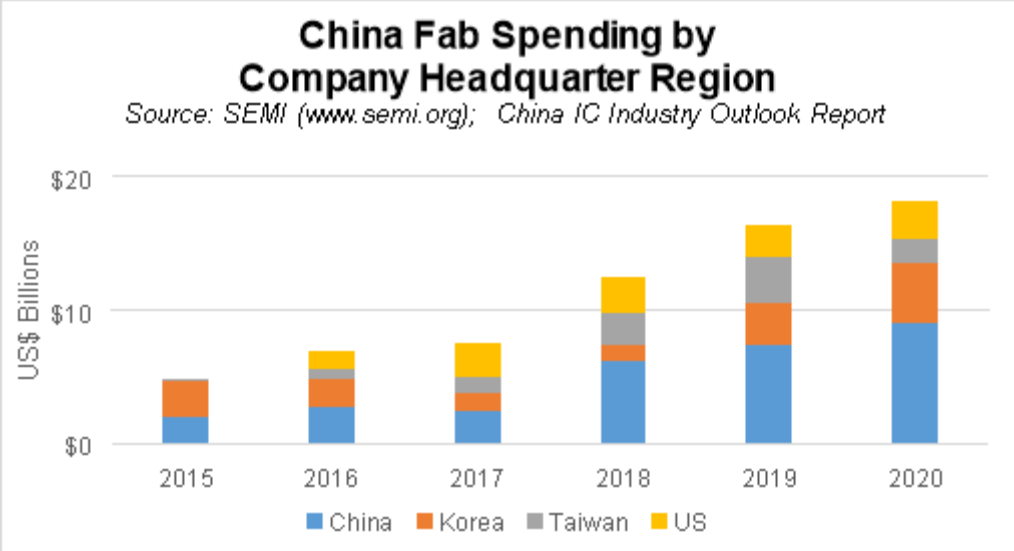
The industry growth logic has not changed. Regardless of the ZTE incident or the Sino-US trade war, it will not change the basic growth logic of China's semiconductor industry, that is, the global semiconductor industry recovery + international semiconductor industry transfer + fast-growing downstream market + national will promote industrial upgrading. The trade war has exposed some problems in the rapid development of science and technology manufacturing in China, but it cannot completely negate the rapid development of China's electronic industry chain in the past 20 years.

The industry will continue to advance in the test of the market. The shortcomings of China's semiconductor industry exposed by trade war are even more worthy of development.

1.2 problem Statement

The profitability of the IC industry is affected by many factors, such as R&D investment, the corporate major customers and major suppliers. In fact, sometimes it will also receive the influence of political factors, such as the background of this article - the Sino-US trade war. Therefore, this article will discuss what factors can affect the corporate net profit and ROAE in the background of trade wars.

Figure 1.1 China Fab Spending by Company Headquarter Region



(Source: www.semi.org, 2018)

Figure 1.2 China Semiconductor Self-sufficiency Rate

(Source: DIGITIMES, 2014)

1.3 Research Questions

1 The purpose of this study is to explore the influence of the financial factor toward on China's integrated circuit industry.

In order to answer the main question, this study develops 10 research questions, with detail as follows:

1. Is there any influence of the Sales Volume towards Net Profit?
2. Is there any influence of the Percentage of Personnel in R&D towards Net Profit?
3. Is there any influence of the Percentage of Top 5 Customers towards Net Profit?
4. Is there any influence of the Percentage of Top 5 Suppliers towards Net Profit?
5. Is there any influence of the Sales Volume towards ROAE?
6. Is there any influence of the Percentage of Personnel in R&D towards ROAE?
7. Is there any influence of the Percentage of Top 5 Customers towards ROAE?
8. Is there any influence of the Percentage of Top 5 Suppliers towards ROAE?
9. Is there any influence of the Net Profit towards the Percentage of Personnel in R&D
10. Is there any influence of the ROAE towards the Percentage of Personnel in R&D

1.4 Research Objectives

Through the use of data from five representative Chinese integrated circuit corporations between 2016 and 2017, this study explores what factors can influence the corporate profitability in the context of trade wars, and further discover where the corporate problems are. In order to help the corporations, develop better. In order to fulfil the main research objectives, this study focuses to analysis 8 research objectives, as follows:

1. Identify the influence of Sales Volume towards Net Profit.
2. Identify the influence of the Percentage of Personnel in R&D towards Net Profit.
3. Identify the influence of the Percentage of Top 5 Customers towards Net Profit.
4. Identify the influence of the Percentage of Top 5 Suppliers towards Net Profit.
5. Identify the influence of Sales Volume towards ROAE.
6. Identify the influence of the Percentage of Personnel in R&D towards ROAE.
7. Identify the influence of the Percentage of Top 5 Customers towards ROAE.
8. Identify the influence of the Percentage of Top 5 Suppliers towards ROAE.
9. Identify the influence of Net Profit towards the Percentage of Personnel in R&D
10. Identify the influence of ROAE towards the Percentage of Personnel in R&D

This study explores the influence of the financial factors of China's five integrated circuit corporations on the corporate profitability in the context of the Sino-US trade war. Through the multiple linear regression model, analyze whether the four independent variables have an influence on the corporate profitability, and the extent of the influence. Through the results of the analysis, we can find out which variables have a positive impact on the corporate profitability, so that we can provide some

effective advice to the IC industry.

1.5 Significance of Study

1.5.1 For Academic

Previous research on the IC industry is about the development and the future trend of IC, from the aspect of technology development to analyze the status of the IC industry. Therefore, the subject of research has some limitations. This study is a study of which financial factors can influence the corporate profitability, which can fill the gaps in research and is of great significance.

1.5.2 For IC Corporations

Since this study explores what factors can influence the corporate profitability in the context of trade wars, exploring the influence of sales volume, the percentage of personnel in R&D, the percentage of TOP 5customers, the percentage of TOP5 suppliers towards net profit and ROAE goes further. Therefore, this study has a great significance to the IC corporations face to trade war. If the results of this study are meaningful, the IC corporations can make corresponding countermeasures based on the results of this study.

1.6 Scope and Limitations

1.6.1 Scope

The scope of this study is the data of five representative Chinese integrated circuit corporations from 2016 to 2017. Because these corporations have strong influence and international business, they are easily influenced by external factors and are more representative.

1.6.2 Limitations

The limitations of this study are twofold:

First, the independent variables of this study only consider the corporate performance, and do not consider external factors, such as government intervention in the IC industry and industry trends. These factors have an influence on a corporation or even the entire industry.

Second, the scope of this study is 2016-2017. Although the United States launched a survey on China in 2017 and adopted some measures for some high-tech industries in China, the Sino-US trade war officially took place in 2018, provide production materials to most of China's high-tech industries no longer, and increase import tariffs for other industries. So, the time period of this study is the beginning of the Sino-US trade war.

1.7 Organization of the Study

The structure and content of this study are as follows: The first chapter is an introduction; the background of the research, the problem statement, the problem, the goal, the importance and the limitation of the study. The second chapter is a literature review that reviews relevant websites, journals, books, blogs, etc., detailing the meaning of the various variables and how they affect other factors or are influenced by other factors. The third chapter is the research method of this research. It introduces the setting of multiple regression model, the research framework and the research tools to be used. The fourth chapter is the research process and the results of this research, and the variables are descriptively analyzed. The fifth chapter summarizes the conclusions and recommendation of the research and puts forward corresponding suggestions for both academic and IC corporations.

CHAPTER II

LITERATURE REVIEW

2.1 Integrated Circuit Industry

From the first integrated circuit invention in 1958, the development of the global IC industry has experienced the process of originating in the United States, developing in Japan, accelerating in South Korea and Taiwan province, and the entire industry has moved to China (Kilby, 2001). Signs of transfer in the mainland. The industry chain of the narrow sense integrated circuit industry includes chip design, manufacturing, packaging and testing, and each link has developed into an independent and mature sub-industry.

According to the formation process of chip products, the integrated circuit design industry is the upstream of the integrated circuit industry. The product design scheme designed by the IC design corporation is completed by the foundry and package test manufacturers through the OEM method, and then the chip finished product is sold as a component to the electronic equipment manufacturer. Chip processing is in the middle of the chip industry, and packaging testing is a physical activity in the chip industry (Ernst, 2005). The industry chain of the integrated circuit industry in a broad sense includes integrated circuit manufacturing equipment, special materials used in processing, and materials used in manufacturing itself.

2.2 Current Situation of Industry Development in China

Zhao Weiguo, chairman of Unisplendour Co., Ltd, said on the China Chip Development Summit Forum on September 19, 2018 that China's integrated circuit industry is still very fragile today and is expected to be stable in five years. Between 2028 and 2030, China's Integrated circuits will have a better status in the world,

accounting for a third or a quarter of the world's total revenue.

At present, the development of China's integrated circuit industry is faced with two backgrounds: one is the evolution of chip development from low-end to high-end, and the other is the arrival of 5G. Against these two backgrounds, China's IC industry faces Both opportunities and unprecedented challenges. In recent years, the development of the IC industry has attracted the attention of the central and local governments, especially after the Sino-US trade war.

This is an opportunity for the IC industry to become the industry concerned by the whole country. But at the same time, it also faces the challenge of Sino-US relations and the leading technological level of Europe and America. At present, the competition in Domestic IC industry is still at the low level, which reflects my lack of real innovation capacity (Browning et al, 1995). "More than 90% of chip design corporations in China don't make money. Some foreign countries are fiercely defending us.

On the market level, a lot of new industries, new products and new technologies are emerging, such as the Internet, the Internet of things, the industrial Internet, cloud computing, big data, artificial intelligence, smart power grid, new energy vehicles, Driverless, etc., all of which are in great demand for chips. Zhao believes that China's huge market demand is the best opportunity for chip development. As a highly globalized industry, the development of integrated circuits should emphasize independent innovation as well as openness and Cooperation. (Zhao, 2018)

2.3 Independent Variables

2.3.1 Sales Volume

When the product is sold, the number of sales personnel is directly related to the

number of sales volume, and becomes a non-linear function relationship. This study has found that if there are too many sales personnel, the increase in personnel expenses will be greater than the increase in sales volume. At the same time, due to the shortage of sales personnel, the sales volume of products will decrease. In both cases, the seller's best sales profit model cannot be met. Therefore, how to effectively match the relationship between personnel and sales, to meet the cost control and profit acquisition of the seller, is an "economic problem" in our daily operations. Break-even analysis is an effective method to predict and solve this problem. It is an analytical method to study the relationship between the quantity, cost, tax, profit and other factors of sales of products in a one-time period. (Shi, 2014)

At present, there are two types of corporate sales models in the society: one type of corporation sends products directly to consumers, that is, direct sales. The other type is through many intermediate links, agents, wholesalers, etc. as an intermediate bridge, and finally deliver the products to consumers. This model is indirect sales. At present, most corporation use the second sales model.

In fact, long ago, the United States has begun to use the first model in large quantities. The first model is to omit many steps to shorten the time for products to enter customers, so that products can achieve rapid consumption, thereby increasing product sales. Corporation branch--The work procedure must be consistent, and the corporation must replicate the model corporation, which is conducive to personnel transfer and cooperation. For example, during personnel training, personnel cannot be trained because of the temporary presence of the branch trainers. Since the training progress and content are the same, a trainer can be deployed from another branch to directly carry out the work and train the relevant personnel. This can save time and enable the trainers to get on the job quickly, increase sales and reduce labor costs. (Zhang, 2016)

2.3.2 The Percentage of personnel in R&D

Research and experimental development (R&D) are the focus of scientific and technological activities, systematic and creative work in scientific and technological activities, an effective way to achieve technological progress and breakthroughs, and a real source of innovation. How to objectively and effectively carry out the efficiency analysis of R&D input and output - is the focus and hot issue of scientific and technological activity management. (Zeng, 2011)

Foreign scholars have long paid attention to the value relevance of R&D investment. Most research conclusions support R&D investment to increase corporate value. Hu, A.G and Jfferson used the innovation data of large and medium-sized industrial corporations in Beijing, China, to study the impact of R&D investment on corporate performance. The study found that the contribution of R&D investment to corporate performance is significant, the degree of significance is different for different industries, the degree of influence is getting smaller and smaller with time, and the relationship between R&D investment and corporation size is not obvious.

The impact of R&D investment on business performance shows a significant lag effect, which indicates that R&D investment will drive corporate profitability in the coming year. The input of R&D personnel also has a positive driving effect on current profits and future profits. Its lag period is longer than capital investment, and the driving effect is not as strong as capital investment, which is in line with objective reality. More and more valuable information and ideas are provided by the staff in the research and development process, which will take longer and take more risks to turn into visible profits. (Zhou, 2011)

2.3.3 The percentage of Top 5 Customers

Large customers are also known as key customers. There are two aspects, which means that the customer range is large, the customer includes not only the ordinary

consumers, but also the distributors, wholesalers and agents of the corporation; the second refers to the value contributed by the customers to the corporation. Different customers contribute a lot to the profit of the corporation, and the corporation should attach great importance to high-value customers and customers with high value potential.

“Big customers” are partner customers of the corporation and customers who create 80% profit for the corporation. Foreign research on marketing and management of major customers is relatively early. Tommy believes that large customers are considered strategic by the seller in the industrial market. Large customer management is a strategic management method adopted by the seller. The purpose is to cultivate loyal customers by continuously tailoring products/services to meet the specific needs of customers.

Wilson (2003) believes that the big customers in the big customer marketing strategy refer to the customers who use a large of products or special units in the area under the jurisdiction of the corporation, including major economic customers, important customers, group customers and strategic customers. Large customer marketing is a marketing activity carried out around large customers. The purpose is to establish and maintain long-term mutually beneficial cooperation with large customers, continuously improve the loyalty of large customers to the corporation, and ultimately maximize the mutual value of both parties. Once the big customers are lost, the losses to the corporations will be great. Therefore, corporations should attach great importance to the resources of large customers and try to improve the loyalty of large customers. (Feng, 2015)

2.3.4 The percentage of Top 5 Suppliers

The corporate procurement is an important job for the corporation, and the general corporation will have certain suppliers in the procurement process (Presutti, 2003;

Brammer and Walker, 2011). The supplier directly supplies the relevant materials to the corporation, and the quality of the materials provided is directly related to the quality of the products in the whole corporation production process. Therefore, the supplier is a very important factor for the corporation. (Shi, 2018)

In the procurement process, the supplier must be properly managed. Through certain management measures, the purchased product can meet the production requirements of the corporation, and at the same time, the benefits of the corporation can be realized maximize. The importance of important suppliers is reflected in several aspects.

Firstly, it can effectively reduce the production cost of corporations, achieve reasonable management of suppliers, and establish long-term cooperation with suppliers, on the one hand, reduce the manpower and material resources consumed in the process of constantly searching for suppliers. So that can effectively save business costs.

In addition, if a long-term cooperation with the supplier is reached, the corporate evaluation of the materials provided by the supplier will reduce the input of related costs, and in the long-term cooperation mode, there will be fixed customers for the supplier, for the corporation. There is a fixed source of procurement materials, which can achieve a mutual win-win between the two parties, so that the interests of both parties can be effectively improved.

On the other hand, the production of the corporation can be more stable, and the procurement of materials is critical to the corporation. The role is a premise and foundation of the entire corporation activities. If there is no stable supply of materials, it will lead to a large interruption in production. (Zhou, 2011)

2.4 Dependent Variables

2.4.1 Net Profit

Profitability refers to the ability of a corporation to earn profits in a certain period of time. The higher the profit, the stronger the profitability. For the operator, through the analysis of profitability, it is aware of the shortcomings in business operation and management. So that corporations can get useful information from them to help the corporation develop. The size of profitability is not an absolute statement. Profit is often the relative cost of input. In terms of income, the higher profit has, the stronger profitability has. On the contrary, the lower the profit, the worse the profitability. Profitability reflects the quality of business operations.

Net profit refers to the corporate profit retention after paying income tax in the sum of all profits, generally referred to as after-tax profit or net income. The net profit is calculated as follows: net profit = total profit - income tax expense. The good or bad of a business depends on the net profit. More net profit means that the business efficiency of the corporation is good, and the corporation is in the rising stage. On the contrary, if the net profit is small, it indicates that the operating efficiency of the corporation is very poor. Corporations are in a difficult situation, and the good and bad business benefits of a corporation depend on the amount of net profit.

The amount of net profit has a big relationship with these two factors. The first is the sum of profits. The second is the income tax expense. The income tax rate of a corporation has certain regulations. If the income tax rate is high, the net profit will decrease. As the main indicator of corporation performance evaluation index system, corporate net profit has been questioned by theoretical circles and practical workers.

The author believes that the scientific fairness and feasibility of this indicator is debatable. Because the income, expenses and profits confirmed according to the current corporation accounting standards are virtual, it will cause the corporate net

profit compliance to be false. The net profit confirmed according to the current corporation accounting standards is not the embodiment of the corporation value, nor does it reflect the true operating performance of the corporation. (Qi, 2017)

2.4.2 ROAE

ROAE is the percentage of net profit and the average shareholders' equity. It is the corporate profit after tax divided by the percentage of net assets. The indicator reflects the level of income in shareholders' equity, a measure of efficiency for the corporation to use its own capital. The higher the index value, the higher the return on investment. This indicator reflects the ability of its own capital to obtain net income.

$$\text{ROAE} = \frac{\text{Net income}}{(\text{Average Shareholders}' \text{ Equity}) / 2}$$

(source: Gimede Gigante, PhD, 2013)

2.5 Previous study

Table 2.1 Previous studies

No.	Title	Author(s)	Year	Result
1	The best match between sales cost and sales volume	Shi Yang shu	2014	The research conclusions show that the increase in sales cost usually leads to an increase in sales revenue. The increase in sales cost indicates that the company is investing more and more in various projects in order to create better company performance.
2	The Relationship between Innovation Search Embeddedness of Customers and Suppliers, R&D Investment and Firm Performance.	Shi Huibin, Yang Dong, & Zhao Jie	2018	The research conclusions show that China's high-tech industry R&D investment will promote the improvement of corporate performance, and the search strategy (embeddedness) for specific search channels will have an impact on the performance results of R&D investment.

3	Empirical research on the relationship between corporate R&D investment and corporate performance--based on data dug of listed companies in Shanghai and Shenzhen.	Zhou Yan, & Zeng Jing,	2011	R&D investment has a certain positive correlation with the performance of Chinese enterprises. For every 1% increase in R&D investment intensity, the profit rate of main business increased by 0.9% in the same year, and the profit rate of main business increased by 1.4% in the following year; 1%, the profit rate of the main business increased by 0.28% in the same year, and the profit rate of the main business in the third year increased by 0.22%.

(Source: These data and table compiled by researcher, 2018)

2.6 Research Gap

It can be seen from the previous study that the impact of the Sino-US trade war on China's IC industry is from a realistic point of view. Because China and the United States have too much gap in core technology, and the United States blocks important production and research information, Therefore, the United States dominates, which limits the development of China and other countries, and causes the income of China's integrated circuits to not rise rapidly. These are all from an objective point of view. This article focuses on the factors that can affect net profit and ROAE, thereby affects the corporate profitability. Because the corporate profitability changes reflect the extent to which the industry is affected, this is a starting point worth studying.

According to the current condition that Sino-US trade war more and more serious, which is a disaster, this is the largest trade war in economic history so far. The United States has made a ruling on many Chinese corporations and scientific fields, the most serious is the IC industry. So, it will have significant impact toward the profitability of IC industry

However, during 2016 -2017 the profitability is increased in most IC industry in

China. China's IC industry is developing very well, and the government is constantly giving the IC industry some good policies to help corporations develop faster.

CHAPTER III

METHODOLOGY

3.1 Research Method

The study was found to explain or correct facts, methods and systems of positive events, actions and theories. Research is the application of scientific methods to find answers to questions of procedure, because the collection, analysis and interpretation of data systems and the systems approach is the emphasis on the scientific method.

Quantitative research refers to the provision of scientific research to determine the number one aspect of things. It is through the expression of problems and phenomena in number, then analysis, and interpretation of test methods to obtain meaningful and processes. Quantization is based on the measurement of digitized symbols. Quantitative Study characteristic value of the object is determined by comparing the study subject feature amount based on certain criteria, or to identify variation between the number of certain factors. Because its purpose is to answer the attribute number of things and their movement. Research is becoming more and more popular in the use of quantitative sociology. The characteristics of quantitative research is rigorous logic and reliable, its conclusions are usually very accurate. However, in specific applications, we must have a correct theoretical perspective to guide. Therefore, this study used quantitative research.

By taking the financial data of the sample corporations and using the quantitative analysis method, this study analyzes the independent variables and dependent variables, and analyzes them step by step, establishes the hypothesis and analysis, and then formulated a multiple regression model to determine the influence.

The study has 3 steps as follows:

Step 1: This study will analyze the financial factors of five Chinese listed integrated

circuit corporations.

Step 2: This study will analyze the profitability of five Chinese listed integrated circuit corporations.

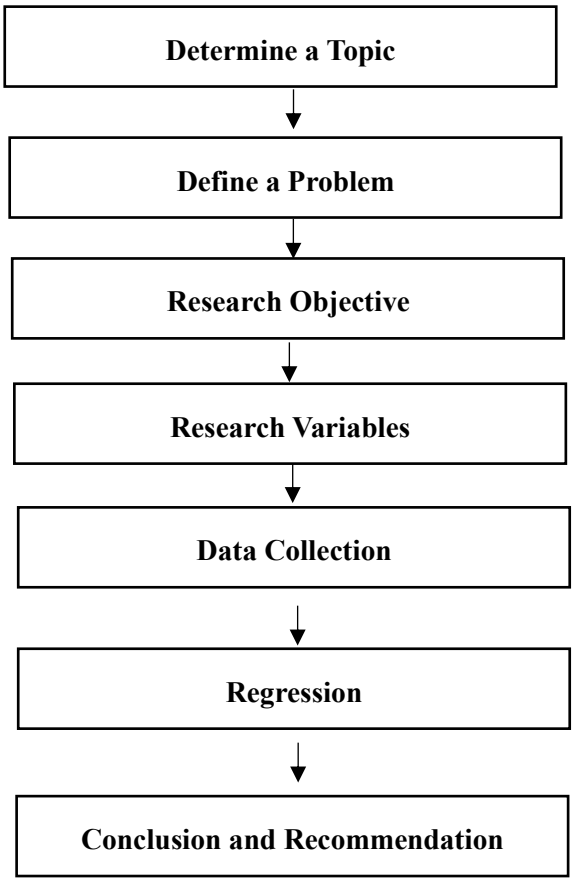
Step 3: This study will analyze the impact of the financial factors of five Chinese listed integrated circuit corporations towards on profitability.

In this study, the specific influence of each independent variable on the dependent variable will be discussed separately. The scope of this study includes six variables, four of them are independent variables, respectively, sales volume, the Percentage of Personnel in R&D, the Percentage of Top 5 Customers, the Percentage of Top 5 Suppliers. Two of them are dependent variables, respectively, net profit and ROAE.

3.2 Research Framework

The research framework of this study is shown below (Figure 3.1). After the research topic is identified, the research problem and objective will be identified. Find the appropriate independent and dependent variables from the five IC corporations and collect relevant data. Use the related collected research, books, journals, and websites to find the appropriate theoretical support, and use the research tools to analyze the data. Finally draw conclusions and provide some advice to the IC industry.

Figure 3.1 Research Framework



(Source: Compiled by researcher, 2018)

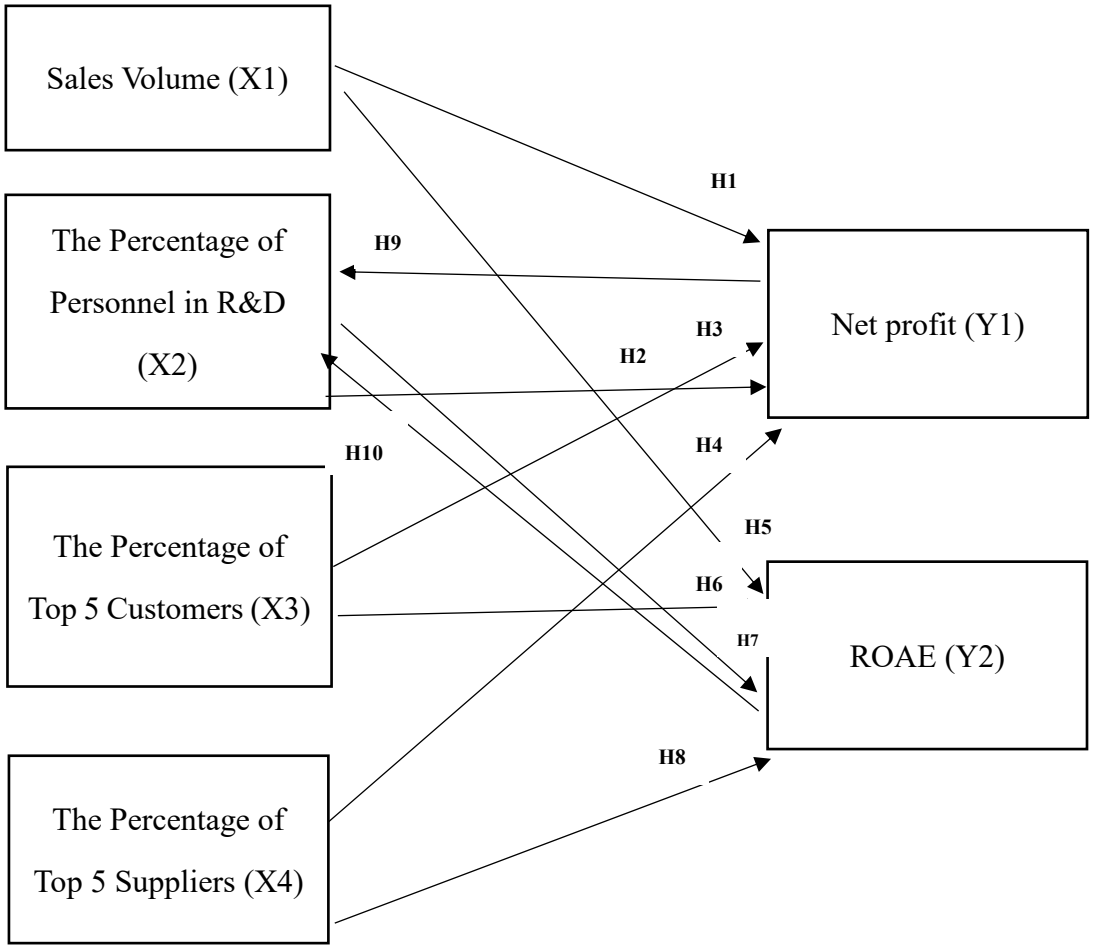
The relevant data for 2016-2017 will be found in the annual reports of the five IC corporations, which will then be analyzed and counted using research tools. Finally, get the results and give advice

3.3 Theoretical Framework

The purpose of this study is to through the use of data from five representative Chinese integrated circuit corporations between 2016 and 2017, exploring what factors can influence the corporate profitability in the context of trade wars, and further discover where the corporate problems are. In order to help the corporations, develop better.

Among them. Financial factors include sales volume, the percentage of personnel in R&D, the percentage of Top 5 customers, the percentage of Top 5 suppliers. Corporate profitability includes net profit, ROAE.

Figure 3.2 Theoretical Framework



(Source: Compiled by researcher, 2018)

3.4 Hypotheses

In this study, researchers will use these independent variables and dependent variables to further discuss whether the financial factors of IC corporations affect the corporate profitability.

H_1: Sales volume has significant influence towards Net Profit

H_2: The percentage of personnel in R&D has significant influence towards Net Profit

H_3: The percentage of Top 5 customers has significant influence towards Net Profit

H_4: The percentage of Top 5 suppliers has significant influence towards Net Profit

H_5: Sales volume has significant influence towards ROAE

H_6: The percentage of personnel in R&D has significant influence towards ROAE

H_7: The percentage of Top 5 customers has significant influence towards ROAE

H_8: The percentage of Top 5 suppliers has significant influence towards ROAE

H_9: Net profit has significant influence towards the percentage of personnel in R&D

H_{10}: ROAE has significant influence towards the percentage of personnel in R&D

3.5 Operational Definitions

Table 3.1 Operational Definition

Variables	Definition	Formula
Sales volume	Sales volume refers to the number of products that the corporation actually promotes during a certain period of time. It includes the number of products sold by contract or other means of delivery, as well as the number of pre-deliveries that have not yet been delivered to the contract delivery date.	$\frac{\text{product sales}}{\text{sales unit price}}$ (Shi, 2014)
The Percentage of Personnel in R&D	Refers to the number of people involved in the creative activities of the system in the field of science and technology to increase the amount of knowledge and to use this knowledge to create new applications.	$\left(\frac{\text{Total employees}}{\text{Employees involved in R\&D}}\right) \times 100\%$ (Zeng, 2011)
The Percentage of Top 5 Customers	Top5 customers refer to key customers (KA) who have a high frequency of consumption of products (or services), high consumption, and high customer profit margins, which can affect the business performance of the corporation, and other customer groups can be classified. Small and medium customer categories.	$\left(\frac{\text{Revenue from Top 5 customers}}{\text{Total revenue}}\right) \times 100\%$ (Feng, 2015)

The Percentage of Top 5 Suppliers	Top 5 suppliers are the five corporations that provide the most production materials and energy etc., good supply relationships can maintain the corporate financial and business stability.	$\left(\frac{\text{Cost from Top 5 suppliers}}{\text{Total cost}}\right) \times 100\%$ (Walker, 2011)
Net Profit	Net profit refers to the amount of the corporate current profit after subtracting the income tax, that is, the after-tax profit of the enterprise. Income tax refers to the total amount of profits that the enterprise will realize to the state in accordance with the standards stipulated by the Income Tax Law. It is a deduction for total corporate profits.	Total profit - income tax expense (Chen, 2014)
ROAE	Return on average equity (ROAE) is a financial ratio that measures the performance of a corporation based on its average shareholders' equity outstanding. Typically, ROAE refers to a corporate performance over a fiscal year	$\frac{\text{Net income}}{(\text{Average Shareholders}' \text{ Equity})\ /2}$ (Gimede Gigante, PhD, 2013)

(source: These data and table compiled by researcher, 2018)

3.6 Research Instrument

Quantitative research is usually to obtain statistics on specific subjects of general carried out. Quantitative research refers to the prescribing scientific research that determines the quantity of a certain aspect of a thing. It is a method and process of obtaining meaning by expressing the problem and phenomenon in quantity, and then analyzing, testing, and interpreting. Thus, quantitative research is adopted for this study.

The application premise of the fixed effect model is to assume that the direction of all the research results is basically the same as the effect size, that is, the results of the independent studies tend to be consistent, and the consistency test is not significant. Therefore, the fixed effect model is applicable to studies with no differences or small

differences between independent studies. The fixed effect model means that the experimental results only want to compare the differences between specific categories or categories of each self-variant and its interaction with specific categories or categories of other independent variables, and do not want to infer the same self. Experimental design of other categories or categories not included in the variable

The random effects model is a generalization of the classical linear model, which means that the fixed regression coefficients are regarded as random variables, and the hypothesis is generally derived from a normal distribution. If some of the coefficients in the model are random and others are fixed, they are generally called hybrid models.

The basic principle behind the random effects model is different from the fixed effects model, changes in cross-entity is considered to be random, unrelated to the predictor or independent variables included in the model. If researchers have reason to believe that the differences between entities have a certain effect on dependent variables, then they should generate a random effect.

The variables in this article are all from the corporate annual report, including sales volume， the percentage of personnel in R&D, the percentage of Top 5 customers and the suppliers.

3.7 Sampling

Some of the individuals actually observed or investigated in the study are called samples, and the whole of the subjects are called the population. In order for the sample to correctly reflect the overall situation, there must be clear regulations on the whole; all observation units in the population must be homogeneous; in the process of sampling, the randomization principle must be followed; the observation unit of the sample must have sufficient Quantity. A portion of individuals removed from the

population according to certain sampling rules. The number of individuals in the sample is called the "sample size.

1. The five Chinese integrated circuit corporations are listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange.
2. The five corporations covering a wide range of business, involving both domestic and foreign operations, large-scale corporations
3. The annual reports of these five corporations are very detailed and the data is very comprehensive.

According to the all of standard above, all data are from the annual report.

3.8 Regression Models

This study will discuss the influence of four financial factors (sales volume, the percentage of personnel in R&D, the percentage of Top 5 customers, the percentage of Top 5 suppliers) towards on two corporate profitability (net profit, ROAE). These date will be modeled and analyzed by researcher

$$Y_1=-7.72e^{+08}+.0592903 \cdot X_1^{*}+8.12e^{+09} \cdot X_2^{*}-2.16e^{+09} \cdot X_3^{*}-4.92e^{+09} \cdot X_4^{*}+\varepsilon$$

Legend:

R^2 overall=99.14%

Data behavior is Random-effects GLS regression

Legend:

*significant with 95% confident level

Y_1= Net Profit

X_1= Sales Volume

X_2= The Percentage of Personnel in R&D

X_3= The Percentage of Top 5 Customers

X_4= The Percentage of Top 5 Suppliers

ε = error

$$Y_2=-.0216849+9.98e^{-13} \cdot X_1+.1427281 \cdot X_2+.0965428 \cdot X_3^{*}-.0717665 \cdot X_4+e$$

Legend:

R^2 overall=86.20%

Data behavior = Random effect

*significant with 95% confident level

Y_2= ROAE

X_1= Sales Volume

X_2= The Percentage of Personnel in R&D

X_3= The Percentage of Top 5 Customers

X_4= The Percentage of Top 5 Suppliers

ε = error

CHAPTER IV

ANALYSIS AND RESULTS

4.1 Corporate Profile

Tianshui Huatian Technology Co., Ltd

Tianshui Huatian Technology Co., Ltd. was established on December 25, 2003 and listed on the Shenzhen Stock Exchange on November 20, 2007. Stock abbreviation: Huatian Technology; stock code: 002185. Currently (Dec.31 2017), the corporate total share capital is 2,131,112,900 shares, with a registered capital of 2,131,112,900 yuan. The total assets are 9,366,444,197.41 yuan. The corporate ROAE is 4.03%, Net profit margin is 4.73%

The corporation is mainly engaged in semiconductor integrated circuit packaging and testing business. Products are mainly used in computer, network communication, consumer electronics and intelligent mobile terminals, Internet of Things, industrial automation control, automotive electronics and other electronic machines and intelligent areas. The annual package size and sales revenue of the corporate integrated circuits ranks second among listed corporations in the same industry in China.

The corporation has a stable customer base and a strong sales network, and has won extensive trust from customers and established long-term good cooperative relations. In recent years, while the corporation has steadily expanded its domestic market, it has effectively expanded the international market by adopting measures such as increasing international market development and overseas mergers and acquisitions. It has formed a global sales structure and provided a strong market for the corporate

development. Guaranteed, reduced market risk.

Shanghai Belling Co., Ltd.

In September 1988, Shanghai Belling Co., Ltd. was established, which was a landmark corporation that successfully attracted foreign investment and introduced advanced foreign technology in the early stage of national reform and opening up. In September 1998, the corporation was successfully listed on the Shanghai Stock Exchange (SH600171), becoming the first listed corporation in the China's integrated circuit industry. The corporate total assets are 2,747,915,332.57 yuan, ROAE is 7.21%, and Net profit margin is 31.15%.

After years of development, Shanghai Belling has become a key integrated circuit design corporation within the country's planning layout, with a state-level corporation technology center. The corporate current integrated circuit products business covers measurement and SoC, power management, general analog, non-volatile memory, high-speed high-precision ADC five product areas, providing customers with analog and digital-analog hybrid integrated circuit and system solutions.

Adhering to the mission of “Creating a better life with the chip”, the corporation will continue to increase investment in research and development, focusing on the development of industrial control and automotive electronic core chips, providing high-performance, high-reliability integrated circuits and power devices to provide customers with system solutions. Become a first-class independent and controllable core chip supplier in China, and work together with partners to achieve a better future.

Hangzhou Silan Microelectronics Co., Ltd

Hangzhou Silan Electronics Co., Ltd. was established in September 1997, and in March 2003, this corporation listed 26 million shares at the Shanghai Stock Exchange. The corporate total assets are 6,254,406,544.04 yuan, ROAE is 1.81%, and Net profit margin is 3.75%.

Silan Microelectronics is principally engaged in the design, manufacture and sale of integrated circuits and semiconductor microelectronics related products. It is an IDM corporation with design and manufacturing capabilities. The corporate main products include integrated circuits, semiconductor discrete devices, LED products in three categories, widely used in computers, communications, and other electronic equipment manufacturing industries. With the support of the National Integrated Circuit Industry Fund and local governments, the corporation has strategically established a development plan for the 8-inch chip project to fully promote the development of special process development and manufacturing platforms.

Silan Microelectronics adheres to the philosophy of "integrity, patience, exploration and enthusiasm" and strives to create a corporate culture featuring technology and management innovation. At the same time, Silan Microelectronics seeks to balance the interests of employees, shareholders and partners, and coordinate the recent interests and long-term interests to achieve sustainable development.

Changsha Jingjia Microelectronics Co., Ltd

Changsha Jingjia Microelectronics

Co., Ltd. was established in April 2006. The corporation is committed to providing high-reliability, high-quality solutions, products and ancillary services to customers in the areas of information detection, information processing and information delivery. At present, it is China's only corporation that successfully develops and manufactures domestically produced graphics processing unit (GPU) and industrializes them. In March 2016, Jingjiawei was listed on the Shenzhen Stock Exchange with stock code: 300474. The corporate total assets are 1,160,325,367.05 yuan, ROAE is 11.28%, and Net profit margin is 38.80%.

As a high-tech corporation with deep development of military and civilian integration, Jingjiawei has complete scientific research and production qualification and quality system certification. It has nearly 500 outstanding employees, establishes strategic partnerships with many research institutes and universities, and establishes a joint laboratory. Engineering Center. The corporate products cover graphic image processing systems, small radar systems, image transmission data link systems, consumer chips and other directions, and are widely used in aviation, aerospace, marine, automotive and other professional fields with high reliability requirements. Over the years, with the increasing innovation ability and mature and flexible customization ability, Jing Jiawei has cooperated closely with users, research institutes and manufacturers to practice the concept of creating value for customers, strive to improve product quality, shorten delivery time and win Customer trust and praise.

Unisplendour Co., Ltd

Unisplendour Co., Ltd. is a Chinese high-tech A-share listed corporation (stock code: 000938), which is mainly engaged in the information electronics industry. It was established in 1999 by Qinghua Unisplendour

(Corporation) controlling Corporation. The corporate total assets are 42,575,690,855.09 yuan, ROAE is 6.60%, and Net profit margin is 6.73%.

Combining the development trend of the global information industry and the characteristics of its own advantageous business, Unisplendour Corporation focuses its strategy on IT services. The industry application fields of information technology such as the Internet and big data processing are comprehensive and in-depth, and become a full-industry chain service provider which is integrating research, development, construction, operation and maintenance of modern information systems.

At present, the core business of Unisplendour Corporation shares basically covers the important areas of IT services: hardware provides intelligent network equipment, storage systems, a full range of servers and other advanced equipment for future computing architecture. Software provides application software solutions from the desktop to the mobile. Technical services cover technical consulting, infrastructure solutions and support services. Both hardware and software products and services are effectively integrated in the leading top-level design of Unisplendour Corporation, which enables the information system to display an optimized and integrated operation. Unisplendour Corporation has the ability to provide complete and leading IT services for the information needs of any large customer.

4.2 Descriptive Analysis

Descriptive analysis is designed to analyze all the variables and descriptive involved in this study. The large amount of data obtained from the research is initially sorted and summarized to find out the inherent laws of these data.

4.2.1 Corporate Profitability Analysis

For net profit:

Net profit refers to the amount of the corporate current profit after subtracting the income tax, that is, the after-tax profit of the corporation. Income tax refers to the total amount of profits that the corporations will realize to the state in accordance with the standards stipulated by the Income Tax Law. It is a deduction for total corporate profits. The income tax rate of corporations is statutory. The higher the income tax rate, the less net profit. There are two kinds of income tax rates in China. One is the income tax rate of 25% for general corporations, that is, 25% of the total profits should be paid to the state finances; the other is the preferential tax rate for foreign-funded corporations and some high-tech corporations. The rate is 15%. When the operating conditions of the corporation are equal, the operating efficiency of the corporation with a lower income tax rate is better.

Table 4.1 Net Profit

Corporation	2017		2016	
	Net profit	Rank	Net profit	Rank
1	331,363,688	2	296,864,222	2
2	175,050,822	3	40,559,367	5
3	102,813,026	5	91,643,102	4
4	118,829,353	4	113,329,191	3
5	2,630,870,387	1	1,193,527,377	1

（source: Annual Report, 2016 and 2017）

Legend:

1. Tianshui Huatian Technology Co., Ltd.
2. Shanghai Belling Co., Ltd.
3. Hangzhou Silan Microelectronics Co., Ltd
4. Changsha Jingjia Microelectronics Co., Ltd
5. Unisplendour Co., Ltd

This study shows that the Net Profit of five corporations in 2016 and 2017. It shows that Unisplendour's is highest in these two years, and increased a lot, 2,630,870,387 and 1,193,527,377 respectively. For the rest of four corporations, their Net Profit all increased from 2016 to 2017, especially Shanghai Belling had increase a lot.

To conclude, this study finds that all corporate net profits are positive from Table 4.1, which means that all of corporations have profitability. On the other hand, this study discovers that Shanghai Belling's net profit had increased to more than fourfold (from 40,559,367 to 175,050,822 Yuan) and Unisplendour's net profit had increased a lot as well, which means they have an excellent profitability. However, for the rest of three corporations have lower profitability, and the net profits are higher than last year.

For net cash flow:

Net cash flow is an indicator in the cash flow statement, which refers to the inflow (income) of cash and cash equivalents minus the balance of outflows (expenses) during a certain period of time, reflecting the net increased or decreased cash and cash equivalents of the corporation during the period. Net cash flow calculation is the basis of present value calculation and is very important in project investment decision. The calculation of net cash flow during the operation period is based on the realization of the payment system. It is necessary to consider not only the income and cost, but also the cost of cash and the cost of non-cash. In the case of considering the income tax factor, the calculation of net cash flow becomes more complicated

Table 4.2 Net Cash Flow

Corporation	From operating activities		From financing activities		From investing activities	
	2016	2017	2016	2017	2016	2017
1	862,521,251	903,535,928	(419,568,162)	561,918,086	(1,439,893,456)	(1,693,857,070)
2	59,757,736	18,674,684	(9,955,011)	(15,076,710)	45,555,313	(22,693,012)
3	381,758,829	352,397,125	606,592,179	543,816,707	(944,083,910)	(729,008,114)
4	46,906,602	21,418,047	282,095,996	58,460,621	(44,679,919)	(119,437,257)
5	1,308,281,891	297,457,043	19,207,028,176	1,776,267,640	(17,325,343,012)	(2,004,950,334)

（Source: Annual Report, 2016 and 2017）

Legend:

1. Tianshui Huatian Technology Co., Ltd.
2. Shanghai Belling Co., Ltd.
3. Hangzhou Silan Microelectronics Co., Ltd

4. Changsha Jingjia Microelectronics Co., Ltd
5. Unisplendour Co., Ltd

we can infer that the corporation develops with a rapid speed, if the net cash flow (NCF) from operating activities is positive, financing activities is positive and investing activities is negative. we can infer that corporation enters a stable period, if the NCF from the operating activities is positive, financing activities is negative and investing activities is positive,

To conclude, If the corporation is in this stage of rapid development, it means that the corporate products have a large market share in the market, and the sales volume has increased significantly. If the corporation wants to continue to increase sales, it still needs a lot of investment. If the corporation enters a stable sales period, it means that the corporate market share has been relatively stable. With stable customers, the sales volume will not change much, and the investment cost can be recovered slowly.

4.2.2 Top 5 Customers Analysis

This industry has a stable customer base and a strong sales network, and has won extensive trust from customers and established long-term good cooperative relations. At the same time, while optimizing and adjusting the customer structure, the industry aims at key customers and gives full play to the joint efforts of sales and research team members to effectively improve market development capabilities.

Table 4.3 Top 5 Customers Analysis

Corporation	2017	2016	Average	Rank
1	0.2964	0.3270	0.3117	3
2	0.3527	0.3402	0.3465	2
3	0.1673	0.1747	0.1710	5
4	0.9767	0.9930	0.9849	1
5	0.2434	0.1925	0.2180	4

（Source: Annual Report, 2016 and 2017）

Legend:
1. Tianshui Huatian Technology Co., Ltd.
2. Shanghai Belling Co., Ltd.
3. Hangzhou Silan Microelectronics Co., Ltd
4. Changsha Jingjia Microelectronics Co., Ltd
5. Unisplendour Co., Ltd

This study finds that Changsha Jingjia Microelectronics Co., Ltd 's Top 5 customers average ranking is highest (0.9849) from the Table 4.3, The average share of the remaining four corporations (0.3117,0.3465, 0.1710, 0.2180 respectively) are far lower than the Changsha Jingjia Microelectronics Co., Ltd

To conclude, the proportion of the top five customers can roughly determine the corporate dependence on customers. If the proportion is small, the customer is more dispersed and the risk is smaller. If the proportion is high (>70%), it means that the customer is still concentrated, which helps to reduce management costs. However, it also proves that the corporation has a dependence on these large customers, and its business performance will be affected by customers.

4.2.3 Top 5 Suppliers Analysis

The supplier directly supplies the relevant materials to the corporation, and the quality of the materials provided is directly related to the quality of the products in the whole corporation production process. Therefore, the supplier is a very important factor for the corporation. The importance of important suppliers is reflected in several aspects. Firstly, it can effectively reduce the production cost of corporations, achieve reasonable management of suppliers, and establish long-term cooperation with suppliers, on the one hand, reduce the manpower and material resources consumed in the process of constantly searching for suppliers. So that can effectively save business costs.

Table 4.4 Top 5 Suppliers Analysis

Corporation	2017	2016	Average	Rank
1	0.2324	0.2917	0.2621	4
2	0.5283	0.5578	0.5431	1
3	0.2362	0.2257	0.2301	5
4	0.3686	0.3319	0.3503	3
5	0.4553	0.4990	0.47715	2

（Source: Annual Report, 2016 and 2017）

Legend:

1. Tianshui Huatian Technology Co., Ltd.
2. Shanghai Belling Co., Ltd.
3. Hangzhou Silan Microelectronics Co., Ltd
4. Changsha Jingjia Microelectronics Co., Ltd
5. Unisplendour Co., Ltd

This study shows that Shanghai Belling's the average percentage of Top 5 suppliers is highest, which is 0.5431. Unisplendour's average percentage of Top 5 suppliers is near Shanghai Belling, which is 0.47715. For the rest of three corporations, their percentage is obviously lower than Shanghai Belling and Unisplendour, which are 0.2621, 0.2301, 0.3503 respectively.

To conclude, the proportion of the top five suppliers can roughly judge the corporate dependence on suppliers. If the proportion is small, the risk is less if the client and supplier are more diversified. If the proportion is high, proving that the corporation is dependent on a small number of suppliers, the operating performance will be affected by the supplier.

4.3 Multiple Regression Equation

Multiple regression analysis refers to treating a variable as a dependent variable in a related variable, and one or more other variables as independent variables, establishing a linear or nonlinear mathematical model quantity relationship between multiple variables and using sample data for analysis. Statistical analysis method.

There is also a multiple regression analysis that discusses the linear dependence of multiple independent variables and multiple dependent variables, called the multiple regression analysis model.

The basic principle behind the random effects model is different from the fixed effects model, changes in cross-entity is considered to be random, unrelated to the predictor or independent variables included in the model. If researchers have reason to believe that the differences between entities have a certain effect on dependent variables, then they should generate a random effect.

The overall R-square in the Random Effects Model get 0.9914, showed that the model's fitting degree high to 99.14%, which means the model is relatively good.

The question of this study is what corporate financial factors can affect corporate profitability.
This study has 8 hypotheses

For H1-H4：

$$Y_1=-7.72e^{+08}+.0592903 \cdot X_1^{*}+8.12e^{+09} \cdot X_2^{*}-2.16e^{+09} \cdot X_3^{*}-4.92e^{+09} \cdot X_4^{*}+\varepsilon$$

Legend:

R^2 overall=99.14%

Data behavior is Random-effects GLS regression

Legend:

*significant with 95% confident level

Y_1= Net Profit

X_1= Sales Volume

X_2= The Percentage of Personnel in R&D

X_3= The Percentage of Top 5 Customers

X_4= The Percentage of Top 5 Suppliers

ε = error

Table 4.5 Results of Multiple Regression

Y_1	Coef.	Z	P> | z |
X_1	.0592903	21.42	0.000
X_2	8.12e+09	15.45	0.000
X_3	-2.16e+09	-12.01	0.000
X_4	-4.92e+09	-9.54	0.000
_cons	-7.72e+08	-6.32	0.000
Number of obs	10		
Wald chi2 (4)	573.40		
Prob > chi2	0.0000		
R-square	0.9914		

(Source: Researcher Compiled from Annual Reports - Analyzed by STATA M-64)

H1: Sales Volume has significant influence towards Net Profit

The result: H1 accepted, this equation shows that the Sales Volume has positive and significant influence towards Net Profit.

The meaning: If Sales volume increases 1, the Net Profit will be increasing .0592903.

Regression coefficient of X_1 as the Sales Volume = .0592903; the result of multiple regressions provide that Sales volume has an influence of .0592903 toward Net Profit. It means that every Sales volume increasing 1 and the Net Profit will increase by .0592903.

H2. The Percentage of Personnel in R&D has significant influence towards Net Profit

The result: H2 accepted, this equation shows that the Percentage of Personnel in R&D has positive and significant influence towards Net Profit.

The meaning: If the Percentage of Personnel in R&D increases 1, the Net Profit will be increasing $8.12e^{+09}$.

Regression coefficient of X_2 as the Percentage of Personnel in R&D = 8.12e+09; the result of multiple regressions provide that Percentage of Personnel in R&D has an influence of 8.12e+09 toward Net Profit. It means that every Percentage of Personnel in R&D increasing 1 and the Net Profit will increase by 8.12e+09.

H3. The Percentage of Top 5 Customers has significant influence towards Net Profit

The result: H3 accepted, this equation shows that the Percentage of Top 5 Customers has negative and significant influence towards Net Profit.

The meaning: If the Percentage of Top 5 Customers increases 1, the Net Profit will be decreasing $2.16e^{+09}$.

Regression coefficient of X_3 as the Percentage of Top 5 Customers =-2.16e+09; the result of multiple regressions provide that the Percentage of Top 5 Customers has an influence of -2.16e+09 toward Net Profit. It means that every Percentage of Top 5 Customers increasing 1 and the Net Profit will decrease by 2.16e+09.

H4. The Percentage of Top 5 Suppliers has significant influence towards Net Profit

The result: H4 accepted, this equation shows that the Percentage of Top 5 Suppliers has negative and significant influence towards Net Profit.

The meaning: If the Percentage of Top 5 Suppliers increases 1, the Net Profit will be decreasing $4.92e^{+09}$.

Regression coefficient of X_4 as the Percentage of Top 5 Suppliers =-4.92e+09; the result of multiple regressions provide that the Percentage of Top 5 Suppliers has an influence of $-4.92e^{+09}$ toward Net Profit. It means that every Percentage of Top 5 Suppliers increasing 1 and the Net Profit will decrease by 4.92e+09.

For H5-H8:

$$Y_2=-.0216849+9.98e^{-13}\cdot X_1+.1427281\cdot X_2+.0965428\cdot X_3^{*}-.0717665\cdot X_4+\varepsilon$$

Legend:

R^2 overall=86.20%

Data behavior = Random effect

*significant with 95% confident level

Y_2= ROAE

X_1= Sales Volume

X_2= The Percentage of Personnel in R&D

X_3= The Percentage of Top 5 Customers

X_4= The Percentage of Top 5 Suppliers

ε = error

Table 4.6 Results of Multiple Regression

Y_2	Coef.	Z	P> | z |
X_1	9.98e-13	1.69	0.092
X_2	.1427281	1.27	0.204
X_3	.0965428	2.51	0.012
X_4	-0.717665	-0.65	0.515
_cons	-.0216849	-0.83	0.405
Number of obs	10		
Wald chi2 (4)	573.40		
Prob > chi2	0.0000		
R-square	0.8620		

(Source: Researcher Compiled from Annual Reports - Analyzed by STATA M-64)

H5: Sales Volume has significant influence towards ROAE.

The result: H5 rejected, this equation shows that the Sales Volume has positive and no significant influence towards ROAE.

The meaning: If Sales volume increases 1, the ROAE will be increasing $9.98e^{-13}$.

Regression coefficient of X_1 as the Sales Volume = 9.98e-13; the result of multiple regressions provide that Sales volume has an influence of 9.98e-13 toward ROAE. It means that every Sales volume increasing 1 and the ROAE will increase by 9.98e-13.

H6. The Percentage of Personnel in R&D has significant influence towards ROAE.

The result: H6 rejected, this equation shows that the Percentage of Personnel in R&D has positive and no significant influence towards ROAE.

The meaning: If the Percentage of Personnel in R&D increases 1, the ROAE will be increasing .1427281.

Regression coefficient of X_2 as the Percentage of Personnel in R&D = .1427281; the result of multiple regressions provide that Percentage of Personnel in R&D has an influence of .1427281 toward ROAE. It means that every Percentage of Personnel in R&D increasing 1 and the ROAE will increase by.1427281.

H7. The Percentage of Top 5 Customers has significant influence towards ROAE.

The result: H7 accepted, this equation shows that the Percentage of Top 5 Customers has positive and significant influence towards ROAE.

The meaning: If the Percentage of Top 5 Customers increases 1, the ROAE will be increasing .0965428.

Regression coefficient of X_3 as the Percentage of Top 5 Customers =.0965428; the result of multiple regressions provide that the Percentage of Top 5 Customers has an influence of .0965428 toward ROAE. It means that every Percentage of Top 5 Customers increasing 1 and the ROAE will increase by .0965428.

H8. The Percentage of Top 5 Suppliers has significant influence towards ROAE.

The result: H8 rejected, this equation shows that the Percentage of Top 5 Suppliers has negative and no significant influence towards ROAE.

The meaning: If the Percentage of Top 5 Suppliers increases 1, the ROAE will be decreasing .0717665.

Regression coefficient of X_4 as the Percentage of Top 5 Suppliers =-.0717665; the result of multiple regressions provide that the Percentage of Top 5 Suppliers has an influence of -.0717665 toward ROAE. It means that every Percentage of Top 5 Suppliers increasing 1 and the ROAE will decrease by .0717665.

4.4 Conclusion

The purpose of this study is to explore the influence of the financial factor toward on China's integrated circuit industry.

In order to answer the main question, this study develops 8 hypotheses with detail as follows:

H1: Sales Volume has significant influence towards Net Profit

The result: H1 accepted, this equation shows that the Sales Volume has positive and significant influence towards Net Profit.

H2. The Percentage of Personnel in R&D has significant influence towards Net Profit

The result: H2 accepted, this equation shows that the Percentage of Personnel in R&D has positive and significant influence towards Net Profit.

H3. The Percentage of Top 5 Customers has significant influence towards Net Profit

The result: H3 accepted, this equation shows that the Percentage of Top 5 Customers has negative and significant influence towards Net Profit.

H4. The Percentage of Top 5 Suppliers has significant influence towards Net Profit

The result: H4 accepted, this equation shows that the Percentage of Top 5 Suppliers has negative and significant influence towards Net Profit.

H5: Sales Volume has significant influence towards ROAE.

The result: H5 rejected, this equation shows that the Sales Volume has positive and no significant influence towards ROAE.

H6. The Percentage of Personnel in R&D has significant influence towards ROAE.

The result: H6 rejected, this equation shows that the Percentage of Personnel in R&D has positive and no significant influence towards ROAE.

H7. The Percentage of Top 5 Customers has significant influence towards ROAE.
The result: H7 accepted, this equation shows that the Percentage of Top 5 Customers has positive and significant influence towards ROAE.

H8. The Percentage of Top 5 Suppliers has significant influence towards ROAE.
The result: H8 rejected, this equation shows that the Percentage of Top 5 Suppliers has negative and no significant influence towards ROAE.

Therefore, this study would like to conclude that only the percentage of top 5 customers can affect corporate profitability completely (both of net profit and ROAE), for other three factors can affect corporate profitability, either, but the degree of influence less than the percentage of top 5 customers

4.5 Extended Research Model

However, this study would like to extend two analyses further, about the influence of corporate profitability towards R&D since R&D is crucial for IC industry. Therefore, this study employs another 2 hypotheses, which are:

$$X_2 = .3640532 + 5.52e^{-11} \cdot Y_1^{*} + \varepsilon$$

Legend:

R^2 overall=00.67%

Data behavior = Random effect

*significant with 95% confident level

Y_1= Net profit

X_2= The Percentage of Personnel in R&D

ε = error

Table 4.7 Results of Multiple Regression

X_2	Coef.	Z	P> | z |
Y_1	5.52e-11	4.61	0.000
_cons	.3640532	4.17	0.000
Number of obs	10		
Wald chi2 (1)	3.01		
Prob > chi2	0.0826		
R-square	0.0067		

(Source: Researcher Compiled from Annual Reports - Analyzed by STATA M-64)

H9: Net Profit has significant towards the Percentage of Personnel in R&D.

The result: H9 accepted, this equation shows that Net Profit has positive and significant influence towards the Percentage of Personnel in R&D.

The meaning: If the Net Profit increases 1, the Percentage of Personnel in R&D will be increasing 5.52e-11.

Regression coefficient of Y_1 as the Net Profit = 5.52e-11; the multiple regressions provide the result that Net Profit has an influence of 5.52e-11 toward the Percentage of Personnel in R&D. It means that every 1 value increase of Net Profit and the other variables are remained constant then the Percentage of Personnel in R&D will increase by 5.52e-11.

$$X_2 = .3701604 + .3649695 \cdot Y_2 + \varepsilon$$

Legend:

R^2 overall=41.17%

Data behavior = Random effect

*significant with 95% confident level

Y_2= ROAE

X_2= The Percentage of Personnel in R&D

ε = error

Table 4.8 Results of Multiple Regression

X_2	Coef.	Z	P> | z |
Y_2	.3649695	0.54	0.592
_cons	.3701604	4.45	0.000
Number of obs	10		
Wald chi2 (1)	0.29		
Prob > chi2	0.5920		
R-square	0.4117		

(Source: Researcher Compiled from Annual Reports - Analyzed by STATA M-64)

H10: ROAE has significant towards the Percentage of Personnel in R&D.

The result: H10 rejected, this equation shows that ROAE has positive and no significant influence towards the Percentage of Personnel in R&D.

The meaning: If the ROAE increases 1, the Percentage of Personnel in R&D will be increasing .3649695.

Regression coefficient of Y_2 as the ROAE = .3649695; the multiple regressions provide the result that ROAE has an influence of .3649695 toward the Percentage of Personnel in R&D. It means that every 1 value increase of ROAE and the other variables are remained constant then the Percentage of Personnel in R&D will increase by .3649695.

4.6 Conclusion for Extended Research Model

H9: Net Profit has significant towards the Percentage of Personnel in R&D.

The result: H9 accepted, this equation shows that Net Profit has positive and

significant influence towards the Percentage of Personnel in R&D.
The meaning: If the Net Profit increases 1, the Percentage of Personnel in R&D will be increasing 5.52e-11.

H10: ROAE has significant towards the Percentage of Personnel in R&D.
The result: H10 rejected, this equation shows that ROAE has positive and no significant influence towards the Percentage of Personnel in R&D.
The meaning: If the ROAE increases 1, the Percentage of Personnel in R&D will be increasing .3649695.

Therefore, this study found that net profit and ROAE can affect the percentage the personnel in R&D, but the degree of influence of net profit is higher than ROAE.

CHAPTER IV

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study analyzed the influence of four financial factors toward corporate profitability in five China IC corporations.

The financial factors are four independent variables in IC industry, which are, sales volume, the percentage of personnel in R&D, the percentage of top 5 customers, the percentage of top 5 suppliers.

As the opposite, the corporate profitability are two dependent variables in IC industry, which are, net profit, ROAE

By using the above explained variables, the researcher establishes a multiple regression model. Through the analysis of the output of the model, the following conclusions are reached:

a. The sales volume has significant influence toward net profit, it means sales volume can affect net profit effectively, so it can affect corporate profitability, either.

b. The percentage of personnel in R&D has significant influence toward net profit, it means sales volume can affect net profit effectively, so it can affect corporate profitability, either.

c. The percentage of top 5 customers has significant influence toward net profit, it means sales volume can affect net profit effectively, so it can affect corporate profitability, either.

d. The percentage of top 5 suppliers has significant influence toward net profit, it means sales volume can affect net profit effectively, so it can affect corporate profitability, either.

e. The sales volume has no significant influence toward ROAE, it means sales volume cannot affect ROAE effectively, so it cannot affect corporate profitability, either.

f. The percentage of personnel in R&D has no significant influence toward ROAE, it means sales volume cannot affect ROAE effectively, so it cannot affect corporate profitability, either.

g. The percentage of top 5 customers has significant influence toward ROAE, it means sales volume can affect ROAE effectively, so it can affect corporate profitability, either.

h. The percentage of top 5 suppliers has no significant influence toward ROAE, it means sales volume cannot affect ROAE effectively, so it cannot affect corporate profitability, either.

i. The net profit has significant influence toward the percentage of personnel in R&D, it means net profit can affect he percentage of personnel in R&D effectively.

j. The ROAE has no significant influence toward the percentage of personnel in R&D, it means sales volume cannot affect the percentage of personnel in R&D effectively.

In addition, this study shows that the percentage of personnel in R&D has the greatest

influence on the corporate profitability. Through this finding, this study confirms that in China IC industry, the percentage of personnel in R&D plays important role to generate its profitability, therefore, this study encourages the future researcher to emphasis on the human capital characteristics that will be needed to sustain IC corporations in China in the future.

5.2 Recommendation

5.2.1 For Academic

This study is a study of which financial factors can influence the corporate profitability, which can fill the gaps in research and is of great significance. This study results shows there are significant positive influence of sales volume, the percentage of personnel in R&D, the percentage of top 5 customers, the percentage of top 5 suppliers toward net profit, but, only the percentage of top 5 customers has significant positive influence toward ROAE. So, for further study, researcher can explore the other factors that can positively affect corporate profitability.

5.2.2 For IC Industry

First, through the results of this study, the percentage of top 5 customers has significance toward corporate profitability, (both net profit and ROAE). So, IC corporate leaders can focus on the strategy of “big customers”, this can ensure corporate profitability.

For the other hand, R&D also shows a important role toward corporate profitability. Research and development is the core of a corporation, especially high-technology industries. We can learn from the Sino-US trade war that if a country wants to develop better and forever, core high-technology is very important. Therefore, corporations need to work hard to inspire all researchers to work hard for scientific

advancement, increase investment, and not opportunistic. The government also needs to give some better policies to the IC industry, such as reducing the income tax in the IC industry and giving some financial support to corporations with promising prospects.

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APPENDICES

Appendix 1: Result of Random-effects Generalized Least Squares Regression

```
. xtreg Y1 X1 X2 X3 X4, re

Random-effects GLS regression                   Number of obs     =         10
Group variable: Corporation                     Number of groups  =          5

R-sq:                                           Obs per group:
     within  = 0.9529                                         min =          2
     between = 0.9999                                         avg =        2.0
     overall = 0.9914                                         max =          2

                                                Wald chi2(4)      =     573.40
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

Y1	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
X1	.0592903	.0027676	21.42	0.000	.0538658	.0647147
X2	8.12e+09	5.26e+08	15.45	0.000	7.09e+09	9.15e+09
X3	-2.16e+09	1.80e+08	-12.01	0.000	-2.51e+09	-1.81e+09
X4	-4.92e+09	5.16e+08	-9.54	0.000	-5.93e+09	-3.91e+09
_cons	-7.72e+08	1.22e+08	-6.32	0.000	-1.01e+09	-5.32e+08
sigma_u	0					
sigma_e	62489518					
rho	0	(fraction of variance due to u_i)				

(Source: Output of STATA M-64)

Appendix 2: Result of Random-effects Generalized Least Squares Regression

```
. xtreg Y2 X1 X2 X3 X4, re

Random-effects GLS regression                   Number of obs     =         10
Group variable: Corporation                     Number of groups  =          5

R-sq:                                           Obs per group:
     within  = 0.0310                                         min =          2
     between = 0.9955                                         avg =        2.0
     overall = 0.8620                                         max =          2

                                                Wald chi2(3)      =          .
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =          .
```

Y2	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
X1	9.98e-13	5.91e-13	1.69	0.092	-1.61e-13	2.16e-12
X2	.1427281	.1123033	1.27	0.204	-.0773823	.3628385
X3	.0965428	.0384109	2.51	0.012	.0212588	.1718268
X4	-.0717665	.1102699	-0.65	0.515	-.2878915	.1443585
_cons	-.0216849	.0260679	-0.83	0.405	-.0727771	.0294072
sigma_u	0					
sigma_e	.00433377					
rho	0	(fraction of variance due to u_i)				

(Source: Output of STATA M-64)

Appendix 3: Result of Random-effects Generalized Least Squares Regression

```
. xtreg Y1 X2, re

Random-effects GLS regression                   Number of obs     =         10
Group variable: Corporation                     Number of groups  =          5

R-sq:                                           Obs per group:
     within  = 0.8267                                         min =          2
     between = 0.0015                                         avg =        2.0
     overall = 0.0067                                         max =          2

                                                Wald chi2(1)      =       3.01
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0826
```

Y1	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
X2	5.44e+09	3.14e+09	1.74	0.083	-7.02e+08	1.16e+10
_cons	-1.63e+09	1.38e+09	-1.18	0.239	-4.33e+09	1.08e+09
sigma_u	8.982e+08					
sigma_e	2.126e+08					
rho	.9469681	(fraction of variance due to u_i)				

```
. xtreg Y2 X2, re

Random-effects GLS regression                   Number of obs     =         10
Group variable: Corporation                     Number of groups  =          5

R-sq:                                           Obs per group:
     within  = 0.0002                                         min =          2
     between = 0.4784                                         avg =        2.0
     overall = 0.4117                                         max =          2

                                                Wald chi2(1)      =       2.81
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0934
```

Y2	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
X2	.1555176	.0926989	1.68	0.093	-.0261688	.3372041
_cons	-.0006325	.0394745	-0.02	0.987	-.0780011	.0767361
sigma_u	.03229516					
sigma_e	.0231708					
rho	.66016937	(fraction of variance due to u_i)				

(Source: Output of STATA M-64)